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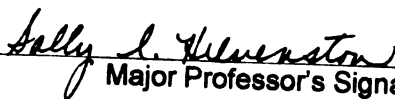
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**FASHION AND FUNCTION IN WOMEN'S DRESS
AS REVEALED IN CLOTHING PATENTS,
1846 - 1920**

By

Mihaela Cornelia Petcu

A DISSERTATION

Submitted to
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ABSTRACT

FASHION AND FUNCTION IN WOMEN'S DRESS AS REVEALED IN CLOTHING PATENTS, 1846 – 1920

By

Mihaela Cornelia Petcu

The present study brings new information regarding the fashion and function in women's dress as revealed by 864 utility patents¹ of bustles, hoops and skirts from the *Apparel – Nether Garments* class, issued between 1846 and 1920. Also, this study constitutes an example of the usefulness of patents for dress history research.

A database containing basic information about each patent was developed. Additional information was provided for patents studied in depth (36% of the total patents). Content analysis was completed for nine subclasses of *Nether Garments*.

The research results of the quantitative analysis show three major peaks of the patenting activity formed by: a) 78% of the patented hoops, 1858-1869; b) 60% of the patented bustles, 1883-1889; and c) 43% of the patented skirts, 1894-1903. The pulse of patent activity was relatively related to the economic boom or depression periods. The articles most patented were the bustles (267 patents), followed by the hoops (227 patents) and skirts (114 patents). The least patented articles were riding skirts (27 patents), and skirts with pads or distenders (33 patents). Also, the results illustrate the roles played by all patent categories in promoting increased comfort, safety and/or protection in women's garments, while maintaining the social conformity in appearance. One in five inventors of *Nether Garments* was a woman, which is 20 times higher compared to women

¹ Only utility (and not design) patents related to women's clothing were studied. Patents describing adornment, and machinery or manufacturing methods for clothing items were excluded.

inventors for all types of patents cited in literature, as of 1895. The number of female patentees exceeded the number of male patentees only for bicycle skirt patents. Patent activity was concentrated in the Northeast region of the United States, where the number of approved patents was almost four times the number of approved patents in all of the other five regions combined. Only four patentees had 10 or more patents granted each. From the total number of patents, 22% were assigned to companies or persons. Usually the assignees were from the same geographical region as the patentees from which they bought the patent rights. Also, two interesting and unexpected aspects resulted from the quantitative analysis: a) a discrimination tendency toward women, who waited a longer time (on average 70 days more) than men to be granted patents; b) during the 'bicycle craze,' the peak of patenting activity for bicycle skirts preceded the peak of patenting activity for bicycles per se and their accessories by two years.

The qualitative analysis provided the following answers to the research questions:

a) there was an evolutionary functioning of the *fashion process*, each patent being designed based on the previous knowledge in the field, on the available technology, materials, and manufacturing possibilities; b) the evaluation of the outcomes of both quantitative and qualitative analyses demonstrate that the utility patents relate closely to fashion cycles, as they are depicted in specialized literature; c) the data show a tendency toward increased functionality and healthiness of the patented garments; d) the first patent in which the term *ready-made* appeared dates back to 1907, though indirect references related to ready-to-wear started a half century earlier; and e) valuable insight is gained on the patenting process, and the creativity shown by inventors working within the confines of women's roles and what was considered socially acceptable dress for women.

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To my son, Mihai, and my husband, Serban, for their continuous loving support in
accomplishing my youth ideal.

And to my parents, Tamara and Viorel, for encouraging me to come to America, the Land
of All Possibilities, or in Romanian idiom “*Pamintul Fagaduintei*.”

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This long and wonderful journey started years ago when I decided to return to graduate school. I earned my Master's degree in Mechanical Engineering; however, continuing my studies in the same field would not have fulfilled my desire to know more about the world culture. As a teenager, I had an affinity toward History, and –as most girls– I loved Fashion. All this time I kept History and Fashion dear to me, so when I enrolled in the Ph.D. program I decided that my future studies would be related to what I really love, namely the History of Costume.

I acknowledge with heartfelt appreciation my dissertation committee,² who solidly supported me through a successful completion of the program. I consider myself lucky for meeting Dr. Sally Helvenston, Associate Professor of Apparel & Textiles (AT) and Chairperson of the Department of Human Environment and Design in the College of Human Ecology, who believed in me and in the success of my endeavor, and for being accepted in the Apparel & Textiles program even though I had a different background. For my first one-credit independent study Dr. Helvenston introduced me to an admirable book on the History of Costume and Fashion, which strengthened my wish for learning more about this topic. Therefore I will always be grateful to Dr. Helvenston for encouraging me, and for giving me the opportunity to work in what I knew is my calling. She carefully guided all my steps in the program, and involved me in exciting research projects. Many whole-hearted thanks go out to Dr. Suzanne Sontag – Professor of AT, and to Dr. Ann Slocum – Associate Professor of AT, for giving me the chance to do research in important areas complementary to my major, such as psychological aspects of

² Chair: Dr. Sally Helvenston; Members: Dr. Suzanne M. Sontag, Dr. Ann Slocum, and Dr. Kurt Dewhurst.

clothing and occupational protective clothing. Under my professors' guidance I learned the rigors required in research, and the beauty of making sense of the research results. If today I enjoy doing research in the Apparel field, it is because my dear professors carefully cultivated this seed in me.

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TABLE OF CONTENTS

LIST OF TABLES	xi
LIST OF FIGURES	xii
INTRODUCTION	1
Short history of patents	2
Trends in patent activity	8
Women inventors	12
PURPOSE OF STUDY	17
Goals	19
Objectives	19
Research questions	20
STATEMENT OF NEED / IMPACT	22
CONCEPTUAL FRAMEWORK	28
PROCEDURES / METHOD / STUDY EVALUATION	39
RESULTS / CONTENT ANALYSIS	56
Quantitative analysis – Bustles, Class 210	58
Quantitative analysis – Skirts, Classes 211 to 215, 217, and 222	76
Regular skirts, Classes 211, 215, 217, and 222	76
Bicycle skirts, Classes 212 and 213	95
Riding skirts, Class 214	111
All skirts combined, Classes 211 to 215, 217, and 222	114
Quantitative analysis – Hoop Skirts, Class 216	121
Quantitative comparison of bustle, skirt, and hoop patents	127
Comparison by gender	132
Comparison by geographical region	143
Comparison by patentees	155
Comparison by assignees	159
Qualitative thematic analysis of all patents	162
Victorian and Second Empire Era (1848 – 1870)	162
Later Victorian: The Gilded Age (1870 – 1890)	183
Late Victorian and Edwardian: Art Nouveau (1890 – 1911)	200
World War I: Pre Art Deco (1911 – 1920)	215
Bicycle and horse riding skirts	222
CONCLUSIONS	241

REFERENCES	287
APPENDICES	293
Definitions	294
Selective notes from the history of patents	298
Early African-American patentees	305
Bustles (tables)	306
Skirts (tables)	320
Hoops (tables)	330
Average patenting time for the most prolific patentees of hoop-skirts, bustles and skirts	339

LIST OF TABLES

Table 1.	Index to the US patent classification	24
Table 2.	Nether garments utility patents, 1846-1920	50
Table 3.	Patents common to two or more classes	52
Table 4.	Grand total of patents per class	56
Table 5.	Patents excluded from class 210	59
Table 6.	Patents whose primary class in other than 210	59
Table 7.	Companies having assigned bustle patents	66
Table 8.	Name of assignees and patentees with assigned patents	67
Table 9.	Total number of bustle patents approved per month, 1857 – 1912 ...	72
Table 10.	Patents excluded from class 211	77
Table 11.	Patents whose primary class is other than 211	78
Table 12.	Patents whose primary class is other than 215	81
Table 13.	Patents excluded from class 217	83
Table 14.	Patents whose primary class is other than 217	83
Table 15.	Patents excluded from class 222	87
Table 16.	Patents whose primary class is other than 222	88
Table 17.	Patents whose primary class is other than 212	98
Table 18.	Patents whose primary class is other than 213	100
Table 19.	Patent excluded from class 214	111
Table 20.	Patents whose primary class is other than 214	111
Table 21.	Patents whose primary class is other than 216	121
Table 22.	Patents issued to foreign nationals, by gender	142
Table 23.	Number of patents issued to the most active states in patenting nether garments	144
Table 24.	Number of patents by region	146
Table 25.	The distribution of nether garments patentees by region and gender, 1846 – 1920	149
Table 26.	Hoop, bustle, and skirt patents distribution by region	152
Table 27.	Patenting period of the most prolific patentees for hoops, bustles, and skirts	156
Table 28.	All patentees of nether garments having three or more patents	158
Table 29.	Changes in bustle classification	305
Table 30.	Selected list of bustle patentees and their assignees	306
Table 31.	List of assignees – class 210, Bustles	311
Table 32.	List of number of patents per assignee – class 210, Bustles	315
Table 33.	Changes in skirt classification	319
Table 34.	Selected list of skirt patentees and their assignees	320
Table 35.	List of assignees – Skirts, classes 211 to 215, 217, and 222 combined	323
Table 36.	Selected list of hoop patentees and their assignees	329
Table 37.	List of assignees – class 216, Hoops	333
Table 38.	References to ready-to-wear production of women clothing	269

LIST OF FIGURES

Figure 1.	Applications filed and patents issued 1790 – 1920	17
Figure 2.	Patents granted 1874 – 1920	18
Figure 3.	Patents 259,092 (1882), and 302,190 (1884) – Air cushion for boot or shoe soles, by George F. Butterfield of Stoneham, MA	26
Figure 4.	The fashion process: Changes in appearance styles according to Symbolic Interactionist Theory (Kaiser, Nagasawa, and Hutton, 1995)	34
Figure 5a.	Example of multiple classes/subclasses listing	40
Figure 5b.	Example of single class/subclass listing	40
Figure 6.	Drawings and specifications for patent 1,283,092	41
Figure 7.	Drawings and specifications for patent 532,601 – Skirted trousers, by Lena Sittig	42
Figure 8.	The earliest clothing patents	43
Figure 9.	The earliest patent (4,584) and the latest patent (1,360,362) included in the present research	46
Figure 10.	Number of applications and approvals for bustle patents (class 210), 1857 – 1912	60
Figure 11.	Average number of days elapsed between application and approval dates by year for bustle patents (class 210), 1872 – 1907	62
Figure 12.	Number of bustle patents issued to certain male and female patentees	63
Figure 13.	Number of days elapsed between application and approval of bustle patents for certain male and female patentees	63
Figure 14.	Number of approved bustle patents (class 210) to primary patentees, by gender, 1857 – 1912	71
Figure 15.	Bustles (class 210) – Number of patents by state, 1857 – 1912	74
Figure 16.	Number of applications and approvals for skirt patents (class 211), 1864 – 1920	79
Figure 17.	Average number of days elapsed between application and approval dates by year for skirt patents (class 211), 1873 – 1920	79
Figure 18.	Number of approved skirt patents (class 211) to primary patentees, by gender, 1864 – 1920	80
Figure 19.	Number of applications and approvals of patents for skirts with pads or distenders (class 215), 1859 – 1907	81
Figure 20.	Average number of days elapsed between application and approval dates by year for skirts with pads or distenders (class 215), 1873 – 1906	82
Figure 21.	Number of approved skirts with pads and distenders patents (class 215) to primary patentees, by gender, 1859 – 1907	82
Figure 22.	Number of applications and approvals of patents for lifters and holders of skirts (class 217), 1864 – 1912	85

Figure 23.	Average number of days elapsed between application and approval dates by year for lifters and holders of skirts (class 217), 1873 – 1911	86
Figure 24.	Number of approved patents for skirt lifters or holders (class 217) to primary patentees, by gender, 1864 – 1912	86
Figure 25.	Number of applications and approvals of patents for edge bindings or protectors of skirts (class 222), 1865 – 1920	90
Figure 26.	Average number of days elapsed between application and approval dates by year for edge bindings or protectors of skirts (class 222), 1873 – 1919	91
Figure 27.	Number of approved patents for skirt edge bindings or protectors (class 222) to primary patentees, by gender, 1865 – 1920	91
Figure 28.	Number of applications and approvals for regular skirt patents (classes 211, 215, 217, and 222 combined), 1859 – 1920	92
Figure 29.	Average number of days elapsed between application and approval dates by year for regular skirt patents (classes 211, 215, 217, and 222 combined), 1873 – 1920	93
Figure 30.	Number of approvals for regular skirts category, 1859 – 1920	94
Figure 31.	Left: Bloomer costume, 1851; Right: The Metropolitan Gymnastic Costume – <i>Godey's Lady's Book</i> , January 1858	96
Figure 32.	Number of applications and approvals of patents for combined bifurcated skirts (class 212), 1874 – 1919	99
Figure 33.	Number of approved combined bifurcated skirt patents (class 212) to primary patentees, by gender, 1874 – 1919	99
Figure 34.	Number of applications and approvals of patents for convertible bifurcated skirts (class 213), 1885 – 1920	101
Figure 35.	Number of approved convertible bifurcated skirt patents (class 213) to primary patentees, by gender, 1885 – 1920	101
Figure 36.	Number of applications and approvals of patents for bicycle skirts (classes 212 and 213), 1874 – 1920	103
Figure 37.	Average number of days elapsed between application and approval dates by year for bicycle skirts (classes 212 and 213), 1874 – 1919	103
Figure 38.	Number of approved bicycle skirt patents (classes 212 and 213) to primary patentees, by gender, 1874 – 1920	104
Figure 39.	Patents granted for Bicycles and accessories, and Bicycle skirts, 1884 – 1914	105
Figure 40.	Velocipedes of 1860s	107
Figure 41.	Patent 90,302 – Improved apparatus for connecting velocipedes ..	108
Figure 42.	Pickering bicycle	109
Figure 43.	Patent 392,973 – Bicycle, 1888	110
Figure 44.	Number of applications and approvals of patents for riding skirts (class 214), 1884 – 1915	113
Figure 45.	Average number of days elapsed between application and approval dates by year for riding skirts (class 214), 1884 – 1915	113
Figure 46.	Geographical distribution of riding skirt patents (class 214), and bicycle skirt patents (classes 212 and 213 combined), 1874 – 1920 ..	114

Figure 47.	Geographical distribution of riding skirt patents (class 214), and bicycle skirt patents (classes 212 and 213 combined), 1874 – 1920	115
Figure 48.	Average number of days elapsed between application and approval dates by year for all skirt patents (classes 211 to 215, 217, and 222 combined), 1873 – 1920	116
Figure 49.	Average number of days elapsed between application and approval dates by year and by class for all skirt patents (classes 211 to 215, 217, and 222 combined), 1873 – 1920	116
Figure 50.	Number of applications for all skirt patents, 1872 – 1920	117
Figure 51.	Number of approvals for all skirt patents, 1859 – 1920	117
Figure 52.	Number of approved patents for all skirt classes (211 to 215, 217, and 222) to primary patentees, by gender, 1859 – 1920	118
Figure 53.	Skirts (classes 211, 212, 213, 214, 215, 217, and 222) – Number of patents by state, 1859 – 1920	120
Figure 54.	Number of applications and approvals of patents for hoop skirts (class 216), 1846 – 1907	122
Figure 55.	Average number of days elapsed between application and approval dates by year for hoop skirts (class 216), 1873 – 1906	123
Figure 56.	Number of approved hoop patents (class 216) to primary patentees, by gender, 1846 – 1907	123
Figure 57.	Patent 21,839 – Hoop-Skirt (1858), patent 92,811 – Improvement in Hoop-Skirts (1869), and patent 839,931 – Hoop-Skirt (1907)	124
Figure 58.	Patent 87,648 – Brace and Suspender Combined	125
Figure 59.	Hoops (class 216) – Number of patents by state, 1846 – 1907	126
Figure 60.	Number of hoop patents issued to certain male patentees	125
Figure 61.	Number of applications and approvals for all patents: Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1846 – 1920	127
Figure 62.	Average number of days elapsed between application and approval dates by year for all patents: Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1872 – 1920	128
Figure 63.	Patents granted between 1846 and 1920 for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216)	129
Figure 64.	Average number of days elapsed between application and approval dates by year for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1872 – 1920	131
Figure 65.	Average number of days elapsed between application and approval dates by year for Bustles (class 210), Skirts (class 211 to 215, 217, and 222 combined), and Hoops (class 216)	132
Figure 66.	Total number of patentees for regular skirts (classes 211, 215, 217, 222) by gender, 1859 – 1920	133
Figure 67.	Total number of patentees for bicycle skirts (classes 212 and 213), by gender, 1874 – 1920	134

Figure 68.	Total number of patentees for regular skirts (classes 211, 215, 217, 222), bicycles skirts (classes 212 and 213), and riding skirts (class 214) by gender, 1859 – 1920	135
Figure 69.	Patents granted between 1846 and 1920 for all bustle (class 210), skirt (classes 211 to 215, 217, and 222 combined), and hoop patents (class 216) to primary patentees, by gender	136
Figure 70.	Patents granted between 1846 and 1920 for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216) to primary patentees, by gender	137
Figure 71.	Total number of patentees for nether garments, classes 210 to 217 and 222, by gender, 1846 – 1920	138
Figure 72.	Total number of patentees for hoop, bustle, and skirt patents by gender, 1846 – 1920	138
Figure 73.	Patentees' distribution by gender for assigned patents	139
Figure 74.	Patentees' distribution by gender for unassigned patents	139
Figure 75.	Patentees' distribution by gender for all patents	140
Figure 76.	Percentage of extra time necessary for the approval of women's patents in comparison with men's patents	141
Figure 77.	Number of hoop, bustle, and skirt patents, by state	145
Figure 78.	Patent distribution by geographical regions, 1846 – 1920	148
Figure 79.	Average days elapsed between application and approval dates of the patents, by region	149
Figure 80.	Percentage of male and female patentees, by region	152
Figure 81.	Hoop, bustle, and skirt patents' distribution by region	154
Figure 82.	Average days elapsed between application and approval dates for hoop, bustle and skirt patents, by their assigned status	160
Figure 83.	Upper Left: <i>Godey's Lady's Book</i> , January 1850; Lower Left: Worth & Bobergh Ball Gown, ca. 1860; Right: Patent 4,897 – Lady's Skirt, 1846	165
Figure 84.	Left: "The very fine lady." Center: "The lady." (<i>Godey's Lady's Book</i> , January 1857); Right: <i>Godey's Lady's Book</i> , February 1859	168
Figure 85.	Left and Center: Tournure Corset (<i>Godey's Lady's Book</i> , 1859); Right: Patent 26,491 – Corset, 1859	169
Figure 86.	Left: English Crinoline, 1864; Right: Patent 25,583 – Hoop of Skeleton Skirts, 1859	169
Figure 87.	<i>Godey's Lady's Book</i> . Douglas and Sherwood's patents: Left: New Expansion Skirt, May 1858; Right: New Matinee Skirt, March 1859	171
Figure 88.	Patent 20,681 – Skirt-Hoop, 1858	172
Figure 89.	Patent 21,479 – Lady's Hoop-Skirt, 1858	173
Figure 90.	Patent 21,806 – Skeleton Skirt, 1858	174
Figure 91.	Patent 22,426 – Lady's Hooped Skirt, 1858	175
Figure 92.	Left: <i>Godey's Lady's Book</i> , September 1859; Right: English Summer Day Dress, 1858-1860	176
Figure 93.	Left: <i>La Mode [Illustree]</i> , 1862; Center: <i>Godey's Lady's Book</i> , November 1865; Right: Walking Dress, ca. 1860	177

Figure 94.	Left: Crinoline, ca. 1865; Right: Patent 54,785 – Improvement in Hoop-Skirts, 1866	178
Figure 95.	Left: Patent 40,285 – Improvement in Hoop-Skirts, 1863; Upper Right: Hoop Skirt, ca. 1865, Bridgeport Skirt Company, Bridgeport, Connecticut; Lower Right: Hoop Skirt, ca. 1865, Bradley’s patent duplex elliptic Empress reception spring skirt, West’s Bradley & Cary	179
Figure 96.	Left: Patent 63,234 – Improvement in Hoop Skirts, 1867; Right: Afternoon Dress, 1866-1869	181
Figure 97.	Left: Hoop, ca. 1850-1870; Center: Patent 63,233 – Improvement in Hoop Skirts, 1867; Right: <i>Godey’s Ladies Book</i> , September 1868	182
Figure 98.	Patent 86,340 – Improvement in Hoop-Skirts, 1869	183
Figure 99.	Left: Bustle, 1870-1875; Right: Patent 105,124 – Improvement in Hoop-Skirts, 1870	185
Figure 100.	Left: Patent 318,162 – Hoop-Skirt, May 1885; Right: Patent 329,271 – Hoop-Skirt, October 1885	187
Figure 101.	Left: Afternoon Dress, 1870-1874; Right: Patent 139,677 – Improvement in Ladies’ Dresses, 1873	188
Figure 102.	Left: <i>Godey’s Lady’s Book</i> , June 1880; Right: Worth Visiting Costume, ca. 1880	189
Figure 103.	Left: Patent 184,765 – Improvement in Bustles, 1876; Center: Patent 187,350 – Improvement in Hoop-Skirts, 1877; Right: Patent 197,409 – Improvement in Paniers, 1877	190
Figure 104.	Left: English Bustle, 1880-1890; Right: Patent 273,165 – Pannier and Bustle, 1883	191
Figure 105.	Left: English Bustle, 1880-1890; Right: Patent 334,707 – Bustle, 1886	193
Figure 106.	Left: English Bustle, 1884; Right: Patent 364,003 – Bustle, 1887 ...	194
Figure 107.	Up: Patent 338,634 – Combined Skirt and Bustle, 1886; Lower Left: Bustle – ca. 1884; Lower Right: Dress – ca. 1888	196
Figure 108.	Left: English Bustle, 1884; Right: Patent 364,820 – Bustle or Pannier, 1887	197
Figure 109.	Left: Worth Court Gown and Train, ca. 1888; Upper Right: Patent 406,553 – Bustle, 1889; Lower Right: Bustle ca. 1870s	199
Figure 110.	Patent 469,637 – Combined Flounce and Belt, 1892	201
Figure 111.	Left: Broadcloth visiting dress that belonged to Empress Alexandra Fiodorovna, second half of the 1890s; Right: Patent 586,446 – Dress-Skirt Lifter, 1897	202
Figure 112.	Left: Worth Afternoon Dress, 1896; Center: Patent 554,998 – Skirt, 1896; Right: <i>Delineator</i> , July 1897	203
Figure 113.	Left: Patent 549,269 – Attachment for Skirts, 1895; Right: <i>The Delineator</i> , 1898	205
Figure 114.	Left: The Gibson Girl, 1890-1910; Right: Patent 709,862 – Skirt-Holder, 1902	207

Figure 115.	Left: <i>Harper's Bazar</i> , December 1901; Right: Patent 769,970 – Skirt Supporter, 1904	209
Figure 116.	Upper Left: English Skirt Pad and Small Bustle, 1890-1905; Lower Left: Patent 353,881 – Bustle, 1886; Right: Patent 790,299 – Skirt, 1905	210
Figure 117.	Left: Worth Evening Dress, ca. 1900; Center: Patent 707,387 – Skirt-Protector, 1902; Right: Worth Dinner Dress, ca. 1900	212
Figure 118.	Upper Left: <i>Delineator</i> , 1909; Lower Left: Dress, 1908; Right: Patent 914,414 – Skirt, 1909	214
Figure 119.	Patent 1,104,319 – Skirt, 1914	216
Figure 120.	Upper Left: Evening Dress, ca. 1910–1914, by Callot Soeurs; Upper Right: <i>La Mode</i> , May 1912; Lower Left: Patent 1,037,331 – Skirt, 1912; Lower Right: Patent 1,303,092 – Lady's Garment, 1919	217
Figure 121.	Upper Right: Fashion illustration, ca. 1914; Lower Left: YWCA Overseas Uniform, label Worth, 1918; Lower Right: Patent 1,280,963 – Garment, 1918	221
Figure 122.	Left and Center: Patent 567,979 – Cycling-Skirt, 1896; Right: Columbia Cycling Outfit ca. 1895, American	224
Figure 123.	Upper Left: <i>The Delineator</i> , 1894; Upper Right: Undated Photo; Lower Left: Patent 567,069 – Bicycle-Skirt, 1896	226
Figure 124.	Upper Row: Bicycle Dresses, 1896; Lower Row Left: Patent 540,173 – Bicycle Skirt, May 1895; Lower Row Right: Undated Photo	227
Figure 125.	Upper Left: Bicycle Dress, 1896; Upper Right: Patent 568,943 – Skirt for Riding-Habits, 1896; Lower Row: Undated Photos	229
Figure 126.	Upper Row and Lower Row, Left: Cycling Attire – <i>Delineator</i> , May 1899; Lower Row, Center and Right: Patent 616,026 – Bicycle-Skirt, December 1898	231
Figure 127.	Undated Photos	233
Figure 128.	Left: English Cycling Outfit, 1895-1900; Right: Patent 608,469 – Skirt, 1898	234
Figure 129.	Left: English Riding Habit, 1880-1890; Right: Patent 348,573 – Lady's Riding-Habit, 1886	235
Figure 130.	English Riding Habit, 1880-1890	236
Figure 131.	Left: Sidesaddle Outfit from an English advertisement, 1911; Right: English Wool Sidesaddle Habit, ca. 1911-1913	237
Figure 132.	Left: Patent 631,949 – Safety Hunting-Skirt, 1899; Right: Patent 1,164,382 – Riding-Skirt, 1915	238
Figure 133.	Different bustle designs based on the same construction principle ..	246
Figure 134.	Different bustle designs issued in the same year (1887)	247
Figure 135.	The increase in bustles' complexity over time	248
Figure 136.	The increase in bustles' variety over time	249
Figure 137.	Support and protection for skirt's train in two 1877 patents. Left: Pannier; Right: Dress-Train Supporter	250

Figure 138.	Use of same type elements in different apparel items. Left: Bustle – 1886; Right: Attachment for Skirts – 1895	250
Figure 139.	Metallic edge binders	251
Figure 140.	Left: Patent 17,241 – Lady’s Skirt, 1857; Right: Patent 25,211 – Improvement in Ladies' Bustles	278
Figure 141.	Average patenting time for the most prolific patentees of hoop-skirts, bustles, and skirts	339

INTRODUCTION

A number of researchers in the field of dress history have investigated technological aspects of dress and apparel, and the history of inventiveness in apparel design (e.g., Farrell-Beck & Gau (2002) – *Uplift: The Bra in America*, and Friedel (1994) – *Zipper: An Exploration in Novelty*). Many have used patents as a source of knowledge about these inventions. However, no comprehensive database exists to aid researchers in using this valuable resource for historical research. My original intent was to develop a comprehensive database, along with analysis and summary information in monograph form for use by researchers in the field, and to describe clothing invention from the time of the first U.S. clothing patent in 1827 to the period following World War I (1920). For the purposes of my doctoral dissertation the topic had to be narrowed considerably; in the 1827-1920 time interval there were as many as 16,171¹ utility patents granted in the whole *Apparel* and *Foundation Garments*² classes (class 2, and class 450, respectively). Fashion was considered an important factor in women's dress, therefore I have focused the project on women's clothing/apparel in the *Apparel-Nether Garments* classification and the dichotomy between fashion and function.

I am aware that following fashion was an important preoccupation for nineteenth-century middle and upper class women, and that elements of fashionable dress (corsets, bustles) are characterized as dysfunctional by current researchers. The patentees of that time probably had the same thoughts since they tried to improve the functional characteristics of dress elements, and thus alleviate women's discomfort. For example, in

¹ This figure includes 217 *reissued patents* (see Appendices – *Definitions*).

² Due to massive garment silhouettes in women's clothing in the 19th century, corsets and supporters were numerous enough to form a class by themselves.

the second half of the 19th century, women's skirts were voluminous and heavy. One of the problems was supporting the whole weight of the skirt at the waist. If no hoop or bustle had been used to support their shape, the gravity force would have made them indistinguishable as style from one decade to another. When the fashion system took its course –sometimes to extremes, most of the patentees proved to be attuned to women's complaints, and tried through their inventions to correct the flaws of previous designs. The patentees did not come with radical ideas as Amelia Bloomer did with her Turkish trousers tied at the ankles; instead they took small steps like suspending the skirt from the corset's hooks, or designed bustles with shoulder straps and hip support. They often praised their inventions as being light, detachable, easy to clean, and cheap to manufacture. So patentees' purpose was to reduce the hindrance of existent models of hoops, bustles, or skirts by improving them or designing new ones, and to make them wearable and still maintain the proper appearance women had to have in society.

The patent literature I reviewed focuses on three aspects: (a) the history of patents and of the USPTO, as a background information about the work of this governmental branch, blended with historical events; (b) trends in patent activity over time, geographically, etc.; and (c) women as inventors of apparel who left their mark in the American history of technology through their inventions, and the social-cultural milieu in which their ideas were patented.

SHORT HISTORY OF PATENTS³

Before the Constitution of the United States was adopted, many of the American Colonies and States issued patents by special acts of the legislature or upon the

³ Please see also Appendices for *Selective Notes From the History of Patents*.

prerogative of a monarch because there were no general laws providing for the granting of patents. “The first patent on this continent was granted by the Massachusetts General Court to Samuel Winslow in 1641 for a novel method of making salt,” (USPTO, 1988).

There was a general concern that patents might come to resemble the type of monopolies granted by European monarchs. As a solution, limited monopolies were granted in the form of patents on inventions. The inventors had the opportunity to profit from their labor for the duration of the patent,⁴ and at the same time society benefited systematically from inventions released to the public after the inventors’ limited right expired. The patent system was founded precisely on the assertion that a patent is of greater benefit to society than to the individual inventor.

Toward the end of the 18th century, the industrial revolution was under way. Numerous inventions were made which played a key role in the technological and scientific advancement of America. Moreover, inventions were a factor in helping people “discover new worlds, build communities, develop resources, increase productivity, cure diseases, ease burdens, and enjoy life to the fullest” (Welsh, 1965).

In the provision of the Constitution adopted in 1787, Article 1, Section 8 states: “Congress shall have power... to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries” (USPTO, 1999). This protective system for inventors was needed so that they could get the benefits of their work. The best, most feasible method yet devised for this purpose was the *patent system*. The fact that the American patent system has its origins in the Constitution shows that the nation’s founders recognized the

⁴ The Act of 1790 stipulated that patents were issued for a period not to exceed 14 years. Today, *utility patents* are granted for a term of 20 years from the date of the grant, and *design patents* for 14 years.

importance of intellectual property and its protection, which in turn gave inventors trust and impetus for new endeavors. In 1790, Thomas Jefferson declared: “The issue of patents for new discoveries has given a spring to invention beyond my conception” (USPTO, 1988).

On April 10, 1790, president George Washington signed the bill that laid the foundations of the modern American patent system. The patent was defined as “any useful art, manufacture,⁵ engine, machine, or device, or any improvement thereon not before known or used” (USPTO, 1988). This Patent Act had subsequent major legal changes that empowered the patent system. At the time of the 1790 Patent Act, the United States was a young country that had just won its independence. Under the Constitution, it was organized as a single nation rather than a group of ex-colonies. The new nation was struggling because capital was insufficient, and many manufactured products were imported. Therefore the patent provision was a patriotic call to invent, make and use indigenous products, hence replacing the imports.

In its earlier days “the Patent Office had on various occasions the responsibility for administering copyright⁶ matters, collecting and publishing agricultural information, and even collecting meteorological data, and for some years it was the custodian not only of the famous old Patent Office models –the delight of every visitor to Washington for many years– but of the Declaration of Independence, and other historical documents and relics” (USPTO, 1965).

At the beginning of the 19th century, Americans relied upon their English counterparts for almost every innovation. The 1807 Embargo Act prohibited all

⁵ For example, Samuel Hopkins, a resident of Vermont, was granted a patent in 1790 by Thomas Jefferson, then Secretary of State, for a method of making potash (a component of soap).

⁶ In May 1790, the Congress enacted the first Federal copyright law.

American exports, and consequently the trading restrictions⁷ brought economic hardship. In this circumstance, any technological contributions to advance and support American manufacturers were absolutely welcome. When Andrew Jackson first became president⁸ in 1828, the American character was idealized in heroic proportions. Jackson helped to “elevate the democratic individualism to a national policy, and celebrated the self-reliant common man through free pursuit of economic gain” (Meyers, 1960). One of the most appreciated virtues was inventiveness, referred to as *Yankee ingenuity*, which revolutionized industry (Breedon, 1971). American society was preoccupied not only with mechanization and technical proficiency, but also with home labor-saving devices and increased comfort. The patentees described their inventions with words like: essentially beneficial to mankind, great ease and convenience, facility, strength, much quicker, durability, preservation of lives, simplicity, security, expeditious manner, precisely, accuracy, domestic comfort (Welsh, 1965).

The responsibility of granting patents was placed upon a Board. Because the members of the Board did not have sufficient time to spare from their regular duties to devote to patent matters, the Act of 1793 was passed stipulating that: “An application is no longer examined for novelty and usefulness, but a patent is granted to anyone who applies, submits the proper drawings and pays the necessary fee.” Thus, the issuing of patents became little more than a clerical function, because patents were granted without any examination into the merits or novelty of the invention. “Many patents granted [were] worthless and void and conflict upon one another, and a great many law suits [arose] from this condition” (USPTO, 1988). Frauds developed: people copied existing

⁷ During the Napoleonic wars.

⁸ He was re-elected in 1832.

patents, made slight changes, and were granted patents. This system remained in effect for 43 years, when the Act of 1836 changed the law, reestablishing the examination system in effect before 1793. The patent laws of today are based upon the principles set forth in the 1836 act.

Unfortunately, the great fire of 1836 destroyed the Patent Office completely. The loss was estimated at 7,000 models, 9,000 drawings, and 230 books, plus the loss of all records of patent applications and grants. With the help of U.S. court clerks and owners of patents a partial restoration of the records was made in the next few years. Still, American industry continued to flourish under the patent system, and to give employment to millions of people. In 1857, The United States issued 2,190 patents –about 35% more than Great Britain, which had a far larger population. Abraham Lincoln said in 1859: “The Patent System added the fuel of interest to the fire of genius” (USPTO, 1988).

There was a decrease in the activities of the Patent Office due to the outbreak of the Civil War. In contrast, the war stimulated the use of a number of comparatively new inventions: “the field telegraph [had] an important influence on tactics, machinery [was] employed on a large scale to manufacture clothes and equipment for the armed forces, and the breech loading rifle [was] widely used. The importance of the reaper, mower, and thresher in providing food for the armies [could] not be overestimated” (USPTO, 1988). As soon as the war was over, there was a noticeable increase in patent applications until World War I.

For over 200 years the patent system furthered the outstanding abilities of hundreds of thousands of inventors, and encouraged industrial and technical progress. In 1824, Daniel Webster in a speech in Congress expressed the same views of the patent

system voiced earlier by Washington, Jefferson, Hamilton, Madison, and Franklin:

“...invention is the fruit of a man’s brain, that industries grow in proportion to invention, and that therefore the government must aid progress by fostering the inventive genius of its citizens” (USPTO, 1988).

The emulation and enthusiasm of the population for new discoveries was so remarkable, that no other nation could reach the record number of American patents. Internationally, the United States Patent Office became the model for the patent systems of numerous foreign countries. For example, a Swiss commissioner to the Philadelphia Centennial Exhibition (1876) was so impressed with the American Patent System that on his returning home he told his countrymen: “We must introduce the patent system. America has shown us how. May our sister republic serve as our model in this.” Switzerland subsequently introduced a patent system in 1888, and later on Albert Einstein became an examiner in the Swiss Patent Office (USPTO, 1988).

By issuing patents, the U.S. Patent Office⁹ gave strong incentives to businesses, inventors and others to invent, invest in, and make available their innovations worldwide. Similarly, by issuing trademarks the agency helped safeguard consumers against confusion and deception in the marketplace.

As of April 2003, there were more than 6,550,000 patents granted since the patent system was established in the late 18th century. In 2002-2003, more than 170,000 utility patent¹⁰ applications by U.S. and foreign inventors were filed at the USPTO. About 92% of patent grants are utility patents.

⁹ For a unified terminology, I will use [US]PTO for both United States Patent Office (USPO) and United States Patent and Trademark Office (USPTO), though the first constitutional trademark registration act was passed in 1881, and the name of the Patent Office was changed to the Patent and Trademark Office much later, in 1975.

¹⁰ Please see Appendices for *Definitions*.

As technology continued to expand, per capita application filing rates by residents of the United States was more than 35 patent applications per 100,000 U.S. population in 1991. While U.S. corporations continue to receive nearly three-fourths of utility patent grants for U.S. inventions, independent inventors increased their share of utility patent grants from 23% in 1985 to 26% in 1991 (USPTO, 1992). The cost of obtaining and maintaining a patent in the United States continued to be most competitive compared to other countries. By the 1990s, the average length of time required to examine a patent application decreased from 24 to less than 18 months.

Now, the United States as a great industrial nation must, more than ever, protect intellectual property which is vital to the economy “as it allows firms –large and small alike– to maintain a leading edge in the global marketplace, and encourages businesses to invest in research, development and marketing” (USPTO, 1999).

TRENDS IN PATENT ACTIVITY

Trends in patent activity point to the steady increase in patent application filings and grants, and to the success of the United States patent system in promoting technological development and disseminating new technology. Mechanical improvements were sought out with predilection, which –in turn– revealed the orientation of the country. The patent records exemplified frequently the interest in simple and practical things/processes that made work easier. “Usually patentees were largely unconcerned with elegant furniture, exquisite silver, and fine china” (Welsh, 1965).

Indicators of the rapid change that took place in American life were defined by the preponderance of patents granted in each level of technology. “Note the manually operated tools, and compare them to the steam-operated, iron-jawed excavator that

readied the course of railroads and canals, diverted rivers, dredged harbors, and vastly speeded the construction of civil works and conserved human resources” (Welsh, 1965).

A characteristic of the 19th century patents was patentees’ attempt to cover every possible use of their invention, so that they could better guard their claims. “In James H. Chappell’s geometrical pattern book, *A Map of Spheres and Right Lines*, (patent 7962X, January 18, 1834) appears a ‘Coat, great coat, and vest, pantaloons, garters, cloak, frock, shirt collars and lapels, and a lady’s habit, all of which are formed by right lines and spheres as the printed explanations fully show.’ Nor, as can be observed in the drawing, does Chappell neglect the militia uniform at a time when such garb was often a social requirement. Buttons, combs, hats, tailor’s shears, and umbrellas as well as measuring devices were patented. Some patents, like Hiram Seger’s tailor’s square, included drawings of costumed figures, and thus are particularly valuable (patent 2,590 April 29, 1842)” (Welsh, 1965).

Bijker (1995) considered that “the majority of inventions ... have resulted from individual work rather than large-scale organized research. Often, a stress on the role of the individual inventor [was] accompanied by a declaration that the topic [was] immune to research: like a poet or an artist, therefore, the inventor participate[d] in an act of creation, and no amount of theoretical construction [could] encompass the terms on which such creativity [could] be achieved.” This is true of most of the 19th century apparel patents in the women’s nether garments category.

The American patent system remained for 214 years one of the greatest strength of democratic government, because “it offer[ed] the same protection, the same opportunity, the same hope of reward to every individual” (USPTO, 1988).

Geographically and historically, patent activity in the United States was concentrated in the Northeast, Midwest and, to some extent, western states –particularly California.¹¹ Therefore, larger numbers of patent grants were issued to inventors residing in those states than to inventors in other states.

The technological emphasis of patent activity in the U.S. or any country is analyzed with the *activity index for a USPTO class*.¹² In USPTO, 1988, the Apparel¹³ class is listed under classes with “lower emphasis,” and it shows a slight decrease in its activity index from 0.491 in 1980 to 0.467 in 1990. In the same decade, the top of the list of classes with “greater emphasis” was made by processes and products of mineral oils, wells and hydrocarbons chemistry, each having an activity index of more than 1.880. The highest increase of the activity index was in the class of drug, bio-affecting and body treating compositions (from 0.930 to 1.368), and the most dramatic decrease of the activity index was in the class of typewriting machines, which dropped from 1.145 to 0.518.

At the present time, nearly three-fourths of all patents issued to U.S. resident inventors are owned by corporations and other private organizations, and this trend continued to be steady over the last two decades. The remaining patents are owned by independent inventors (individuals or U.S. Government organizations). Since the late 1980s, foreign corporations have received 88 percent of the patents granted to foreign entities each year, while the patent activity by foreign independent inventors has

¹¹ As early as 1900, California was one of the more active patenting states, ranked 10th out of 45 states in the number of patent grants.

¹² A country's *activity index for a class* is determined by taking the proportion of utility patents granted in the class which originated in the country and dividing it by the proportion of all utility patents granted in all classes which originated in that country. Only classes for which at least 200 patents were granted have been included in the calculation of the index (USPTO, 1988).

¹³ Garment Supporters class is not listed in the “Greater emphasis” group of classes, nor in that of “Lower emphasis.”

decreased (USPTO, 1988).

The most important trend in the United States patent activity is its increasingly international character. Any inventor, regardless of his/her citizenship, may apply for a patent on the same basis as a U.S. citizen, because the patent laws of the United States make no discrimination with respect to the citizenship of the inventor. Corporations or residents of foreign countries file patent applications in the U.S. because they seek patent protection in the U.S. Similarly, since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an American inventor who wishes patent protection in other countries must apply for a patent in each of the other countries or in regional patent offices. International conventions and treaties for the protection of industrial property in patent and trademark matters facilitates the filing of applications by providing: a) same rights to foreign inventors as to the citizens of that country; b) the right of priority, which means that, on the basis of a regular first application filed in one of the member countries, the applicant may, within a certain period of time, apply for protection in all the other member countries; and, c) a centralized filing procedures and a standardized application format (USPTO, 2002).

Nearly half of all utility patents are now granted by USPTO to foreign inventors, an evidence of the importance of international trade.¹⁴ The patent technology that is emphasized in a particular country often reflects the economic strength of that country. Japan, Germany, the United Kingdom, France, Canada, Switzerland, Italy, and the Netherlands account for more than 90% of all foreign patent activity in the United States.

¹⁴ Also, the patenting costs in the United States continue to compare favorably to costs in other major patenting countries –e.g., European Patent Office with U.K., Germany, and France (USPTO, 1992).

WOMEN INVENTORS

Women inventors have typically been associated with inventions for domestic use, including garments and apparel. Between 1809 and 1900 approximately 1 out of every 1,000 patents was issued to a woman inventor (USPTO, 1999).¹⁵ Therefore gender relationship to garment invention will be further explored in this research. Mary Kies, of Killingly, Windham County, Connecticut, was the first woman to obtain a United States patent in 1802;¹⁶ her invention related to weaving straw with silk or thread. The legacy of women inventors and their technological contributions were not fully recognized in comparison to those of males, because some types of inventions were not traditionally associated with women. For example, several women invented agricultural implements, streetlights, and railway appliances such as car spikes/heaters/couplings, locomotive chimneys, danger signals, station indicators, railroad tracks, etc. (Hanks, 1981).

Between 1850 and 1870, at least 350 patents were issued to women, as opposed to only about 30 between 1790 and 1850. The Civil War (1861-1865) was a time of accelerated innovation for female inventors, because the wartime brought more diverse opportunities for women who sought employment. Prior to the war, only a few of them patented their inventions, in part because of the stigma of being labeled as a woman inventor. "Reception to the very idea of women as inventors was so negatively circumscribed and so masculine in its very concept that most women chose to not expose themselves to public ridicule and social censure" (Pilato, 1998).

Usually, for a 19th century woman to be a wage earner was for her to lose her social standing. Kidwell (1979) describes women's opportunities in that era as being

¹⁵ Macdonald (1992) disputes the figures, and argues that the ratio women/men patentees is 1/100 and not 1/1,000, which was a clerical/typing mistake.

¹⁶ Her original patent was destroyed in the Patent Office fire of 1836 (Stanley, 1993).

“restricted to traditional feminine activities of child care, housekeeping, cooking, and sewing. If a woman had some education but no children, she might become a governess. Later in the century, teaching in public schools was to become an important alternative for the educated woman [...]. For the many women with little formal education, the main choices were limited to being a cook, laundress, household servant, or seamstress.”

The Victorian Era prescription for women’s “good manners” (including not to mingle in men’s activities) was most probably applied to well-to-do families, where women did not have to work. The rules of the high society trickled down to the lower strata of society, where they were expected to be applied, too. Perhaps the women who had to work outside their households to make ends meet, and who most likely formed the women inventors group, probably were not so keenly conformed to such rigid social restrictions, or they simply ignored them. Thus, working women experienced increased access to technical and business knowledge. Industrial and urban expansion also contributed to the rise in the number of women inventors.

In 1861-1865 wartime, the economic and political survival was closely connected to military operations, so a favorable reception was given to valuable inventions, and they were seen as patriotic gestures in support of the war effort (Pilato, 1998). In this new social context, women’s inventions were beyond domestic constraints, because as more men were recruited for military service women sought work outside of the home, even in fields previously restricted to men. In the years that followed the Civil War, when the industrial revolution was unfolding, women’s exposure to the multitude of problems in the industry was amplified. Even if “they were ‘last hired, first fired, least paid’ these changing opportunities fueled these women inventors to carve out new fields, which led

to sustained and increased production in post-Civil War America” (Pilato, 1998). Work outside the household gave women financial independence, and built up trust in their potential. But the end of the Civil War returned women to their pre-war status, despite the reality that they expanded their domestic boundaries to include a broader environment. Thus, they struggled for increased accessibility to higher education,¹⁷ new job opportunities, legal entitlement, and the right to vote.

At the Philadelphia Centennial in 1876¹⁸ and the World’s Columbian Exposition in Chicago of 1893 women inventors were able to document their technological potential. In Philadelphia, 79 women exhibited and won 14 awards, and in Chicago 335 women exhibited and won at least 33 awards (Stanley, 1993). The 17 years between the expositions showed an increased measure of recognition of women’s inventions and positively changed their public image. For example, Lena Sittig was the patentee of *Skirted trousers*, 1895, which probably is patent 532,601, approved on January 15, 1895 (class 212 – Combined bifurcated) because it is the only patent with this title granted to Lena Sittig before or on 1895. Best & Co. exhibited this bicycle skirt invented by Lena Sittig at the Atlanta Exposition of 1895. “She held three other patents (1892-94)¹⁹ and was credited (by the ‘Scientific American’ April 7, 1903: 247) with inventing a waterproof garment called the ‘duckback.’ Listed as Mrs. Frank Sittig, she showed this waterproof garment at the Suffrage Bazar at the Martha Washington Hotel in New York

¹⁷ Physicians argued that equal education would represent mental and physical dangers for women, since women’s brains were thought to be smaller than men’s, and therefore an equal education was “useless, ineffectual, and stressful” (Marks, 1990).

¹⁸ Women had a separate building devoted exclusively to the wide ranging products of women’s thought and labor (Trescott, 1979). A weekly newspaper, *The New Century for Women*, was published by women for the centennial exhibition, and dedicated to the “industrial interest of women” and to “advancing the prosperity and extending the opportunities of women-workers.”

¹⁹ Lena Sittig probably held more than “three other patents,” because I found patent 602,188, *Trunk for Undergarments*, which was approved on April 12, 1898.

City in November 1908” (Stanley, 1993).

The patent records made clear the gender and nationality of the inventors, but not about their race.²⁰ Baker (1969) mentioned that African-American women had achievements in the field of inventions, though “with an industrial field necessarily more circumscribed than that occupied by our men, and therefore with fewer opportunities and fewer reasons, as well, for exercising the inventive faculty.” Nevertheless, “record shows that more than twenty African-American women have been granted patents [until 1913] for their inventions, and that these inventions cover also a wide range of subjects – artistic, utilitarian, fanciful.” Unfortunately, Baker did not elaborate on this statement, and therefore the names of the inventors and their patents remain unknown. Sarah E. Goode was mentioned as being the first African-American woman to obtain a United States Patent. In 1885, she received a patent for a “Folding Cabinet Bed” (USPTO, 1988).²¹

Toward the end of the 19th century, women were gradually accepted into institutions of higher learning, and new women’s colleges were opened, but domestic curricula remained central in women’s education. Therefore, their role in society remained almost the same²² until World War I, after which a change in women’s views about their equal rights with men became more and more evident.

In the 1906-1921 interval approximately 1.5 percent of all United States patents were issued to women inventors (USPTO, 1988). The significant increase in the number

²⁰ For instance, it is not known with certainty if Henry Blair, of Glen Ross, Maryland, was the first black inventor to receive a patent in 1835 for an improved corn planter (USPTO, 1988).

²¹ Details about African-American patentees are given in Appendices – *Early African-American Patentees*.

²² Sewing, dressmaking, art needlework, millinery, cooking and manual training in all its forms helped a girl to become a good girl, a better woman and a more useful citizen (Beal, 1915). “Home Economics means economy of your grandmother, and the science of the modern chemistry. It means, in fine, that you are to be perfect, and always ladies, and to see that everyone has something to eat and to wear” (Wolverine, 1919).

of patents and the diverse range of these patents provided solid evidence that women were capable and intelligent, strong and independent. Changing the relationship of women to technology challenged the basic assumption about their abilities and potential in technological development as producers, and not as mere consumers.

If technology was influenced by women's innovations, conversely –women were affected by, and benefited from the new technologies. Bijker (1995), in her research on the *safety bicycle*, concluded that “the design of this technological artifact, the safety bicycle, ... allowed our cyclist to travel on her own and to choose a more comfortable form of dress.” Alternatively, women's clothing was designed differently to accommodate the technical constraints of the bicycle and also to make a statement about women's emancipation and societal position. Women as wearers of garments might be uniquely positioned to be aware of dysfunctional features of their dress; whether they were capable or chose to address these issues is one aspect researched by this study.

PURPOSE OF STUDY

Inventors were credited with 1,435,514 issued patents out of 2,439,289²³ application patents since patent registration started in 1837, and until 1920 –the demarcation year that I chose for closing my research. This date was chosen because it extends to the end of World War I, and marks the beginning of the modern era of restriction free clothing for women. Patents issued previous to 1837 were not numbered, and for this reason not included in the above figures. The present system of numbering patents consecutively began with the patents issued under the new patent law of 1836. The number of patent applications filed and issued shows its greatest dynamism from 1884 to 1916, Figure 1, (USPTO, 1988).

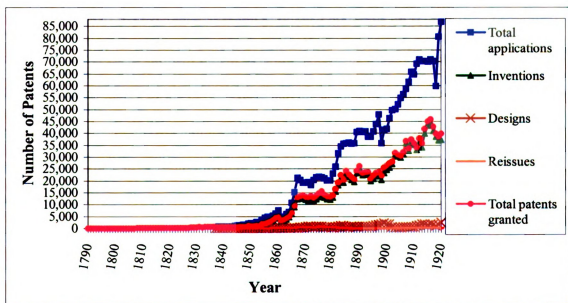


Figure 1. Applications filed and patents issued 1790 – 1920

Schmookler (1972) made an inventory of patents granted for hosiery, hats, caps, and boots and shoes, as part of a larger study. Based on his data, the graph for these

²³ USPTO, 1988.

patents issued in 1874-1920 is presented in Figure 2.

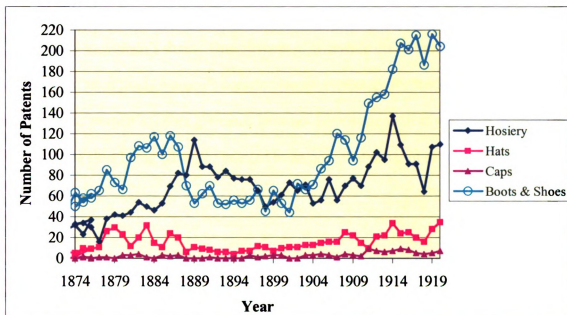


Figure 2. Patents granted 1874 – 1920

Despite of the existence of many published materials on scientific and technical history, many apparel/garment patent documents remain virtually unexplored, though they are a great source of history. “These patents are a unique source of information standing somewhere between objects and manuscripts,” Welsh (1965) stated. As research materials, they could provide a rich field of exploration for scholars. Therefore, the present study seeks to contribute to dress history in America, by adding new findings from the examination of clothing related patents issued between 1846 and 1920.

In the second half of the 19th century and the beginning of the 20th century, patent applications –in practically every class– were submitted mostly by men, and less by women. The study explores if the same proportion of men-women patentees is maintained for different classes of clothing related inventions, since apparel was considered to pertain to household areas, and therefore women rather than men might be

expected to obtain a patent.²⁴ This study also seeks to explore a particular subclass of garments –*Nether Garments*– to illustrate what patents can reveal about fashion and functionality in women’s dress. One element of women’s dress that has received considerable attention is women’s corsets. However, except for studies of bloomers and dress reform, women’s nether garments have not been systematically studied in terms of function –the skirt being taken for granted as an accepted element of women’s dress.

GOALS

The primary goal of this study is to bring to light numerous unknown patents related to clothing issued between 1846 and 1920, and to correlate them with the fashion history time line.²⁵ The use of patent drawings will be a useful tool for students in fashion, theatre or decorative arts as a source of inspiration, or accurate costume designing for movie/theatre productions. They will also be useful for museum curators and historians engaged in artifact documentation, restoration and preservation.

OBJECTIVES

The objectives of the study are:

- 1) To develop a comprehensive database of selected patents that are listed in the USPTO *Apparel* class (#2) and *Foundation Garments* class (#450), with basic information, problems that the invention is attempting to solve, and a short description of each patent.
- 2) To determine trends in patent activity by: geographical dispersion of patent activity,

²⁴ Roth (1981) argues that most inventions by women were related to the household. For example, furniture and furnishings were –understandably– an area in which women had ideas and experience.

²⁵ The patent might have become obsolete even before it was granted, because the process of applying for a patent was a long and costly process, and at the same time the fashion cycles may have been shorter.

gender of patentees, type of invention, prolificacy of certain inventors, cycles of patent activity, time elapsed between patent application and approval, and assigned patents versus patents not assigned to a company or person.

- 3) To research one class of apparel as an example of the usefulness of patents for dress history research.

RESEARCH QUESTIONS

The introduction of the sewing machine in 1846, which dramatically reduced the sewing time, generated an increase in the commercial development of clothing patents (USPTO, 1988). Combined with the existence of the fashion plates published in the American magazines, these factors might have given the inventors new ideas for clothing patents to register.

As the 19th century progressed, with the rise of the middle class and urban society, the fashions continued to change at an increasing rate. Kidwell (1979) remarks: “These new fashions called for more fitted garments of more complicated cut. To keep informed of the latest innovations customers and dressmakers eagerly sought European magazines with fashion illustrations. When American magazines such as *Godey’s Lady’s Book* and *Peterson’s Magazine* were established in the second quarter of the 19th century, they included fashion plates that were copied from European illustrations. These widely distributed publications gave women, even in remote areas of the United States, the opportunity to learn about fashionable styles. In the 1850s these magazines began to include pattern diagrams and full-size patterns.”

I intend to use women’s nether garment patents to answer the following research questions:

- 1) What patents indicate the functioning of the “fashion process” as it existed in 19th century America? How do patents relate to fashion cycles as described in current fashion history scholarship?
- 2) What patents serve as indicators of the importance of fashionable features of women’s dress (i.e., bustles, floor length skirts)?
- 3) What clothing inventions were patented to aid in the physical functioning of women’s apparel (i.e., skirt lifters, skirt protectors)? Were there patents that indicated specialized apparel to facilitate women’s roles (maternity, participant in sports activities, specialized occupations for women)?
- 4) Apparel for women is reported to have lagged behind men’s apparel in converting from custom-made to ready-to-wear production. Considering that patents are important in establishing the manufacturing process, does the patent record show evidence of inventions intended for *ready-to-wear* production?
- 5) How many patents relate to the healthiness of women’s dress (i.e., undergarments, specialized clothing for invalids)?
- 6) What other themes related to women’s fashionable dress exist in the patent record?

STATEMENT OF NEED/IMPACT

In the apparel field, patents could indicate technical level, capabilities, and accomplishments, both statistically and pictorially, at the same time and in the same document. Patents consist of two parts: one has drawing(s) showing the object, and the other summarizes its respective description. Usually, the description provides a better narration about the development of patented techniques than any other source. In general, apparel items per se are greatly affected by the passing of time, and many of them do not survive. Their images might remain in various publications, but complete information about them would be lost in the absence of patents.

Welsh (1965) suggests that “the drawings ... will be used to describe forgotten techniques and implements, to suggest attitudes of taste and fashion, to define technical accomplishment, or to document survivals of the past; in other words, they will be used as cultural documents reflective of a very wide range of activity within a given period.”

In 1872, the Patent Office started printing copies of every United States patent in its publication, the *Official Gazette*.²⁶ Ultimately, this collection of patents became the world’s greatest scientific and mechanical library, and therefore an important educational factor for the interested public.

Traditionally, the patent collection served the information needs of inventors, their attorneys, and agents, and patent examiners involved in determining the

²⁶ Since 1872, *Patent Official Gazette* is the official journal of the U.S. Patent and Trademark Office relating to patents. Issued each Tuesday, simultaneously with the weekly issuance of patents, it contains a selected figure of the drawings and a claim of each patent granted, indexes of patents, list of patents available for license or sale, and general information, such as orders, notices, and changes in rules and classification. *Trademark Official Gazette* is the official journal of the U.S. Patent and Trademark Office relating to trademarks. Published also every Tuesday, it contains an illustration of each trademark published for opposition, a list of trademarks registered, classified list of registered trademarks and Office notices.

patentability of new inventions. In more recent years, however, the patent file became a valuable resource for a much larger community of users who research patent data from a decidedly different perspective. Within numerous academic and professional disciplines, there is growing recognition that trends in patent activity, observed over time and involving large numbers of patents, can indicate a great deal about the status of social and economic forces that guided and influenced the inventive process (USPTO, 1992). Apparel patents are rich primary sources that document the past. Until now, they have remained mostly untapped, and therefore these patents need immediate examination.

My study brings to light many important contributions in clothing as described in inventions, thus attempting to fill the existent gap in the knowledge of clothing patents. I researched 864 utility patents, which represents 5% of all the patents issued between 1827 and 1920 in *Apparel* and *Foundation Garments* classes (class 2, and class 450). However, there are many other categories not included in my database waiting to be further researched by specialists, most of them design patents,²⁷ as could be observed from Table 1. For example, the *Garments* category (which is different from Apparel or Foundation Garments classes) contains various subclasses like *Knitted Garments* (subclass 66/171), *Surgery*²⁸ (classes 602, 604 and 607), *Buoys, Rafts, and Aquatic Devices* (mainly subclass 441/88 – Life Preservers), *Boots, Shoes and Leggings* (class 36), and *Aeronautics* – Parachutes attached to garments (subclass 244/143).²⁹

²⁷ Design patents seem to be more numerous than utility patents.

²⁸ From Surgery classes, the following subclasses are listed in Garments category: 602/1 – Orthopedic bandage, 602/67 – Perineal support, 604/393 – Specific garment, holder, or support for absorbent pad, 604/356 – Receptacle placed under or against body to collect discharge during surgical or obstetrical operations, 607/149 – Means for holding light, thermal or electrical energy applicator against the body tissue.

²⁹ See Appendices – *Definitions*.

Table 1. Index to the US Patent Classification³⁰

Class	Subclass	#	Class	Subclass	#
Apparel		2	Design		<u>D02</u> / <u>700+</u>
Adornment, attachable		<u>D11</u>		Hosiery	<u>D02</u> / <u>983+</u>
Apparatus		<u>223</u>	Dress		<u>D02</u> / <u>756+</u>
	Boot and shoe making	<u>12</u>	Exercise suit		<u>D02</u> / <u>731+</u>
	Knitting	<u>66</u>	Female support under- garments		<u>450</u> / <u>1+</u>
	Patterns	<u>33</u> / <u>2 R+</u>	Fire fighters		<u>169</u> / <u>48+</u>
	Sewing	<u>112</u>	Footwear		<u>D02</u> / <u>896+</u>
	Weaving	<u>139</u>	Hand coverings		<u>D02</u> / <u>610+</u>
Blouse, shirt		<u>D02</u> / <u>840+</u>	Headwear		<u>D02</u> / <u>865+</u>
	Design	<u>D02</u> / <u>896+</u>	Knitted		<u>66</u> / <u>169 R+</u>
	Making	<u>12</u>	Layout and measure- ment means		<u>33</u> / <u>403+</u>
Cape, stole, shawl		<u>D02</u> / <u>823+</u>		Footwear	<u>33</u> / <u>4+</u>
Catamenial and diaper		<u>604</u> / <u>358+</u>		Garments	<u>33</u> / <u>11+</u>
	Design	<u>D24</u> / <u>125+</u>	Leather manufac- tures		<u>69</u>

³⁰ USPTO, 2002. This classification includes both utility and design classes of patents. Classes of utility patents have no prefixes. The first number represents the class of invention, and the number following the slash is the subclass of invention within the class. Classes of non-utility patents have prefixes: D for Design Patents, PP for Plant Patents, RE for Reissues, T for Defensive Publications, and H for Statutory Invention Registrations (SIRs). Letter R that follows the class/subclass number (e.g., 66/169R) means Residual, and it is an artificial designation by USPTO for a group of patents that does not fall in any of the established classes/subclasses.

Class	Subclass	#	Class	Subclass	#
Ceremonial robe		<u>D02 / 739</u>	Light thermal electrical treatment		<u>607 / 149+</u>
Cleaning	Brushing devices	<u>15</u>	Lingerie		<u>D02 / 700+</u>
	Ironing or pressing	<u>38</u>	Locks for		<u>70 / 59</u>
	Methods	<u>8 / 137+</u>	Marking & measuring instruments		<u>33 / 2 R+</u>
	Washing devices	<u>68</u>	Neckwear		<u>D02 / 600+</u>
Coat, jacket, vest		<u>D02 / 828+</u>	Respirators		<u>128 / 200.24+</u>
	Coat combined with dress	<u>D02 / 760+</u>	Skirt		<u>D02 / 851+</u>
Collar making		<u>83 / 901*</u>	Stockings, socks		<u>D02 / 980+</u>
Containers for		<u>206 / 278+</u>	Swimming suit		<u>D02 / 731+</u>
	Making	<u>493 / 938*</u>	Tennis		<u>D02 / 731</u>
	Making garment bag	<u>493 / 935*</u>	Travel bags for		<u>206 / 278+</u>
	Making with support	<u>493 / 939*</u>	Under-garments		<u>D02 / 700+</u>
Costume		<u>D02 / 741</u>	Vestment		<u>D02 / 739</u>
	Hosiery	<u>D02 / 980+</u>			
	Negligees	<u>D02 / 718+</u>			

The relationships between patentees' accomplishments and the functionality of their inventions, particularly in specialized garments for occupations and sports, could reveal the patentees' ingenuity, and how they responded to rapid industrialization, or to the introduction of sports as leisure activity. The patents also reveal that some of today's

successes like Nike air cushion shoes (Figure 3) are based on more than 120-year-old patented ideas. Also, mapping the parallel between the fashion cycles of dress as presented in fashion magazines, and the clothing inventions related to dress shaping could conclude if at any time the inventions were up-to-date or lagged behind the fashion.

(No Model)
G. F. BUTTERFIELD.
AIR CUSHION FOR BOOT AND SHOE SOLES.
No. 259,092. Patented June 8, 1882.



Fig. 1.

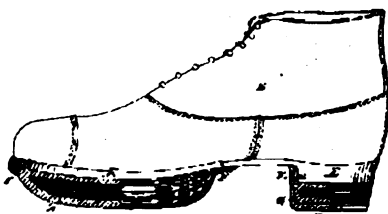


Fig. 2.

Witness:
H. C. Hymovich,
J. C. Hymovich.

Inventor:
George F. Butterfield
John Hymovich
A. H. Hymovich

(No Model)
G. F. BUTTERFIELD.
AIR CUSHION FOR BOOT OR SHOE SOLES.
No. 302,190. Patented July 15, 1884.



Fig. 1.

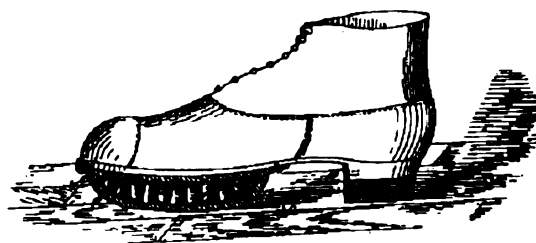


Fig. 2.

Witness:
A. H. Hymovich
H. C. Hymovich

Inventor:
George F. Butterfield

Figure 3. Patents 259,092 (1882), and 302,190 (1884) – Air cushion for boot or shoe soles, by George F. Butterfield of Stoneham, MA

Several patents were assigned to manufacturing companies. Though it is not the intent of this research to see if the approved patent was ever introduced in production, the number of patents having an assignee³¹ could reveal the interest of manufacturers for particular items of clothing, and which ones –men's versus women's patents– are

³¹ The *assignee* is the party to which a transfer of property, rights or interest is made by the patentee (*assignor*). The patent law provides for the transfer or sale of a patent by an instrument in writing, i.e., *assignment* (See Appendices – *Definitions*).

preponderant. Furthermore, it could be inferred that these items were intended for *ready-to-wear* production, a new concept at the end of the 19th century, and a time when women entered into the work force in large numbers. In this study, the impact that the development of clothing patents had on society as a whole is not viewed as unidirectional, thus leaving the possibility to reveal the major influence that patents had in turn on society: they not only changed fashion or improved functions of clothing, but modernized entire concepts and rules of the proper roles for women in society, defying the prescripts of the Victorian era.

The outcomes of this endeavor are intended to broaden the scholarship in this field, and help academic researchers, museum curators, designers and students by providing new insights into the history of technology. Patents described in this study provide a solid database that could facilitate further research in various areas, such as women's history, material culture, theatrical design, fashion design, business history, museum curatorship, or it could be used for didactic purposes.

CONCEPTUAL FRAMEWORK

The collection of patents mirrors through contemporary illustrations the activity of American society on a year-by-year basis, argued to be better than any other publication of the time. Patent applications show the fact that persons at all levels accepted the machine as a basic part of American life. In 1846, Elias Howe Jr., of Cambridge, Massachusetts, received a patent for an “Improvement in Sewing Machines.” By inventing a “new and useful machine for sewing seams in cloth or other articles,” Howe gave a new stimulus to industry (USPTO, 1988).

The level of living could also be assessed from the patent records. Welsh (1965), remarked “the large number of patents for household appliances [which] reflects an increased standard of living in a new nation where comfort and convenience gradually emerged as middle-class prerequisites. For example, pianoforte patents increased greatly between 1830 and 1847. Piano in every parlor could be seen as a sign of increased leisure in a society where young women now found time to give recitals at the piano instead of an extra hour at the loom or wheel. Or it could be a response to a technical advance, the application of the metal frame to piano³² construction.”

Kidwell (1979) explains how social changes generated by the technical revolution affected clothing manufacturing: “New factories drew rural populations to urban production centers. Those wanting ‘respectable’ city clothes rather than laboring garb were increasing in number, but they could not afford the exclusive prices of traditional made-to-order work. [...] At the same time, they [tailors] were subjected to consumer

³² Toward the end of the 19th century, the mechanical pianos were a craze. An African-American inventor, Joseph Hunter Dickinson, of New Jersey, invented “devices for automatically playing the piano that were incorporated in the construction of some of the finest player pianos in the market” (Baker, 1969).

pressures to keep their prices down. Tailors, especially those wanting to take advantage of the new market opportunities, were in a position to welcome any new technique that would solve their cutting problems. Technological development was essential if clothing manufacture was to be shifted from custom tailoring to mass production –that is, producing for the masses.”

In the clothing industry, the sewing machine and the dressmakers’ drafting devices³³ patents had a great importance in the democratization of clothing. They “reduced the amount of time and skill required to cut a fashionable garment that fit well.”³⁴ The concept behind the first generation of drafting systems was used as the basis for the sizing systems in the paper pattern industry and the women’s ready-made clothing industry” (Kidwell, 1979).

Nevertheless, there were probably many clothing items that were manufactured but not patented, and many that were patented but were never manufactured. Though patentees created numerous inventions and innovations, there were other categories of people working in manufacturing and marketing that brought the patents to fruition. The U.S. Patent Office granted patents, but could not assist in the development and marketing of an invention. The only help that a patentee had from the Patent Office was to publish, at owner’s expense, a notice in the weekly *Official Gazette* that the patent was available for licensing or sale. As a result, a patentee was supposed to consult Chambers of Commerce, banks, industrial development organizations, or similar groups for help in

³³ “In the 18th century, a tailor measured his customer with a long strip of paper or parchment, recording the pertinent dimensions by cutting notches in this strip. [...] Each cutter had his own particular way of marking his “measure,” ... and thus one cutter would have found it difficult to understand another cutter’s measure” (Kidwell, 1979).

³⁴ “Dressmakers’ drafting systems with specialized tools became obsolete in the 20th century after simpler, less fitted dress styles became popular” (Kidwell, 1979).

promoting the invention.

A journal that was ‘the advocate of industry and journal of scientific, mechanical and other improvements,’ *Scientific American*,³⁵ published ‘the claims of inventors to new inventions and improvements recently entered at the Patent Office.’ Page four of each number was dedicated to “New Inventions;” over time, the journal also allocated pages two and three for publicizing the inventions due to rapid increase of registered patents. Moreover, *Scientific American* had examiners ‘with extensive experience in mechanical and chemical improvements’ who gave advice ‘free of charge’ to inventors in regard to the novelty of their new applications³⁶ –and implicitly their preliminary review insured patentees’ success before the Patent Office. The new inventions were published in a quite short time from their approval. For example, patent 4,897 – Lady's Skirt, was approved on December 17, 1846 (patentee – Sewall Folsom), and it was advertised in *Scientific American* on January 30, 1847 (Volume 2, Issue 19, p. 148³⁷).

The most important category in deciding the success or failure of a patent was that of the consumers, who assessed the value of the product, and who sometimes modified the product according to their expectations through buying patterns and commitment to the product. Yet, the characteristics of all categories of people involved in the process were a product of social and cultural environments.

Because Roach and Musa (1980) considered the interaction of various environments in studying Western dress and the fashion process, the patents were

³⁵ First published on August 28, 1845. It was a weekly publication having eight large pages. The price of the subscription was \$2 per year, or \$1 for six months.

³⁶ *Scientific American* furnished a printed circular of information to all interested patentees ‘giving instructions as to the proper method which should be adopted in making applications’ (Volume 12, issue 36, p.282, May 16, 1857). [Online]. Cornell University Library (2004). Available: http://cdl.library.cornell.edu/moa/moa_browse.html [17 August, 2004].

³⁷ [Online]. Cornell University Library (2004). Available: http://cdl.library.cornell.edu/moa/moa_browse.html [17 August, 2004].

researched in the conceptual framework they proposed. In their opinion, the basic factors that influence the specific forms of dress³⁸ chosen by members of a particular society – and the functions served by these forms– are related to climate and availability of natural resources within the natural world, culture contact and trade, technology and inventions, social structure, economical, and political conditions/events that transform the world.

Roach and Musa argue that: (a) the development of technology for production of textiles in clothing in 18th, 19th, and 20th century Europe and America eventually had the effect of making some version of fashionable dress available to nearly everyone, including the working class; (b) three conditions are necessary for a fashion system³⁹ to operate: the existence of a multi-level class system, within which more than one class is able to participate in fashion change in dress; the possibility of mobility from one class to the next; and the presence of competition between at least two classes. In their opinion, “the fashion system has a network of people that includes those who introduce or propose changes in dress, and those who adopt at least a portion of the proposed changes.”

Fashion change is the process of replacement of an old fashion by a new one, which happens because of the complex relationships between the environments, and *fashion system* mediation that provides the means for continuous change of fashion.

Roach and Musa compare the fashion change with a discrete erosion of aesthetic preference enough that changes proposed will be accepted. The change in forms of dress from one year to the next is small, but “the accumulation of several years can create the

³⁸ Dress is the total arrangement of all outwardly detectible modifications of the body itself and all materials objects added to it (Roach and Musa, 1980). They emphasized that “an assemblage of elements of dress only becomes dress while being displayed on a human body.” They also underlined that dress can be perceived as a Gestalt: the total becomes more than the sum of its parts when a combination of any *specific* modification of the body itself and element of dress (any object added to the body) take place.

³⁹ A *fashion system* provides the means whereby fashion change continually takes place.

impression of a sharp break with the past.” The authors also point to several studies that reveal differing rates of fashion change among persons of different economic strata. They define fashion as being: “The total process of adoption, use, discard, and substitution of items, or aspects of dress, within what we are calling a fashion system is a type of collective behavior, and consequently, a form of dress, or a way of using it, is not a fashion, or ‘in fashion,’ until it has been adopted and used by a large proportion of people in a society (or segment of a society) who are eligible to use it.”

At a micro (individual) level, Roach and Musa acknowledge the importance of functions of dress (how dress serves human beings) in relationship with the environment, which all affect the maintenance, survival, and change of individual human beings, society, and culture.

They classify the basic functions of dress in: a *physical environment*, and as a *means of communication*. “As a physical environment, dress is (1) a *micro-environment* that interacts with the body, and (2) an *interface* between the body and a macro-environment that includes biological, physical, and, according to belief, supernatural components. As a *means of communication*, dress conveys several interrelated types of information about people.” Roach and Musa give an example of how the functions of dress sustain individual human beings through its capability to achieve bodily comfort and survival within potentially hostile environments. However, emotional responses to dress emanating from its psychological component “are facilitated by what dress communicates to the wearer, as meanings for dress are learned through direct or indirect contact with other people. Through time people learn what kinds of reactions to dress to expect from others and can respond to their own dress on the basis of how they anticipate

it will be received by others.”

Roach and Musa identify functions of dress in sustaining the society by expanding the individual survival due to the protection offered by dress, to collective survival. They also argue that in society dress served as a cue that was instrumental in the attraction between sexes, in signaling social status, in maintaining social solidarity within national units, and in promoting social change (e.g., social roles for women in the 19th and 20th centuries). Other important functions of dress described by Roach and Musa are in sustaining the culture. The cultural patterns for dress are agreed and established by the society in terms of: what forms of dress should be, how these forms should be used, and what meaning is attributed to them. “Once cultural patterns for use are established, forms of dress become receptacles for shared meanings,” (Roach and Musa, 1980). By extrapolation, the clothing patents should also follow the fashion cycles, have the same functions, and follow the same discrete erosion of aesthetic preference that brings about fashion change, as dress does.

Kaiser, Nagasawa, and Hutton (1995) employ a similar contextualist approach, like Roach and Musa used in their framework, but using a different terminology for analogue concepts. Figure 4 synthesizes the Symbolic Interactionist (SI) Theory developed by Kaiser et al., where the new concepts are: Ambivalence (mixed emotions), Symbolic Ambiguity (potential for multiple meanings), and Negotiation. The theory is based on five principles:

1. Human Ambivalence. Tensions exist between individual freedom and social conformity (ambivalence is a basic human condition).
2. Appearance-modifying commodities in the capitalist marketplace (development of

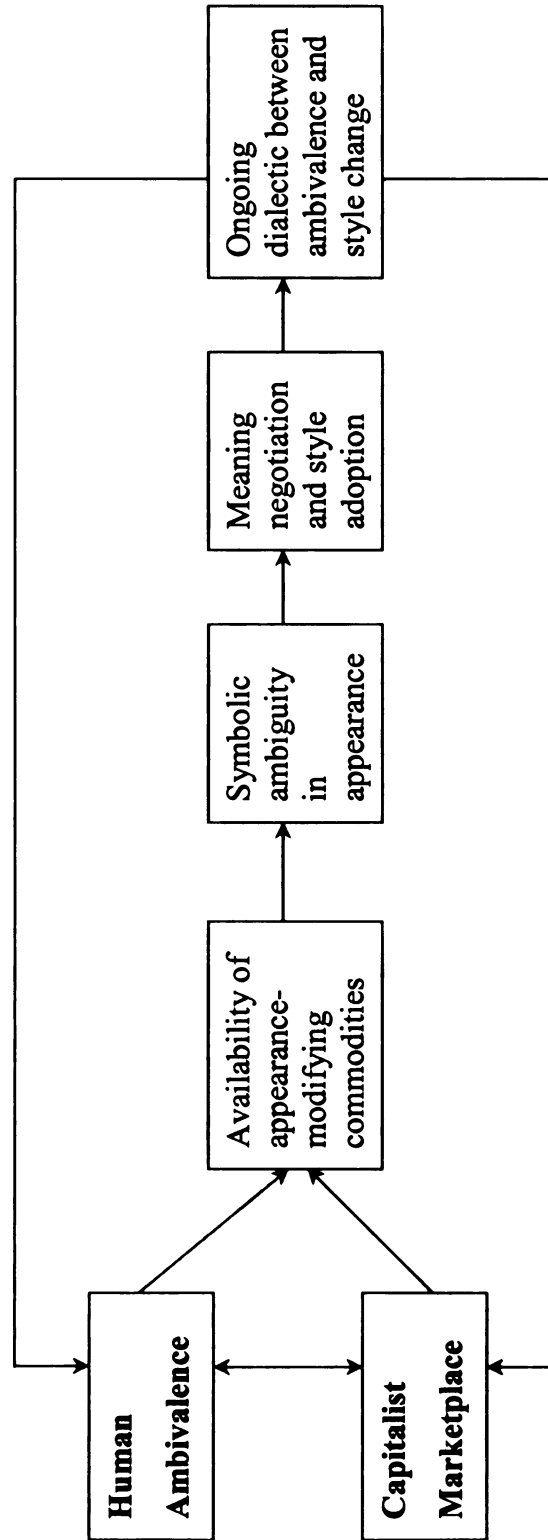


Figure 4. The fashion process: Changes in appearance styles according to Symbolic Interactionist Theory (Kaiser, Nagasawa, and Hutton, 1995)

fashion innovation and competition): *If Human Ambivalence exists, then in an open marketplace new appearance-modifying commodities will emerge to express this ambivalence.*

3. Symbolic Ambiguity. *If new appearance-modifying commodities emerge in the open marketplace to express ambivalence, then appearance styles created by consumers will convey symbolic ambiguity.*
4. Meaning Negotiation and Style Adoption. *If appearance styles convey symbolic ambiguity, then the meanings of these styles will be collectively negotiated in social interaction, and style that becomes meaningful will be adopted by a majority of consumers.*
5. Ongoing Dialectic: Ambivalence and Style Change: *If certain appearance styles are adopted by a majority of consumers but do not resolve ambivalence, then appearance styles will undergo change in an ongoing dialectic between ambivalence and style change.*

Like Roach and Musa (1980), Kaiser et al. convey the same idea of gradual transition from one style to another: “changes in styles⁴⁰ are evolutionary rather than revolutionary, thus new commodities are likely to be composite visual images that seem both vaguely familiar and decidedly novel.”

The patenting process is an evolutionary rather than revolutionary process, too. Helvenston (2002) reached this conclusion by researching the history of the featherbone⁴¹ invention. This invention was intended to replace the expensive and brittle whalebone,

⁴⁰ In this process, experimenting with new appearances is an important factor.

⁴¹ Featherbone was a whalebone substitute, made from the shredded quill portion of turkey feathers, bound into cords, and several cords were bound together side by side to create a stiffening blade or a garment stay. In 1883, Edward K. Warren was granted the first featherbone patent.

and to recycle the discarded feathers from feather duster factories. Helvenston describes the environmental factors that brought about the transition to other materials for stays: “The decline was based on the devaluation of whale oil due to the discovery of cheaper lard oil and petroleum. Eventually, whales were hunted chiefly for whalebone. So claims about the scarcity and expensiveness of whalebone were real. [...] The challenge for the inventors was to produce a stiffener that had the strength, light weight, and flexibility of whalebone, but which could be cheaply and easily manufactured.” Helvenston infers that Warren’s idea did not come all of a sudden, because a letter was discovered from the U.S. Patent Office addressed to him, and which was dated prior to his invention. This letter led Helvenston to believe that “Warren was certainly aware of the technological system within which he was working.”

Indeed, the Act of 1836 that changed the patenting law, reestablishing the examination system in effect before 1793, constrained USPTO to grant patents on merits of usefulness or novelty of the inventions, and not merely for a payment fee. Also, patented models were displayed to the public in galleries, in Washington, and later on the *Official Gazette* kept the public informed regularly about the latest patents. As a consequence, the patentees became aware of previous developments in their USPTO classes/subclasses of interest, and hence they avoided rejection of their patent applications.

Many clothing patents include an acknowledgement of earlier patents, and state the problem that should be corrected. Thus, often times the new patent is an improvement of an old one. The evolution of a product toward a superior functionality encompasses all small steps taken with each utility patent granted. For example, in 1848,

W.E. Meginnis was granted patent 5,441 – Lady's Corded Skirt, which is an improvement of patent 4,897 – Lady's Skirt, issued two years earlier to S. Folsom. Both patents deal with fabrics for petticoats with cordage. The old patent had the sissal or manila hemp cord twisted in only in one direction. Meginnis commented on the Folsom fabric that had a tendency to “kink vertically, obliquely, and horizontally, and extend the dress upward, when the wearer is seated, giving it the appearance of a number of inflated bags.” Therefore, he came up with a fabric having interwoven alternate threads or cords twisted in opposite directions.

Sometimes the patentees were their own critics of their shortcomings. By recognizing them, they worked to correct the deficiencies, and came up with improvements. One example is patent 273,165 – Pannier and Bustle (1883), which is an improvement of the patent 257,769 (1882) – Skirt and Pannier, and having the same author. The patentee said: “One of the principal objects of my present invention is to remedy this defect” [the arranging of the springs that wore the textile]. Moreover, in 1884 and 1885 the same patentee brought up other improvements of his previous patents (patent 308,996 Pannier, and patent 312,518, respectively, Pannier and Bustle) consisting in removable springs from the pockets of the hoop-skirt. In another instance, the inventor of patent 49,447 – Improvement in Hoop-Skirt Joints (1865) purchased the right to make and sell “the Moody skirt,” to which he –subsequently– brought an improvement.

The progress achieved through small increments is best illustrated by the bustle and hoop developments. The first bustle made of strips of whalebone was patented in 1857 (Patent 17,082 – Bustle), and 1858 the first ‘cage’ type hoop-skirt was introduced (20,561 Skirt-Hoops). Their role was to support the skirts “upon the hips in a manner

which shall relieve the body from compression around the waist, as well as from the great thickness of the numerous skirts around that part of the body” (patent 24,720 – Skirt-Supporter, 1859). Additionally, the bustle brought the fullness of the skirt to the rear. By the 1870s, almost all the bustles and hoops (*the available appearance-modifying commodities*) incorporated metal strips and/or wire, which was clearly a reflection of the rapid increase of the *industrial capitalism* based on new technological discoveries.

Some of the patents combined the functionality of two items into one, e.g.: bustle as an extension of the corset, or as an intrinsic or detachable part of the petticoat or pannier (tournure) or hoop-skirt.⁴² The prevalence of the bustle over the hoop-skirt in the 1870s was a result of the *collective negotiation of the meanings* of these styles, in social interaction. The *ambivalence* created by the parallel existence of these two commodities explains why the number of bustle patents approved in the first wave of the bustle cycle was approximately four times lower than in the second wave. After almost a decade of *ongoing dialectic between ambivalence and style change*, the extreme bustle style was finally adopted. An example of the role society played in deciding the appropriateness of the new *appearance styles* created by consumers that conveyed *symbolic ambiguity* is given in patent 1,245,720 – Wearing-Apparel (1917) in which the patentee seemed to be compelled to design a sport costume with both “complete freedom of the lower limbs” and the “esthetic element of conventional drapery.” The inventor stated in his patent: “I accomplish this end by means of certain provisions in themselves not radical in plan, but on the contrary such as have been found to be practical and acceptable under present standards of civilization. I combine these, however, in such a way as to produce a wholly novel article in regard to its practical utility.”

⁴² Many of the hoop-skirt patents include references to the “bustle” portion, and the [hoop] “skirt” portion.

PROCEDURES / METHOD / STUDY EVALUATION

USPTO (2002) defines the *Apparel* Class as the “generic class for garments and other devices to be worn by mankind to adorn, cover or protect the body or person. Included within the class are (1) such garments or devices, per se, (2) combinations of such garments or devices with other things where the combination is not elsewhere provided for, (3) processes of, and patterns for making such garments or devices, (4) subcombinations of garments and the like, not elsewhere provided for and processes of manufacture relating to such subcombinations, and (5) garment supporters and retainers.”

The Apparel class is formed mostly of utility patents, and very few design patents.⁴³ *Utility patents* are granted to “anyone who invents or discovers any new, useful, and nonobvious process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof.” *Design patents* are granted to “anyone who invents a new, original, and ornamental design for an article of manufacture.” Conversely, the listings of design classes contain mostly design patents, and very few utility patents. These patents could be easily differentiated from utility patents because they have a capital letter D preceding their number. Design patents are not included in this study because they focus on ornament more than function.

According with USPTO, the *Utility apparel patents* classification is different from the *Design apparel and haberdashery patents* classification. In both classifications, there are hierarchic rapports between classes and subclasses. For an easy representation of the selected subclasses studied, I use the generic term *class* interchangeable with *subclass*.

⁴³ Same for Foundation Garments, class 450.

The format for patents is fairly standard. They usually consist of *drawings* that illustrate the invention, and text to describe prior related inventions, the particular problem that the invention is attempting to solve, *specifications* of the invention itself and how it is constructed, and specific *claims* of novelty or uniqueness of the invention. When searching a patent on USPTO's website, the result is presented also with a cover

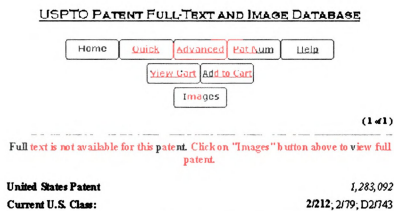


Figure 5a. Example of multiple classes/subclasses listing

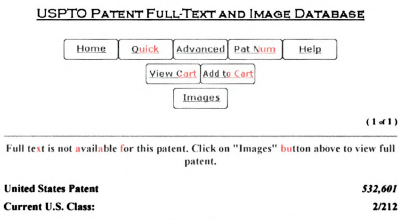


Figure 5b. Example of single class/subclass listing

page in which the main class/subclass of the patent is written in bold letters/figures, according to the main claim of the patent. If the patent has other claims, the subclasses in which it fits are listed too, but written with regular font; some of the patents are classified as both utility and design patents (Figure 5a). Other patents pertain to only one class (Figure 5b).

The drawing pages precede the specifications, as in Figure 6 and Figure 7. Some of the patents have only one page of drawing(s), and one page of specifications, other patents have multiple pages of drawings and specifications. In the example given in Figure 6, there are four pages of drawings and three pages of specifications. In the examples of patents that I chose to present in my dissertation, I tried to include all the drawings in the respective patents, and to summarize what inspired the patentee to focus

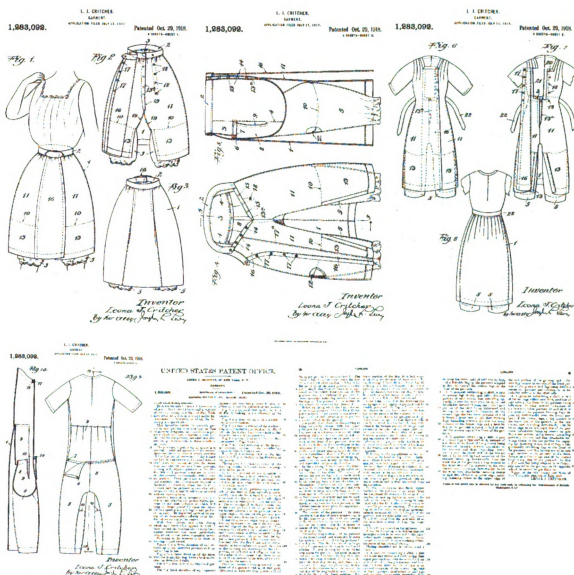


Figure 6. Drawings and specifications for patent 1,283,092

on an innovation in the field (where it was available), some of the explanation of how the improvement worked, and the claims made. Part of the patents' drawings are made on landscape orientation which are difficult to see when all the other drawings and texts are on portrait orientation. Therefore, after I transferred all the drawings in Adobe PhotoShop, I rotated the landscape images 90° clockwise.

(No Model.)

L. SITTIG.
SKIRTED TROUSERS.

No. 532,601.

Patented Jan. 15, 1895.

UNITED STATES PATENT OFFICE.

LENA SITTIG, OF BROOKLYN, NEW YORK.

SKIRTED TROUSERS.

Specification forming part of Letters Patent No. 532,601, dated January 15, 1895.
Application filed September 18, 1894. Serial No. 794,111. (No model.)

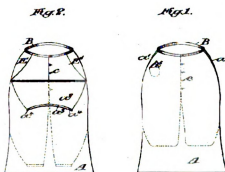
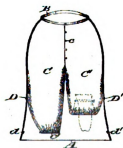


Fig. 3.



Witnesses:
George Conroy,
C. H. Hargreaves

Invention
Lena Sittig
by attorney
Brown & Howard

To all whom it may concern:

Be it known that I, Lena Sittig, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful improvement in Skirted Trousers, of which the following is a specification.

My invention relates to an improvement in skirted trousers in which a pair of trousers is so constructed with a skirt that the wearer will present the appearance of having a gracefully hanging skirt and will, at the same time, be provided in case of riding a bicycle, climbing, walking, or walking in a stormy wind, against exposure, and the legs of the wearer will draw in, and so will not be blown out or waisted, without interference from the skirt. A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a front view of the skirted trousers, showing the parts in the position which they assume when adjusted to the person. Fig. 2 is a similar view, showing the front of the skirt turned down, and showing, in dotted lines, the trousers underneath. Fig. 3 is a detail view of the front portion of the skirt removed and the trousers with one leg extended and the other turned up and secured beneath the knee of the wearer.

The skirt is denoted by A and is secured to the waist band B. The skirt is divided from the waist downwardly a short distance on each side, as shown at C and C', leaving a front flap D, which may be turned down into the position shown in Fig. 1, for the purpose of adjusting the skirted trousers for wear.

The flap D is provided with a band D' at its top and with suitable fastening device D'' as its means for the purpose of securing it to the band if it were turned up in the position shown in Fig. 1. The front flap D may further be conveniently provided with a side pocket or as shown in Fig. 1.

Trousers legs E, E' are permanently secured to the main body F from which the skirt A hangs, by stitching or other suitable fastening means, the said trousers legs being extended at the crotch from at or near the band at the back to the band at the front and provided with some suitable fastening device, such for example as buttons, at intervals for making them. The trousers legs at their

lower ends are gathered by a elastic band G to cause them to fit the lower leg and to hold them in a turned up position, after the manner of Turkish trousers, by clipping the elastic band G up in a position under the knee.

The trousers legs are permanently secured along their outer edges to the skirt A from the upper band down to a point where the flap D is joined with the skirt, for the purpose of making the upper portion of the trousers hang smoothly within the skirt and below this point they are further fastened at or about G opposite the knee portions by buttons, hooks or other suitable fastenings H, I, J, while the lower ends of the trousers legs may be secured with the skirt by appropriate fastening devices K, L near the bottom of the skirt for the purpose of preventing the skirt from flying up in windy weather when the trousers legs are in their normally extended position.

In constructing the trousers legs with the band and skirt, I prefer to lay the upper portion of the skirt over the upper portion of the trousers legs, as shown at C, C' and the openings in the sides of the skirt near the flap D are fastened to the back and will permit the hand to pass through the skirt and into the knee pocket or pocket as may be provided in the upper portion of the trousers.

The trousers may be adjusted to the wearer by simply lowering the front flap D and extending one or more of the buttons G at and below the band D at the front and after clipping the legs through the trousers, again buttoning the band and fastening the front flap to the band.

The article is very simple and graceful in external appearance and serves as a perfect protection for the limbs and body of the wearer in riding and walking and may be adjusted and removed with great facility.

What I claim is—
A skirted trousers, comprising a skirt, trousers within the skirt and permanently secured to the skirt at its top and its bottom and separate fastenings for securing the skirt to the trousers legs at the lower portions thereof, substantially as set forth.

LENA SITTIG.

Witnesses:
THOMAS HAYES,
GEORGE HARRY.

Figure 7. Drawings and specifications for patent 532,601 – Skirted trousers, by Lena Sittig

The identification of utility patents' number from the earliest in the 19th century to the latest issued in 1920 (the year that closes my investigation) was necessary because patents issued earlier than 1976 can be searched on USPTO's website⁴⁴ only by number

⁴⁴ <http://www.uspto.gov>

and current US classification, and not by key words, title of patent, author, etc. The patents are listed in descending order, from the most recent to the earliest. If there are reissued patents in a class, they are listed after the earliest patent, also in descending order. I chose from the USPTO listings only patents from the earliest date up to December 31, 1920. For this purpose, I established the number of the latest patent for each class, closest to December 1920, by plotting on a spreadsheet those patents that seemed to be the earliest or the latest patented. When another patent was patented even earlier or later than those already plotted, I added it to the spreadsheet. Thus, the earliest patents found out of 16,171 utility patents from Apparel and Garment classes (2 and 450, respectively) are: patent X4,935 – *Vest spring & stiffener* (1827), class 2/102 (Body garments – Vests); patent X8,205 – *Improvement in manufacture of napped hats* (1834), main class 2/175.1 (Head coverings having crown and horizontally extending brim, e.g., hat); and patent 90 – *Elastic ventilating-hat* (1836), main class 2/173.5 (Head coverings with outward bulge in crown), Figure 8.

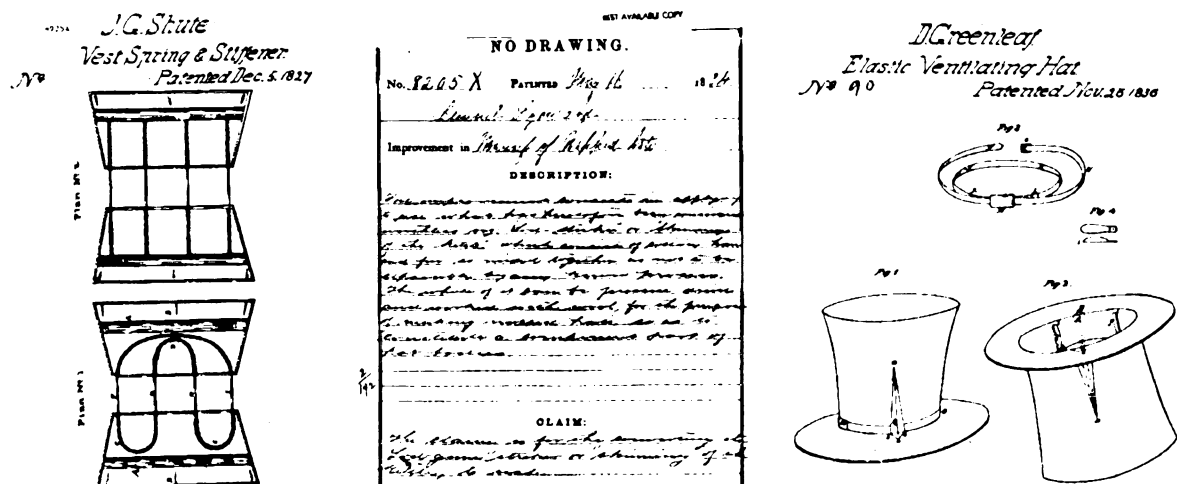


Figure 8. The earliest clothing patents

Patents having their number preceded by an X are patents reconstituted after the 1836 fire. Patent X8,205 is written by hand, and has no drawing. In this patent it is mentioned that “a sample of this material together with a hat body into which a portion of it has been wrought, accompanies this application.” The last patent included in my spreadsheet is patent 1,364,058 – Undergarment (class 2/113 – Body garments, shirt type undergarment) patented on December 28, 1920.

The patent information was entered into a Microsoft Access database, which was chosen for its capabilities to generate queries and reports. The comprehensive database has basic information for each patent: number, title, author(s), date of application and date of issuance, assignee(s) – if any, state/country of residency, and comments in monograph form about the subject of the invention and its claim(s).⁴⁵ Sometimes the patent’s title on the drawing(s) was slightly different from the title on the specifications (e.g., *improvement* was added to the title). I was consistent in transcribing the title of the patent that was mentioned in specifications, because it seemed to be more complete. Where the difference between the two titles was irreconcilable, both titles were mentioned, with the title on the drawing page in parenthesis.

The created database contains 16,171 utility patents only from *Apparel* – Class 2, and *Foundation Garments* – Class 450. Most of the patents pertain to more than one class, therefore it is possible that some of the patents from class 2 and class 450 might be found in other classes that refer to clothing (like Surgery, class 604).

I narrowed down successively the focus of my study to *Bustles* and *Skirts*,⁴⁶ in the *Nether Garments* class of the Apparel classification, thus reducing the number of

⁴⁵ The comment section was divided in: *Problem to Solve, Novelty of the Invention, Functional Purpose, and Fashion*.

⁴⁶ Skirts class (211) contains the *Hoop* subclass (216).

researched patents to 864. Bustles and Skirts classes allowed me an automatic second filtering, namely garments worn by women, and not by men or children. After printing all the patents in these classes (including those not included in my dissertation), I decided that only nine subclasses out of 14 are most representative for my purpose.

For my in depth research, I selected a group of patents which is a sample of approximately 36% of the 864 patents in the Nether Garments class. In my analysis, I excluded 33 patents from the USPTO classification for two reasons: 1) their subject matter did not pertain to the focus of this dissertation (e.g., patents referring to adornment, tools/machines/devices, or methods/treatments related to clothing), or 2) they did not relate –in my opinion– to the assigned classes (Table 5, Table 10, Table 13, Table 15, and Table 19 – in Results/Content Analysis Chapter).

The criterion for choosing a group of patents for in depth study was somewhat subjective. I browsed each of the 864 patents, and I tried to sample as many patents as possible showing different shapes or functional principles of a garment from a certain class, and –where available– I presented drawings of women wearing the improved bustles, skirts, or hoops (*purposive nonrandom sampling*).⁴⁷

The earliest patent of included in this study was patent 4,584 – [*Improvements in fabric for*] *Lady's skirt*, approved on June 16, 1846 (class 216 – Hoop Skirts), and the latest was patent 1,360,362 – *Petticoat*, approved on November 30, 1920 (class 211 – Skirts), Figure 9.

⁴⁷ A major disadvantage of purposive nonrandom sampling is that the researcher's judgment may be in error when estimating the representativeness of the sample or the expertise regarding the information needed. Other statistical sampling methods, like *Random sampling* (simple, stratified, or cluster), or *Systematic nonrandom sampling* could be used instead to improve the generalizability (external validity) of the study.

The approval date is present on all the patents, but application date not. This information is missing in patents issued previous to 1873. After that, the format of the patent changed slightly over time, one of the modifications being the inclusion of the application date in the patent specifications.

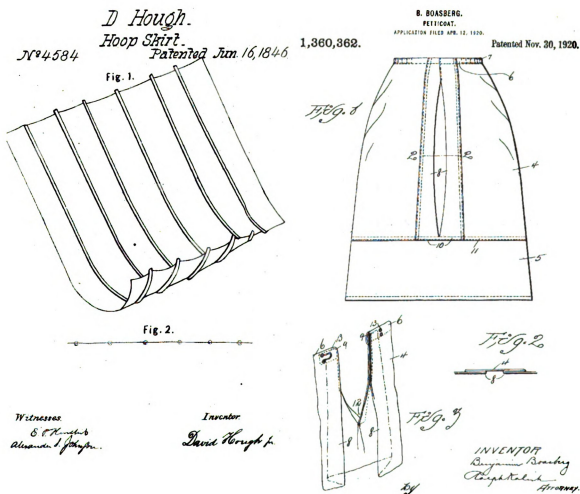


Figure 9. The earliest patent (4,584) and the latest patent (1,360,362) included in the present research

In some instances, the application date is more relevant than the approval date of the patent in judging the awareness of the patentees to the fashion style of the time. In comparing the closeness of fashion trend and patent activity, I considered useful to

introduce the notion of *days elapsed* between application and approval dates for a patent. The value of calculating the days elapsed was in evaluating how close the patent activity followed the fashion style. The smaller the difference between approval and application of a patent, the better was the likelihood to be current with the latest trends, and the patentee to benefit from his/her invention. The value of days elapsed could be calculated starting with patents issued from 1873 on. The earliest application date of January 12, 1872 is mentioned in a Bustles class patent, #141,854 – Improvement in Paniers, which was approved on August 19, 1873.

The average number of days elapsed by state and city, and by patents assigned or not, could give a glimpse of the intensity of the patent activity by geographical region, as well as the time frame and the speed with which some of the patents might have entered the economic circuit. Through the years the Patent Office struggled to keep up with the patent applications because most of the time it was understaffed. If the fluctuation of Patent Office personnel over time is not taken in consideration, then I could assume that any change in the average of days elapsed per year was due solely to the interest/disinterest of the economy or society for certain products, at a certain point in time (the application date of the patents submitted that year).

These data were examined using content analysis. First, a quantitative analysis was used to determine trends in patent activity by region, gender of patentee, type of invention, cycles of patent activity, the productivity of certain inventors, and other themes derived from the data. Then, a qualitative analysis was completed to look for themes within the text and drawings of the patent about fashionability and functionality of dress.

I considered it necessary to bring up women's contribution to apparel patent activity.⁴⁸ I tried to decide if the patentee was a female or male by his/her first name, and where I was uncertain I got help from an Internet website.⁴⁹ I avoided labeling "unknown" first names that I had doubts if they were male/female because it would have hampered the analysis of the data. Where only the initial(s) of the first name(s) was provided, I looked in both drawing and specification parts of the patents to check if the patentee's signature could provide the whole first name. Though in two cases there were only initials of the first names, I attributed the patents to female patentees because in the specification "Mrs." or "Madame" was used before patentee's name. These two cases are: patent 42,677, *Improvement in Hoop-Skirts*, which starts with "Be it known that I, Mrs. S. A. Moody, ...," and patent 87,648, *Brace and Suspender Combined*, which starts with "Be it known that we, Madame E. L. Demorest, [...] and W. G. Cook," From these two examples I assumed that all the other initials that were not preceded by Mrs., Ms., or Madame, were male name(s). As a consequence, for latter invention, patentee E. L. Demorest was classified as female, and patentee W. G. Cook –as male. After 1869 first names are not presented anymore as initials, probably because on July 1870 the most important patent act since 1836 was passed. This act required a standardized form of the specifications and drawings to simplify the process of reproduction.

Bustles class (210) has no subclasses, therefore a need for organizing the patents according with their main characteristics was needed. The classification of bustles proved to be a difficult task since the patentees tried to include in their claims as many

⁴⁸ The real number of women patentees is difficult to ascertain since some women presented their invention under men/husbands' name presuming that it would speed the granting (Macdonald, 1992).

⁴⁹ <http://www.enlightenedsoftware.com/babynames/>

alternatives for materials and construction as possible. Thus, most of the patents could be classified in more than one category, for example by different materials or shapes of the bustles. My categorization is presented in Appendices, Table 29.

Skirts class (211), though organized in subclasses by USPTO, could have an improved system of classification if the class definitions were not so vague. In my opinion, the recurrent claims are for adjustability and versatility of the skirts, therefore making it difficult to classify a patent in only one category. Then, there are categories important for apparel researchers, like safety skirts and skirt guards, or methods for pattern cut and skirt fitting, which are not reflected in the present USPTO classification of skirts. Therefore I attempted to break down subclass 211 into six categories: skirt material, adjustability and versatility of the skirt, pattern cut, fitting methods, dress former and guard, and safety dress. I tried to keep the rest of the USPTO classification unchanged, still, in the classification, I moved a few patents from one subclass to another (Appendices, Table 33).

USPTO classification divides the Skirts class in eleven subclasses (212 to 223). Seven subclasses were selected to be researched (Table 2), subclass 216 – Hoop being studied in a separate chapter because of the particularities of the circular frames, and also because of the numerous patents approved, i.e. 227 patents, that form a class in itself. Though the other four subclasses (218–*Placket closures*, 219–*Waist closures*, 220–*Waistbands*, and 223–*Supporters*) might have had the potential to reveal some functional purposes in women's dress, they were excluded from the study because they were not representative enough to assess the fashion change. Also, many inventions in these subclasses were applicable to men's and children's clothing as well.

Table 2. Nether Garments Utility Patents, 1846-1920

Class	Class Title	Total Patents Listed*	Researched Patents		Time Span per Class of Researched Patents
			In General	In Depth	
210	Bustle	269	267	58	April 21, 1857 – August 27, 1912 Two (2) patents not studied**
211	Skirts	123	114	77	December 27, 1864 – November 30, 1920 Nine (9) patents not studied**
	212 Combined bifurcated	52	52	32	October 20, 1874 – February 04, 1919
	213 Convertible bifurcated	20	20	6	November 24, 1885 – August 10, 1920
	214 Riding	28	27	27	June 30, 1885 – December 14, 1915 One (1) patent not studied**
	215 With pads or distenders	33	33	10	October 25, 1859 – March 26, 1907
	216 Hoop	227	227	59	June 16, 1846 – January 01, 1907
	217 Lifters and holders	56	54	20	January 26, 1864 – December 31, 1912 Two (2) patents not studied**
	218 Placket closures	81	-	-	September 23, 1851 – August 03, 1920 Not studied
	219 Waist closures	36	-	-	February 24, 1863 – March 05, 1918 Not studied
	220 Waistbands	25	-	-	June 19, 1866 – June 08, 1920 Not studied
	221 Adjustable or elastic	109	-	-	April 14, 1868 – November 02, 1920 Not studied
222	Edge bindings or protectors	100	81	22	January 10, 1865 – June 08, 1920 Nineteen (19) patents not studied**

Table 2. Nether Garments Utility Patents, 1846-1920

Class	Class Title	Total Patents Listed*	Researched Patents	Time Span per Class of Researched Patents
223	Supporters	36	-	July 22, 1862 – July 11, 1916
TOTAL		1,195	875***	Not studied

* Total number of patents listed per class by USPTO, including reissued patents, issued between 1846 and 1920.

** Total number of patents not studied because they are out of the purpose of this study, or they have very little or no connection with class/subclass, as defined in apparel. See Tables 5, 10, 13, 15, and 19 for details, in Results/Content Analysis Chapter.

*** There are 864 distinct patents (see Table 3).

There are 875 patents considered in this study: 864 distinct patents, and 11 patents that pertain to more than one class 211 to 217, or 222 (Table 3). These 11 patents were studied in each of the two classes they belong, but they were reciprocally excluded from the analysis of the whole data. For example, patent # 343,974 (Dress Skirt) is analyzed in both classes, 215 and 222, however in the overall analysis of skirts it was cited only once for a more accurate account.

Table 3. Patents common to two or more classes

No.	Utility Patent #	Title of Patent	Last Name Patentee 1	First Name Patentee 1	Gender	Class 1	Class 2	Class 3
1	343,974	Dress-Skirt	Westigate	Ida H.	Female	2/215	2/222	
2	345,199	Protector and Stiffener	Westgate	Ida H.	Female	2/215	2/222	
3	491,057	Bicycle-Garment	Lawson	Margaret H.	Female	2/212	2/213	
4	552,052	Bicycle-Habit	Dryfoos	Emma	Female	2/212	2/213	
5	564,271	Bicycle-Skirt	Cook	Kate J.	Female	2/212	2/213	
6	578,444	Bicycle-Skirt Fastener	Clagett	Sarah C.	Female	2/211	2/213	24/72.1
7	790,299	Skirt	Harman	Emma Elizabeth	Female	2/215	2/211	
8	564,292	Divided Skirt	Schlivinski	Hyman	Male	2/211	2/214	
9	1,104,632	Riding-Habit	Cowen	Max	Male	2/212	2/214	
10	531,063	Trousers-Fastener	Rhoads	John N.	Male	24/360	2/217	2/222
11	550,739	Trousers-Guard	Barber	William L.	Male	24/72.1	2/217	2/222

I present jointly the selected patents from class 212 – *Combined bifurcated* and 213 – *Convertible bifurcated*, because the differences between classes are small considering that most of the patents had broad claims regarding the convertibility and/or adjustability of the garment.

The *Riding skirts* subclass (214) refers mainly to horse riding skirts, and the entire group of 26 patents listed⁵⁰ by USPTO is presented in an unaltered form. In my opinion, four patents are better fitted in other classes; for example: #346,006 in class 222 – Edge bindings or protectors; and #742,349, #791,620, and #995,609 in classes 212 – *Combined bifurcated*, or 213 – *Convertible bifurcated*. These patents do not have the main characteristics of a riding skirt, i.e. the knee fullness, and pommel pocket or slit. Still, I left the classification unchanged in my presentation of patents because the riding habits are few. Besides, the riding habits have been studied in depth by many authors, and it would be better to leave the USPTO classification unchanged for ease of retrieval. Although USPTO does not differentiate between overskirts and underskirts, I also did not attempt to classify by this criterion because the classification would have become too extensive.

The quantitative analysis of skirt patents by gender, region, name of patentee(s), and name of assignee(s) was also completed for groups of classes, such as *Regular skirts* (classes 211, 215, 217, and 222 combined), *Bicycle skirts* (classes 212, and 213 combined), *Riding skirts* (class 214), and *All skirts* (classes 211 to 215, 217, and 222). In the end, the analysis included all researched patents from bustle, skirt and hoop classes.

Patentees with three or more patents were listed in Appendices, Table 30, Table 34, and Table 36. In listing the inventors with highest number of patents granted,

⁵⁰ Indeed there are 27 patents listed, but one of them (#564,292) has class 211 as its primary/major class.

patentees with the same name but different state or city were not added up. For example E.G. Atwood had five patents, but I considered having only four because in the fifth patent the location of the patentee was not Derby, CT but New York, NY. Another example is Albert Carter listed twice as from New York, NY, and twice as from Brooklyn, NY. For this reason, he also was excluded from the list of most prolific patentees. If the patentee had three patents, and one of them was a reissued patent I considered the patentee having only two patents, and therefore the patentee was not cited in the list.

The qualitative analysis of patents is based on four categories that were designed in the database: *Problem to Solve*, *Novelty of the Invention*, *Functional Purpose*, and *Fashion*. References about fashionable dress in patents' specification are few, probably because these are utility patents (and not design patents). In the description of many patents there is not a clear demarcation between these four categories, therefore some of the citations I gave as examples are under one heading instead of two or three, because I did not want to break the flow of the narration. As expected, most of the patents refer to the novelty of the inventions, and their functional purposes. Still, the fashion trends could be ascertained from the patents' drawings, and from the correlation between the type of innovations and their submission dates when compared to primary and secondary sources showing fashionable dress. To attain this goal, I used photos of artifacts and fashion illustrations of the time posted online by various American and foreign museums and historical societies/organizations. Though the number of online photos/illustrations is far from being a comprehensive source of information, I chose to work with the available examples because picture quality is much improved in comparison with that

reproduced from microfilms or book illustrations. Online photo galleries of *Godey's Lady's Book*, or of websites that have examples from *La Mode Illustree*, *Pictorial Review*, and *Harper's Bazaar* are sources for fashion plates and illustrations. Museum websites such the Metropolitan Museum of Art, the Museum of the City of New York, Smithsonian National Museum of American History, Victoria and Albert Museum, McCord Museum, etc., are sources for actual artifacts. A comparison is made between fashion illustrations, patent drawings and specifications, and artifacts from the same time frame. From the 311 patents studied in depth, more than 40 patents are used to exemplify the relationship between the patenting trends for hoop, bustle and bicycle skirt patents, and the fashion cycles. Where fashion illustrations are not dated, patents are compared only with existing objects, as in the case of bustle patents. Moreover, the large variety of bustle designs impedes the choice of an actual dress/skirt photo from the same period when the artifact's description does not give a hint about its underpinnings.

In this dissertation, all graphs and maps are presented in color. All patents are presented in black and white. Fashion plates/illustrations, and photos of clothing artifacts are presented in black and white, as well as in color, according with their availability from the source.

RESULTS / CONTENT ANALYSIS

The Nether Garments class has four main subclasses: *Bustles* (210), *Skirts* (211), *Bifurcated* (no number), and *Stockings* (239). Only Bustles (class 210), and eight out of 12 subclasses of Skirts (211 to 217, and 222) are researched in this study. Class 216, *Hoops*, was treated in a separate chapter, as a class in itself. The total number of patents issued in each of these subclasses is presented in Table 4.

Table 4. Grand total of patents per class

Class	Class Title		Grand Total Patents Listed 1846-2003	Patents* Listed 1846-1920	Recent Patents 1921-2003
210	Bustles		273	269	4
211	Skirts		282	123	159
	212	Combined bifurcated	107	52	55
	213	Convertible bifurcated	41	20	21
	214	Riding	39	28	11
	215	With pads or distenders	47	33	14
	216	Hoop	242	227	15
	217	Lifters and holders	74	56	18
	218	Placket closures	109	81	28
	219	Waist closures	58	36	22
	220	Waistbands	74	25	49
	221	Adjustable or elastic	318	109	209
	222	Edge bindings or protectors	111	100	11
	223	Supporters	41	36	5
TOTAL			1,816	1,195**	621

* As they are listed by USPTO, 2002.

** The total for the whole class of *Nether Garments*, including Bifurcated (class 400 – Underwear, class 227 – Trousers or Overalls, and class 238 – Trunks), and Stockings (class 239), is 2,491 patents.

There were about 1,200 patents issued between 1846 and 1920 (the endpoint of this study) for Bustles and Skirts subclasses, however their number dropped to half, at about 600 granted patents between 1921 and 2003, which shows a general decrease in the interest for patenting items belonging to these two classes.

By subclasses, the number of approved patents over the last 83 years, 1921-2003, fluctuated. The comparison between subclasses reveals the sharp decrease after 1920 in *Bustle, Hoop, Lifters and Holders*, and *Skirt's Edge Bindings or Protectors* patents. Bustles and hoops were out of fashion since the last decade of the 19th century,⁵¹ and skirts shortened in the second decade of the 20th century, therefore there was no need for protecting their hems, or having devices for lifting or holding them. Benedict (2003) asserts: "Probably the fashions of the period from 1830 to 1900 –the desperately constricted waist, the bustle and the heavy dragging skirt– were the ugliest and most unhealthful in the history of women's dress in western civilization."

An increase in *Skirt* patents may be a result of increase in the work attire for women, which entered the work force in larger numbers than before due to World War II, and also because of the increase of the apparel mass production in standardized sizes. *Adjustable or Elastic Waistbands* saw a significant increase after 1920, as a result of advances in producing elastic materials. This subclass includes many of the maternity skirts. The new medical view regarding the link between women's health and less constrictive attire may also explain why in this category there are almost twice as many patents issued after 1920 than in the previous 75 years.

⁵¹ In my study, the last patented hoop was in 1907, and the last patented bustle was in 1912.

QUANTITATIVE ANALYSIS – BUSTLES, CLASS 210

USPTO definition: Nether garments of the bustle type. The *American Heritage Dictionary* (2000) defines the bustle as: “1) A frame or pad to support and expand the fullness of the back of a woman’s skirt. 2) A bow, peplum, or gathering of material at the back of a woman’s skirt below the waist.”

Picken (1973), in her dictionary, gives a more complete definition of bustle: “ [A] pad or frame worn below waist at back to distend skirts. Began about 1870 as connecting link between panniers. [...]”

- *Bishop*. Formerly kind of bustle filled with horsehair. So called by American colonists.
- *Crinoletta*. Cylindrical device of whalebone or steel, often covered with flounces, worn as bustle in late 19th century.
- *Tilter*. Petticoat bustle like a *Tournure*, except that shirring containing springs is separate piece of material; adjusted to figure by means of belt.
- *Tournure*. Petticoat bustle made by placing steel springs in shirring across back of petticoat and tying the ends together with tape across front.
- *Waterfall*. Bustle drapery falling in loops, often to a train.”

According to the *Oxford Dictionary* (1996), bustle is an 18th century word, having unknown origin, defined as “a pad or frame worn under a skirt and puffing it out behind.” Also, the *Oxford Dictionary* defines pannier as: “a) part of a skirt looped up around the hips; b) a frame supporting this.”

The quantitative analysis of the bustle patents is made according with USPTO classification.

BUSTLES, CLASS 210

Time span of 55 years, 1857-1912.

Total number of patents researched: 267, out of which 58 in depth (Table 2, page 50).

Number of reissued patents: six (6).

Patents unrelated to the present study are listed in Table 5.

Table 5. Patents excluded from Class 210

#	Patent Number	Patent Title	Note
1	353,928	Machinery for Forming Wire Bustles	The subject matter does not pertain to the focus of this dissertation
2	32,077	Improvement in Cultivator-Teeth	Possible USPTO misclassification, or typing mistake

Not all the patents in this class have class 210 as primary class (Table 6).

Table 6. Patents whose primary class is other than 210

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
321,408	Bustle Attachment for Corsets	450/110	2/210	450/98	450/135	450/140	450/144
611,068	Bustle-Corset	450/145	2/210				
666,066	Bustle	450/95	2/210				
707,717	Garment-Supporter	2/300	2/210	2/305			
753,474	Garment-Protector	2/407	2/210				

Note:

Subclass 450/110 is Garments for lower torso including thighs, (e.g., corset, girdles) with means to supportingly engage apparel-type garment, e.g., skirt supporters; *Subclass 450/145* is Garments for lower torso including thighs, (e.g., corset, girdles) with stiffening strips or stays, movably articulated directly one to another; *Subclass 450/95* is Garments for lower torso including thighs, (e.g., corset, girdles) combined with apparel type garment; *Subclass 2/300* is Apparel – Garment supporters and retainers combined with other than garment supporter structure; *Subclass 2/407* is Apparel – Nether garments bifurcated underwear, particular to female, with leg portion.

The number of approvals for bustle patents per year follows closely the pattern of applications,⁵² as can be seen in Figure 10. Between 1860 and 1867 there were no bustle patents approved, maybe due to the predominance of hoop-skirts and the initiation of the backfulness cycle. A significant increase in patent applications⁵³ and approvals took

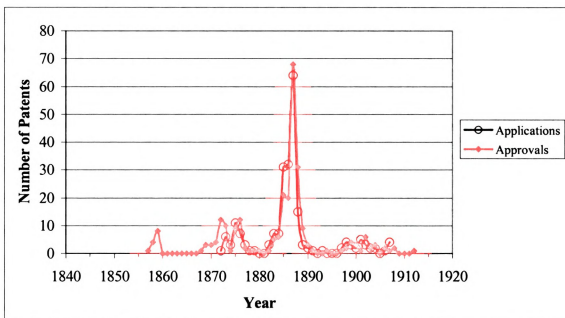


Figure 10. Number of applications and approvals for bustle patents (class 210), 1857 – 1912

place between 1872 and 1876, with a peak in 1875-1876 followed by a sudden decrease in the next six years. The next wave was between 1883 and 1889, when the number of patent applications increased more than five times and the number of patent approvals increased almost four times in comparison with the number issued in 1872-1876. In this case, 1887 was the peak when there were registered 64 applications and 68 approvals. After 1890 the patent activity for bustle class dropped dramatically, and in some years –

⁵² Because my classification is subjective, the Bustles' analysis is made according with the USPTO classification.

⁵³ Starting with January 1873 the date of application for a patent was mentioned in the approved patent. Patents issued before this date did not include this information in their format.

like 1895 and 1896— no patents were registered for both categories. Moreover, since 1921 to present only four more bustle patents were issued. This fact demonstrates the ephemerality of this fashion.

The two waves of bustle patents correspond to the two fashion periods when the bustle was *en vogue*. Though I expected at least one-year lag between the French fashion plates of the time that dictated the trend, and its diffusion to the American continent, it seems that this was not the case if the application date (and not the approval date) is considered. The first wave of patents coincides with the early 1870s bustle, then the sudden decrease in patenting overlaps with the short disappearance of the bustle as the hourglass silhouette and fish train skirts became fashionable. The revival of the bustle in mid 1880s matches exactly the effervescent activity of the bustle patenting of the second wave. As the bustle finally disappeared in female costume around 1890s, the number of patents decreased significantly after 1889. Starting with 1907, no other bustle patent application is recorded until the end of 1920, the year when my research ends. The same happened with the approval of the bustle patents that stopped in 1912, and no other bustle patents were issued for the next eight years.

A comparison between the graph in Figure 10 and the trend line⁵⁴ in Figure 11 shows an interesting development: as the number of patent applications increased, the average number of days elapsed between patent application and approval decreased. For example, the peak of patent applications from 1875-1876 corresponds to a valley of average of days elapsed to their approval. This also happens for the second wave of bustle patents of 1883-1889, when the number of applications increased, and at the same time the average of days elapsed decreased. The average of days elapsed between

⁵⁴ The trend line is a moving average, period 2, automatically calculated by Excel.

application and approval for the entire bustle class was approximately 187 days, or more than six months. At the peak of the first bustle wave, the average was 95 days. In the

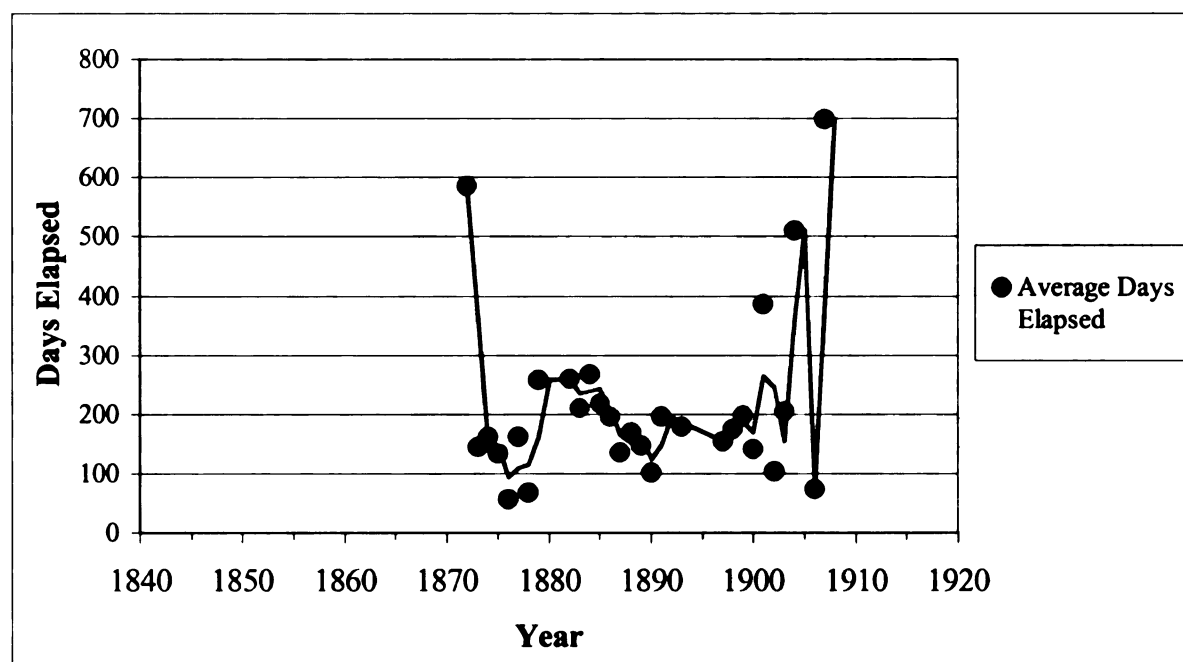


Figure 11. Average number of days elapsed between application and approval dates by year for bustle patents (class 210), 1872 – 1907

second bustle wave, the waiting time decreased from 260 days in 1882 to 135 days in 1887. As the interest in the bustle started to dwindle, the average of days elapsed increased sharply, thus in 1907 reaching 698 days, or almost two years between the application and the approval dates.

The most prolific inventors were seven male patentees who obtained 53 patents, and two female patentees who got seven patents, or 20% and respectively 3% of the total 267, (Appendices, Table 30). It seems that the higher the number of patents per patentee, the lower the average of days elapsed between the application and approval of their patents was. An example is shown in Figure 12 and Figure 13, for patentees with three, or more granted bustle patents.

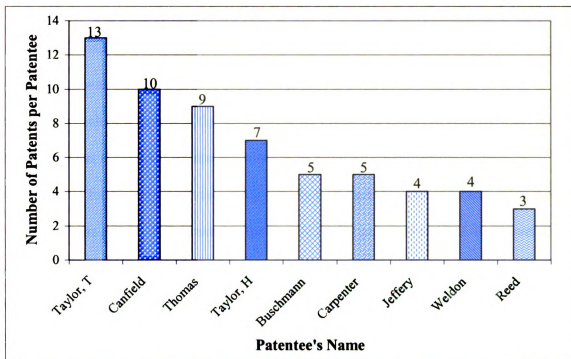


Figure 12. Number of bustle patents issued to certain male and female patentees

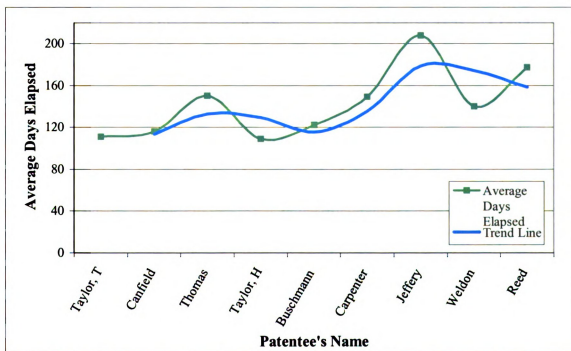


Figure 13. Number of days elapsed between application and approval of bustle patents for certain male and female patentees

This aspect might be explained by the fact that each patentee was specialized in one type of bustle, and the many patents that he/she had were variations of the same idea. Therefore, it was probably much easier for the Patent Officers to judge the novelty brought by each new patent of the same patentee, because a model of reference already existed. It was also easier for the patentees with multiple patents to fulfill the requirements for a new patent since they already knew what mistakes would delay the approval of the patent. For example, Thomas P. Taylor patented in 1887-1888 twelve spring ribs, wire bustles, and combinations of wire and spring bustles –collapsible or not. More than a decade later, in 1899, he patented a different type of bustle, a woven wire bustle. In 1887-1888, Henry O. Canfield patented ten patents of bustles made of spring bars or flattened steel strips. All his patents were assigned to the same company, the Canfield Rubber Company, but only one of his patents (# 372,116) included an element of “vulcanized India-rubber.” Amos W. Thomas patented between 1871 and 1888 only bar or flat wire bustles. Henry H. Taylor patented mesh wire-cloth bustles between 1898 and 1902, and hair/cotton stuffed bustles in 1902-1903. Victor H. Buschmann patented only spring-bow bustles in 1886-1889, and in 1888 Frank M. Jeffery patented only bustles with torsion spring. Charles C. Carpenter had a more diverse array of patents: from stuffed bustles –braided tubes (1885), or horizontal tubes (1886), to spring bustles in 1887-1888, and finally to “pendant coil” in 1890, which consisted of three long vertical coils. In 1876, Elizabeth S. Weldon had three pannier with bustle patents, and one spring bustle. Beverly S. Reed had three patents in 1885-1886: a hoop skirt with bustle, and two rib/spring bustles.

Fifty-eight bustle patents out of 267 were assigned to companies or individuals

(Appendices, Table 31). The general average of days elapsed between application and approval of bustle patents was 187 days. For the assigned patents⁵⁵ the average was only 153 days, in comparison with 198 days for patents with no assignees. In other words, the approval process for assigned patents was speeded up, necessitating 23% less time. It would be interesting for future research to reveal if the assigned patents were ever produced. If I presume that the Patent Office fees were the same –regardless if the patents were assigned to companies/persons or not, and if I also presume that the assigned patents were manufactured, then I could speculate that the shorter time for their approval was deliberate for their rapid introduction into industrial production.

There were three most important assignees of the bustle patents. The first assignee, The Canfield Rubber Company of Bridgeport, Connecticut, had ten bustle patents. Its average days elapsed was 116 days. The second assignee, Thomas P. Taylor, of the same place, had his six patents approved in an average of 81 days. The third assignee, August H. Brinkmann, of Baltimore, Maryland, had six patents approved on average of 139 days. All three of them had their patents approved in less time than the general average time (187 days) with 38%, 57%, and 26%, respectively. This significant time reduction between application and approval might be due to the fact the assignees had reputable companies, and therefore pressure might have been placed on Patent Office employees to speed up their analyses.

Eight assignees were companies (Table 7), and the total number of patents assigned to them was only 18 patents (7%). It is possible that most of the assignees were small businesses whose production figures did not amount to those of larger companies, and therefore they did not identify their businesses as companies.

⁵⁵ Patents whose ownership was transferred from the patentee to another person or company.

Table 7. Companies having assigned bustle patents

#	Assignor to:					
1	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]					
	Utility Patent #	359,240	365,045	370,927	373,050	375,923
		359,711	370,181	372,116	375,922	375,924
	Total patents <i>The Canfield Rubber Company</i> = 10 patents					
2	The Weston & Wells Manufacturing Company, of Camden, New Jersey					
	Utility Patent #			325,031		358,712
	Total patents <i>The Weston & Wells Manufacturing Company</i> = 2 patents					
3	The Weedsport Skirt and Dress Company, of same place [Weedsport, New York]					
	Utility Patent #					391,757
	Total patents <i>The Weedsport Skirt and Dress Company</i> = 1 patent					
4	The Warner Brothers Co., of Bridgeport, Connecticut, a corporation of Connecticut					
	Utility Patent #					838,722
	Total patents <i>The Warner Brothers Co.</i> = 1 patent					
5	The Rheubottom & Teall Manufacturing Company, of same place [Weedsport, New York]					
	Utility Patent #					404,798
	Total patents <i>The Rheubottom & Teall Manufacturing Company</i> = 1 patent					
6	I. Newman & Sons, of New Haven, Connecticut					
	Utility Patent #					378,134
	Total patents <i>I. Newman & Sons</i> = 1 patent					
7	Osborn & Vincent, of New York, New York					
	Utility Patent #					25,865
	Total patents <i>Osborn & Vincent</i> = 1 patent					
8	The Coronet Corset Company, of same place [Jackson, Michigan]					
	Utility Patent #					292,453
	Total patents <i>The Coronet Corset Company</i> = 1 patent					

There are instances, in which patentees seemed to be also stakeholders in the assigned companies. Henry O. Canfield assigned all his 10 patents to The Canfield Rubber Company, and Homer E. Rheubottom assigned his patent to The Rheubottom & Teall Manufacturing Company (Table 8). Other patentees might have had a family relationship to the assignees, like Joseph L. Wells of Philadelphia, PA, who assigned his two patents to The Weston & Wells Manufacturing Company, of Camden, NJ; or Alfred Taylor of Bridgeport, CT who assigned one of his two patents to Thomas P. Taylor, of same place; or Mark A. Waterhouse of Boston, MA who assigned his patent to AI Waterhouse, of Durham, Maine; or Frank Fant of Joliet, IL, who assigned his patent to James Fant, of same place [Joliet, Illinois]. Many patentees assigned only a percentage of their patent rights (one-half, three-fifths), other times when two patentees were involved only one of them assigned his/her rights. Most of the patentees' cities/states coincides with assignees' cities/states.

Table 8. Name of assignees and patentees with assigned patents

Assignor to	Last Name Patentee 1	First Name Patentee 1	Patentee's City 1	Patentee's State 1
The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	Canfield	Henry O.	Bridgeport	Connecticut
The Rheubottom & Teall Manufacturing Company, of same place [Weedsport, New York]	Rheubottom	Homer E.	Weedsport	New York
The Weston & Wells Manufacturing Company, of Camden, N.J.	Wells	Joseph L.	Philadelphia	Pennsylvania
Thomas P. Taylor, of same place [Bridgeport, Connecticut]	Taylor	Alfred	Bridgeport	Connecticut

Assignor to	Last Name Patentee 1	First Name Patentee 1	Patentee's City 1	Patentee's State 1
AI Waterhouse, of Durham, Maine	Waterhouse	Mark A.	Boston	Massachusetts
James Fant, of same place [Joliet, Illinois]	Fant	Frank	Joliet	Illinois
Assignor of three-fifths to Jacob Stettheimer, Jr., of same palce [New York, NY]	Haynes	Charles W.	New York	New York
Assignor to himself and Charles A. Durgin	Earl	Thomas A.	North Attleborough	Massachusetts
Assignor to himself and James L Harlem, of same place [Brooklyn, New York]	Barnum	Joseph I.	Brooklyn	New York
One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	Buschmann	Victor H.	Baltimore	Maryland
One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	Buschmann	Victor H.	Baltimore	Maryland
One-half to John P. Platte, of Grand Rapids, Michigan	Colquhoun	Edward	Grand Rapids	Michigan
One-half to Myron G. Wood, of Hillsdale, Michigan	White	Alice	Detroit	Michigan
One-half to Ralph Rees of same place [Minneapolis, Minnesota]	Melville	Frank B.	Minneapolis	Minnesota
One-half to Richard S. Mallary, of same place [Detroit, Michigan]	White	Alice	Detroit	Michigan
Said Olive J. Decker [second patentee] assignor to James Ayres and Peter Ayres, of same place [Keokuk, Iowa]	Decker	Alexander C.	Keokuk	Iowa
Assignor, by Mesne Assignments, to Wallace C. Sexton, of same place [Chicago, Illinois]	Felton	Emerson C.	Chicago	Illinois

Assignor to	Last Name Patentee 1	First Name Patentee 1	Patentee's City 1	Patentee's State 1
Assignors, by Mesne Assignments, to William Meyst, Walter A. Holbrook, and Richard Klau, all of the same place [Milwaukee, Wisconsin]	Randall	Purdy M.	Milwaukee	Wisconsin
Assignors to the Coronet Corset Company, of same place [Jackson, Michigan]	Weeks	Eugene J.	Jackson	Michigan
Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	Hubbard	Sherman H.	Bridgeport	Connecticut
August H. Brinkmann, of same place [Baltimore, Maryland]	Keil	Harry H.	Baltimore	Maryland
Augustus H. Brinkmann, of same place [Baltimore, Maryland]	Buschmann	Victor H.	Baltimore	Maryland
C. C. Carpenter	Carpenter	Charles C.	New York	New York
Chas. [Charles] C. [Clarence] Carpenter, of same place [New York, New York]	Phillips	Mary	New York	New York
Charles W. Higby, of same place [Jackson, Michigan]	Moulton	Henry W.	Jackson	Michigan
Charlotte Abair, of same place [Denver, Colorado]	O'Day	Charlotte	Denver	Colorado
George H. Engelman, of same place [St. Louis, Missouri]	Weinholt	Paul P.	St. Louis	Missouri
Jacob W. Truxel, of same place [Sedalia, Missouri]	Wertz	Daniel	Sedalia	Missouri
James Stuart, of same place [Brooklyn, New York]	Kelley	Austin	Brooklyn	New York
John R. Deatherage, of same place [Fayette, Missouri]	Durnil	Cecil M.	Fayette	Missouri
Leonard Winship and Samuel E. Barney of same place [New Haven, Connecticut]	Crosby	Chauncey O.	New Haven	Connecticut
Simeon Rheuben Payne, of same place [Fayette, Missouri]	Wertz	Daniel	Fayette	Missouri

Assignor to	Last Name Patentee 1	First Name Patentee 1	Patentee's City 1	Patentee's State 1
The Warner Brothers Co., of Bridgeport, Connecticut, a corporation of Connecticut	Kuebler	Freda B.	Bridgeport	Connecticut
The Weedsport Skirt and Dress Company, of same place [Weedsport, New York]	Miller	Darwin V.	Weedsport	New York
Thomas P. Taylor, of same place [Bridgeport, Connecticut]	Galvin	James	Bridgeport	Connecticut
Thomas P. Taylor, of same place [Bridgeport, Connecticut]	Williamson	Samuel S.	Bridgeport	Connecticut
Assignor, by Mesne Assignments, to Emerson C. Felton, of Chicago, Illinois	Brown	Worthington	Chillicothe	Missouri
Henry B. Harford, of Scott County, Iowa	Fosgate	Daniel Oscar	Aurora	Illinois
I. Newman & Sons, of New Haven, Connecticut	Hammond	M. Burdette	Bridgeport	Connecticut
Isaac B. Kleinert, of New York, N.Y.	Townsend	William	London	England
Osborn & Vincent, of New York, N.Y.	Davis	Barron	Brooklyn	New York
Sophia H. Sawyer, of Wellfleet, Massachusetts	Wetherell	Mary E.	Boston	Massachusetts

Note: Multiple patents of the same patentee assigned to the same company/person(s) were not repeated.

The distribution of approved bustle patents by gender is presented in Figure 14.

The first woman who patented a bustle was Susan B. Fisler of Newark, New Jersey, to whom an “Improvement in Corsets” (# 87,160) was issued in February 1869. Her invention was a modified bustle, for “attaching or applying to the back of the corset a dress-supporter, or bustle, consisting of a shirred piece of corset-cloth, cut to the desired form, and supported by whalebone, or other suitable stays, the lower part of the back of the corsets being cut out, to make room between the lower ends of the fronts for the said

bustle, or skirt-supporter.”

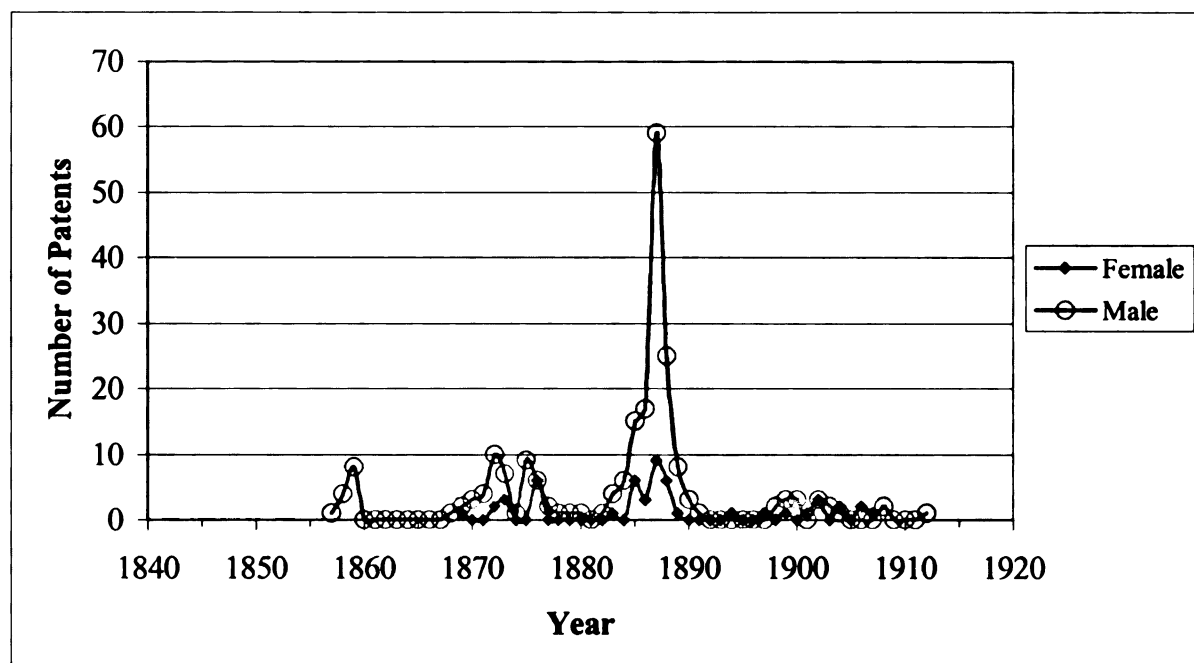


Figure 14. Number of approved bustle patents (class 210) to primary patentees, by gender, 1857 – 1912

An interesting observation is that patents having a woman as first patentee were approved in approximately 237 days, with more than 27% over the general average of 187 days, and with more than two months (or with 36% more) than patents having a man as first patentee. On the other hand, patents having men as primary patentee were approved in 174 days, or 7% less than the average waiting period for approval. If gender discrimination existed in all strata of the society, then the delay in the approval of women’s patents might explain this.

A different situation existed in the case of assigned patents where there was almost no difference between female and male first patentees: females’ patents were approved in 141 days, and males’ patents in 146 days. The percentage of female patentees for assigned patents of 17% was close to the approximately 19% overall

percentage of females that patented bustles (Appendices, Table 32). At least two women were assignees of bustle patents: Charlotte Abair, of Denver, CO, and Sophia H. Sawyer, of Wellfleet, MA (Table 8, page 67).

The number of bustle patents approved between 1857 and 1912 varied by each month of the calendar (Table 9). In the month of March it was the highest number of approvals (28), and in September it was the lowest (15). This aspect might be linked not only with Patent Office schedule for its personnel vacation time, but also with the fashion seasons.

Table 9. Total number of bustle patents approved per month, 1857 – 1912

Month	No.	Month	No.	Month	No.	Month	No.
January	19	April	19	July	23	October	26
February	23	May	19	August	23	November	25
March	28	June	24	September	15	December	23
Total/trim.	70	Total/trim.	62	Total/trim.	61	Total/trim.	74
Total Bustle Patents							267

It is known that novelties in fashion always were announced months in advance. Now, there are two fashion shows per year for ready-to-wear apparel, one in spring, and one in fall. The fall show announces the predominant styles and colors for spring/summer of the next year. The runway shows, a way to disseminate the latest trends, are a 20th century creation started in the 1910s by Paul Poiret by his widely reported fashion presentations. The printed media, like fashion plates and magazines, were well-established as the primary source of new style promotion. Spring, a season of renewal, was probably the time when the time for major changes in fashion was considered opportune. If the printed media signaled these changes in advance, maybe the fact that the last three months –October, November and December amount to the highest

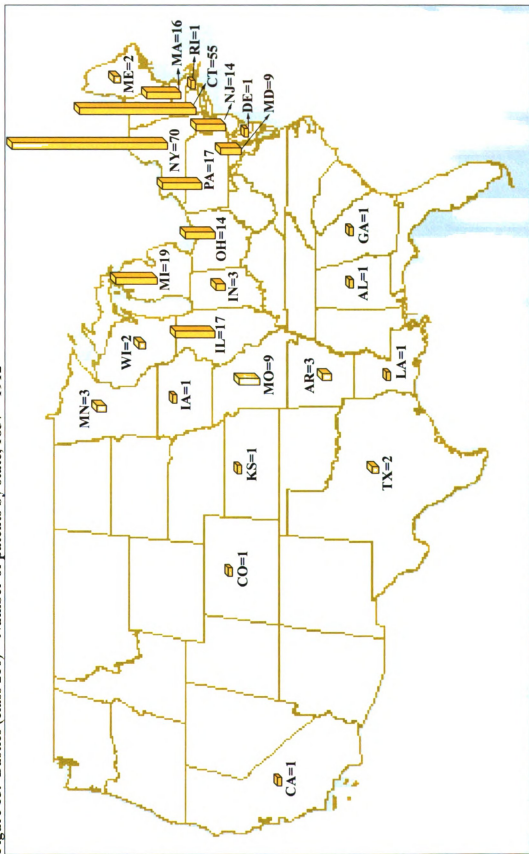
number of approved patents (74), followed closely (70) by the first months of the year – January, February, and March, this characteristic might be explained as having the patents ready for the production of improved bustles that had an important role in defining the new shapes of skirts/dresses.⁵⁶

The bustle patent distribution by geographical region is presented in Figure 15. There were 25 states that had a total of 264 bustle patents issued. Two patents were issued to patentees from England, and one patent could not be traced to a state. The most patents were issued to inventors in two states: New York – 70 patents, and Connecticut – 55 patents. These states had almost half of the total number of bustle patents (47%).⁵⁷ States from the Northeast region (ME, NY, MA, RI, CT, PA, NJ, DE, and MD) had 185 patents issued (70%), states from Midwest region (MI, OH, IN, IL, IA, WI, and MN) had 59 patents issued (22%), states from Southeast region (GA, AL, LA, AR, and MO) had 15 patents issued (6%), states from Southwest region (CA, CO, and TX) had 4 patents (2%), KS from the Great Plains region had 1 patent, and no states from Northwest region had any patents issued. The clear concentration of bustle patent activity in the Northeast and Midwest region might be related to the many industrial and commercial centers that existed in these regions in the second half of the 19th century, and the large population that was attracted to these cities. This population was the consumer, and at the same time was the producer of material or intellectual goods. Therefore, the patentees had more applications for inventions because they knew that a potential market existed for their ideas.

⁵⁶ If the amount of time required to commence production of a newly patented item were known, this analysis would have increased significance.

⁵⁷ Percentage is reported to 264 patents having US patentees with known state/city origins.

Figure 15. Bustles (class 210) – Number of patents by state, 1857 – 1912



Note: The map reflects 264 patents out of 267 researched. One patent has no information on patentee's city/state, and two patents belong to foreign citizens from England. One patent has two patentees from different states, NY and NJ; in this case, the patent was added to the state of the primary patentee, NY.

The average of days elapsed between the application for a bustle patent and its approval varied by state and city. For a more accurate account, I compared the average values of days elapsed only for cities/states that had five or more patents. By state, Connecticut had the least average number of days for receiving the grants (109 days), followed by Pennsylvania (147 days), and Massachusetts (160 days). States having the greatest delays in obtaining patents were: Ohio (246 days), Michigan (224 days), and Illinois (210 days). By city, Bridgeport, CT, had the fastest timing for patents granted (107 days), followed by Philadelphia, PA (137 days), and Boston, MA (162 days). This pattern is similar with that of the least time for patent approval by state. Cities having the slowest timing for approval were: Chicago, IL (272 days), New York, NY (220), Brooklyn, NY (196 days), and Jackson, MI (195).

QUANTITATIVE ANALYSIS – SKIRTS, CLASSES 211 TO 215, 217 AND 222

Classes included in this analysis are: 211–*Skirts*, 212–*Combined bifurcated*, 213–*Convertible bifurcated*, 214–*Riding*, 215–*With pads or distenders*, 217–*Lifters and holders*, and 222–*Edge bindings or protectors*. Placket closures (218), Waist closures (219), Waistbands (220), and Supporters (223) are not part of the present research, and Hoop (216) is analyzed in a separate chapter. The researched skirt patents are presented according with my classification (Appendices, Table 33).

Regular Skirts, Classes 211, 215, 217, and 222

Regular Skirts is a grouping of subclasses: one subclass (210, Skirts), and three of its derivative subclasses (215, Skirts with pads or distenders; 217, Lifters and holders; and 222, Edge bindings or protectors). The quantitative analysis is presented individually for each subclass, and also cumulatively for all four subclasses. The scope for presenting the analysis of each class of patents is to facilitate data retrieval by researchers interested only in a certain aspect of skirts (e.g., Lifters and holders).

A standard format is used in presenting the information for each class: USPTO definition; the time span in which the patents were issued; the overall number of patents in the class, and the number of patents researched in depth; how many patents were reissued (if any); patents unrelated to the objectives of this study; patents whose primary class is different from the class in which they are listed; the number of patent applications⁵⁸ and approvals, trend line of average days elapsed between application and approval dates, by year; and number of granted patents to primary patentee, by gender.

⁵⁸ Starting with 1873 the date of application for a patent was mentioned in the approved patent. Patents issued before this date did not include this information in their format.

Commentaries are made in the cumulative analysis. The quantitative analysis of skirt patents is made according with the USPTO classification.⁵⁹

Class 211, Skirts

USPTO definition: Nether garments of the skirt type.

Time span of 56 years, 1864-1920.

Total number of patents researched: 114, out of which 77 in depth (Table 2, page 50).

Number of reissued patents: one (1).

Patents unrelated to the present study are listed in Table 10.

Table 10. Patents excluded from Class 211

#	Patent Number	Patent Title	Note
1	989,626	Trolley-Head	Possible USPTO misclassification, or typing mistake
2	814,328	Sleeve-Fastener	The subject matter does not pertain to the focus of this dissertation
3	697,823	Shirt	The subject matter does not pertain to the focus of this dissertation
4	172,493	Improvement in Apparatus for Pneumatic Railway-Signals	Possible USPTO misclassification, or typing mistake
5	273,115	Water-Proof Coat	The subject matter does not pertain to the focus of this dissertation
6	130,476	Improvement in Sash-Balances	Possible USPTO misclassification, or typing mistake
7	15,133	Machine for Paring Apples	Possible USPTO misclassification, or typing mistake
8	14,500	Steam Radiator-Cock	Possible USPTO misclassification, or typing mistake
9	14,431	Improvement in Manufacturing Umbrella-Ribs	The subject matter does not pertain to the focus of this dissertation

⁵⁹ My classification was used in the qualitative analysis of patents.

Not all the patents in this class have class 211 as primary class (Table 11).

Table 11. Patents whose primary class is other than 211

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
164,317	Improvement in Skirts	428/180	2/211	112/428	428/122	428/167	428/192
318,538	Combined Storm-Shield and Overdress	2/84	2/211				
353,103	Fur Skirt	2/65	2/211				
715,248	Protective Garment	2/75	2/70	2/211			
790,299	Skirt	2/215	2/211				
873,167	Maternity-Skirt	2/221	2/211				
874,487	Combination-Garment	2/71	2/211				
965,552	Garment	2/88	2/211				
1,001,940	Self-Fitting Petticoat	2/221	2/211	2/401			
1,013,764	Garment	2/75	2/74	2/211	2/247		
1,037,331	Skirt	2/47	2/211				
1,084,968	Skirt, Petticoat, and the Like	2/221	2/211				
1,118,913	Garment	2/74	2/1	2/211			

Between 1873 and 1920, the number of approved patents (110) was equal to the number of applications. Their distribution has the same pattern (Figure 16), though in some years there were more applications than approvals (e.g., 1896, or 1902), and in other years there were more approvals than applications (e.g., 1898, or 1903).

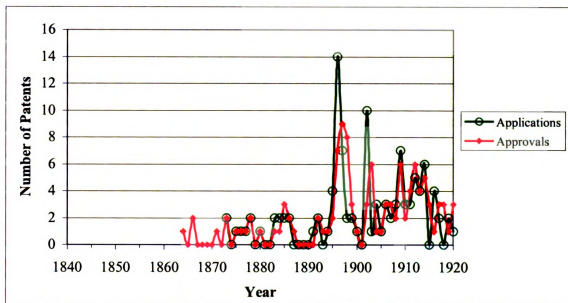


Figure 16. Number of applications and approvals for skirt patents (class 211), 1864 – 1920

The average days elapsed between application and approval dates is presented in Figure 17. The general average for class 211, Skirts, was approximately 332 days, the highest average of all the classes of patents studied.

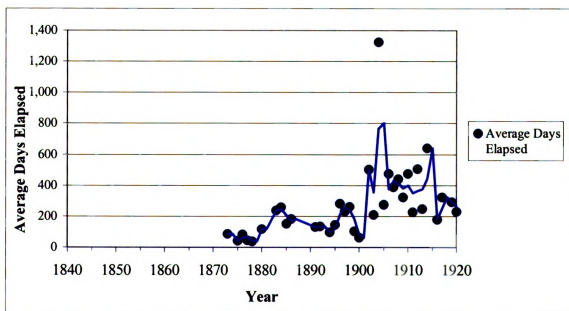


Figure 17. Average number of days elapsed between application and approval dates by year for skirt patents (class 211), 1873 – 1920

The gender distribution is presented in Figure 18. In class 211, there are 114 skirt patents having as primary patentees 47 women and 67 men. An additional number of secondary patentees contributed to these inventions: five women, and three men. Though women started patenting skirts almost a decade later than men (1873 versus 1864), female patentees had one of the closest percentages to male patentees in comparison with other classes of patents.

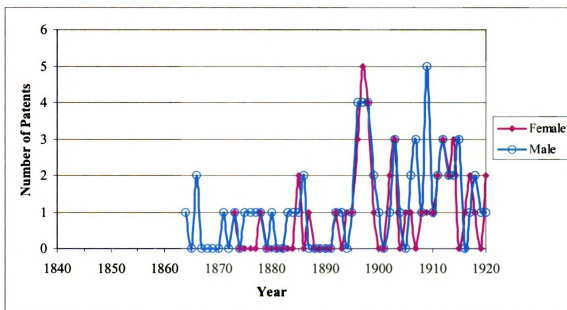


Figure 18. Number of approved skirt patents (class 211) to primary patentees, by gender, 1864 – 1920

Class 215, Skirts – With pads or distenders

USPTO definition: Devices provided with attached bustles, pads, stiffeners, or the like.

Time span of 48 years, 1859-1907.

Total number of patents researched: 33, out of which 10 in depth (Table 2, page 50).

Number of reissued patents: zero (0).

Patents unrelated to the present study: none.

Not all the patents in this class have class 215 as primary class (Table 12).

Table 12. Patents whose primary class is other than 215

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
656,913	Apparel-Corset	450/17	2/215	24/114.7			

Class 215 has 33 patents, and more than half of them were patented between 1883 and 1890 (Figure 19). Thirty-one patent applications, and the same number of approvals were listed between 1873 until 1907. The numbers of approvals per year follow the same trend of the number of applications, at about eight months delay between them.

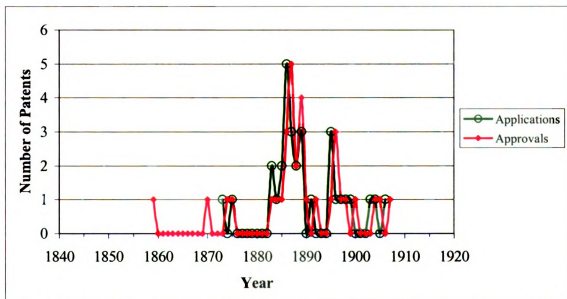


Figure 19. Number of applications and approvals of patents for skirts with pads or distenders (class 215), 1859 – 1907

The general average days elapsed for class 215 is 245 days, which is lower than the average for all skirts (280 days), and it is close to the overall average 239 days for all studied patents. The average days elapsed by year is shown in Figure 20.

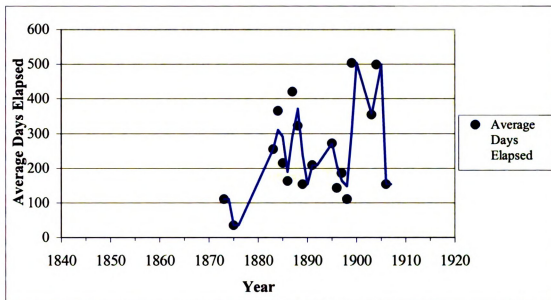


Figure 20. Average number of days elapsed between application and approval dates by year for skirts with pads or distenders (class 215), 1873 – 1906

Patents in class 215 were issued to 11 females and 22 males. Women started patenting 28 years later than the first patent issued to a man (Figure 21).

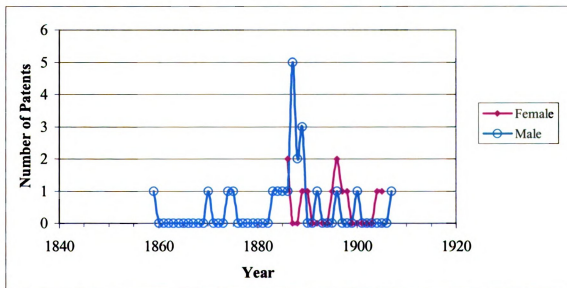


Figure 21. Number of approved skirts with pads and distenders patents (class 215) to primary patentees, by gender, 1859 – 1907

Class 217, Skirts – Lifters and holders

USPTO definition: Devices provided with means for lifting and holding the same.⁶⁰

Time span of 48 years, 1864-1912.

Total number of patents researched: 54, out of which 20 in depth (Table 2, page 50).

Number of reissued patents: zero (0).

Patents unrelated to the present study are listed in Table 13.

Table 13. Patents excluded from Class 217

#	Patent Number	Patent Title	Note
1	718,291	Book-Mark	Possible USPTO misclassification, or typing mistake
2	387,611	Safety Hair-Braid Pin	The subject matter does not pertain to the focus of this dissertation

Not all the patents in this class have class 217 as primary class (Table 14).

Table 14. Patents whose primary class is other than 217

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6	Subclass 7
52,179	Improvement in Eyelets	2/336	2/217	24/714.9				
80,196	Improvement in Dress and Satchel-Holder Combined	24/348	2/217	24/533	24/537			
180,430	Improvement In Clothes-Pins	24/551	2/217	24/555				
201,531	Improvement in Skirt-Supporters	24/709.8	2/217	24/706				

⁶⁰ Different from *Supporters*, Class 223, which are “devices provided with straps or the like for suspending the skirt on the body” (USPTO, 2002).

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6	Subclass 7
307,080	Clamp- Fastener	24/549	2/217	294/99.2				
485,780	Dress- Elevator	2/330	2/217					
497,516	Skirt- Supporter	24/337	2/217	24/72.5	24/536	24/562		
531,063	Trousers- Fastener	24/360	2/217	2/222	24/72.1	24/380	24/698.2	
547,989	Pants-Leg Holder	24/625	2/217	24/72.1				
550,739	Trousers- Guard	24/72.1	2/217	2/222				
580,053	Skirt-Lifter	2/87	2/217	2/304				
581,884	Skirt- Elevator	2/312	2/217					
588,560	Clasp	223/96	2/217					
593,569	Skirt- Adjuster	24/1	2/217	2/302	24/71SD			
686,068	Skirt-Support	24/299	2/217	24/337	24/352	24/542	24/564	63/14.3, 63/20
709,459	Skirt- Elevator	2/314	2/217					
724,518	Skirt- Elevator	2/334	2/217	2/302				
769,970	Skirt Supporter	24/302	2/217	24/334	24/344	24/507	160/349.2	
793,625	Spring-Wire Catch	24/710.8	2/217	24/72.5	24/DIG22			
795,788	Pivoted Clasp	24/513	2/217	294/118				
819,534	Clasp	24/507	2/217	24/508	24/510			
839,553	Combined Yoke and Hose- Supporter	2/311	2/217					
905,705	Supporter	24/485	2/217	24/543	24/564			
911,630	Collar-	24/579.09	2/217	24/336	2/343	24/582.11	24/900.1	24/DIG34

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6	Subclass 7
	Fastener							
923,468	Roll-Carpet Fastener	24/301	2/217	24/360				

Figure 22 presents the distribution per year of the applications and approvals for patents in class 217. Lifters and holders were patented for almost half a century, however no clear pattern of the patent activity is revealed by the graph other than two peaks in 1866-1868, and 1894-1898.

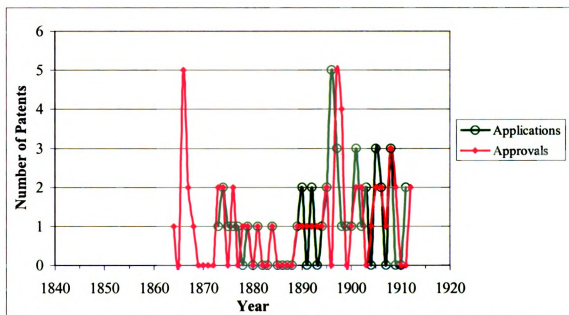


Figure 22. Number of applications and approvals of patents for lifters and holders of skirts (class 217), 1864 – 1912

The general average of days elapsed was 319 days, the second longest time for patent approval after Skirts (class211). One patent for skirt/train lifter, and one for skirt elevator were granted after more than five years from their date of application in 1903 (Figure 23).

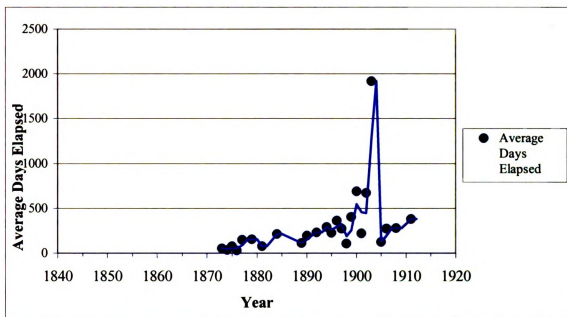


Figure 23. Average number of days elapsed between application and approval dates by year for lifters and holders of skirts (class 217), 1873 – 1911

Women's contribution to items invented in this class is three times less than of their male counterparts (Figure 24). A gap of ten years exists between the first patent

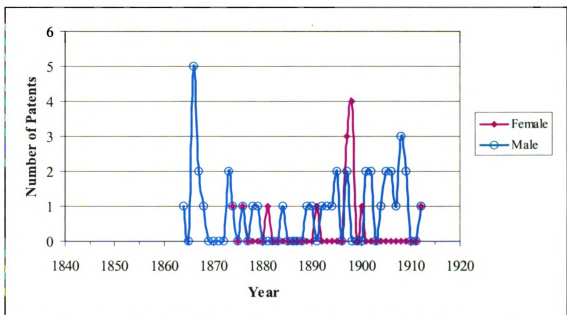


Figure 24. Number of approved patents for skirt lifters or holders (class 217) to primary patentees, by gender, 1864 – 1912

issued to a man (1864), and the first patent issued to a woman (1874). If the first peak of patent activity could be attributed solely to male patentees, the second peak was due mostly to women's inventions, which surpassed men's activity between 1897 and 1900.

Class 222, Skirts – Edge bindings or protectors

USPTO definition: Devices comprising edge bindings, facing and protectors for the hems of skirts.

Time span of 55 years, 1865-1920

Total number of patents researched: 81, out of which 22 in depth (Table 2, page 50).

Number of reissued patents: one (1).

Patents unrelated to the present study are listed in Table 15.

Table 15. Patents excluded from Class 222

#	Patent Number	Patent Title	Note
1	1,362,525	Safety-Robe	The subject matter does not pertain to the focus of this dissertation
2	1,315,090	Binder for Sewing-Machines	The subject matter does not pertain to the focus of this dissertation
3	1,214,133	Folding and Guiding Attachment for Sewing-Machines	The subject matter does not pertain to the focus of this dissertation
4	809,276	Harness Lining and Pad and the Like	The subject matter does not pertain to the focus of this dissertation
5	724,885	Edge-Holder for Carpets or Rugs	The subject matter does not pertain to the focus of this dissertation
6	672,321	Badge	The subject matter does not pertain to the focus of this dissertation
7	505,935	Process of Making Fringes	The subject matter does not pertain to the focus of this dissertation
8	448,151	Horse-Blanket	The subject matter does not pertain to the focus of this dissertation
9	359,905	Heading for Window-Shades	The subject matter does not pertain to the focus of this dissertation

#	Patent Number	Patent Title	Note
10	345,542	Cement for Securing Metal Rings to Electric-Lamp Bulbs and for Other Purposes	Possible USPTO misclassification, or typing mistake
11	272,847	Sewing-Machine Guide	The subject matter does not pertain to the focus of this dissertation
12	228,233	Machine for Making Buttons	The subject matter does not pertain to the focus of this dissertation
13	162,183	Improvement in Metallic Paper-Fasteners	Possible USPTO misclassification, or typing mistake
14	31,424	Life-Preserving Ship	Possible USPTO misclassification, or typing mistake
15	30,585	Improvement in Sealing Preserve-Cans	Possible USPTO misclassification, or typing mistake
16	29,780	Improvement in Cotton-Gins	Possible USPTO misclassification, or typing mistake
17	29,779	Clothes-Drier	Possible USPTO misclassification, or typing mistake
18	29,778	Car-Register	Possible USPTO misclassification, or typing mistake
19	29,556	Machine for Bending Tires	Possible USPTO misclassification, or typing mistake

Not all the patents in this class have class 222 as primary class (Table 16).

Table 16. Patents whose primary class is other than 222

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
293,440	Bias Tape and Process of Making the Same	428/54	2/222	156/159	156/258		
319,453	Seamed Fabric	112/418	2/222				
343,974	Dress-Skirt	2/215	2/222				
345,199	Protector and Stiffener	2/215	2/222				
365,147	Woven	139/383R	2/222				

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
	Fabric for Skirt-Facings						
375,219	Bifurcated Garment	2/401	2/222				
376,210	Garment-Protector	2/65	2/46	2/222			
441,423	Velvet Skirt-Binding	139/391	2/220	2/222			
503,683	Trousers-Guard	24/72.1	2/222	24/543			
531,063	Trousers-Fastener	24/360	2/217	2/222	24/72.1	24/380	24/698.2
550,739	Trousers-Guard	24/72.1	2/217	2/222			
553,707	Skirt-Protector	139/385	2/222				
581,419	Trousers	2/227	2/222				
606,876	Skirt-Protector	139/385	2/222				
607,555	Corded Skirt-Facing	87/7	2/222				
614,481	Skirt-Protector	87/5	2/222				
621,089	Skirt of Garment Binding	139/385	2/222	139/407			
638,193	Edge-Protector for Garments	139/385	2/222				
703,579	Trousers-Guard	24/72.1	2/222	36/70R			
923,345	Combination-Trousers	2/232	2/222	2/227			
1,343,166	Garment-Protector	2/232	2/222				

The graph of distribution of patent applications and approvals by year has two significant periods of increased activity: 1873-1874, and 1894-1902. In these time intervals, 63% of the 81 patents were granted. After 1902, the interest for items in this class dropped, and reached a halt after 1910 (Figure 25). The only patent granted in 1920 (patent 1,343,166, Garment-Protector) could be considered a revival of an old concept in a new form, with extended uses like protection of the bottoms of the trousers, coat, dress, or sleeve cuffs, or edges of pockets.

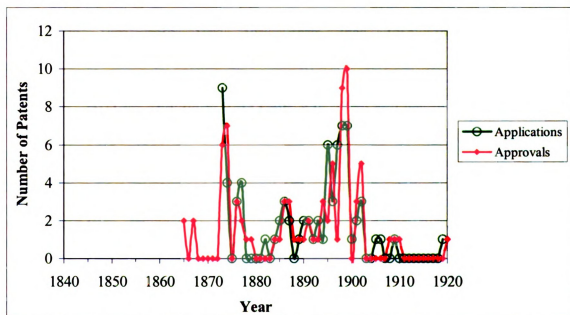


Figure 25. Number of applications and approvals of patents for edge bindings or protectors of skirts (class 222), 1865 – 1920

Except for one patent that was granted after almost four years from the application date, the general average days elapsed was reasonable (244 days) in comparison with the average for all patents (239 days). Between 1873 and 1877 the waiting period for approval was on average 38 days, with a record of only seven days for one of the patents that was granted in 1874 (Figure 26).

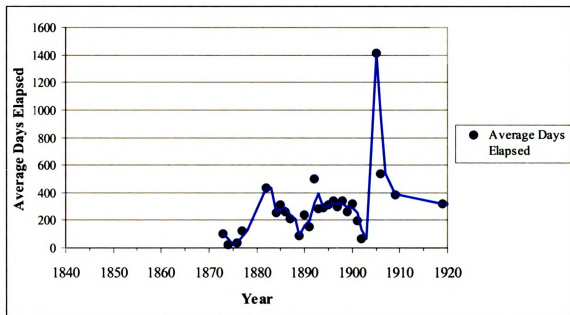


Figure 26. Average number of days elapsed between application and approval dates by year for edge bindings or protectors of skirts (class 222), 1873 – 1919

In this class, women had the lowest participation in comparison with their participation from previous classes presented (Figure 27). There were 10 female

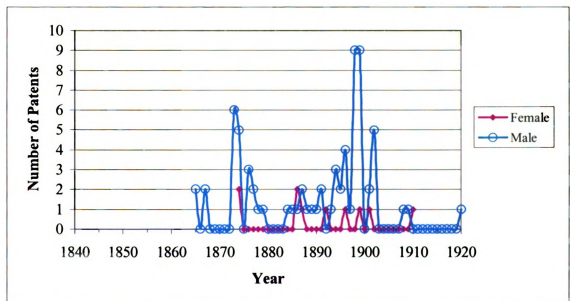


Figure 27. Number of approved patents for skirt edge bindings or protectors (class 222) to primary patentees, by gender, 1865 – 1920

primary patentees, and 71 male primary patentees. Out of the 55 years time span in which patents were granted in this class, women patented only in eight different years spread between 1874 and 1910, having two patents in 1874, and also in 1886.

Regular Skirts, Classes 211, 215, 217, and 222 combined

The patent distribution by year for Regular Skirts is given in Figure 28.

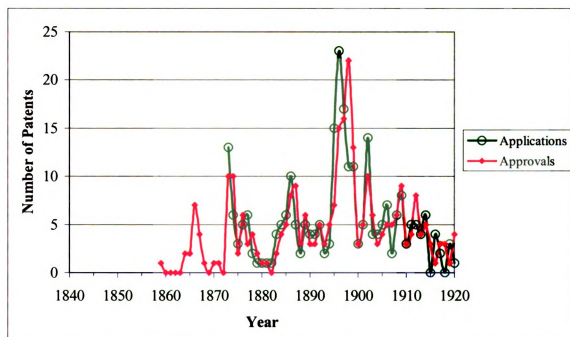


Figure 28. Number of applications and approvals for regular skirt patents (classes 211, 215, 217, and 222 combined), 1859 – 1920

In 61 years the USPTO granted 275 individual patents.⁶¹ The general average days elapsed for this group of patents was 287 days. The distribution of average days elapsed by year is shown in Figure 29.

⁶¹ The total number of patents in all four classes is 282, but seven patents belong to more than one class.

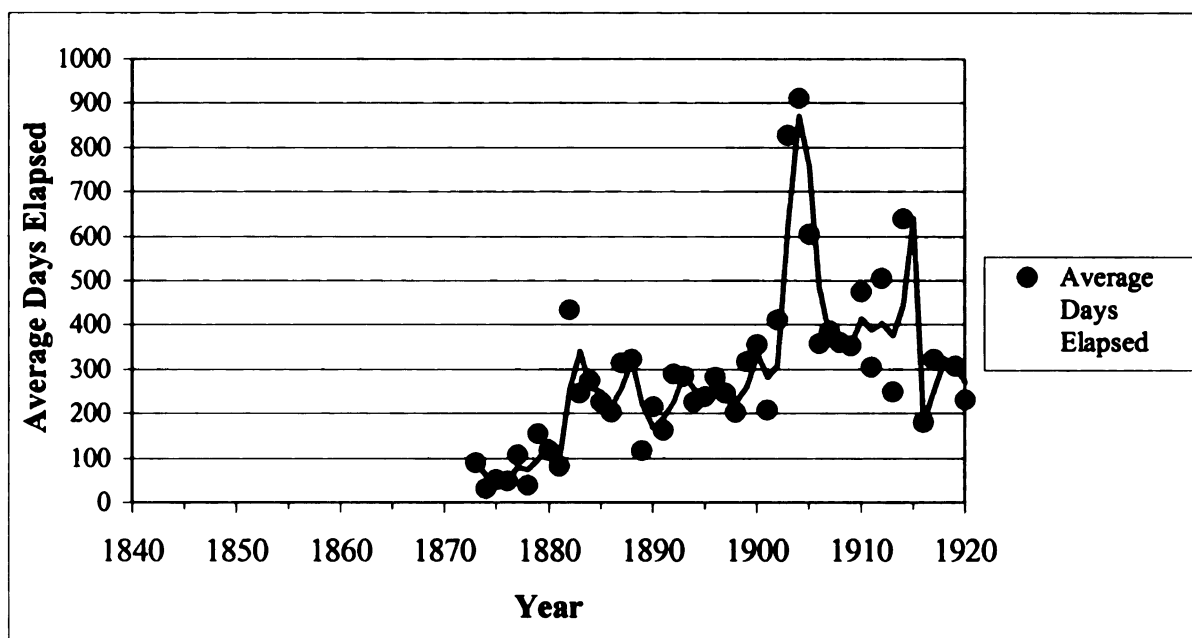


Figure 29. Average number of days elapsed between application and approval dates by year for regular skirt patents (classes 211, 215, 217, and 222 combined), 1873 – 1920

The comparison between approved patents of Skirts (class 211), With pads or distenders (class 215), Lifters and holders (class 217), and Edge bindings or protectors (class 222) is presented in Figure 30. The graph shows the following: the Edge bindings or protectors had two peaks, one in 1873-1874 when a total of 13 patents were approved, and another peak in 1894-1902 when a total of 38 patents were approved, periods that roughly correspond to the *fish tail* skirt/dress, and respectively to the Art Noveau *funnel-shaped* skirt, with sinuous lines and fullness at the back. Skirts (class 211) had a peak between 1896 and 1898 when 24 patents were granted, and continued for the next two decades at an average of three patents per year. Though Skirts with pads or distenders showed the least activity in this group (33 patents in 48 years), it had a peak between 1883 and 1890 when 18 patents were approved. Eight patents for Lifters and holders were approved in 1866-1868, and 12 patents were approved in 1894-1898.

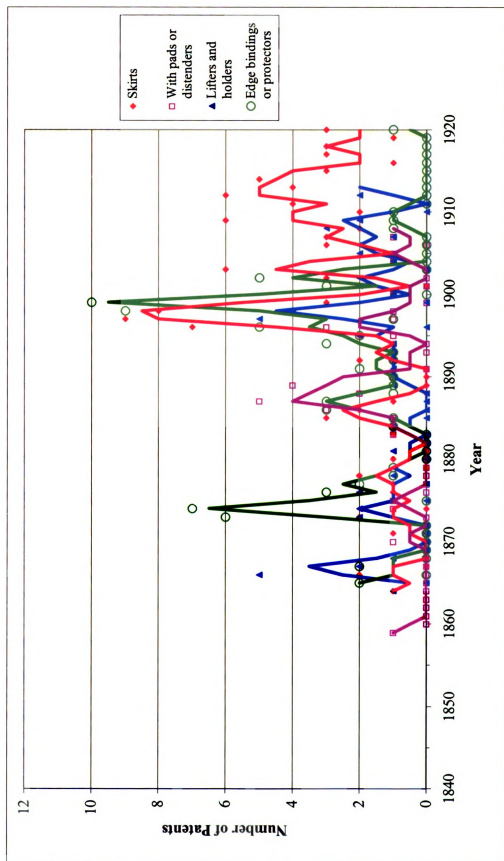


Figure 30. Number of approvals for regular skirts category, 1859 – 1920

In conclusion, the highest patent activity for three of the four classes –Skirts (class 211), Lifters and holders (class 217), and Edge bindings or protectors (class 222)– was in 1896-1898, while for Skirts with pads or distenders the highest patent activity was a decade earlier, in 1883-1890.

Bicycle Skirts, Classes 212 and 213

Bicycle skirts is a name I gave to a group of skirt patents having as a common feature their use for bicycle riding. This artificial construction was created through the unification of two subclasses: 212 – Combined bifurcated, and 213 – Convertible bifurcated. Brief presentations of the quantitative analyses of the two subclasses precede the analysis of the Bicycle skirts, as a grouping of classes 212 and 213.

In the 1850s, Amelia Jenks Bloomer made an attempt to introduce comfort and practicality into female dress by designing pants known as *bloomers*⁶² as a response to the restrictive petticoats of the 1840s and 1850s. An 1858 advertisement for a gymnastic costume⁶³ having characteristics of the Bloomer costume is shown in Figure 31. The ad states: “As gymnastic exercises among the ladies have now become very popular, and as the advantages which result from them on the form, color, grace, ease, dignity, beauty, and health of the ‘human form divine,’ can only be thus developed, and as they are beginning to be more generally appreciated, ... we were induced ... to procure and present to the numerous readers of the *Lady’s Book* an illustration of the most appropriate costume. As will be readily seen, the general outlines comprise a basque waist, full skirt,

⁶² [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/victorian/women/fashionplates/bloomercurrierives.jpg> [July 15, 2004]

⁶³ [Online photo gallery]. Greenberg, H. (2000). Available: <http://www.uvm.edu/%7Ehag/godey/images/glb1-58p68.jpeg> [July 15, 2004]

and Turkish sleeves and pants. The material may be either fine flannel, or French merino, of any two colors that will contrast prettily. [...] A correct pattern of this costume can be procured at Demorest's Emporium."

THE METROPOLITAN GYMNASTIC COSTUME.

[From *Demorest's Emporium of the Fashion*, 375 Broadway, New York.]



Figure 31. Left: Bloomer costume, 1851; Right: The Metropolitan Gymnastic Costume – *Godey's Lady's Book*, January 1858

Though Mrs. Bloomer's avant-garde idea of replacing the numerous petticoats of a regular dress with harem pants was rejected by the society of that time, the bloomers resurfaced much later, in the 1880s as part of the Rational Dress reform, when bloomers were used in cycling and sporting fashions. The patents for bicycle skirts embodied the bloomers' design, and it is not surprising that more women than men were granted patents in this category since "a certain freedom of dress was involved, for obviously no

one could ride a bicycle in floor-length skirts with 15-20 pounds of petticoats in the way” (Stanley, 1993).

The emergence of the bicycle as a means of transportation brought about adaptations to women’s bicycles and skirts. In 1888, the ladies' "drop frame" bicycle was developed which allowed women cyclists to wear ordinary walking skirts, only slightly shortened. Still, the skirt could easily become tangled in the chain. In the 1890s, chainless bicycles were invented, but they were expensive, so bicycles with chain guards more frequently were used. However, the best solution was wearing trouser type garments. A representative quote is given in an 1894 article in *The Ladies' Standard Magazine* (Johnson Lewis, 2004): "If I was compelled to go back to wearing a skirt on my wheel, I would give up cycling.... I shall never forget what I suffered with my arm, all the fault of my skirt. Some friends and I were riding one day last summer against a very heavy wind, when it caught my skirt and wound it around my pedal, throwing me. The rapid gait I was going caused the force of the fall to break my arm. It laid me up six weeks; then it was I [who] decided to wear almost any other costume, but never a skirt, and declared if ever I recovered the use of my arm, I should wear bloomers; and truly glad I am that I did so decide, for never in the years of my experience as a bicycle rider have I derived such pleasure from cycling. I climb hills impossible before. It has increased my speed just double. I fear nothing from teams or roads, for if I slip I light on my feet. With my bloomers and heavy undergarments, leggins to my knees, a corset waist, and in cool weather a double-breasted box coat, which amply protects me from chilling, I enjoy my riding."

Class 212, Skirts – Combined bifurcated

USPTO definition: Devices embodying both skirt and bifurcated features.

Time span of 45 years, 1874-1919.

Total number of patents researched: 52, out of which 32 in depth (Table 2, page 50).

Number of reissued patents: zero (0).

Patents unrelated to the present study: none

Not all the patents in this class have class 212 as primary class (Table 17).

Table 17. Patents whose primary class is other than 212

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
156,018	Improvement in Dress- Protectors	2/47	2/212				
520,225	Skirt-Protecting Garment	2/47	2/212				
545,173	Athletic Suit for Ladies	2/71	2/212				

The number of patent applications and approvals is presented in Figure 32.

Characteristic to this graph is a sharp increase in patent applications and approvals between 1894 and 1897 when 34 applications were submitted, and 32 patents were granted. A small increase in patent activity was registered in 1916-1917, when six patents were submitted and approved.

The patent activity by gender is presented in Figure 33. Fifty-two patents were granted between 1874 and 1919, women receiving 32 of them. In 1894-1897 women patented 46% more patents than men. Class 212 is one of the two classes in which the number of patents issued to women is higher than the number of patents issued to men.

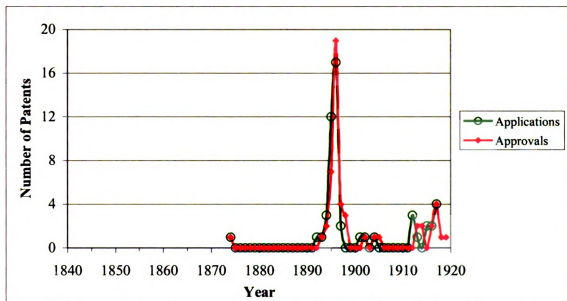


Figure 32. Number of applications and approvals of patents for combined bifurcated skirts (class 212), 1874 – 1919

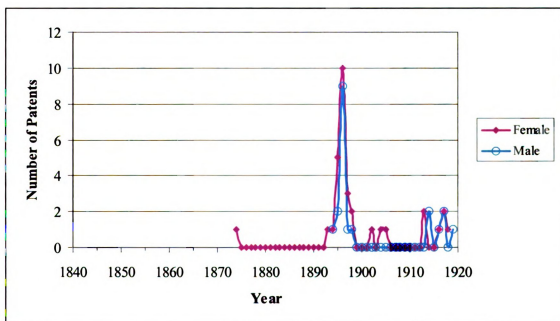


Figure 33. Number of approved combined bifurcated skirt patents (class 212) to primary patentees, by gender, 1874 – 1919

Class 213, Skirts – Convertible bifurcated

USPTO definition: Devices convertible to a bifurcated form.

Time span of 35 years, 1885-1920.

Total number of patents researched: 20, out of which 6 in depth (Table 2, page 50).

Number of reissued patents: zero (0).

Patents unrelated to the present study: none.

Not all the patents in this class have class 213 as primary class (Table 18).

Table 18. Patents whose primary class is other than 213

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
491,057	Bicycle-Garment	2/212	2/213				
552,052	Bicycle-Habit	2/212	2/213				
564,271	Bicycle-Skirt	2/212	2/213				
578,312	Attachment for Skirts	24/300	2/213	24/72.1	24/352		
578,444	Bicycle-Skirt Fastener	2/211	2/213	24/72.1	24/300		

The patent distribution by year is shown in Figure 34. A total of 20 patents were submitted, and the same number of patents were approved between 1885-1920, the second shortest patenting interval (~35 years) in the Nether Garments category after Riding Skirts – class 214 (~30 years). The peak of the patenting activity was in 1895-1897, with 11 applications and nine approvals.

Patent distribution by gender is presented in Figure 35. Convertible bifurcated skirts is the only class in which patents issued to women categorically outnumbered patents issued to men, in proportion three to one (15 patents, and 5 patents respectively).

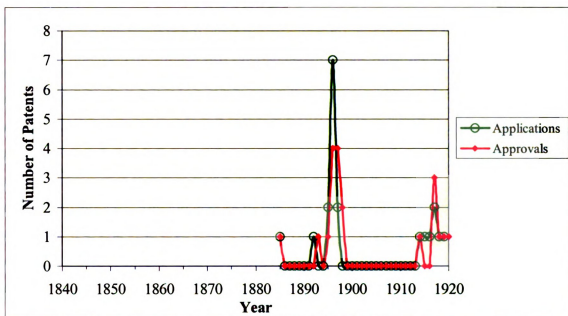


Figure 34. Number of applications and approvals of patents for convertible bifurcated skirts (class 213), 1885 – 1920

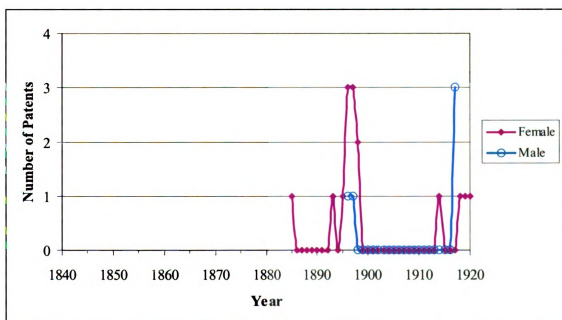


Figure 35. Number of approved convertible bifurcated skirt patents (class 213) to primary patentees, by gender, 1885 – 1920

Bicycle Skirts, Classes 212 and 213 combined

In patent 346,006 – *Lap-Robe and Splatter-Dasher* (1886), the American inventor John. J. Williamson mentioned two English patents from 1884, number 11,287 and number 11,879, that showed in addition to riding aprons and knee sleeves “a form of riding-skirt for ladies’ use,” these patents referring to “developments of the ‘divided skirt,’ so called, introduced in Germany about ten years ago by a celebrated Berlin teacher and author.” The importance of patent 346,006 is not necessarily in its claims, but in this annotation that shows that around 1874 first divided skirts were patented in Europe, and also over the Atlantic, in the US.

A total of 69 distinctive patents⁶⁴ were granted for both subclasses (212 and 213). Between 1895 and 1898 there were 42 bicycle patents approved, with a peak in 1896 when the largest number of patents were applied for (23 patents) and approved (22 patents), Figure 36. The second peak in patenting activity, though at a smaller scale, took place in 1916-1917 when nine applications were received and nine patents were granted.

It can be observed in Figure 37 that the least number of days, beside 1904 when only one patent was approved, was in 1896 when the average days elapsed between application and approval dates for bicycle skirts was 190 days. This was the same year when the highest number of patents was approved.

The average days elapsed for class 212 was 271 days, and for class 213 was 282 days. For all 69 patents combined, the average days elapsed was 281 days, which was close to the average for all skirt patents (280 days), but 18% higher than the general average for all patents in the Nether Garment class (239 days).

⁶⁴ Class 212 = 52 patents; class 213 = 20. Total = 72. Three patents are common to both classes: 491,057, 552,052, and 564,271.

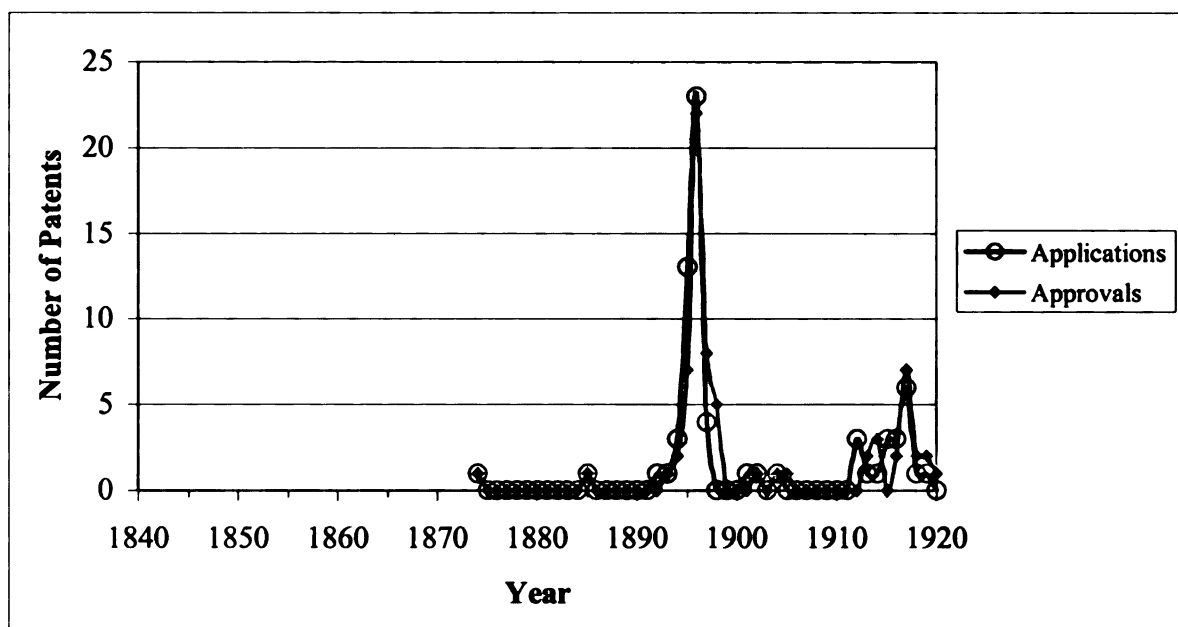


Figure 36. Number of applications and approvals of patents for bicycle skirts (classes 212 and 213), 1874 – 1920

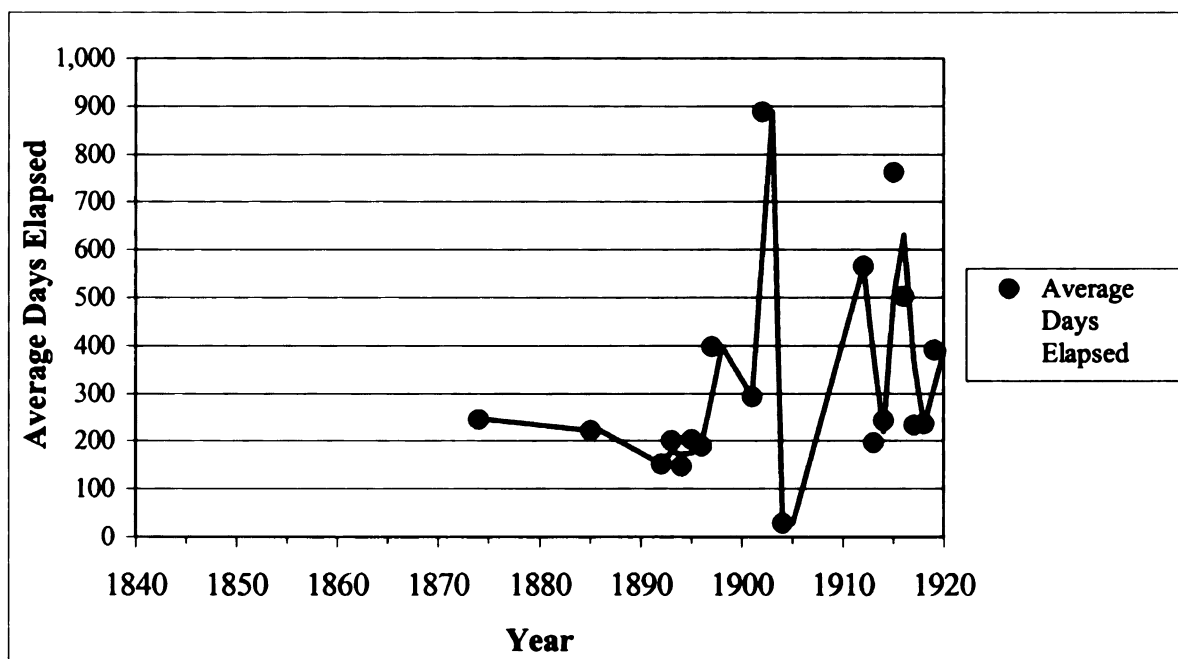


Figure 37. Average number of days elapsed between application and approval dates by year for bicycle skirts (classes 212 and 213), 1874 – 1919

Forty-four patents had women as primary patentees, and 25 patents had men as primary patentees. Women started patenting bicycle skirts 20 years in advance of men,

i.e., 1874 versus 1894 (Figure 38). At the first peak of the patent activity in 1895-1898, 27 patents were granted to women, and 15 patents to men. At the second peak of the patent activity in 1916-1917 the proportion between patents issued to women and patents issued to men changed, thus six patents were granted to men and only three patents to women.

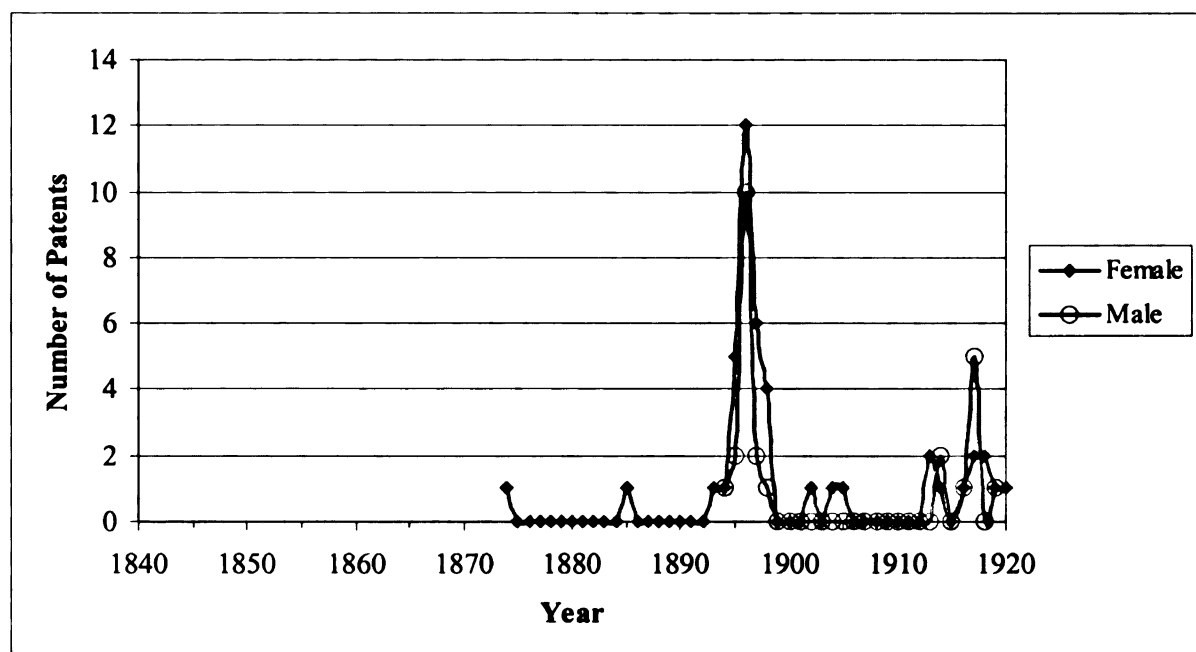


Figure 38. Number of approved bicycle skirt patents (classes 212 and 213) to primary patentees, by gender, 1874 – 1920

Since 1894 when men started patenting bicycle skirts along with women, there were years in which no bicycle skirt patents were issued to women, nor to men: 1899-1901, 1903, 1915, and the longest in 1906-1912. A seven-year gap between periods of patenting is the biggest in comparison with the patent activity for bustles and hoops. Only hoops had a four-year gap between 1886 and 1889 because the hoop fashion was in decline. In the case of bicycle skirts, a correlation could exist in the way the new bicycle models influenced at a certain point in time the new improvements in bicycle skirts, or

vice versa –the bicycle skirts models influenced the new improvements in bicycle models.

A parallel can be made between the number of patents issued for bicycles and for bicycle skirts (Figure 39). The graph reflects the number of approved patents for bicycles skirts (classes 212 and 213 combined), and some representative classes from class 280, *Land Vehicles, velocipede type*.⁶⁵ I did not try to make an exhaustive search for all the patented bicycles, but only for those referring to bicycles that women might have used. Thus, I selected the following classes for bicycles and their accessories: 280/7.11, Convertible land vehicles with drop frame, in which an ordinary frame could be converted to a drop frame, commonly known as a *ladies' bicycle*; class 280/209, Parallel connected cycles; and class 280/288, Wheeled land vehicles, occupant propelled type with frames and running gear, rear forks.

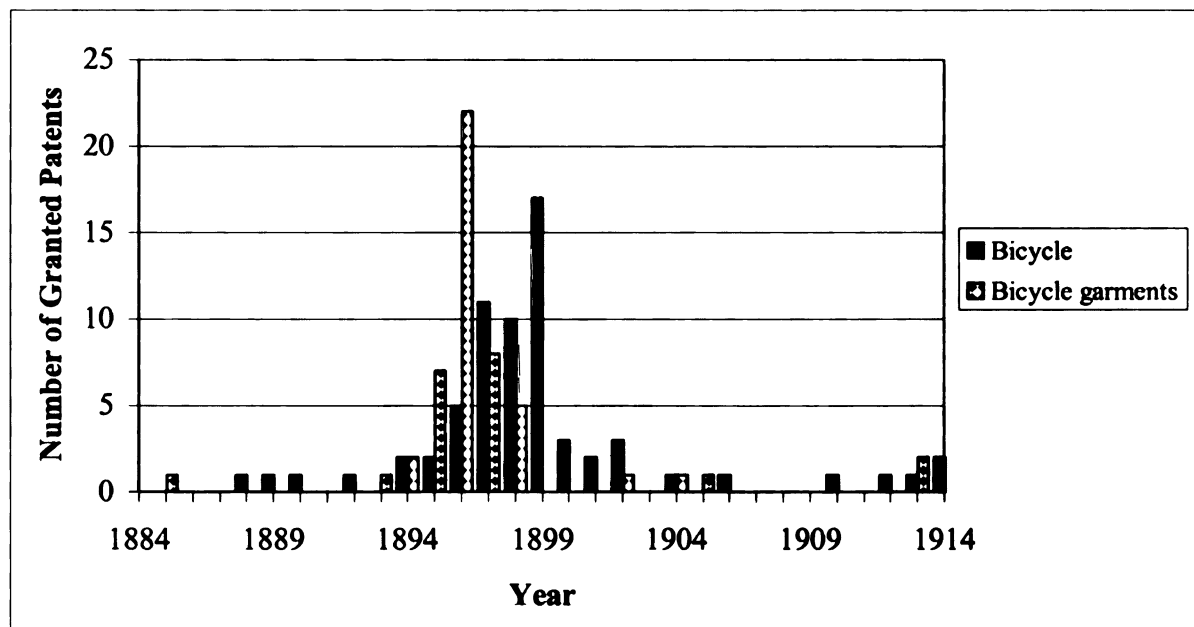


Figure 39. Patents granted for Bicycles and accessories, and Bicycle skirts, 1884 – 1914

⁶⁵ *Velocipedes* are those vehicles adapted to be propelled by the occupant including those pushed by the occupant by contact of the hands or feet with the surface over which the vehicle moves (USPTO, 2002).

The graph clearly shows two things: first, clothing innovation changed faster than trends in mechanical products that required a larger capital for improvements. Second, the serviceability of ladies' bicycles was facilitated by women's bicycling garments. Therefore the peak of granted patents for bicycle garments preceded by two years the peak of granted patents for bicycles per se, which in part contradicts Bijker's (1995) assertion that women's clothing was adapted to the technical constraints of the bicycle. In 1888-1894, six bicycle patents were issued, in comparison with three skirt patents. In 1895-1898, the proportion of approved patents for bicycles versus skirts was reversed (28 bicycle patents, and 42 skirt patents). These data are in agreement with Bijker. A different situation was in the following period, 1899-1902, when 25 bicycle patents were issued in comparison with only one skirt patent. In my opinion, a reciprocal cause-effect relationship existed between improvements in bicycle skirts and new bicycle models; that is, the bicycle skirts patented in 1895-1898 gave –in turn– stimulus to the patenting activity of bicycles per se. Also, the patenting activity for bicycles followed the same trend of the patenting activity for skirts: when skirt patents declined sharply, bicycle patents had the same pattern.

At the beginning, ladies –in particular– did not feel safe riding bicycles. They preferred velocipedes because they did not tip over so easily (Figure 40), or they enjoyed riding on two connected velocipedes,⁶⁶ as shown in Figure 41. As stated in patent 90,302 “If desirable, a connection may be employed between the levers which control the guiding-wheels, so that both will move simultaneously, or this may be left to the skill of

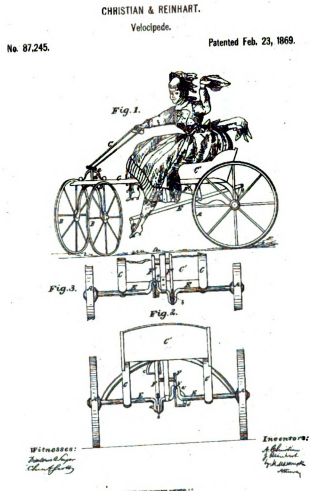
⁶⁶ According with the American Heritage Dictionary (2000), a velocipede is: 1) A tricycle. 2a) Any of the several early bicycles having pedals attached to the front wheel; 2b) An early bicycle propelled by pushing the feet along the ground while straddling the vehicle. French *vélodipède*: Latin *velox*, *veloc*-, fast + Latin *pes*, *ped*-, foot].



Figure 40. Velopedes of 1860s

Left: Velorama National Bicycle Museum, Holland. [Online photo gallery]. Available: <http://www.velorama.nl/engels/museum/voorstelling/index2.html> [April 02, 2004].

Right: Patent 87,245, 1869



the riders. The coupling employed for this purpose may also be made to serve several other valuable uses, among which is that of a rack or platform to support, or underneath which may be suspended a portmanteau or other baggage. It may also be provided with a socket, to receive a standard, on which to support an umbrella, or sun-shade, or other canopy as protection to the riders, or a mast for a streamer, flag, or sail to add in its propulsion. A ready means of connecting two velopedes adds increased interest and enjoyment to their use, by enabling a lady and gentleman, or others socially inclined, to unite their vehicles in pairs, and combine the enjoyment of conversation with exercise, while it facilitates the learning of a beginner, by placing his machine partially under the control of a more experienced companion, and entirely obviating the danger of falling. It

also offers an incentive for ladies to indulge in this healthful and agreeable exercise, by rendering it less fatiguing, and unattended with danger, while it enables them to ride at the side of the seat, as in equestrian exercise.”

The earliest patent bicycle that I found is patent 88,507 from 1869, which was invented by Thomas R. Pickering.⁶⁷ The patent and an actual picture of this invention are presented in Figure 42. Pickering mentions in his patent: “My invention consists in a peculiar tubular construction of the reach, or back-bone of the

velocipede, with socket-attachment, whereby, while lightness and strength are secured, top-heaviness is avoided, and expense of construction reduced. Also, the invention

W. H. RACEY.
Velocipede.

No. 90,302.

Patented May 18, 1869.

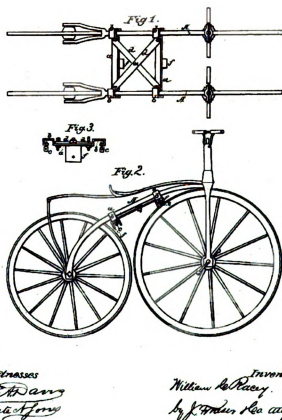


Figure 41. Patent 90,302 – Improved apparatus for connecting velocipedes

⁶⁷ “The Hon. Thomas Pickering, the inventor and late president of the company, was born in England in 1831, coming at an early age to this country, locating in New York and studying in the public schools and Mechanics’ Institute, being educated as a mechanical engineer. About 1862 he commenced the manufacture of the governor which has attained such prominence in engineering circles throughout the world. [...] Mr. Pickering ably represented the United States at international exhibitions at Paris three times, Vienna and Melbourne, besides being Commissioner at the Centennial and New Orleans. He was elected in Nov., 1894, to represent the twenty-second senatorial district of Connecticut, and died in February twenty-first, 1895, in the performance of his duties as senator.” Portland Online. *The Middletown Tribune*, 1896. [Online] Available: <http://www.portlandct.org/History1896/Intro.htm> [2004, April 02]

includes a hollow construction of the fork which carries the front wheel, whereby, while like advantages are obtained, said fork is made to form oil-boxes for lubricating the running axle.” Pickering’s invention closely resembles the lines of the present bicycle, using tubing for frame. This patent has no assignor, but “he afterwards sold some of his patents to a prominent bicycle concern in the United States” (Portland Online, 2004).

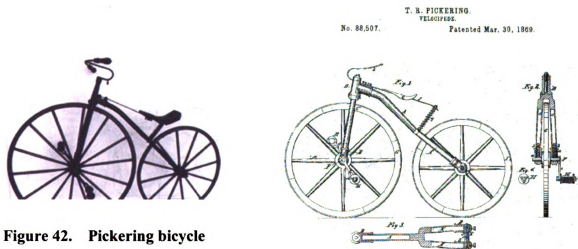


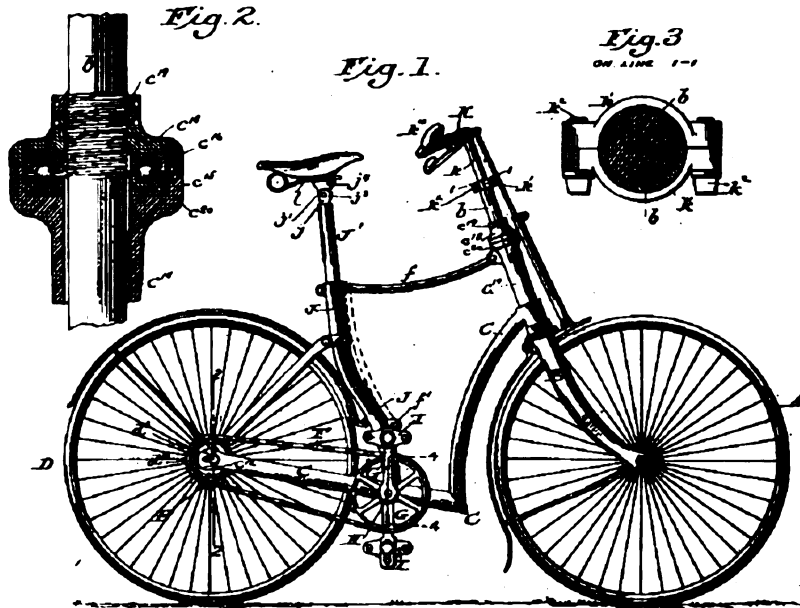
Figure 42. Pickering bicycle

Left: *Pickering bicycle* [Online photo gallery]. Metz Bicycle Museum in Freehold, NJ. Available: <http://www.metzbicyclemuseum.com/bicycles3.htm> [April 02, 2004]

Right: Patent 88,507 – Improved velocipede, patented by Pickering in 1869

A great number of Pickering boneshaker velocipedes were manufactured, and even exported from New York to Liverpool (Clayton, 1994), and orders were received from such remote countries as China (Portland Online, 2004). The velocipede was “mockingly referred to as a ‘boneshaker’ –hardly surprising if you consider that it had to be ridden on unsurfaced roads, without rubber tyres to cushion the bumps” (Velorama, 2004).

Patent 392,973 from 1888 (Figure 43) is the first bicycle for women that I found, and the invention related to the category of ‘safety bicycles’ in which “a seat supporting



WITNESSES.
Edward I. Yewell.
Jos. A. Ryan.

INVENTOR,
W. C. Smith.
By Phil T. Dodge,
Attorney

Figure 43. Patent 392,973 – Bicycle, 1888

nearly-horizontal position to a point near the steering-wheel, when it is curved upward closely around the latter to the steering-fork, and this for the purpose of securing the depression of its middle portion in such manner that it will not interfere with or offer an impediment to the skirts of female riders.” The rear-driven safety bicycle of this type was also known as the ‘Rover.’

“The bicycle was what made the Gay Nineties gay. It was a practical investment for the working man as transportation, and gave him a much greater flexibility for leisure. Ladies, heretofore consigned to riding the heavy adult size tricycles that were only

frame is provided with a front steering-wheel and a rear driving-wheel actuated through a chain and sprocket-wheels from a pedal-shaft seated between the wheels. [...] The main-frame reach, or, as it is sometimes termed, the 'backbone,' instead of extending forward and upward from the rear wheel to the upper part of the steering-fork, as usual, is carried forward in a

practical for taking a turn around the park, now could ride a much more versatile machine and still keep their legs covered with long skirts.” The bicycle craze contributed to the demise of the bustle and the corset, instituted ‘common-sense dressing’ for women and increased their mobility considerably. In 1896, Susan B. Anthony said that "the bicycle has done more for the emancipation of women than anything else in the world" (Pedaling History Bicycle Museum, 2004).

Riding Skirts, Class 214

USPTO definition: Devices adapted primarily for horseback riding.

Time span of 30 years, 1885-1915.

Total number of patents researched: 27, all of them in depth (Table 2, page 50).

Number of reissued patents: none.

Patent unrelated to the present study is listed in Table 19.

Table 19. Patent excluded from Class 214

#	Patent Number	Patent Title	Note
1	346,026	Car-Coupling	Possible USPTO misclassification, or typing mistake

Not all the patents in this class have class 214 as primary class (Table 20).

Table 20. Patents whose primary class is other than 214

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
564,292	Divided Skirt	2/211	2/214				
1,104,632	Riding-Habit	2/212	2/214				

In England, at the end of the 19th century riding became a fashionable sport when hunting gained in popularity as a social event. This led to the introduction of *safety skirts*, and early in the 20th century of bifurcated skirts for use with “gentlemen’s saddles.” In class 214 there are four patents regarding safety skirts: patent 521,478 – Riding-Habit (1894), patent 631,949 – Safety Hunting-Skirt (1899), patent 693,428 – Riding-Habit (1902), and patent 734,775 – Riding-Skirt (1903). The safety skirts were constructed from pieces connected by fabrics and/or systems of hooks-and-eyes that could be easily torn apart in case of an accident, thus releasing the wearer from the saddle to avoid injuries “while the skirt [was] left hanging from the pommels of the saddle.” Albrecht, Farrell-Beck, and Winakor (1988) assert that “patented safety features, which appeared in the United States during the 1870s, were rarely incorporated in American habits.” Probably the authors refer to other types of safety features from different classes than 214, since the first US riding skirt patent was granted in 1885.

The riding skirts had the shortest time span for patenting, and their numbers are the lowest in the Nether Garments class (Figure 44). Between 1901 and 1903 more than 30% of applications and approvals for riding skirt patents were processed.

However, the peak of the patent activity for this class was four times lower than the peak for bicycle skirts that took place six years earlier. Possible explanations might be: a) horse riding was an expensive sport compared to bicycling, and therefore it was accessible only to a select group of women; and b) the advent of the first automobile, Ford’s Model T, in 1908, that brought about new activities for spending leisure time.

The general average of days elapsed between application and approval dates of patents from this class was 233 days, which was about 15% lower than the average for

regular skirts or bicycle skirts. Patents issued between 1890 and 1893 were handled in the least amount of time, in average 153 days (Figure 45).

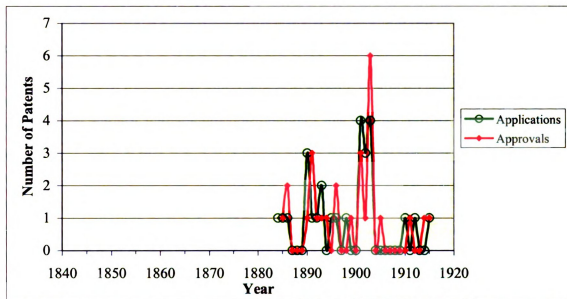


Figure 44. Number of applications and approvals of patents for riding skirts (class 214), 1884 – 1915

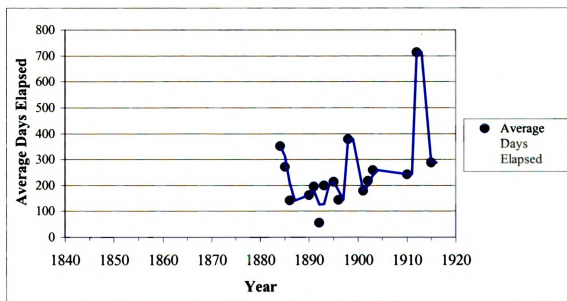


Figure 45. Average number of days elapsed between application and approval dates by year for riding skirts (class 214), 1884 – 1915

A comparison between riding and bicycle skirt patents by geographical

distribution is shown in Figure 46. These types of skirts were associated frequently with sports. The Northeast region had a total of 23 riding skirt patents (85% of the total riding skirt patents), and 54 bicycle skirt patents (78% of the total bicycle skirt patents), New York state having the most patents (21 and 40, respectively). The Midwest region had seven bicycle skirt patents, and one riding skirt patent. Southeast and Southwest regions had a modest activity, with a total contribution of five bicycle skirt patents. The Northwest and Great Plains regions had no riding or bicycle skirts patented.

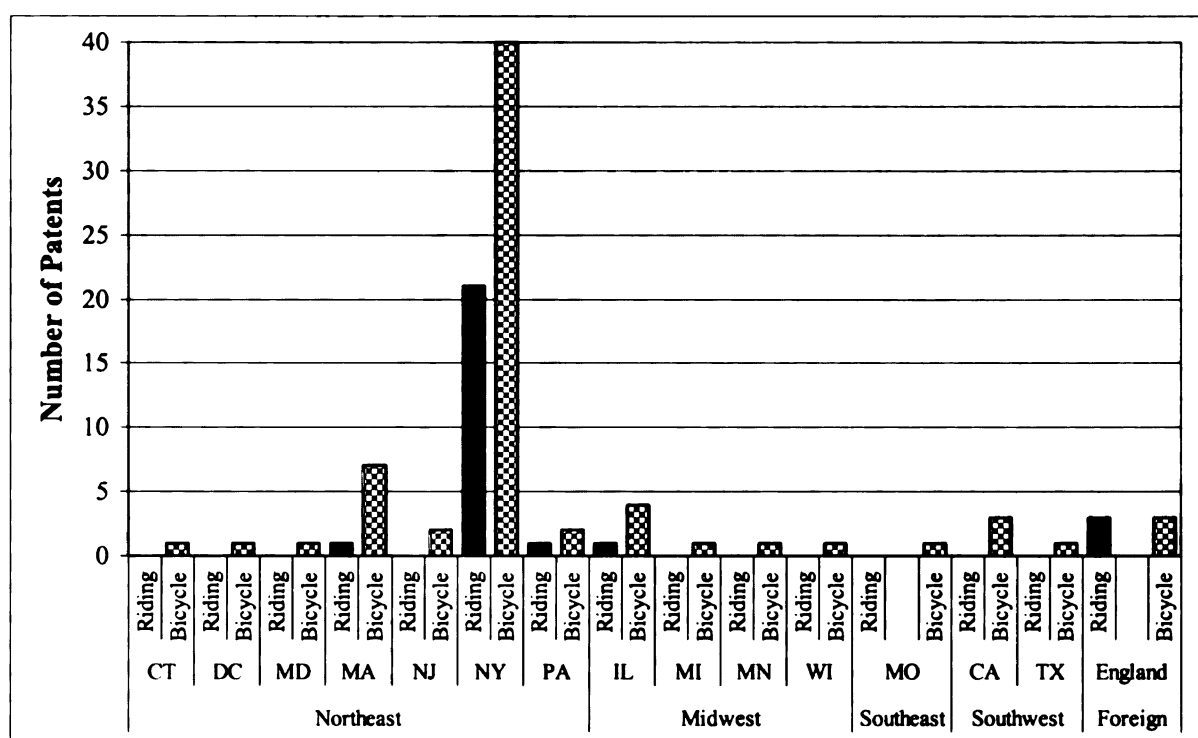


Figure 46. Geographical distribution of riding skirt patents (class 214), and bicycle skirt patents (classes 212 and 213 combined), 1874 – 1920

Riding skirts were patented only by four states: Illinois, Massachusetts, New York, and Pennsylvania. Three riding skirt patents, and three bicycle patents had English patentees. Bicycle skirts were patented in 14 states: California, Connecticut, District of Columbia, Illinois, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Pennsylvania, Texas, and Wisconsin.

All Skirts Combined, Classes 211 to 215, 217, and 222

In 1859-1920, all granted patents for skirts amounted to 370 distinctive patents, out of which 275 patents were for regular skirts (256 since 1873), 69 patents for bicycle skirts, and 26 patents for riding skirts. In 1873-1920, there were 351 approvals. Starting with 1873, all applications for skirt patents were: regular skirts = 255; bicycle skirts = 69; and riding skirts = 26; Total = 350 applications. One application made prior to 1873 (the starting year when the application date was specified in the granted patent) was also approved in the 1873-1920 interval.⁶⁸ The year 1896 was the most remarkable for both the number of applications (48) and for approvals (38) for all types of skirts combined, i.e., regular, bicycle, and riding skirts (Figure 47). At the same time, in 1896 the average

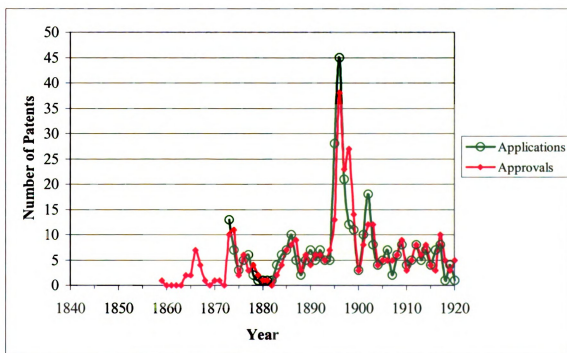


Figure 47. Number of applications and approvals for all skirt patents (classes 211 to 215, 217, and 222 combined), 1859 – 1920

⁶⁸ Eleven patents are in two subclasses. If these patents are added up for each class, the totals would be: total approved skirt patents = 381, out of which 282 patents for regular skirts (263 since 1873), 72 patents for bicycle skirts, and 27 patents for riding skirts. In 1873-1920, there were 362 approvals. Starting with 1873, all applications for skirt patents were: regular skirts = 262; bicycle skirts = 72; and riding skirts = 27; Total = 361 applications.

days elapsed between application and approval dates was 205 days, much lower than the general average of 275 days for this category (Figure 48, and Figure 49).

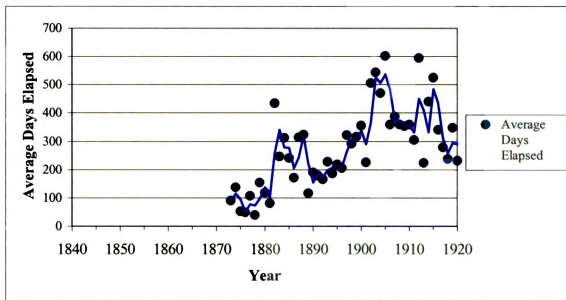


Figure 48. Average number of days elapsed between application and approval dates by year for all skirt patents (classes 211 to 215, 217, and 222 combined), 1873 – 1920

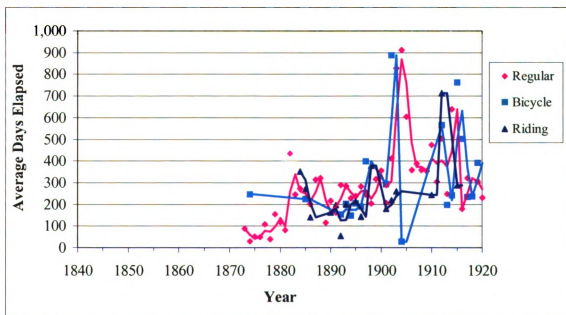


Figure 49. Average number of days elapsed between application and approval dates by year and by class for all skirt patents (classes 211 to 215, 217, and 222 combined), 1873 – 1920

The number of all skirt applications was slightly higher than the number of approvals, but their distribution in time had the same pattern (Figure 50 and Figure 51).

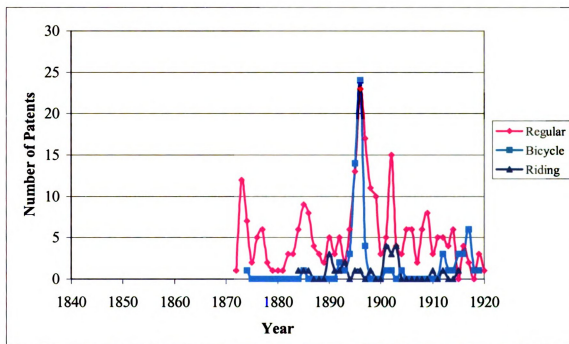


Figure 50. Number of applications for all skirt patents, 1872 – 1920

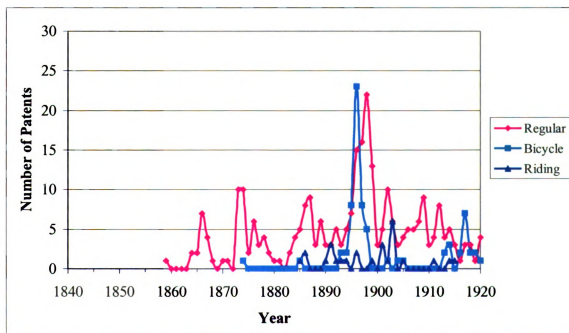


Figure 51. Number of approvals for all skirt patents, 1859 – 1920

It is interesting to observe that between 1893 and 1899 a substantial increase in regular skirts and bicycle skirts took place, both in applications and approvals, while the riding skirts had a much lower frequency. Also, it can be observed that the bicycle skirts surpassed the improvements for regular skirts in 1895 and 1896, when an abundance of patents were issued. For these two years only, there were 38 applications (53%), and 31 approvals (43%) out of 72 applications and respectively 72 approvals existent over 46 years.

Figure 52 shows that between 1895 and 1898 the total number of skirt patents granted to women (52 patents) surpassed those granted for men (49 patents), with a peak in 1897 when 14 patents were issued to women, and nine to men. From the general trend of the graph, it could be observed that the disparity between skirt patents issued to men versus women is the smallest when compared with those issued for bustle or hoop patents.

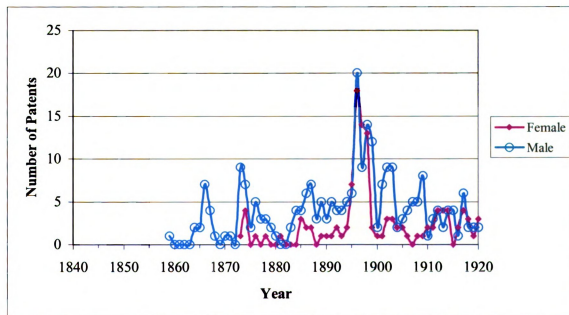
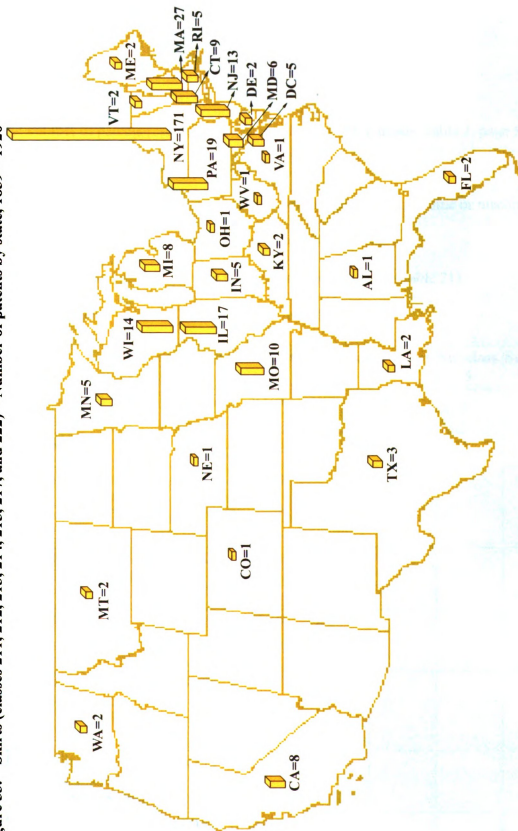


Figure 52. Number of approved patents for all skirt classes (211 to 215, 217, and 222) to primary patentees, by gender, 1859 – 1920

The geographical distribution of skirt patents is shown in Figure 53. Three hundred forty-seven patents were granted to inventors from 30 US states, and 23 patents⁶⁹ were granted to foreign inventors. The patent activity for skirts was much higher than the patent activity for hoops or bustles, both as number of patents and as geographical spread. The number of skirt patents was 50% higher than the average of hoop and bustle patents, and the number of participant states in the patenting activity doubled in comparison with the number of states involved in hoop patenting.

⁶⁹ Foreign patentees received a total of 28 patents for bustle, hoop, and skirt inventions.

Figure 53. Skirts (classes 211, 212, 213, 214, 215, 217, and 222) – Number of patents by state, 1859 – 1920



Note: The map reflects 347 patents out of 370 researched. Twenty-three patents belong to foreign citizens: England (12 patents); Germany (four patents); Canada and New Zealand (two patents each); France, Ireland, and Switzerland (one patent each). One patent has two patentees from different states, IL and PA; in this case, the patent was added to the state of the primary patentee, IL.

QUANTITATIVE ANALYSIS – HOOP SKIRTS, CLASS 216

USPTO definition: Devices of the hoop type.

Time span of 61 years, 1846-1907.

Total number of patents researched: 227, out of which 59 in depth (Table 2, page 50).

Number of reissued patents: twenty-two (22).

Patents unrelated to the present study: none. Apparel apparatus/machine or machine processes for making hoop skirts were not included in the study.

Not all the patents in this class have class 216 as primary class (Table 21).

Table 21. Patents whose primary class is other than 216

Utility Patent #	Title of Patent	Subclass 1	Subclass 2	Subclass 3	Subclass 4	Subclass 5	Subclass 6
5,441	Lady's Corded Skirt	139/426R	2/216				
30,534	Skirt	139/387R	2/216				
40,801	Improvement in Covering Cords, Wires, &c.	427/180	2/216				
59,711	Improvement in Hoop-Skirt Wire	87/1	2/216				
87,648	Brace and Suspender Combined	2/327	2/216	2/223			
105,730	Improved Life-Preserving Skirt	441/88	2/216				
147,905	Improvement in Skeleton Hoop-Skirts	66/177	2/216				
245,483	Hoop-Skirt	66/177	2/216				

Most of the hoop patents were issued before 1873, namely 194 patents, or 85% of 227 total (Figure 54). Therefore the graph of average days elapsed between the application and approval dates for hoop skirt patents is not very relevant since it starts when the hoops were in sharp decline. Still, the same pattern of increased numbers of days for granting patents when the number of patents declined remains evident (Figure 55).

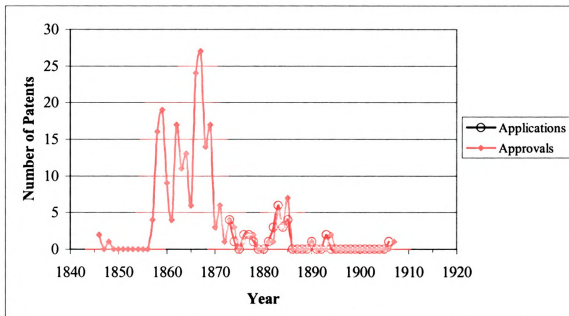


Figure 54. Number of applications and approvals of patents for hoop skirts (class 216), 1846 – 1907

Very few women were involved in hoop patenting. Only 12 patents were issued to women out of a total of 227 hoop patents, though the women's patenting activity was even longer than men's, i.e. 51 years versus 49 years. The first hoop patent granted to a woman was issued 12 years after the first patent was granted to a man, and the last hoop patent was issued to a woman more than a decade after the last men's patents were approved (Figure 56).

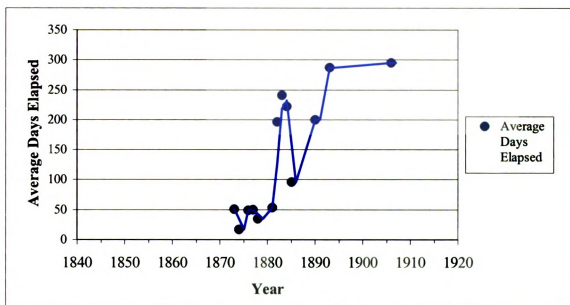


Figure 55. Average number of days elapsed between application and approval dates by year for hoop skirts (class 216), 1873 – 1906

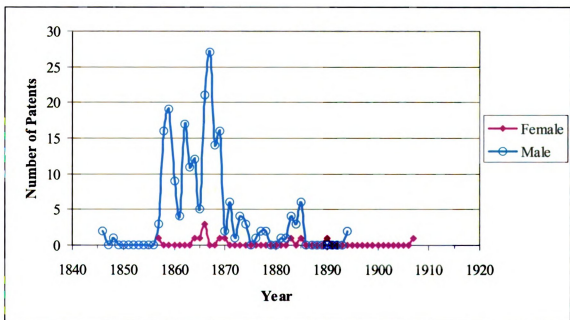


Figure 56. Number of approved hoop patents (class 216) to primary patentees, by gender, 1846 – 1907

The last patent issued in 1907 was patent 839,931 – Hoop-Skirt, and it was granted to Mary J. Hosac of Chicago, IL. Though this patent had as assignee the Warren

Featherbone Company, of Three Oaks, MI, it took almost double the time for its approval in comparison with the average days elapsed for patents in this class (294 days versus 150 days, respectively). This invention seems to be a simplified version of similar patents of spring hoops connected by tapes issued half a century earlier⁷⁰ (Figure 57).

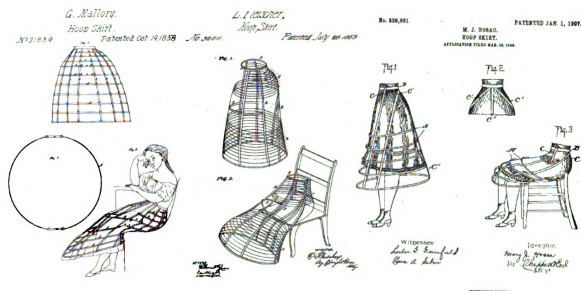


Figure 57. Patent 21,839 – Hoop-Skirt (1858), patent 92,811 – Improvement in Hoop-Skirts (1869), and patent 839,931 – Hoop-Skirt (1907)

One of the female patentees was Madam E.L. Demorest⁷¹ from New York, which was the publisher of one of the leading fashion publications of the time, *Demorest's Illustrated Monthly Magazine*. In 1869, she received patent 87,648 – Brace and Suspender Combined. Macdonald (1992) mentions that Madam Demorest “invented, but did not patent an inexpensive hoop skirt, which won prizes at many fairs.” Indeed, I did not find any hoop patent issued to Madam Demorest, but her patent mentioned above was

⁷⁰ The claims of these three patents relate to improvements that reduced the tilting of the hoop when the wearer was sitting down.

⁷¹ First name was Ellen.

included in the hoop class by USPTO because her brace/suspender was supposed to support the hoop⁷² (Figure 58).

There were 14 states that had a total of 224 hoop patents issued (Figure 59). Two patents were issued to patentees from England, and one patent was issued to a patentee from France. No women patentees had three or more patents, therefore they are not listed in the selected listing of patentees, Appendices – Table 36, and Figure 60.

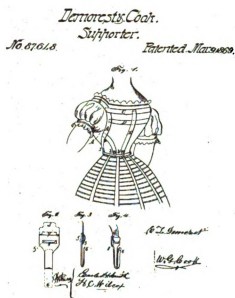


Figure 58. Patent 87,648 – Brace and Suspender Combined

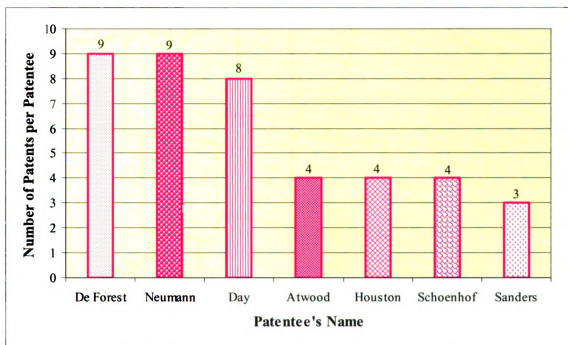
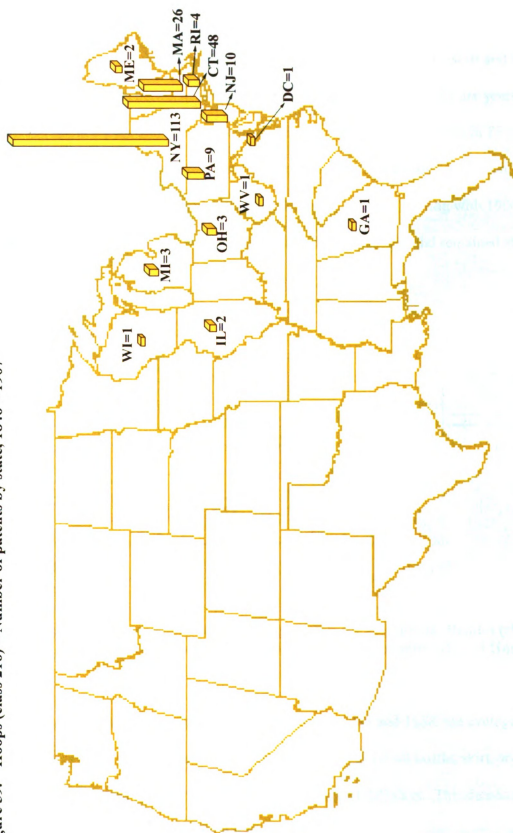


Figure 60. Number of hoop patents issued to certain male patentees

⁷² The primary subclass of this patent is not 2/216, but 2/327 – “Strip connected spaced holders, plural crossed or closed loop shoulder” type, which belongs to the *Garment Supporters and Retainers* class.

Figure 59. Hoops (class 216) – Number of patents by state, 1846 – 1907



Note: The map reflects 224 patents out of 227 researched. Three patents belong to foreign citizens from England (2), and France (1).

QUANTITATIVE COMPARISON OF BUSTLE, SKIRT, AND HOOP PATENTS

The highest number of applications and approvals for all bustle, skirt and hoop patents combined was between 1883 and 1888 (Figure 61), when in only six years there were 199 applications, and 203 approvals (23% out of 864 granted patents in 75 years). The lowest numbers of applications and approvals were in 1880 (one application, and two approvals), and in 1881 (two applications, and two approvals). Starting with 1904, the number of patent applications or approvals dropped significantly, and remained at 10 or less per year.

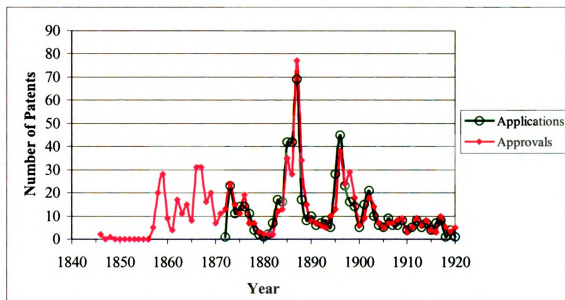


Figure 61. Number of applications and approvals for all patents: Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1846 – 1920

At the highest peak of patent activity, between 1883 and 1888, the average number of days elapsed between applications and approval for all bustle, skirt, and hoop patents was 224 days, 6% less than the general average of 239 days. This demonstrates that USPTO tried to keep up with the large number of applications when such a wave

occurred, and to process them as quickly as possible. The highest average number of days, 603 days, was in 1905 (Figure 62). That year was one with the lowest number of applications (6), and approvals (5).

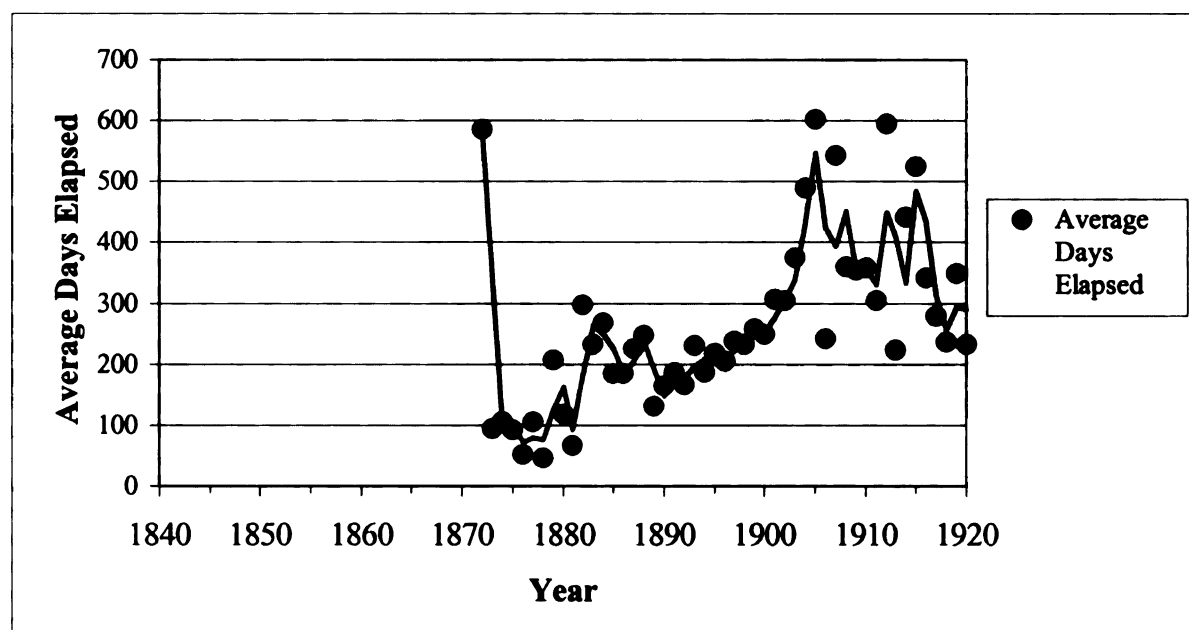


Figure 62. Average number of days elapsed between application and approval dates by year for all patents: Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1872 – 1920

The comparison between granted patents for bustles, skirts, and hoops reveals three distinctive peaks (Figure 63). The first peak extends over 12 years, and it represents 177 hoop patents (78%) approved between 1858 and 1869, out of 227 patents approved over 61 years. The second peak, though brief, registered 160 bustle patents (60%) in only seven years between 1883 and 1889, out of 267 patents approved over 55 years. The third peak was of granted patents for skirts, 1894-1903, when there were 157 approvals (42%) in 10 years, out of 370 approvals in 63 years. A major contribution to the latter was brought by the advent of bicycle skirts, whose upsurge was between 1895-

1898, when in the very short amount of time of four years 42 patents (61%) were granted, out of 69 patents approved over 46 years.

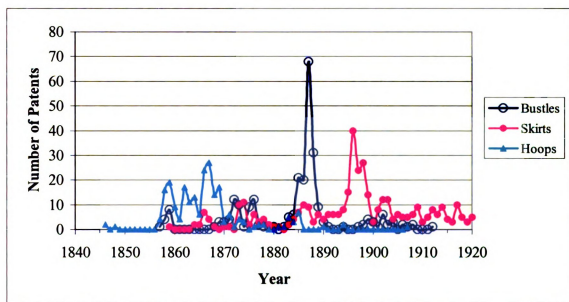


Figure 63. Patents granted between 1846 and 1920 for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216)

The Hoop skirts (class 216) were patented for 61 years, the longest time span of all the classes researched. Skirts (class 211) followed with 56 years, and Edge bindings or protectors (class 222) and Bustles (class 210) with 55 years. Short lived –in comparison with the other classes– were the Riding skirts (class 214), which were patented for 30 years, and Convertible bifurcated skirts (class 213), which were patented for 35 years.

Between 1861-1865, at the time when the Civil War was unfolding, no bustles were patented, and only four skirt patents were approved. Interestingly, hoop patents continued to be granted, though not at the same rate as before or after the war. Fifty-one patents (22%) were approved during the war, which shows how entrenched the wearing of the hoop or hoop skirt was.

Few patents were issued between 1879 and 1882: three bustle patents, two hoop patents, and five skirt patents. This might be explained by the fact that the hoop was almost out of fashion at that time, and the first bustle period traded place with the hourglass silhouette, only to make a greater comeback in the second period (1883-1889). Also, between 1873-1879 an economic crisis affected the United States that led to a lack of capital and market, which in turn might have discouraged the number of patent applications if their promotion would have been put on hold. During the First World War only skirts were patented because the hoop and the bustle were already out of fashion. Their number fluctuated as follows: in 1914 – nine patents, in 1915 – four patents, in 1916 – three patents, in 1917 – 10 patents, and in 1918 – five patents.

It seems that almost all the applications for bustle, skirt and hoop patents were approved. It is difficult to estimate the number of patents not approved since an average of more than eight months existed between application and approval of a patent. Between 1873⁷³ and 1920 there were 608 applications, and 615 approvals. For the first nine years (1873-1881) the granting process took place at an accelerated pace, thus all studied patents were approved in the least average number of days (99 days), Figure 62 and Figure 64.

Indeed in 1870 the most important patent act since 1836 was passed. Among other provisions, it was stipulated that increases in personnel of the Office, and salaries of some of the examiners be raised. In 1875, the Patent Office had 351 staff members. Of this number 24 were principal examiners, 24 first assistant examiners, 24 second assistant examiners, and 24 third assistant examiners (USPTO, 1988).

⁷³ Starting with the approval year 1873, granted patents included information regarding the application date. In 1873-1920, the number of approvals was slightly greater than the number of applications because patent applications prior to 1873 were also granted in this time interval.

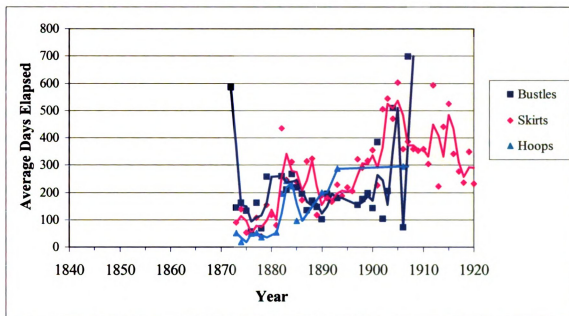


Figure 64. Average number of days elapsed between application and approval dates by year for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216), 1872 – 1920

For the 864 distinct patents in the Nether Garments classes mentioned above, the overall average number of days elapsed is ~239 days. The least number of days between the application and approval dates was for patents from Class 216, Hoop (~150 days), followed by those in Class 210, Bustles (~187 days), and Class 214, Riding Skirts (~233 days). The longest time till the approval of the patent was for Class 211, Skirts (~332 days), and for Class 217, Lifters and Holders (~319 days), Figure 65. If USPTO's clerical improvements are excluded, it seems that for articles that clearly contributed to and defined the fashion trends, like hoops and bustles, the approval process was speeded up.

The time between application and approval of a patent varied wildly: from seven days to more than seven years. The least number of days between the application and approval of a nether garment was seven days for patent 153,314, and eight days for patent

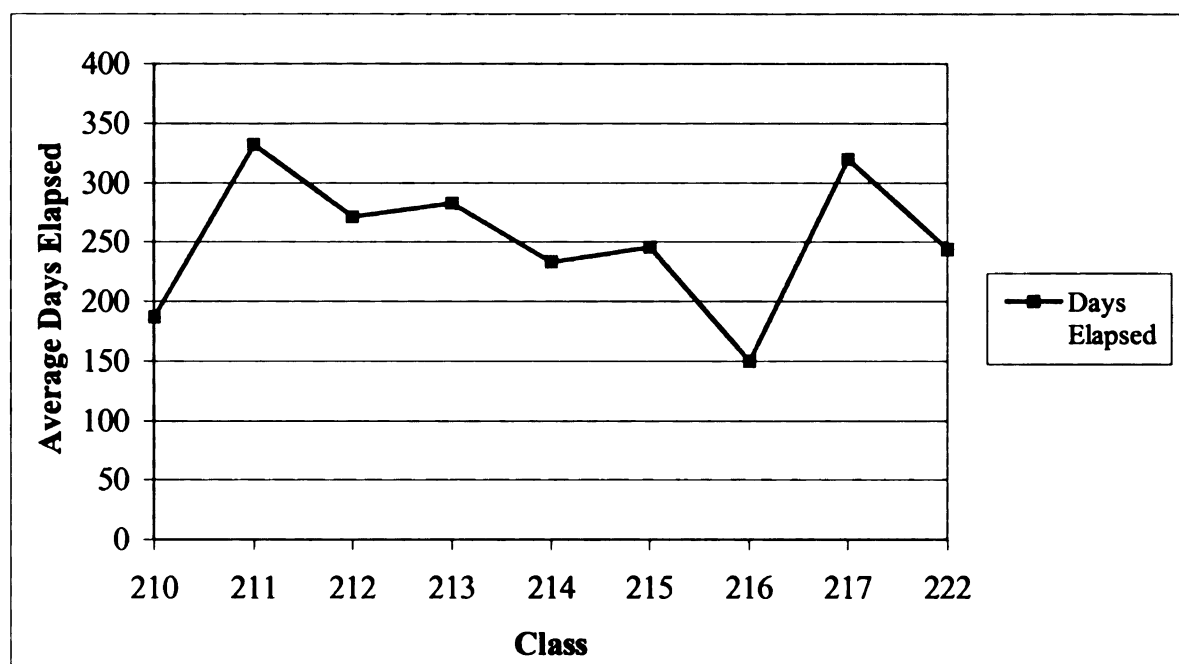


Figure 65. Average number of days elapsed between application and approval dates by year for Bustles (class 210), Skirts (class 211 to 215, 217, and 222 combined), and Hoops (class 216)

149,280, both titled ‘Improvement in skirt-protectors’ (class 222), and both patented in 1874. Also, a patent in class 211 was approved in eight days, ‘Improvement in underwear,’ patent 199,780. The most number of days elapsed between application and approval (2,630 days) was for a ‘Self-fitting petticoat’ (patent 1,001,940, class 211) whose application was dated on June 16, 1904, and its approval was dated on August 29, 1911. Another example was patent 913,815 (class 211), ‘Skirt,’ which took 2,265 days until it was approved.

Comparison by Gender

In the patent analysis by gender, I considered both primary and secondary patentees (if any), for a more accurate account. Therefore some of the figures are slightly higher than the figures reported only for the primary patentee, or the number of patents.

For example, in class 210, Skirts, there are 114 patents, but there were a total of 122 primary and secondary patentees (70 males and 52 females).

In the skirt category, the highest number of women patentees was for class 211, Skirts per-se. In all the other three classes – Skirts with pads and distenders (215), Lifters and holders (217), and Edge bindings or protectors (222), the number of women patentees was four times lower than for class 211, probably because these classes included accessories for skirts (Figure 66). Some knowledge about manufacturing resources was necessary in designing these accessories, and men were probably better informed in this field than women because –at that time– more men than women worked in industry.

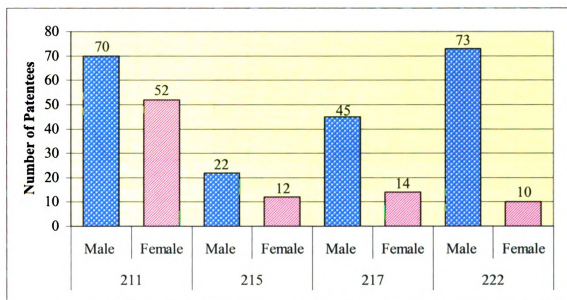


Figure 66. Total number of patentees for regular skirts (classes 211, 215, 217, 222) by gender, 1859 – 1920

The only category in which women patentees prevailed over men patentees was in the bicycle skirts category, Figure 67. Bicycles skirts category is comprised of classes 212 – Combined bifurcated skirts, and class 213 – Convertible bifurcated skirts. The

number of patents granted to women in these classes was 59%, and 75% respectively.

The bicycle skirts best represent the epitome of serviceability, adjustability, and practicality of the garment, characteristics that could not be found in most of the other researched patents. Women looked for a multipurpose functionality of the garment, and to ways for improving their wearability. The divided skirts and bloomers proved to be a real solution to the heavy and cumbersome skirts, especially for sport activities. The enthusiasm for the ‘bicycle craze’ probably motivated more women to be involved in patenting of their ideas.

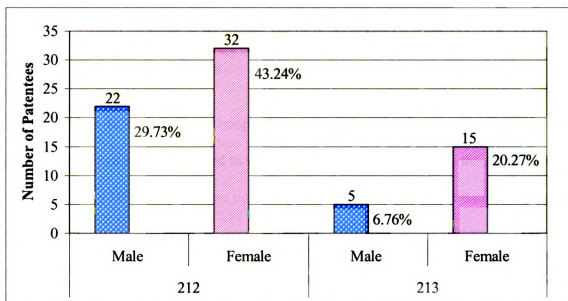


Figure 67. Total number of patentees for bicycle skirts (classes 212 and 213), by gender, 1874 – 1920

Riding Skirts (class 214) seemed to interest only men, because all 27 patents were granted to 28 male patentees, and none to women (Figure 68). This could be explained by the fact that the riding habit was tailored after men’s suits, and special skills were required in their manufacture that were the prerogatives of male tailors.

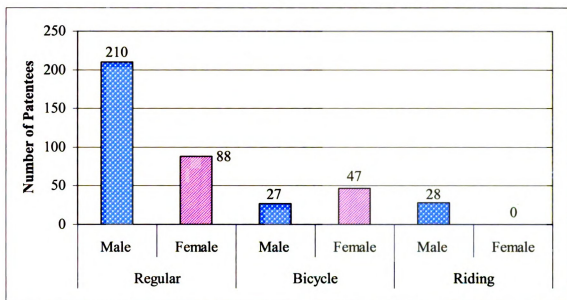


Figure 68. Total number of patentees for regular skirts (classes 211, 215, 217, 222), bicycles skirts (classes 212 and 213), and riding skirts (class 214) by gender, 1859 – 1920

In 1864-1870, only seven hoop patents were granted to women. In 1883-1889, there were 26 bustle patents issued to women, more than three times in the same amount of time. And in 1893-1899 women patented 61 skirts inventions, more than twice the number of bustle patents from the previous period. The progression of women's nether garments inventions included in this study is presented Figure 69.

The number of granted skirt patents to women patentees shows a considerable increase in comparison with those granted for hoop skirts or bustles (Figure 70). The fact that male patentees are predominant until the 1890s could be attributed to the societal constraints for women in the Victorian Era, but also to the mechanical characteristics involved in the construction of hoops and bustles, which required some engineering skills. On the other hand, skirt patents required knowledge of the fabric and pattern cut, which were probably as well mastered by women as by men.

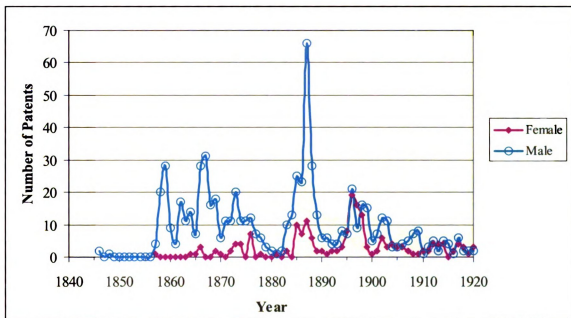


Figure 69. Patents granted between 1846 and 1920 for all bustle (class 210), skirt (classes 211 to 215, 217, and 222 combined), and hoop patents (class 216) to primary patentees, by gender

Figure 71 shows that one in five nether garment patents were granted to women. This percentage is much higher than 1/100 mentioned by Macdonald (1992), for all types of patents. She argues that the patent commissioner, “in his annual report for 1900, ... while correctly supplying the last official total of 5,535 women inventors as of March 15, 1895, misplaced the decimal when he calculated: ‘It is fair to estimate that out of every one *thousand* patents one is granted to a woman.’ [...] Since the cumulative number of patents issued by that date was 560,000, women’s patents accounted for one out of every *hundred*.” Women’s interest was directed –naturally– toward domains well known to them, like clothing. This aspect might explain why the women patentees’ rate for Nether Garments class is about 20 times the rate of women patentees for all USPTO classes of patents.

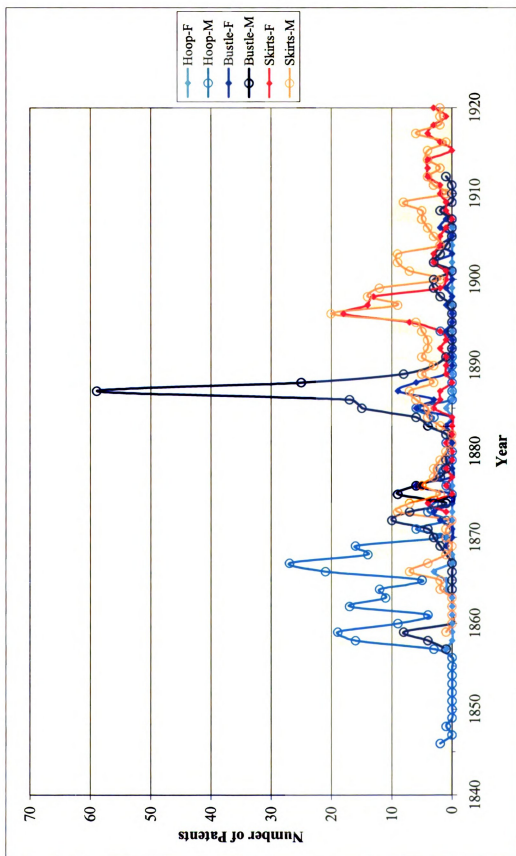


Figure 70. Patents granted between 1846 and 1920 for Bustles (class 210), Skirts (classes 211 to 215, 217, and 222 combined), and Hoops (class 216) to primary patentees, by gender

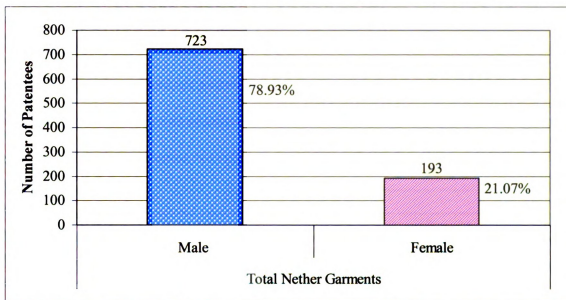


Figure 71. Total number of patentees for nether garments, classes 210 to 217 and 222, by gender, 1846 – 1920

Over time, the number of male patentees for hoop skirts, bustles or skirts per-se seemed to remain almost constant, while the number of female patentees increased (Figure 72). Thus, the number of female inventors for bustles was 4.4 times that for

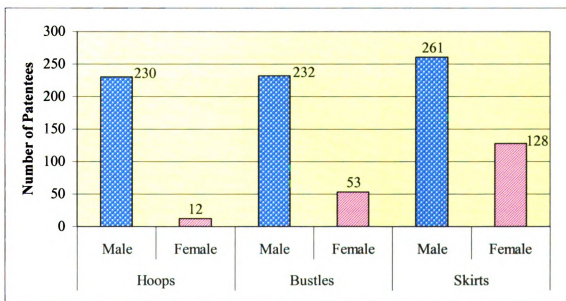


Figure 72. Total number of patentees for hoop, bustle, and skirt patents by gender, 1846 – 1920

hoops, and the number of female inventors for skirts was 2.5 times that for bustles, or 11.3 times higher than the number of hoop patentees.

The number of women patentees increased over time regardless if the patents were assigned or not to companies/persons (Figure 73 and Figure 74). For unassigned patents, females' contribution was slightly higher than for assigned patents.

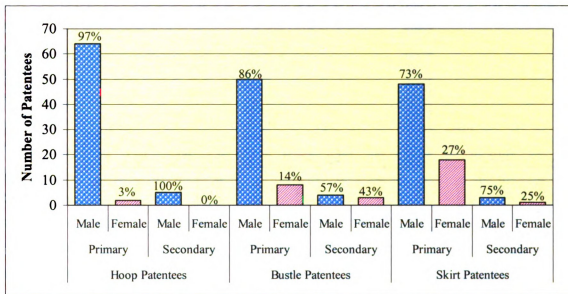


Figure 73. Patentees' distribution by gender for assigned patents

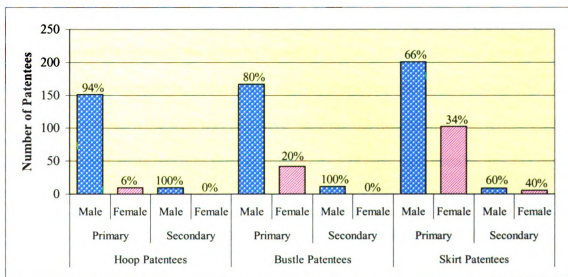


Figure 74. Patentees' distribution by gender for unassigned patents

Reported to the total number of primary patentees (864), and respectively to the total number of secondary patentees (52), the percentage of females as primary patentees was 21%, which was close to the percentage of women as secondary patentees 19% (Figure 75).

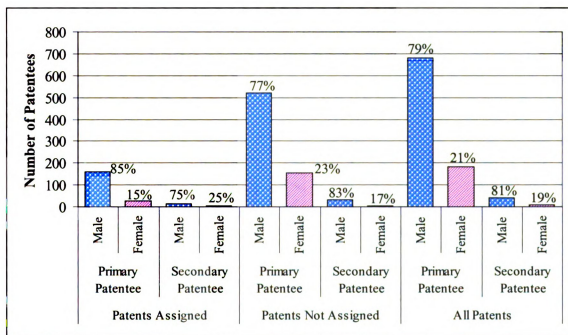


Figure 75. Patentees' distribution by gender for all patents

There is a consistent difference between the approval times for patents issued to males compared to females, the latter being much longer. An illustration is given in Figure 76. For hoop patents, males had to wait for the approvals of their inventions ~142 day, while for women the wait was 202 days. In time, the discrepancy was diminished; for bustle patents, male received their approvals in ~174 days, and females in ~237 days; for skirt patents, though the difference between male and female issuing times for patents (~264 days for male, versus ~312 days for female) was substantially reduced, skirt patents took the longest time for approval for both genders in comparison with the other nether garments classes. The general average of days elapsed for the approval of all

patents included in the study was 239 days, with a gap of 70 days between the granting time for males (~219 days) and females (~289 days). The smallest difference in the approval times by gender was for bicycle skirt patents, male patentees being granted their inventions in ~265 days, and to female patentees in ~291 days. Though in this category female patentees had more patents granted for bicycle skirts than their counterparts, they still lagged behind in the approval time in comparison with male patentees.

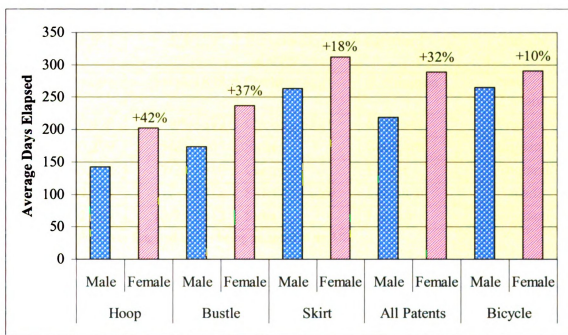


Figure 76. Percentage of extra time necessary for the approval of women's patents in comparison with men's patents

There were 916 primary and secondary patentees for the 864 patents, out of which 27 were foreign patentees mostly from England (Table 22). The foreign patentees could have helped to bring European fashion to the US. Their patents refer to bicycle or riding habits (10 patents), others to bustles, hoops, etc. Only six patents were previously patented in England or/and France, and after a short period of time varying between one to 18 months, applications for the same patents were filed in the US. All the other

patents seemed to be first patented in the US, probably because the American patent system was recognized internationally as being the best in the world.

Table 22. Patents issued to foreign nationals, by gender

Female					
No.	Utility Patent #	Approval Date	Title	City	Country
1	319,960	6/16/1885	Petticoat*	Paris	France
2	455,752	7/14/1891	Skirt-Elevator*	Leicester	England
3	555,428	2/25/1896	Cycling-Skirt*	London	England
4	582,091	5/4/1897	Bicycle-Skirt Adjuster	Stratford	Canada
5	614,097	11/15/1898	Cycling-Skirt	Wellington	New Zealand
6	630,498	8/8/1899	Cycling-Skirt	Southsea	England
7	790,299	5/23/1905	Skirt	Southsea	England
8	965,552	7/26/1910	Garment	Exeter	England
9	1,039,871	10/1/1912	Skirt-Elevator	Gleichen	Canada
10	1,082,467	12/23/1913	Skirt	London	England
* Patented in France or England before being patented in the US.					
Male					
No.	Utility Patent #	Approval Date	Title	City	Country
1	33,517	10/22/1861	Improvement in Hoop-Skirts	Cheetham Hill	England
2	35,091	4/29/1862	Improvement in Crinoline-Clips	London	England
3	109,947	12/6/1870	Improvement in Skirts	Paris	France
4	200,647	2/26/1878	Improvement in Bustles and Panniers	London	England
5	220,588	10/14/1879	Improvement in Dress-Adjusters	Berlin	Prussia
6	444,942	1/20/1891	Riding-Habit	London	England
7	457,172	8/4/1891	Bustle**	London	England
8	488,776	12/27/1892	Riding-Habit**	London	England
9	521,478	6/19/1894	Riding-Habit*	London	England

Male					
No.	Utility Patent #	Approval Date	Title	City	Country
10	575,647	1/19/1897	Bicycle Garment	London	England
11	584,106	6/8/1897	Cycling-Skirt	Wellington	New Zealand
12	614,481	11/22/1898	Skirt-Protector	Barmen	Germany
13	619,328	2/14/1899	Dress-Protecting Edging	Barmen	Germany
14	632,592	9/5/1899	Cycling-Skirt	Dublin	Ireland
15	707,387	8/19/1902	Skirt-Protector	Munich	Germany
16	1,001,940	8/29/1911	Self-Fitting Petticoat	–	Russia
17	1,221,198	4/3/1917	Flounced Skirt	St. Gallen	Switzerland

* Patented in England before being patented in the US.

** Patented both in England and France before being patented in the US.

Comparison by Geographical Region

The geographical distribution of the hoop, bustle, and skirt inventions shows that the number of the US states participating in the invention process increased over time. Two hundred twenty-four hoop skirts were patented between 1846 and 1907 by 14 states, while 264 bustles were patented between 1857-1912 by 25 states, and 347 skirts were patented between 1859-1920 by 30 states. The maps from Figures 59, 15, and 53 (Hoops, Bustles, and Skirts, respectively) show an expansion of the patent activity. For example, California increased its patent activity from no hoop patents, to one bustle patent in 1887, and then to eight skirt patents in 1878-1920. Considering the distribution in time of these nether garments categories, California started patenting more than three decades later than the states on the East Coast, like Connecticut or New York. Also Florida had a timid late start with only two skirt patents, issued in 1880 and 1896. Kentucky joined with two skirt patents granted in 1888 and 1909, and Nebraska with one patent granted in 1897. Vermont also joined at an even later date, namely in 1903 with

one patent, followed by another patent in 1909. Also in the first decade of the 20th century, Virginia and Washington entered the states that patented nether garments, Virginia with one patent in 1909, and Washington with two patents issued in 1903 and 1909.

The Northeast states had the highest number of granted patents, followed by some of the Midwest states (Table 23, and Figure 77).

Table 23. Number of patents issued to the most active states in patenting Nether Garments

Region	State	Hoops	%	Bustles	%	Skirts	%	Total	%
Northeast	New York	113	91	70	64	171	65	354	71
	Connecticut	48		55		9		112	
	Massachusetts	26		16		27		69	
	New Jersey	10		14		13		37	
	Pennsylvania	9		17		19		45	
Midwest	Ohio	3	4	14	19	1	11	18	12
	Michigan	3		19		8		30	
	Illinois	2		17		17		36	
	Wisconsin	1		2		14		17	
Total		215	95	224	83	279	76	718	83

Note: The percentage is reported to the total number of hoop patents = 227, bustle patents = 267, and skirt patents = 370.

Seventy-one percent of all the studied patents were granted to five Northeast states, and only 12% to four Midwest states. New York state had the highest number of patents, 354, representing 41% of the 864 total patents, out of which 269 patents (31% of total patents) originated in New York city.

Being a large port and a powerful industrial center might explain why New York played such an important role in patenting, and furthermore in fashion dissemination. Also, there was an economic base for the patents to be manufactured, and a large

population to buy the products. New York was a trade point from which –along with the manufactured goods– came fashion news from across the Atlantic. For example, there were 27 patents for riding skirts, out of which 21 patents belonged to New York state (19 to New York city). The other six patents remaining belonged to patentees from England (3), Illinois, Massachusetts, and Pennsylvania. Another example is for bicycle skirts: New York state received 40 patents out of a total of 69, which demonstrates once again the influential role New York had in the American fashion system, from the diffusion of fashion news, to manufacturing, advertising, and commercialization of apparel goods.

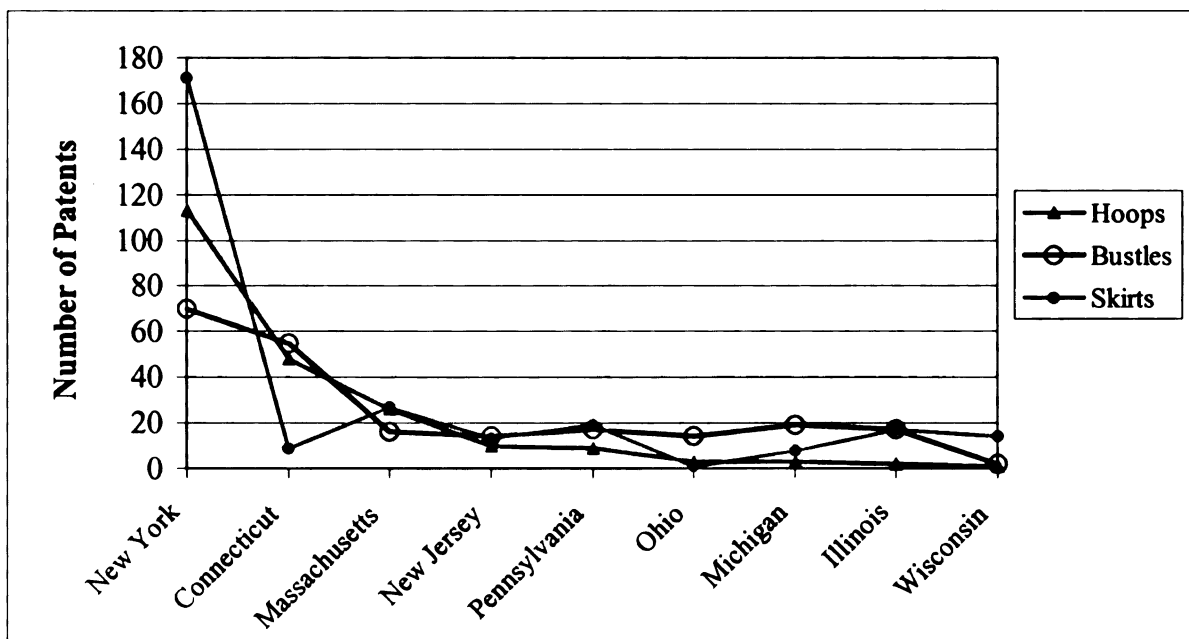


Figure 77. Number of hoop, bustle, and skirt patents, by state

The patent activity by region is given in Table 24 and Figure 78,⁷⁴ according with the first patentee's state. At the beginning of 1846 there were 28 states. In 67 years the number increased to 48 states.⁷⁵ Thirty-four US states and seven foreign countries

⁷⁴ One bustle patent could not be traced to a state.

⁷⁵ In January 1912, New Mexico became the 47th US state. In February 1912 Arizona joined the Union as the 48th state. Alaska and Hawaii entered into Union in 1959.

patented nether garments. The least amount of patent activity was in the Great Plains, and Northwest states, where only two and respectively four patents were granted. An explanation might be that the economy of these states was based mainly on agriculture, and less on industry. Besides, Montana and Washington joined the Union much later, at the end of 1889.

Table 24. Number of patents by region

Region	No.	State of Primary Patentee	Number of Patents	Average Days Elapsed	No.	Zero Patents US States
Northeast	1	Connecticut	112	119	1	New Hampshire
	2	Delaware	3	174		
	3	District of Columbia	6	210		
	4	Maine	6	-		
	5	Maryland	15	219		
	6	Massachusetts	69	263		
	7	New Jersey	37	198		
	8	New York	354	255		
	9	Pennsylvania	45	194		
	10	Rhode Island	10	189		
	11	Vermont	2	244		
Subtotal/Average			659	224		
Midwest	1	Illinois	36	232		
	2	Indiana	8	257		
	3	Iowa	1	-		
	4	Michigan	30	215		
	5	Minnesota	8	316		
	6	Ohio	18	357		
	7	Wisconsin	17	242		
Subtotal/Average			118	252		

Region	No.	State of Primary Patentee	Number of Patents	Average Days Elapsed	No.	Zero Patents US States
Southeast	1	Alabama	2	240	1	North Carolina
	2	Arkansas	3	218	2	South Carolina
	3	Florida	2	105	3	Mississippi
	4	Georgia	2	66	4	Tennessee
	5	Kentucky	2	177		
	6	Louisiana	3	786		
	7	Missouri	19	225		
	8	Virginia	1	-		
	9	West Virginia	2	332		
Subtotal/Average			36	293		
Southwest	1	California	9	345	1	Arizona
	2	Colorado	2	391	2	Nevada
	3	Texas	5	443	3	Utah
Subtotal/Average			16	382		
Northwest	1	Montana	2	148	1	Idaho
	2	Washington	2	508	2	Oregon
Subtotal/Average			4	328	3	Wyoming
Great Plains	1	Kansas	1	-	1	North Dakota
	2	Nebraska	1	-	2	Oklahoma
Subtotal/Average			2	291	3	South Dakota
Total	34	Subtotal US	835		14	Total
Foreign	1	Canada	2	209		
	2	England	16	203		
	3	France	2	-		
	4	Germany/ Prussia	4	391		

Region	No.	State of Primary Patentee	Number of Patents	Average Days Elapsed	No.	Zero Patents US States
	5	Ireland	1	-		
	6	New Zealand	2	222		
	7	Switzerland	1	-		
Subtotal/Average foreign			28	233		

Note: One patent could not be traced to the state it pertains.

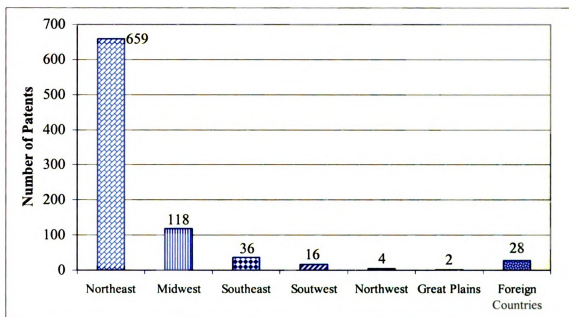


Figure 78. Patent distribution by geographical regions, 1846 – 1920

Over time, there was an increase and a diversification of foreign patents: from three patents for hoops (patentees from England and France) and two patents for bustles (patentees from England), the number increased to 23 for skirt patents: twelve patents were issued to patentees from England, four to patentees from Germany, two to patentees from Canada, and other two to patentees from New Zealand, and one patent each for patentees from France, Ireland, and Switzerland.

The relationship between the number of patents granted, and the average days elapsed between the application and approval dates follows the general trend: as the number of patents decreases, the average days elapsed increases (Figure 79).

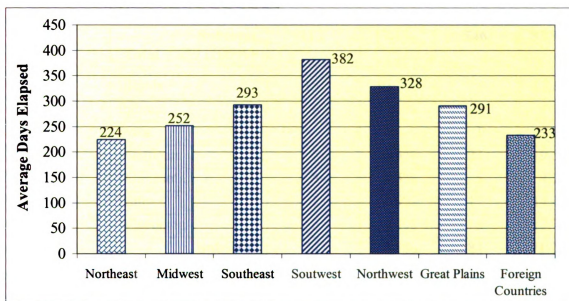


Figure 79. Average days elapsed between application and approval dates of the patents, by region

The detailed distribution of patentees by region and gender of the patentees is presented in Table 25. The percentages are reported to the total number of patentees per region.

Table 25. The distribution of nether garments patentees by region and gender, 1846 – 1920

Region	State of Primary Patentee	Number of Female Patentees	% Females	Number of Male Patentees	% Males
Northeast	Connecticut	8	1.2%	104	15.8%
	Delaware	2	0.3%	1	0.2%
	District of Columbia	2	0.3%	4	0.6%
	Maine	-		6	0.9%
	Maryland	4	0.6%	11	1.7%
	Massachusetts	18	2.7%	51	7.7%
	New Jersey	3	0.5%	34	5.2%
	New York	71	10.8%	283	42.9%

Region	State of Primary Patentee	Number of Female Patentees	% Females	Number of Male Patentees	% Males
	Pennsylvania	3	0.4%	42	6.4%
	Rhode Island	2	0.3%	8	1.2%
	Vermont	-	-	2	0.3%
	Subtotal Total = 659 (100%)	113	17.1%	546	82.9%
Midwest	Illinois	15	12.7%	21	17.8%
	Indiana	6	5.1%	2	1.7%
	Iowa	-	-	1	0.9%
	Michigan	7	5.9%	23	19.5%
	Minnesota	3	2.5%	5	4.2%
	Ohio	1	0.9%	17	14.4%
	Wisconsin	2	1.7%	15	12.7%
	Subtotal Total = 118 (100%)	34	28.8%	84	71.2%
Southeast	Alabama	1	2.8%	1	2.8%
	Arkansas	-	-	3	8.3%
	Florida	1	2.8%	1	2.8%
	Georgia	-	-	2	5.6%
	Kentucky	-	-	2	5.6%
	Louisiana	2	5.6%	1	2.8%
	Missouri	8	22.1%	11	30.4%
	Virginia	-	-	1	2.8%
	West Virginia	2	5.6%	-	-
	Subtotal Total = 36 (100%)	14	38.9%	22	61.1%
Southwest	California	6	37.5%	3	18.7%
	Colorado	1	6.3%	1	6.3%
	Texas	2	12.5%	3	18.7%
	Subtotal Total = 16 (100%)	9	56.3%	7	43.7%
Northwest	Montana	-	-	2	50.0%
	Washington	1	25.0%	1	25.0%
	Subtotal Total = 4 (100%)	1	25.0%	3	75.0%

Region	State of Primary Patentee	Number of Female Patentees	% Females	Number of Male Patentees	% Males
Great Plains	Kansas	-	-	1	50%
	Nebraska	1	50%	-	-
	Subtotal Total = 2 (100%)	1	50%	1	50%
Foreign	Canada	2	7.1%	-	-
	England	7	25.0%	9	32.1%
	France	1	3.6%	1	3.6%
	Germany/ Prussia	-		4	14.2%
	Ireland	-		1	3.6%
	New Zealand	1	3.6%	1	3.6%
	Switzerland	-		1	3.6%
	Subtotal Total = 28 (100%)	11	39.3%	17	60.7%

An interesting phenomenon is revealed in Figure 80, where the data was plotted in percentages of patents issued to women versus to men, by region. The graph shows that the lowest percentage of women patentees was in the Northeast region, where the patent activity was intense. The highest proportion of female patentees compared to male was in the Southwest region, where their number was higher than of male patentees. An explanation might be that the industry of the East Coast states was male dominated, and it was probably difficult for women to break in. At the same time, women were supposed to conform to the societal expectations. The westward expansion of the Frontier that brought many hardships to the pioneers probably lessened the rigid rules with which women were supposed to comply. Maybe the need for practical things encouraged women to pursue invention.

Though the total number of women patentees (59) from all the US regions other

than Northeast (NE) was roughly half of the number of women patentees from NE states (113), the proportion of female patentees was almost double outside the NE (33.5%) than within the NE (17.1%). Also, a more balanced distribution of patent activity between genders occurred in all the US regions other than NE (on average, 33.5% female versus 66.5% male) than in NE states (17.1% female versus 82.9% male).

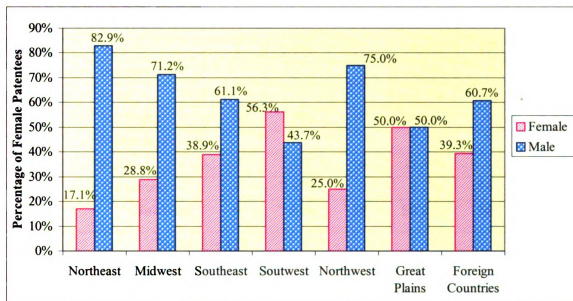


Figure 80. Percentage of male and female patentees, by region

The distribution of hoop, bustle, and skirt patents by geographical region is presented in Table 26.

Table 26. Hoop, bustle, and skirt patents distribution by region

Region	State	Hoop	%	Bustle	%	Skirt	%
Northeast	Connecticut	48	7.3%	55	8.3%	9	1.4%
	Delaware	-	-	1	0.2%	2	0.3%
	District of Columbia	1	0.2%	-	-	5	0.7%
	Maine	2	0.3%	2	0.3%	2	0.3%
	Maryland	-	-	9	1.4%	6	0.9%
	Massachusetts	26	3.9%	16	2.4%	27	4.1%

Region	State	Hoop	%	Bustle	%	Skirt	%
	New Jersey	10	1.5%	14	2.1%	13	2.0%
	New York	113	17.1%	70	10.6%	171	26.0%
	Pennsylvania	9	1.4%	17	2.6%	19	2.9%
	Rhode Island	4	0.6%	1	0.2%	5	0.7%
	Vermont	-	-	-	-	2	0.3%
	Subtotal	213	32.3%	185	28.1%	261	39.6%
Total		= 659					
Midwest	Illinois	2	1.7%	17	14.4%	17	14.4%
	Indiana	-	-	3	2.5%	5	4.2%
	Iowa	-	-	1	0.9%	-	-
	Michigan	3	2.5%	19	16.1%	8	6.8%
	Minnesota	-	-	3	2.5%	5	4.2%
	Ohio	3	2.5%	14	11.9%	1	0.9%
	Wisconsin	1	0.9%	2	1.7%	14	11.9%
	Subtotal	9	7.6%	59	50.0%	50	42.4%
Total		= 118					
Southeast	Alabama	-	-	1	2.8%	1	2.8%
	Arkansas	-	-	3	8.2%	-	-
	Florida	-	-	-	-	2	5.6%
	Georgia	1	2.8%	1	2.8%	-	-
	Kentucky	-	-	-	-	2	5.6%
	Louisiana	-	-	1	2.8%	2	5.6%
	Missouri	-	-	9	25.0%	10	27.6%
	Virginia	-	-	-	-	1	2.8%
	West Virginia	1	2.8%	-	-	1	2.8%
	Subtotal	2	5.6%	15	41.6%	19	52.8%
Total		= 36					
Southwest	California	-	-	1	6.3%	8	50.0%
	Colorado	-	-	1	6.2%	1	6.2%
	Texas	-	-	2	12.5%	3	18.8%
	Subtotal	-	-	4	25.0%	12	75.0%
Total		= 16					

Region	State	Hoop	%	Bustle	%	Skirt	%
Northwest	Montana	-	-	-	-	2	50.0%
	Washington	-	-	-	-	2	50.0%
	Subtotal	-	-	-	-	4	100.0%
Total		= 4					
Great Plains	Kansas	-	-	1	50.0%	-	-
	Nebraska	-	-	-	-	1	50.0%
	Subtotal	-	-	1	50.0%	1	50.0%
Total		= 2					

Figure 81 shows that skirt inventions were patented with priority in all regions, except for the Midwest states where bustle patents were preponderant. Michigan was the leader with 16.1% bustle patents of all 118 patents for hoops, bustles and skirts combined issued for the whole Midwest region. Michigan bustle patents were issued in 1873-1904. No hoops were patented by Southwest, Northwest and Great Plains states. No bustles

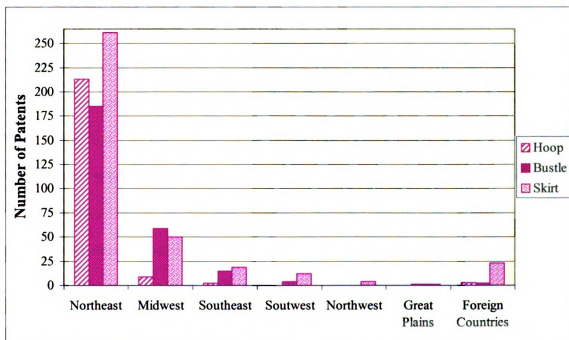


Figure 81. Hoop, bustle, and skirt patents' distribution by region

were patented by Northwest states, and very few by Southwest and Great Plains (four patents, and one patent respectively).

Comparison by Patentees

Patentees with three or more patents are listed in Appendices, Table 36—hoop patentees, Table 30—bustle patentees, and Table 34—skirt patentees. For hoop patents, there were seven patentees having 18% of the granted hoop patents, and for bustle patents there were nine patentees having 22% of the granted bustle patents; in the case of the skirt patents there were eight patentees having only 8% of the granted skirts. In time, it seems that a “democratization” of patenting expanded because patentees that had only one or two skirt patents were granted the other 92% of the skirt inventions. Also, the skirt-patenting interval (i.e., days elapsed) for inventors decreased in comparison with hoop and bustle patenting interval, which means the time span the inventors with the highest number of patents focused on improvements on the same type of article shifted more rapidly in skirt category (~4 years) than in bustle and hoop classes (~6 years), Table 27 and Appendices—Figure 141.⁷⁶

These aspects might be explained by the change in the skirts’ attributes after 1895, change that also contributed to the fading out of hoops and bustles. Skirts became lighter and/or shorter, so distending and supporting them were not focal points of improvements anymore. The patentees’ attention turned toward specialized skirts for sports, travel, dance or work, as well as on skirts’ adjustability, versatility, safety and protection. The specialization of the skirt’s functions led to the fragmentation and delineation of the skirts’ improvements to narrow fields. Thus, more patentees were able

⁷⁶ Figure 141 includes only the most representative patentees for each class.

to participate in the patenting activity, because these improvements did not require engineering skills, like hoops and bustles did. Moreover, it opened the possibility for women patentees to participate in larger numbers in the patenting activity, and to bring their experience and knowledge to the improvements of skirts.

Table 27. Patenting period of the most prolific patentees for hoops, bustles, and skirts

Class/ Category	#	Last Name Patentee 1	First Name Patentee 1	Patents Granted	Interval Interval	Patenting Interval [Years]	Average Days Elapsed
Hoop	1	De Forest*	Thomas B.	9	1861- 1878	18	-
	2	Neumann	Caesar	9	1859- 1867	9	-
	3	Day	Theodore D.	8	1863- 1869	7	-
	4	Atwood*	E.G.	4	1858- 1860	3	-
	5	Houston*	William E.	4	1867- 1867	1	-
	6	Schoenhof	Jacob	4	1882- 1885	4	197
	7	Sanders*	Leopold	3	1863- 1864	2	-
Average Number of Years/Days Elapsed =						6.3	-
Bustle	1	Taylor	Thomas P.	13	1887- 1899	13	111
	2	Canfield*	Henry O.	10	1887- 1888	2	116
	3	Thomas	Amos W.	9	1871- 1888	18	150
	4	Taylor	Henry H.	7	1898- 1903	6	109
	5	Buschmann*	Victor H.	5	1886- 1889	4	122
	6	Carpenter*	Charles C.	5	1885- 1890	6	149

Class/ Category	#	Last Name Patentee 1	First Name Patentee 1	Patents Granted	Interval	Patenting Interval [Years]	Average Days Elapsed
	7	Jeffery	Frank M.	4	1888- 1888	1	208
	8	Weldon	Elizabeth S.	4	1876- 1876	1	140
	9	Reed	Beverly S.	3	1885- 1886	2	177
Average Number of Years/Days Elapsed =						5.9	129
Skirt	1	Weber*	Aaron M.	6	1896- 1901	6	164
	2	Ondrak	Jacob A.	4	1901- 1903	3	191
	3	Padernacht*	William	4	1909- 1911	3	223
	4	Hay	William J.	3	1898- 1902	5	131
	5	Malsin*	Albert	3	1915- 1919	5	1,285
	6	Moschcowitz	Louis	3	1887- 1888	2	306
	7	Schwab	Gabriel	3	1876- 1879	4	152
	8	Taylor*	George H.	3	1894- 1898	5	260
Average Number of Years/Days Elapsed =						4.1	312

* Some of their patents were assigned to persons or companies (see List of Assignees in Appendices, Table 31, Table 35, and Table 37).

In general, patentees with multiple inventions focused their activity on improvements of the same type of product. However, patentees like Caleb E. Brown of Jackson, MI, or Charles C. Carpenter of New York, NY, or Beverly S. Reed of Boston, MA had patents from more than one class of apparel, i.e., bustle and hoop. Another example was Moritz Rosenstock who had in 1883-1891 four patents in three classes: hoop, bustle, and skirt protectors.

The most prolific patentees for hoops and bustles were only from the Northeast region, while for skirts they were mostly from Northeast region, but also from Midwest. Only two women made the list of prolific patentees: Elizabeth S. Weldon with four bustle patents, and Beverly S. Reed with three bustle patents and one hoop-skirt patent. There are 33 patentees with three or more patents granted, which represent 19% of all patents (Table 28). Four patentees had 10 patents or more, and their patents represent 5% of the total patents.

Table 28. All patentees of nether garments having three or more patents

Number of Patents	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1
13	Taylor	Thomas P.	Male	Connecticut	Bridgeport
11	De Forest	Thomas B.	Male	Connecticut	Birmingham
10	Canfield	Henry O.	Male	Connecticut	Bridgeport
10	Thomas	Amos W.	Male	Pennsylvania	Philadelphia
9	Neumann	César	Male	New York	New York
8	Day	Theodore D.	Male	New York	New York
7	Taylor	Henry H.	Male	Connecticut	Bridgeport
7	Weber	Aaron M.	Male	Wisconsin	Oshkosh
6	Carpenter	Charles Clarence	Male	New York	New York
5	Buschmann	Victor H.	Male	Maryland	Baltimore
4	Atwood	E.G.	Male	Connecticut	Derby
4	Brown	Caleb E.	Male	Michigan	Jackson
4	Carter	Albert	Male	New York	New York
4	Houston	William E.	Male	Connecticut	Birmingham
4	Jeffery	Frank M.	Male	New Jersey	Jersey City
4	Ondrak	Jacob A.	Male	New York	New York
4	Padernacht	William	Male	New York	New York
4	Reed	Beverly S.	Female	Massachusetts	Boston
4	Rosenstock	Moritz	Male	New York	New York
4	Schoenhof	Jacob	Male	New York	New York

Number of Patents	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1
4	Weldon	Elizabeth S.	Female	New York	New York
3	Biering	Robert	Male	New York	New York
3	Douglas	Alexander	Male	New York	New York
3	Hay	William J.	Male	Wisconsin	Oshkosh
3	Hubbard	Sherman H.	Male	Connecticut	Bridgeport
3	Jackson	Amos H.	Male	Ohio	Fremont
3	Malsin	Albert	Male	New York	New York
3	Moschcowitz	Louis	Male	New York	New York
3	Sanders	Leopold	Male	New York	New York
3	Schneller	George O.	Male	Connecticut	Ansonia
3	Schwab	Gabriel	Male	New York	New York
3	Shelby	Christopher C.	Male	New Jersey	Paterson
3	Taylor	George H.	Male	New York	New York

Comparison by Assignees

Hoop⁷⁷ and bustles patents having an assignee seemed to be granted in shorter time than those without an assignee. For skirt category, this was not the case (Figure 82, and Appendices – Tables 31, 35, and 37). For example, in 1919 Albert Maslin patented two skirts that took 3.5 years and 4.5 years respectively since their application date, though both patents had as assignee “Lane Bryant, Inc., of New York, N.Y., a corporation of New York.” This inconsistency might be due to the outbreak of World War I, when probably the USPTO granting priorities leaned toward articles that helped US army in the war. For all the other skirt patents issued before World War I, another explanation could be concluded from three factors: a) the percentage of assigned patents

⁷⁷ The average of days elapsed for hoop patents should be regarded with precaution because it was calculated on a much smaller number of patents than for bustle and skirt patents. Due to missing data (application date was mentioned starting with 1873), the average days elapsed for assigned patents was calculated on nine patents out of 66, and the average for patents not assigned was calculated on 22 patents out of 161.

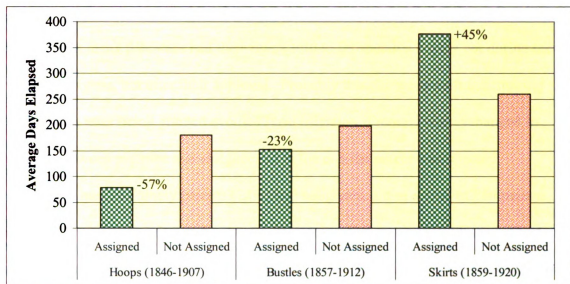


Figure 82. Average days elapsed between application and approval dates for hoop, bustle and skirt patents, by their assigned status

from the total patents in the respective class/category decreased in time: from 29% of hoop patents, to 22% of bustle patents, and 18% of skirt patents; b) the steady increase of time interval for granting the patents. Although during the second half of the 19th century the US experienced an economic boom that culminated with the Gilded Age (1870-1890), it seems that from an investor's point of view the interest in nether garment patents decreased. As many women entered the work force, and the increase of the availability of ready-made clothing, it would be expected that skirt patents have more assignees than those for hoop and bustle, and the time for their issuance to decrease. The fact that an approved patent had an assignee became less relevant because of the third factor: c) starting in 1872 USPTO published weekly the *Official Gazette*, in which excerpts from granted patents were recorded. Also, invention magazines popularized the new patents. Macdonald (1992) mentions the *Inventive Age* magazine "which was inaugurated in the 1890s to capitalize on industry's need for new products in that era of

rapid growth,” and which had a column titled “New Patents for Sale.” Therefore it is possible that many patentees had their rights sold to prospective buyers not during the patenting process, but after their approval. Probably this change in selling/acquiring patent rights after being granted avoided legal litigation if money was exchanged in advance between patentee and assignee but in the end the patent was rejected.

One hundred ninety patents (22%) had assignees, out of a total of 864 patents. Some of the assignees seem to be also the patentees. The assignees with the highest number of patents acquired are: The Canfield Rubber Company, Bridgeport, Connecticut, with 10 bustle patents, all patented in 1887-1888 by Henry O. Canfield; Charles C. Carpenter, of New York City, with seven patents of bustles and hoops patented in 1871-1890; and Thomas P. Taylor of Bridgeport, Connecticut, and Augustus H. Brinkmann of Baltimore, Maryland, each with six bustle patents granted in 1887-1888, and 1886-1899 respectively. None of the assignees acquired more than two skirt patents.

Only a few patents were assigned to persons/companies from states other than ones from which the patentees lived. Except for the foreign patentees, almost all patentees had their inventions assigned to persons/companies in the same geographical region where they lived. An explanation would be that the patentees were aware of the local possibilities for manufacturing their products, thus having bigger chances in selling their inventions. One of the exceptions from the rule was patent 913,815, Skirt (3/2/1909), whose inventor was from New York, NY, and the assignee was the Warren Featherbone Company of Michigan, of Three Oaks, MI, probably because of the uniqueness of this company. Still, the patentee – assignee transfer transaction for the patent rights was made between neighboring regions.

QUALITATIVE THEMATIC ANALYSIS OF ALL PATENTS

The qualitative thematic analysis is based on: 1) textual examination of patents for information related to fashion of the time, functional purpose of the garment, novelty of the invention, and what existing problems prompted new patent applications; and 2) visual comparison between patent drawings, and fashion plates/illustrations and/or photographs from the same time period with the patent. For this purpose, more than 40 patents of the 311 studied in depth are given as examples, together with illustrations from *Godey's Lady's Book*, *La Mode Illustree*, *Pictorial Review* and *Harper's Bazaar*, and photos of artifacts from various museums.⁷⁸

The descriptions of the fashionable silhouettes from different time periods are quite similar between fashion historians. Yet, little consistency exists in delimiting the time interval for each fashion period. For example, Laver's approach (1988) was to present the costume and fashion history between 1850 and 1939 in two periods: 1850 to 1900, and 1900 to 1939. Young's approach (1966) went beyond observing and describing the silhouettes; she systematized the collected data in cycles of fashion, and presented the characteristics of dress within these cycles. Young made an extended statistical study of 8,000 illustrations of the most typical dresses worn in 1760-1937, and concluded that fashions moved in cycles. She considered that only three central types of fashion succeeded one another in the same sequence over the past two centuries, and these types occurred only every three or four decades mainly in the types of skirts. Young identified three types of skirts: a) *Bell* (or *Beehive*) – the figure stands squarely in the center of the wide base skirt; b) *Backfullness* – the figure stands in front of the skirt;

⁷⁸ Metropolitan Museum of Art, the Museum of the City of New York, Smithsonian National Museum of American History, Victoria and Albert Museum, McCord Museum, etc.

and c) *Tubular* (or *Cylinder*) – the skirt has almost the same width at top and bottom.

The author found that for 1760-1867 the cycles were: Backfullness – 1760-1795 (36 years), followed by Tubular – 1796-1829 (34 years), and Bell – 1830-1867 (38 years).

Between 1868 and 1937 (when her study ends), the Backfullness cycle returned in 1868-1899 (32 years), as well as the Tubular cycle in 1899-1937 (38 years). Young observed that “the cycles seem to indicate that the ceaseless changes are in reality confined within a framework of almost ironbound rigidity.” Thus the second Bell cycle appeared 105 years later after the first one, the second Backfullness cycle 108 years later than the earlier one, and the second Tubular cycle 104 years after its predecessor of the same type. The recurrence of a cycle was possible because not all the available modifications brought to the fundamental skirt type of that cycle were exhausted at the end of the cycle.

In the present study, the fashion history timeline proposed by Russell (1983) was chosen for the visual comparison component of the qualitative analysis, because it better matched the time frame of the research, and it individualized each era by the aesthetical movement of the time. There are four fashion periods: Victorian and Second Empire Era (1848 – 1870),⁷⁹ Later Victorian: The Gilded Age (1870 – 1890), Late Victorian and Edwardian: Art Nouveau (1890 – 1911), and World War I: Pre Art Deco (1911 – 1920). Nevertheless, Young’s recurring cycles could be roughly correlated with the fashion periods mentioned above: *Bell cycle* – Victorian Era, *Backfullness cycle* – The Gilded Age and Late Victorian, and *Tubular cycle* – Edwardian and Pre Art Deco.

Bicycle and horse riding skirts (1874-1920) are presented as a separate group. Young’s Backfullness and Tubular cycles do not apply to these skirts, because these

⁷⁹ Though my research starts with 1846, I left Russell’s organization unchanged because only two patents out of 864 were approved between 1846 and 1848.

cycles were established for street and daytime dresses.

Victorian and Second Empire Era (1848 – 1870)

In 1846, the sewing machine was invented, which gave a new stimulus to the clothing industry, and introduced the concept of *mass production*. “The mass production was also facilitated by the accelerated mechanization in weaving mills and the growing ornamental complexities that could be achieved by the Jacquard loom” (Russell, 1983). The *mass distribution* was facilitated by the expansion of railroads⁸⁰ that made products’ distribution and fashion dissemination faster.

The fashionable skirt of the late 1840s and 1850s had a ‘bell’ shape that tapered to a tight waist. The full skirts reached floor length, and their design had usually a series of overlapping flounces. Until this time, the fullness of the skirts was achieved by the use of many petticoats, or by the use of ‘crinolines’ made of horsehair. Later on, they were replaced by a corded or hooped petticoat.

In Figure 83, a fashion illustration from *Godey’s Lady’s Book*⁸¹ from January 1850 is compared with a ball gown⁸² (ca. 1860),⁸³ and a hoop-skirt patent from 1846. In the patent specifications (#4,897), the patentee stated: “The nature of my invention consists in arranging and combining certain cords and other materials in such a way as to form a spring or elasticity of the skirt, to such a degree as will allow it to yield to pressure, and readjust itself after it has been displaced by pressure, or in any manner.

⁸⁰ 1869 – Union Pacific and Central Pacific joined, and formed the first transcontinental railroad.

⁸¹ [Online photo gallery]. *Godey’s Lady’s Book*. Available:
<http://www.history.rochester.edu/godeys/01-50/f3.htm> [July 15, 2004]

⁸² [Online photo gallery]. The Museum of the City of New York. Available:
<http://www.mcny.org/Collections/costume/worth/costume1.htm> [July 15, 2004]

⁸³ The gown was made by Worth, which was a fashion leader. It is possible that the museum artifact might be dated incorrectly, or its display might not be accurate for a 1860s dress.

[...] I will remark, in explanation that it is one of the oldest and most common ways of making petticoat skirts, to introduce, or draw in, as it is termed, at discretionary intervals, as a part of the filling, cotton, or other cordage, in the process of weaving; the same, made up into skirts so arranged as to run horizontally around the skirt. This is done to stiffen the skirt, and make it set out the dress. I am also aware that a patent has been

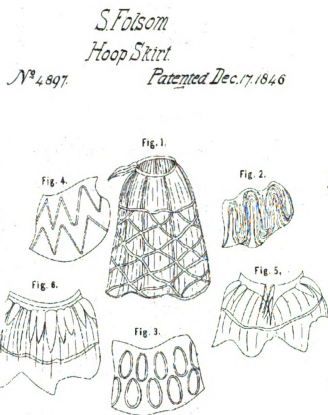


Figure 83.

Upper Left: *Godey's Lady's Book*,
January 1850

Lower Left: Worth & Bobergh Ball
Gown, ca. 1860

Right: Patent 4,897 – Lady's Skirt, 1846

granted for the combination of sisal or manila hemp with cotton or other substance, the sisal or manila being introduced in an untwisted or slightly twisted state, and for this claiming the quality of a spring, and this is woven or drawn in in the common way of using cords of cotton, in the weaving, as appears by the patent and the manufactured article. The experience of years, and very much of practical experiment has shown to the inventor of the "self adjusting skirt," that this method of attempting to effect spring is fallacious, but that if a set of horizontal springs or stiffeners are to be used, hard twisted cords of any kind are much the best, and the best known method of using them, (before my invention, herein described) was by taking a cord, of hard twisted materials and gathering it up within a sufficient quantity of the cloth of the skirt to cover it, sew through the gathered up cloth of the skirt to cause it to be tight upon the cord; in this way I have used cords passed horizontally around the skirt; cord of any size not exceeding half an inch may be used for this purpose, but cords used in this way will cause the skirt to kink, that is to bag in some places and swell in others, frequently taking the dress with it, in its zig-zag or serpentine course of changes of position.'

The novelty of this invention is described as follows: "My invention I have found to prevent many difficulties, and afford every necessary requisite; I make a piping by inserting a cord into a strip of cloth, or by inserting in this way any kind of suitable springy material, as whalebone, cane, hair, or hair roping, India rubber, leather, bristles, flax, hemp, or cotton cordage, or metallic springs, such as used for main spring of watches being preferable; this piping consists of a piece of cloth wrapped around and inclosing the spring materials, any of the above named, and then sewing the enveloping cloth to the skirt in any other direction (by crossing or not) than horizontal, except at the

bottom of the skirt where it must run horizontally around the skirt. I then commence one near this last named and in a circular spiral line carry it up toward the top of the skirt, and at an opposite point another in direct reversal of this, thus forming a spiral reversed or crossed set of cords, either with or without the cover, or piping sewed on to the surface of the skirt. By this it will be apparent that one of these crosses over the other, and forms an equal amount of spring, all around, so broken up and crossed, as to form, by the action of the cords one upon the other and upon the skirt, a certainty to spring back, after removing any pressure..." The method was applied in the similar manner for diamond, circular, angular, or "other curve and irregular forms, so as to break up the plain horizontal lines..."

The function played by this new type of hoop-skirt is explained by the patentee: "I provide of cotton, linen, or any common or known cloth or material a skirt, and upon this, articles of such a light, pliant character may be placed, as will cause the skirt to preserve its stiffness, and resist the pressure of the dress, worn upon or over it, and besides this, to have a sufficiency of elasticity or spring, to cause it to adjust itself after the removal of any ordinary pressure that may have been placed upon it."

In Figure 84, illustrations from *Godey's Lady's Book*, January 1857,⁸⁴ seem to suggest that exaggerated expansion of the skirt, and increased number of flounces and trims made the difference between a "very fine lady," and just a lady. *Godey's* continued advertising fashionable tiered skirts of the time, as in the example from February 1859 issue.⁸⁵

⁸⁴ [Online photo gallery]. Greenberg, H. (2000). Available: <http://www.uvm.edu/~hag/godey/images/glb1-57p13.jpeg> [July 15, 2004]

⁸⁵ [Online photo gallery]. Greenberg, H. (2000). Available: <http://www.uvm.edu/%7Ehag/godey/images/glb02-59p100.jpg> [July 15, 2004]



Figure 84. Left: “The very fine lady.” Center: “The lady.” (*Godey’s Lady’s Book*, January 1857); Right: *Godey’s Lady’s Book*, February 1859

Sometimes the extension of the skirt was achieved by a tournure, as in the advertisement and patent examples that follow. The Tournure Corset⁸⁶ from Figure 85 refers to a patent issued to Douglas and Sherwood in January 4, 1859. This patent does not pertain to the group of patents studied, probably because the main function was as a corset, and not as a bustle. On the other hand, D. B. Hale patented a similar model (Figure 85, Right).

By 1858, the multiplicity of petticoats, some of them stiffened with cords to maintain the shape of the skirt, was replaced by the hoop-skirt, which was viewed by women as an “instrument of liberation” (Laver, 1988). Initially, the ribs of the hoop-skirt were usually made of whalebone or cane, and later of spring steel set onto a petticoat. An English crinoline⁸⁷ and an American hoop patent are presented in Figure 86. The

⁸⁶ [Online photo gallery]. Greenberg, H. (2000). Available: (front) <http://www.uvm.edu/%7Ehag/godey/images/p5904296.jpg> (back) <http://www.uvm.edu/%7Ehag/godey/images/p5904297.jpg> [July 15, 2004]

⁸⁷ [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/costume/catalogue/Display.php?irn=15189&QueryPage=/costume/catalogue/index.ph> [July 18, 2004]

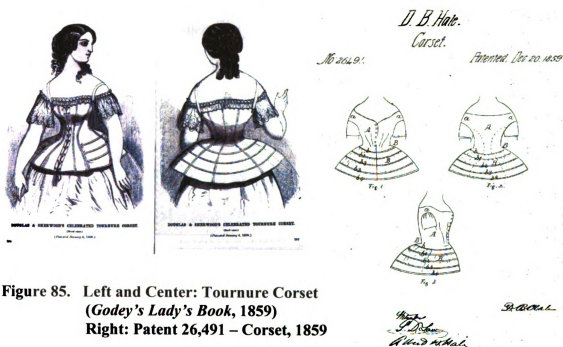


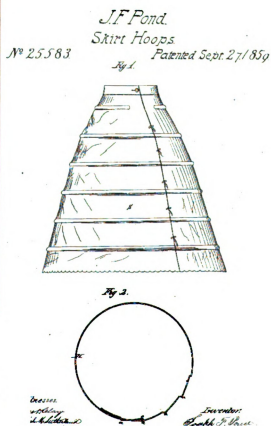
Figure 85. Left and Center: Tournure Corset
(Godey's Lady's Book, 1859)
Right: Patent 26,491 – Corset, 1859



Figure 86.

Left: English Crinoline, 1864

Right: Patent 25,583 – Hoop of
Skeleton Skirts, 1859



English crinoline has a supplementary semi-hoop arched at the back of the crinoline before the first round hoop, which was placed much lower than usual, thus giving a somewhat more funnel- than bell-shape silhouette to the skirt, characteristic for the early 1860s. The novelty of the American patent was based on a simple system to secure hoops' ends. "The nature of the invention consists in having an eye on one extremity of the hoop, and on the other a series of set offs, so that when the hoop is run through the tuck in the skirt, the one end is passed through the eye on the other end, and said eye catching against the set off, holds its securely; and by moving the eye to either of the set offs the circumference of the hoop is increased or diminished as desired."

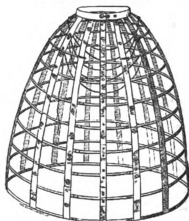
Starting with mid 1850s, tapes of heavy muslin or cords— instead of petticoats— were used for assembling the hoop-skirt. In Figure 87, advertisements from *Godey's Lady's Book* referred to two other patents issued to Douglas and Sherwood, which illustrate both methods used to construct the hoop-skirts. One advertisement was for the "New Expansion Skirt," May 1858,⁸⁸ which included their adjustable bustle patent "without which no skirt is perfect, [and] gives them a decided advantage over the common 'Extension' skirts." Douglas and Sherwood stated that they were "the sole owners" of the *Patent Adjustable Bustle*, and encouraged orders to be filled for them. The second advertisement was for the "New Matinee Skirt," March 1859,⁸⁹ which combined the advantages of the previous invention with an additional improvement: "that by means of the *Patent Detachable Hoop Fastening*, the hoops can be removed and replaced instantly and easily." The hoop-skirt's bustle not only shaped the silhouette of

⁸⁸ [Online photo gallery]. Greenberg, H. (2000). Available: <http://www.uvm.edu/%7Ehag/godey/images/glb5-58wp454.jpeg> [July 15, 2004]

⁸⁹ [Online photo gallery]. Greenberg, H. (2000). Available: <http://www.uvm.edu/%7Ehag/godey/images/s5903265.jpg> [July 15, 2004]

the wearer, but also had a protective role for the skirts: “For wet weather ... it is a good plan to increase the size of the Bustle, the better to keep the skirts out of the mud.”

DOUGLAS & SHERWOOD'S NEW EXPANSION SKIRT.
WITH THE PATENT ADJUSTABLE BUSTLE.



DOUGLAS & SHERWOOD'S NEW MATINEE SKIRT.

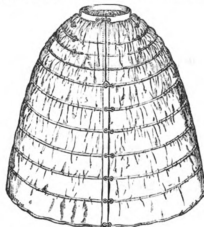


Figure 87. *Godey's Lady's Book*. Douglas and Sherwood's patents:
Left: New Expansion Skirt, May 1858
Right: New Matinee Skirt, March 1859

Alexander Douglas and Samuel S. Sherwood had three bustle patents together: patent 21,747 – Fastening for Skirt-Hoops (10/12/1858), patent 22,355 – Slide and Fastening for Skirt-Hoops (12/21/1858), and patent 34,568 – Improvement in Ladies' Skirts (3/4/1862). Independently, Alexander Douglas patented Bustle – 17,082 (4/21/1857), and Samuel S. Sherwood patented Skeleton Skirt – 28,941 (6/26/1860), Improvement in Hooped Skirts – 37,374 (1/6/1863), Improvement in Skeleton-Skirts – RE3,360 (4/6/1869), Improvement in Hoop-Skirts – 40,985 (12/15/1863). Three of the Sherwood's patents had as co-assignee Douglas, but their three patents registered together had no assignee.

It is possible that elements of Douglas and Sherwood's 1857-1858 approved patents were included in the advertisements, but a clear connection could not be made because the drawings are different, and the claims in the advertisements are much broader

than in the patents, probably for marketing purposes. It is also possible that the patents to which references are made in the advertisement might have been rejected, and never came to fruition. Or, maybe these patents indeed exist, but they might be classified as design patents, or misclassified. For comparison with *Godey's* hoop-skirt advertisements, four examples of hoop patents from 1858 are presented below.⁹⁰

Example 1. Patent 20,681 – Skirt-Hoop, 1858 (Figure 88)

Novelty of the Invention:

“The nature of my improvement consists in making skirts for ladies by forming a series of hoops placed at stated distances, and made in such manner that they can be enlarged or diminished by means of slides, and also the peculiar manner of fastening the said hoops, to the perpendicular straps, by means of a small clamp, the said clamp, being made with teeth or otherwise; and also forming on the two top hoops (next to the waist band) an extra spring or hoop [bustle], after the manner of a corrugated surface, the

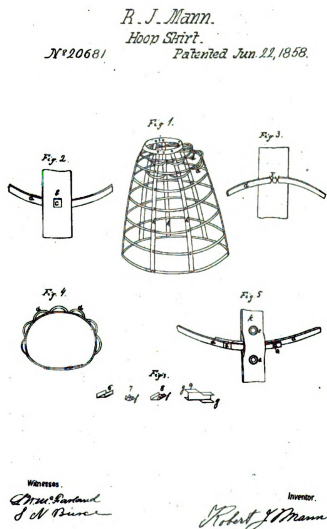


Figure 88. Patent 20,681 – Skirt-Hoop, 1858

⁹⁰ In 1858, two other patents preceded patent 20,681 (6/22/1858): patent 20,561 – Skirt-Hoops (6/15/1858), and patent 20,598 – Clasp for Skirt-Hoops (6/15/1858).

said corrugation fitting in the plaits or folds of the dress, thus presenting an agreeable effect, and affording an extension of the crinoline so desirable in such costumes.”

Example 2. Patent 21,479 – Lady's Hoop-Skirt, 1858 (Figure 89)

Problem to Solve:

No. 21,479. **S. BEREEDY.**
HOOP SKIRT. **PATENTED SEPT. 14, 1858.**

“The nature of my invention consists in constructing the expanding stay or support of ladies’ skirts of one continuous rod or strip of flexible material which is bent and arranged spirally on the fabric constituting the skirt or interwoven in a spiral form with the same, ... the spirals of the stay being of gradually decreasing diameter from the bottom to the top of the skirt ... By thus constructing the expanding stays or supports of ladies’ skirts a considerable

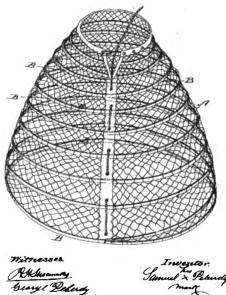


Figure 89. Patent 21,479 – Lady's Hoop-Skirt, 1858

reduction in the first cost of manufacturing the same is effected, as the slides which are used for fastening the meeting ends of the hoop or circle stay are dispensed with and the labor and time of applying said slides and fastening the ends of the hoops are saved. It is also found in practice that considerable saving in material as well as time in manufacturing the stays is effected, as a complete skirt having a given number of spirals can be produced from a shorter strip than a stay formed of the same number of concentric circles or hoops, no overlapping being necessary. It is likewise found that ... less number of pieces have to be handled and adjusted, ... which are by no means of slight importance, when we

consider the fact that hundreds of dozens of skirts are made in some large factories per day...”

Novelty of the Invention:

“The stay may be either of elastic wood, whalebone, gutta percha, india rubber or metal and the skirt fabric may be woven...”

Example 3. Patent 21,806 – Skeleton Skirt, 1858 (Figure 90)

E. G. Ahood.
Hoop Skirt.
N° 21806 Patented Oct. 19, 1858.

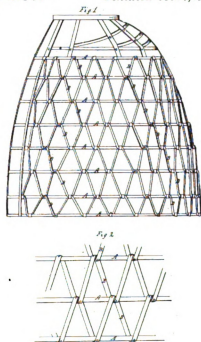


Figure 90. Patent 21,806 – Skeleton Skirt, 1858

Problem to Solve:

“...In the knit fabric the threads fill up all the spaces between the hoops, the thread running diagonally and tying or interlocking midway of the spaces between the hoops. This construction of knit skirt gives as perfect and symmetrical set to the dress as mine, but there are objections to its use because it hangs into objects and has its meshes broken and when one mesh breaks there is nothing to prevent a series of others giving way with it and the consequent formation of a very large rent...”

Novelty of the Invention

“The nature of my invention consists in a skirt formed of tape or similar material and a series of

circle hoops, when the tape is passed over one hoop and under the next below it in opposing oblique directions and the tapes fastened at the points where they interlock on the hoops themselves by claspings, sewing or tying. By this method of constructing a skirt

the hoops are entirely supported by the tapes or straps without depending upon the strength of the clasps, sewing or the tying by which the tapes are held in proper position on the hoops and thus increased durability is secured."

Functional Purpose:

"The oblique arrangement of the straps or tapes gives a more steady motion to the skirt and carries the dress more evenly and symmetrically as the straps are disposed more universally throughout the skirt in a manner to give the dress a support at every point. Said oblique arrangement also prevents that painful swinging or wiggling of a lady's dress so common to those skirts having the straps placed perpendicularly and not braced laterally or diagonally."

Example 4. Patent 22,426 – Lady's Hooped Skirt, 1858 (Figure 91)

Fashion:

"My invention consists in a circular network of cords or twine, of a s[imil]ar structure to the nets used for fishing, but so formed that when hoops are passed through its meshes, the entire fullness of the skirt will be thrown in one direction in such a manner as to give it the 'bishop' or 'bustle' shape, and so that the skirt so formed will be self sustaining, which enables me to retain the fullness in one direction and support

J. Holmes
Hoop Skirt.
N^o 22426 *Patented Dec. 28, 1858*



Figure 91. Patent 22,426 – Lady's Hooped Skirt, 1858

the ‘bishop’ or ‘bustle’ shape from the top to the extreme bottom of the skirt, regardless of the weight of the dress upon it, and thus dispensing with all clasps, sewing, lacings, extra ‘bustles,’ &c., which are now used to accomplish the same purpose.”

The above examples of hoops might have been worn with dresses such as those depicted in *Godey’s Lady’s Book*,⁹¹ or with a dress like one from photo⁹² (Figure 92).



**Figure 92. Left: *Godey’s Lady’s Book*, September 1859
Right: English Summer Day Dress, 1858-1860**

During the Civil War, the patent activity for hoops remained relatively high (51 patents granted), while patents for skirts and bustles were almost nonexistent (four skirt patents granted, and no bustle patents). Between 1860 and 1865 the width of the skirt increased dramatically, and in the second part of the 1860s the fullness of the skirt moved toward the back, as could be seen in Figure 93. The fashion plate from the French magazine *La Mode Illustree*⁹³ is dated 1862, while a costume with same general

⁹¹ [Online photo gallery]. Greenberg, H. (2000). Available:

<http://www.uvm.edu/~hag/godey/images/glb09-59c.jpg> [July 15, 2004]

⁹² [Online photo gallery]. Victoria and Albert Museum, England. Available:

<http://images.vam.ac.uk/images/photo/sch/20030207/high/1089-003.jpg> [July 18, 2004]

⁹³ [Online photo gallery]. Maginnis, T. (2004). Available:

<http://www.costumes.org/history/victorian/women/fashionplates/1862LaMode226.JPG> [July 22, 2004]

characteristics was published in *Godey's Lady's Book*⁹⁴ three years later. The museum exhibit⁹⁵ resembles quite closely *Godey's* illustration.



Figure 93. Left: *La Mode [Illustrée]*, 1862; Center: *Godey's Lady's Book*, November 1865; Right: *Walking Dress*, ca. 1860

In Figure 94 an actual crinoline⁹⁶ is compared with the American patent 54,785 from 1866. The patented hoop-skirt is similar with the artifact, except for a front piece called “apron.” The apron “is made of a wide piece of tape or series of pieces placed side by side. The tape thus employed is woven with the ordinary pocket through which the wires pass. This apron is applied upon the front of the skirt, as shown, so as to cover the lap of the wearer, keeping the hoops from spreading, and protecting the clothing as well as the hoops themselves from wearing at that the most exposed part.”

Other examples of hoop-skirts whose construction is based on the same principle as the one above are presented in Figure 95, where the patent drawing of the hoop-

⁹⁴ [Online photo gallery]. Katherine's Dress Site: Fashion Plates and Photographs. Available: <http://www.koshka-the-cat.com/godeys/nov1865godeys3.jpg> [July 22, 2004]

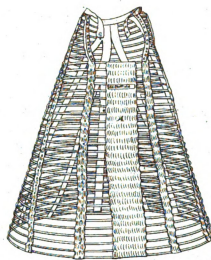
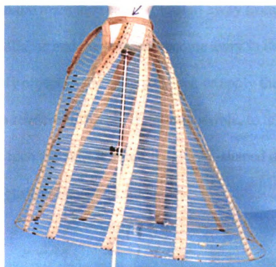
⁹⁵ [Online photo gallery]. The Metropolitan Museum of Art – The Costume Institute. Image flipped horizontally. Available: <http://www.metmuseum.org/collections/view1zoom.asp?dep=8&zoom=0&full=1&mark=1&item=CI+69%2E33%2F4a%2Dd> [July 22, 2004]

⁹⁶ [Online photo gallery]. The Kyoto Costume Institute, Japan. Available: http://www.kci.or.jp/cgi-bin/collection.cgi?lang=e&path=1850/10-003863_a [July 18, 2004]

Figure 94.

Left: Crinoline, ca. 1865

Right: Patent 54,785 – Improvement
in Hoop-Skirts, 1866



P. E. Sheffield.

Hoop Skirt.

Patented May 15, 1866.

N^o 54,785

Witnesses
E. J. [unclear]
L. [unclear]

Inventor
P. E. Sheffield
By
D. P. [unclear] & Co.
Attorneys

skirt and the artifacts⁹⁷ are viewed from the back.

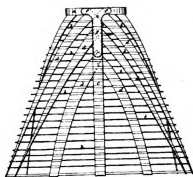
The innovation in patent 40,285 refers to a reinforcement of the median back tape:

“The usual method of applying the tapes employed in the style of skirt shown to support the rear portion thereof, has been to run a main tape down the center of the back of the hoops, and to cause to branch or diverge therefrom other tapes, which, being fastened by stitches at or near the top of the main tape, radiate therefrom, extending down to the bottom of the skirt and from the central line around to the opposite sides of the hoops. This application of the tapes is found to conduce to a full, easy, and graceful ‘set’ of the skirt, with a desirable contour not otherwise easily obtained. Skirts so made have, however, this objection: Most of the weight of the sustained skirts and dress worn comes

⁹⁷ [Online photo gallery]. Philadelphia Museum of Art. Available:
<http://www.philamuseum.org/exhibitions/installations/hoopskirts.shtml> [July 18, 2004]

upon and is supported by this rear portion of the hoops, causing a great drag upon the hoops and tapes. The trail of the dress, also, is very liable to be trod upon. The result is that the stitches confining the diverging tapes to the main tape soon give way, and pulling on the main tape cause it to start away from the waistband, allowing the springs to collapse and the dress to become awry in its appearance, besides soon ruining the skirt. My object has been to so fasten or apply these tapes to the central tape and waistband as to render it difficult, if not impossible, to tear or break them away in the ordinary wear to which the skirt is subjected." A T-shaped dorsal strap of leather was stitched through both main tape and side tapes.

L. S. Scofield.
Hoop Skirt.
 No 40285 Patented Oct. 13, 1863.



Witnesses
J. B. Cook
John W. Smith
Inventor
L. S. Scofield

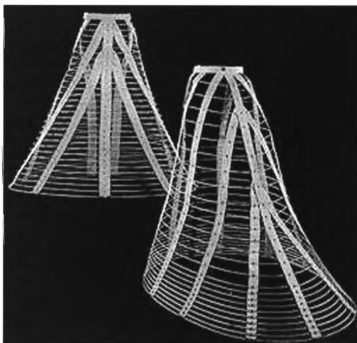


Figure 95.

Left: Patent 40,285 –

Improvement in Hoop-Skirts, 1863

Upper Right: Hoop Skirt, ca. 1865, Bridgeport Skirt Company, Bridgeport, Connecticut

Lower Right: Hoop Skirt, ca. 1865, Bradley's patent duplex elliptic Empress reception spring skirt, West's Bradley & Cary

The museum's hoop-skirts were made by two companies: Bridgeport Skirt Company, and West's Bradley & Cary. Among the patents studied, I found a company⁹⁸ with a slightly different name –The West, Bradley, and Carey Manufacturing Company, and in Bridgeport, CT, I found only American Press and Clasp Company.⁹⁹ The Bridgeport Skirt Company, CT, was not mentioned as assignee in any patent pertaining to hoops or skirts classes probably because the ownership of the patent might have been changed after patent's approval, and therefore not included in the patent specifications. Or, the patent was assigned to a person, and not to the company per-se. Patent 40,285 had no assignee.

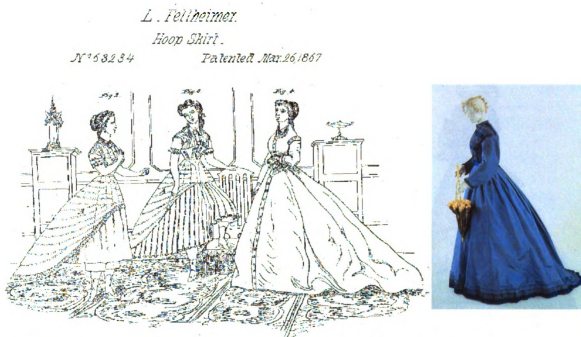
In Figure 96 a dress rendering from patent 63,234 (1867) could be compared with an actual dress from the same period.¹⁰⁰ By this time, the hoop finally lost its front curve. Thus, the front of the skirt became “straight and flat, and an abundance of fabric was massed at the back of the figure that ended in a train” (Russell, 1983).

The inventor of patent 63,234 stated: “The object of this invention is to provide a hoop skirt which will overcome the objection heretofore experienced by ladies on entering and leaving carriages from the entanglement of their feet in the skirts. Another object is to provide a hoop skirt which will fit either stout or slender females, which I accomplish by having a gathering on the rear end of the waist-band, through which passes a series of strings sewed or otherwise attached on each side of the gathering, to two separate strings, which are drawn around the waist and tied. On the upper inner side

⁹⁸ Patent 105,124 – Improvement in Hoop-Skirts (7/5/1870), Assignor to himself [Charles E. Pratt, of Rahway, New Jersey], M. Cohn & Co., of New York City, and the West, Bradley, and Carey Manufacturing Company, of same place.

⁹⁹ Patent 58,540 – Improvement in Clasps for Skirt-Hoops (10/2/1866).

¹⁰⁰ [Online photo gallery]. McCord Museum, Canada. Available: http://www.virtualmuseum.ca/PM.cgi?LM=Gallery&LANG=English&AP=vmc_display_static&DB=human&KEY=MCCDM6327.1-3 [July 18, 2004]



**Figure 96. Left: Patent 63,234 – Improvement in Hoop Skirts, 1867
Right: Afternoon Dress, 1866-1869**

of the skirt, in opposite direction to each other, are sewed, or otherwise attached, bands, to which is fastened a series of strings, ... the object of which is to convert the skirt into a trailing form; this is accomplished by passing the strings around the rear of the ordinary skirt, and there securely tied. [...] The hoops in the skirt are so arranged that they can be easily removed, and replaced after the skirt has been washed.”

In the 1860s, round hoop skirts were more frequently patented than hoops with atypical shapes, like the one presented above. In Figure 97, the hoop drawn in patent 63,233 – Improvement in Hoop Skirts is similar with the artifact,¹⁰¹ namely –no hoops over the abdomen, and clustered double tapes for supporting the hoops.

Patent 63,233 – Improvement in Hoop Skirts (1867), is an improvement of

¹⁰¹ [Online photo gallery]. Philadelphia Museum of Art. Available: <http://www.philamuseum.org/exhibitions/installations/hoopskirts.shtml> Image flipped horizontally. [July 22, 2004]

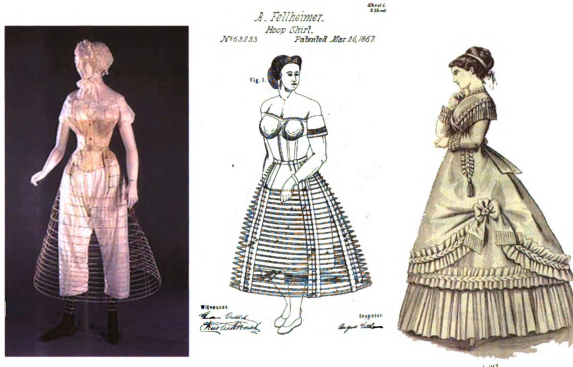


Figure 97. Left: Hoop, ca. 1850-1870; Center: Patent 63,233 – Improvement in Hoop Skirts, 1867; Right: *Godey's Ladies Book*, September 1868

another patent¹⁰² from 1866. “The invention consists in forming a loop at each end of the hoops composing the skirt, by bending such hoop over, and then securing it to the main portion of the hoop with any suitable clasp-fastening therefor, by means of which hoop-loops a more reliable and durable, and a much better connection between the hoop ends and their sliding tubular fastenings, or the tapes of the skirt, as the case may be, is established than by the clasps employed in the Letters Patent hereinbefore referred to. [...] By looping the ends of the skirt hoops as described, ... the wearing or cutting away of the tape and tubular fastening to which such hoop-loops are connected or hung, is entirely obviated and remedied...”

¹⁰² Patent 54,998 – “Improvement in Hoop-Skirts,” May 22, 1866 (patentee Anna M. Bardwell).

Later Victorian: The Gilded Age (1870 – 1890)

In this period, many remarkable discoveries and inventions contributed to the rapid progress of the U.S. capitalist industry. As a result, the agrarian economy shifted to an industrial one, which subsequently led to changes in the society. “This new-rich era came to be known as the *Gilded Age*” (Russell, 1983).

In fashion, the voluminous skirts decreased in size, and a transition from hoop-skirts to the first wave of bustles began. An example is given in patent 86,340,

Improvement in Hoop-Skirts
(1869), Figure 98: “To suit the prevailing fashion, hoop-skirts are made to fit very closely to the wearer, except at the bustle-point, where, by various attachments, they are made to protrude so far as to give the appearance of a panier-attachment.”

Another example is patent 111,998 – Improvement in Hoop-Skirt (1871), in which the patentee summarizes the fashion trend: “In the prevailing style of dress it is desired to

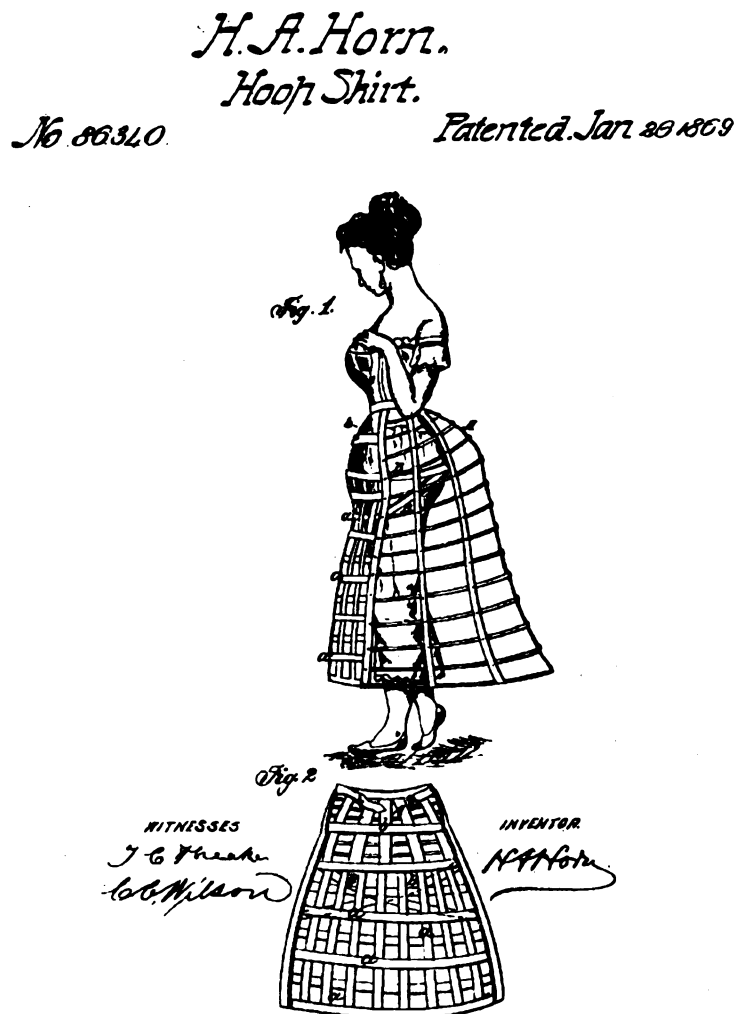


Figure 98. Patent 86,340 – Improvement in Hoop-Skirts, 1869

have the skirt to hang as nearly vertical at the front as possible, but swell out prominently at the back of the waist and downward therefrom.”

Starting with 1857, the first ‘bustle effect’ was achieved by increasing the tension through lacing between ends of strips made of whalebone (patent 17,082 – Bustle, 1857), or by using curved strips of steel webbed in a textile fabric to avoid losing “its necessary elasticity, nor be liable to become, either displaced, broken, or permanently distorted as heretofore, by the external force or compression to which such articles are usually subjected when worn in crowded assemblies or traveling vehicles; nor be subject to the ungraceful motions occasioned, in most of the bishops and bustles worn, by the necessary alternate motions of the gluteal muscles in walking” (patent 22,124 – Tournure, 1858).

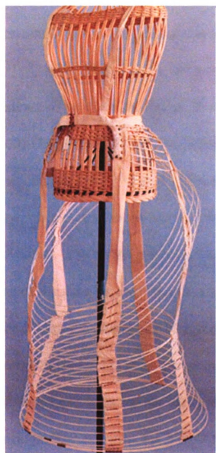
Some designs had an additional corrugated hoop placed next to the waistband (patent 20,681 – Skirt-Hoop, 1858), or a frame made of spring steel parts attached to the hoop (patent 81,262 – Improvement in Bustle-Attachment for Skirts, 1868). Some hoop-skirts had adjustable bustles that “...may be raised or lowered at pleasure, to give more or less fullness or prominence to the portion of the dress covering it” (patent 83,986 – Improvement in Hoop-Skirts, 1868).

Other bustles were pads filled with horsehair (known as ‘bishops’), whose filling was replaced later on by lighter materials or springs (e.g., patent 22,133 – Improvement in Bustles for Ladies’ Dresses, 1858). From 1859 on bustles were made predominantly of strips of metal (ribs) and/or wire (springs), assembled in a large variety of shapes.

In Figure 99, a bustle from 1870-1875¹⁰³ is compared with a hoop patent from 1870 that had the ‘bustle effect’ built in. These examples belong to the first bustle wave,

¹⁰³ [Online photo gallery]. The Kyoto Costume Institute, Japan. Available: http://www.kci.or.jp/cgi-bin/collection.cgi?lang=e&path=1870/01-002856_a [July 18, 2004]

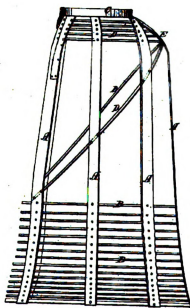
1872-1876. The inventor of patent 105,124 mentions: "This invention ... consists in the employment of one or more bracing-hoops, attached to the back near the top, and springing around to the front, and downward to a point about the height of the knees of the wearer, as hereinafter described, in substitution of a large number of the concentric hoops, which, by this improvement, may be omitted from a short distance below the waist to the lower portion of the skirt, which are in contact to the wearer when sitting down, both because of sitting on them, and because the front parts are thrown up, so as to



No. 105,124.

C. E. PRATT,
Hoop Skirt.

Patented July 5, 1870.



Witnesses:
Charles R. Smith
Geo. W. Mabey

Witnesses:
Chas. E. Pratt
Wm. H. Pratt
Wm. H. Pratt

Figure 99.

Left: Bustle, 1870-1875

Right: Patent 105,124 – Improvement in Hoop-Skirts, 1870

raise the front of the dress, by sitting on the rear parts, which it is one of the principal objects of this invention to counteract.” The omission of the concentric hoops was “highly desirable, for, when used, the wearer cannot sit without sitting on the hoops, which are always uncomfortable, and sometimes injurious. The knees are exposed to the liability of being cut or hurt by them...” The advantages of the braces were: it held “the front parts of the bottom hoops from falling to the floor when sitting, as they do in the skirts as now made; and, when the wearer kneels, the front wire falls below the knees, so that they may not be injured, as they are liable to be with the skirts in which the concentric hoops are arranged as in the common way.”

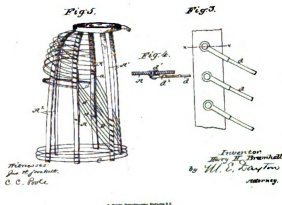
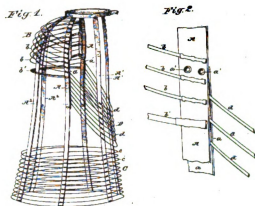
After fifteen years, in the second bustle wave (1883-1889) other hoop-skirt patents resembling the design above were registered (two examples are given in Figure 100). In patent 318,162, the patentee stated: “This invention relates more particularly to that class of skeleton hoop-skirts in which diagonal wires are employed between the lower horizontal hoops and the upper end of the skirt. [...] One and prime object of the invention is to obtain a free movement of the diagonal springs fully independently of the top of the skirt, in order that flexure of the person at the hips, as in sitting or rising, may not disturb the bustle,” and “at the same time serving its proper office of holding the garments distended at proper points.” The solution was to insert flexible junctions made of short tapes between the side supporting tapes of the hoop skirt and the diagonal springs, thus allowing the diagonal springs “to tilt more freely than if they were secured to the tapes themselves.” The lower ends of the diagonal springs were left unattached from the front tapes, which “enabled [them] to freely rise and fall in the movements of the wearer.”

(No Model.)

H. H. BRAMHALL.
HOOP SKIRT.

No. 318,162.

Patented May 19, 1885.



(No Model.)

C. E. BROWN.
HOOP SKIRT.

No. 329,271.

Patented Oct. 27, 1885.

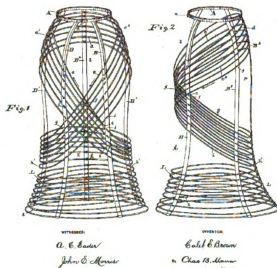


Figure 100.

Left: Patent 318,162 – Hoop-Skirt, May 1885

Right: Patent 329,271 – Hoop-Skirt, October 1885

In the second example (Figure 100–Right), the hoop is constructed without a built in bustle, the bustle being probably added separately. Patent 329,271 offers an ingenious and elegant solution to the wires/tapes junctions by making the hoop skirt of a single continuous piece of wire. “Commencing at a point, at the side and near the front above where the knees would come, the wire passes up and diagonally across the front, around one hip, across the back, just below the waistband, around the other hip, then inclining down and diagonally across the front, where it crosses at the first diagonal, then continuing down to the opposite side, then straight around the back and up the side, again up and diagonally across the front (below where it crossed first,) [etc.]. [...] An

advantage of this construction in forming the front or abdomen opening is that there are no ends of hoops attached to tapes, as is commonly the case in other skirts at each side of this front opening. Another advantage of this construction of the upper series of hoops lies in the absence of hoops at the seat. By reason of this seat opening or space the wearer can take a seat without sitting on the hoops.” Also, by this construction method, the spring’s windings formed an inverted V-shape space for the knees.

Sometimes, an overskirt train was draped over an underskirt and a hoop, as in patent 139,677 from 1873 (Figure 101). By this invention, the two female patentees

HARRIET & EMILY S. JUDSON.
Ladies' Dresses.
No. 139,677. Patented June 10, 1873.



Figure 101.

Left: Afternoon Dress,
1870-1874

Right: Patent 139,677 –
Improvement in Ladies'
Dresses, 1873



wanted to enable those dresses which were worn with an over-skirt or basque “to be converted at will, and without removal from the wearer, into walking dresses for the street, or into house or evening dresses, with a trained skirt.” The invention consists in a back skirt yoke “provided with gathering strings [...] by means of which the train portion of the skirt is rendered adjustable to accomplish the required result.” By means of this yoke, “a lady may adapt her dress to the occasion by the simplest effort, and even without attracting attention.” In Figure 101, the patented dress having the train raised resembles closely the afternoon dress in the photo.¹⁰⁴ In both cases, the bustle effect was achieved by draping the overskirt, which in the latter case was supported by interior vertical tapes.

By the late 1870s the bustle began to disappear as the outerskirt was draped more tightly about the lower part of the body (Russell, 1983), as could be seen in Figure 102.



**Figure 102. Left: *Godey's Lady's Book*, June 1880
Right: Worth Visiting Costume, ca. 1880**

¹⁰⁴ [Online photo gallery]. McCord Museum, Canada. Available: http://www.virtualmuseum.ca/PM.cgi?LM=Gallery&LANG=English&AP=vme_display_static&DB=human&KEY=MCCDM971.105.6.1-3 [July 18, 2004]

The 1880s fashion plate,¹⁰⁵ and the museum artifact¹⁰⁶ show the characteristic *hourglass* silhouette, and *fish tail* train of the dress. Bustle, pannier and hoop patents were adapted to the new style by emphasizing their main function as ‘trail-support’ (Figure 103). Still, as a result of this change in fashion, patent activity for bustles and hoop-skirts dropped significantly between 1877 and 1882, when a total of only 6 bustle patents and 6 hoop patents were granted.

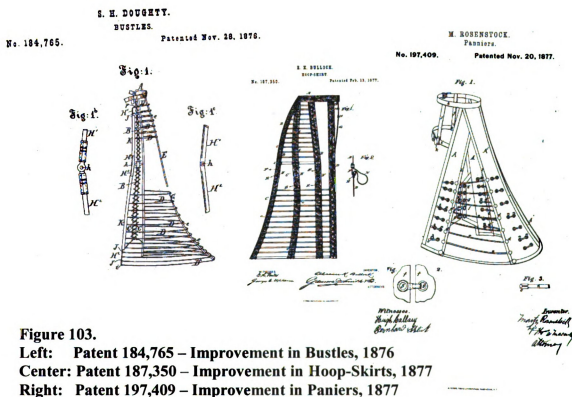


Figure 103.

Left: Patent 184,765 – Improvement in Bustles, 1876

Center: Patent 187,350 – Improvement in Hoop-Skirts, 1877

Right: Patent 197,409 – Improvement in Panniers, 1877

In Figure 104, a photo of a bustle/pannier¹⁰⁷ is presented together with a drawing from patent 273,165 issued in 1883.¹⁰⁸

¹⁰⁵ [Online photo gallery]. Griswold, R.E. (2004). University of Arizona. Available: http://www.cs.arizona.edu/patterns/weaving/illustrations/SAMPLES/gdy_3153.gif [July 18, 2004]

¹⁰⁶ [Online photo gallery]. The Museum of the City of New York. Available:

<http://www.mcny.org/Collections/costume/worth/costume36.htm> [July 18, 2004]

¹⁰⁷ [Online photo gallery]. Manchester Gallery of Costume, England. Available:

<http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=2598&refable=ecatalogue&refirn=17115> [July 18, 2004]

¹⁰⁸ Application date: May 3, 1882

The improvement described in patent 273,165 is based on a previous patent of the same patentee. He observed that the spring-wires inserted in the pockets had the tendency “to straighten, chafe and wear the textile material against which their ends abut, and eventually protrude[d] through the material. This pressure and wear [was] also very much increased by the pressure thrown upon the arch of the spring by the wearer in sitting down.” He found also “that this difficulty is not obviated by capping the ends of the springs with sheet metal or other clips, as is commonly practiced, as the ends will in



Figure 104.

Left: English Bustle, 1880-1890

Right: Patent 273,165 –
Pannier and Bustle,
1883

(No Model.)

J. SCHOENHOF.
PANNIER AND BUSTLE.

No. 273,165.

Patented Feb. 27, 1883.

Fig. 1.

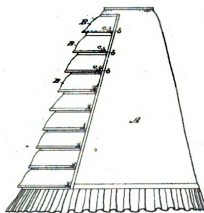


Fig. 2.

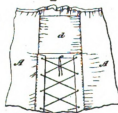


Fig. 3.



Fig. 4.



Fig. 5.



WITNESSES:

W. H. Allen
W. H. Allen

INVENTOR:

Jacob Schoenhof
By *His Attorney,*
Wm. H. Allen

U. S. PAT. OFF. PHOTODUPLICATION SERVICE

any case eventually wear their way through the material. [...] In my former patent I showed a lacing device arranged inside of the skirt and extending from top to bottom, whereby the protrusion of the springs might be regulated. I find, however, that with this construction the lateral enlargement of the body at the hips tends to flatten the pannier at the upper part; and this strain, acting upon the lacing below, causes the springs to stand out unduly at the lower part.” As a remedy, two or more independent lacing devices were employed in lieu of a single strip to avoid the flattening of the upper part of the pannier, and “to maintain a certain normal curvature in the springs on the outside ...”

In the early 1880s the bustle returned again, this time it was more protruding and higher at the back of the waist than in the first wave. Therefore, “greater attention was paid to tailoring skirts over the bustle extension rather than merely piling up fabric” (Russell, 1983). Some bustles were made of mesh wire, and shaped to fit the curve of the back just below the waist.

In Figure 105, examples of mesh wire bustles are presented in the photo¹⁰⁹ and patent 334,707 from 1886.¹¹⁰ Actually, the American inventor of this bustle patent had already protected his patent rights in Belgium, France, England, and in Austria-Hungary since 1885. The patentee wanted to provide “a light, durable, and elastic bustle, which can be readily compressed, and will unfailingly assume its normal position when relieved of impact or pressure. [...] A bustle thus constructed may be manufactured at comparatively small expense.” The bustle was composed of braided or plaited wire, preferably tempered steel wire, in tubular form. Two or more tubular sections of

¹⁰⁹ [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=400135&refable=ecatalogue&refirn=13489> [July 18, 2004]

¹¹⁰ Application date: July 2, 1884

different sections and sizes were employed to conform to different styles and changes of fashions. Each tube was of smaller diameter at the ends than at the middle “to form a swell and provide that amount of projection which the nature of the bustle requires.” The shape of the tube in transverse section varied from cylindrical, oval, to elliptical.

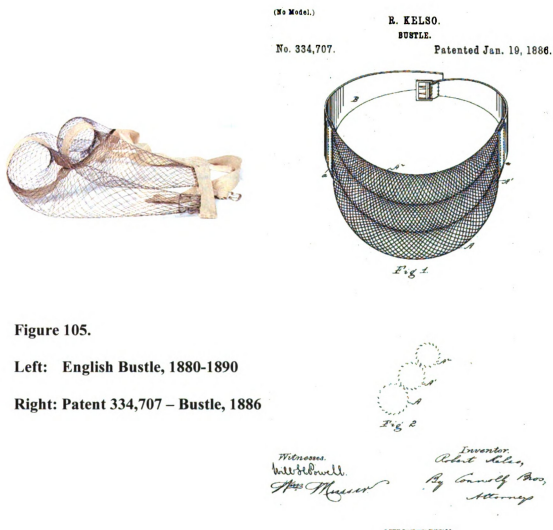


Figure 105.

Left: English Bustle, 1880-1890

Right: Patent 334,707 – Bustle, 1886

Another type of bustle, with arched bows, is presented in Figure 106, where an English bustle¹¹¹ from 1884 is presented in parallel with an 1887 American patent (patent 364,003). The American patent is more elaborate, and since it was issued three

¹¹¹ [Online photo gallery]. Victoria and Albert Museum, England. Available: <http://images.vam.ac.uk/images/photo/sch/20000525/high/mb47-039.jpg> [July 18, 2004]

years later than the English artifact it was probably an improvement of an existent model. The patentee's aim was to provide "a simple, cheap and durable bustle, and one wherein the parts are so arranged that when the extending loops are subjected to any pressure directed toward the person of the wearer said loops will fold upward and inward to positions within the line of the main supporting hoop or loop." The novelty of this

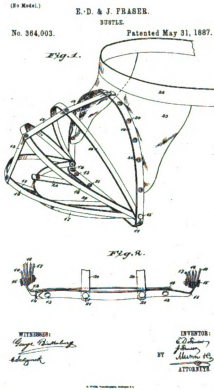


Figure 106.

Left: English Bustle, 1884

Right: Patent 364,003 – Bustle, 1887

invention consisted in a series of loops (bows) being pivotally connected with rivets, and held against any excessive outward unfolding by a retaining strip or band that was secured to the upper end of the arch formed by the loops and the two outwardly extending spring arms of the lower loop. The main loop was connected with eyelets to a flap, and the flap was attached to the waistband

Some skirt-distenders included also a bustle that supported the skirt, as in patent 338,634, and also in photos of a combined skirt and bustle,¹¹² and of a dress with a built-in bustle¹¹³ (Figure 107). In patent 338,634 – Combined Skirt and Bustle (1886), the patentee describes his invention as follows: “In my improved article the bustle is formed in the back breadth of the skirt, which is made sufficiently large for the purpose, and is also of sufficiently greater length than the front breadth to allow its upper portion to be drawn in over the bustle snugly around the waist of the wearer. In the back breadth are formed pockets to contain the hoop-skirt wire or other elastic strips, which, together with that part of the back breadth of the skirt where they are placed, form the body of the bustle; and these wires or strips are bent, so as to distend the bustle, by cross-tapes or their equivalent, which are attached at their ends to opposite sides of the bustle portion of the skirt. The pockets for the reception of the wires are preferably provided with eyelets, through which the wires are threaded, and the ends of the wires are received in end pockets in the skirt, the arrangement being such that the wires –any or all of them– can readily be removed and replaced. ... The cross-tapes are made, preferably, of elastic webbing or other elastic material which will stretch and yield to the person of the

¹¹² [Online photo gallery]. The Historic Costume & Textiles Collection – Ohio State University. Available: http://costume.osu.edu/Reforming_Fashion/image_exhibition/bustle84.htm [July 22, 2004]

¹¹³ [Online photo gallery]. McCord Museum, Canada. Available: http://www.virtualmuseum.ca/PM.cgi?LM=Gallery&LANG=English&AP=vmc_display_static&DB=human&KEY=MCCDM20281.1-2 [July 22, 2004]

(No Model.)

L. DRYFOOS.
COMBINED SKIRT AND BUSTLE.

3 Sheets—Sheet 1.

No. 338,634.

Patented Mar. 23, 1886.

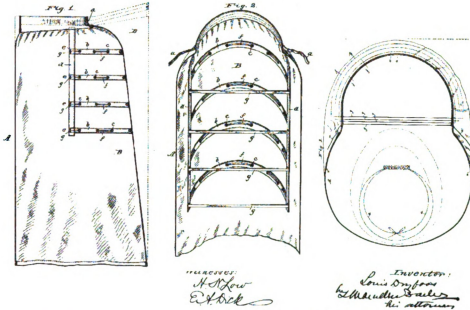


Figure 107. Up: Patent 338,634 – Combined Skirt and Bustle, 1886;
Lower Left: Bustle – ca. 1884; Lower Right: Dress – ca. 1888

wearer.” The eyelets of the pockets furnished the most “convenient and efficient means of holding the wires in place and of compelling them to bend evenly and uniformly.”

A bustle incorporated in a more rigid structure is exemplified in Figure 108 by an English bustle/pannier¹¹⁴ and an American variation of this design. The object of the American invention 364,820 was “to provide a lady’s panner or bustle combined with a tilting skirt, so as to give a graceful outline to the rear portion of the dress, to be



Figure 108.

Left: English Bustle, 1884

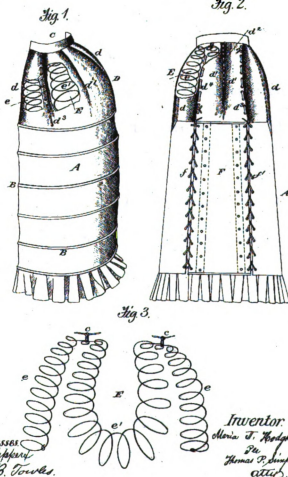
Right: Patent 364,820 – Bustle or Pannier, 1887

(No Model.)

M. J. HODGKIN.
BUSTLE OR PANNIER.

No. 364,820.

Patented June 14, 1887.



¹¹⁴ [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?im=2217&refable=ecatalogue&refirm=15211> [July 18, 2004]

susceptible of a nice adjustment, and to be automatically brought into its true position after an accidental displacement.” The bustle or pannier was formed of an enclosing fabric divided into three vertical pockets, a coil spring, and horizontal stiffening ribs (reeds). The middle pocket was partially separated by a short vertical line of stitching, and it was linked to the side pockets by lacing end eyelets. A continuous coil spring (which could be as well formed of three springs connected at their upper ends) was passed in each of the pockets, the upper ends being shaped as spiral cones. The spring was connected by loops with the semi-circular waistband, while the waistband itself was secured to the corset by safety pins. The tilter skirt was cut out in front and provided with a gore, which was adjustably attached to the edges of the tilter skirt by lacing and eyelets, so that the skirt could “fit snugly on ladies of different size.” The arrangement of spring(s) in pockets separated by lacing, as well as the reeds, made easy their removal, and allowed the skirt to be properly laundered.

A wide variety of types of bustles were patented, especially in the second bustle wave (1883-1889), which reached its peak in 1887 when 68 bustle patents were granted. One of the most protruding bustles was made of a multitude of support springs. In Figure 109, a bustle patent from 1889 could be compared with an actual artifact.¹¹⁵ The patentee praised the invention as being “a very light, pliable, and graceful bustle.” The bustle was made of several tubular wire coils with different diameters and lengths inserted in pockets formed by fabric enclosures. Smaller spring coils were used for the inner set than for the outer set of coils, and a less number, drawing the inner coils into the

¹¹⁵ A discrepancy exists between the approximate year of the artifact (in the first bustle period), and the year of the patent registration (the second bustle period). Patent 359,860 – Bustle, issued in 1887, was the first of this type that I found in the sample of patents studied in depth. The photo is courtesy of the Online photo gallery of the University of New Hampshire Museum. Available: <http://www.izaak.unh.edu/museum/Textile-Ex/undies.htm> [July 18, 2004]

interstices between the outer set of coils. Three coils for the outer set and two coils for the inner set were "generally sufficient for the purpose of forming a bustle of sufficient size; but more springs may be used, if desired." A bow-tape connected the central portion of the outer set of coils with the top of the inner set adjusted the shape of the bustle by lengthening or shortening the tape. The gown¹¹⁶ from Figure 109 might have had the skirt supported by a protruding bustle like the one described above, with an increased number of springs. Draping the skirt over an extreme bustle required added fullness to the skirt, which was accomplished by inserting gores.

Late Victorian and Edwardian: Art Nouveau (1890 – 1911)

By the early 1890s, the rigid prescription of the Victorian Age was replaced by a new style called *Art Nouveau*. In clothing, the hoop-skirt and bustle disappeared in time, and the sinuous lines of *Art Nouveau* influenced the feminine silhouette, giving it a more delicate appearance.

Between 1890 and 1911 patent activity decreased for hoops and bustles, and increased for skirts. In this time interval, there were only four hoop patents and 32 bustle patents, while an overwhelming 220 skirt patents were registered. After 1907 no hoop patents were issued. Same for bustle, 1912 being the last year for a bustle approval.¹¹⁷

The dress in patent 469,637 – Combined Flounce and Belt, 1892 (Figure 110) is shown having a much lower and smaller bustle than in the previous era. The patentee presents a practical way to add a nice touch to a garment: "My invention is a

¹¹⁶ [Online photo gallery]. Doyle New York. Available: <http://www.doylenewyork.com/specialist/images/property/worth.jpg> Image flipped horizontally. [July 21, 2004]

¹¹⁷ This patent is not included in the 32 patents issued between 1890 and 1911.

Fig 1

**Figure 110. Patent 469,637 –
Combined Flounce and Belt,
1892**

combined flounce and belt adapted to be readily applied to and detached from the body of the wearer without disturbing any other garment, and to be worn with different dresses.” The short flounce of open-work was “adapted to disclose the color of the underlying garment through its openings.”

In Figure 111, the design of the dress depicted in patent 586,446 – Dress-Skirt Lifter¹¹⁸ is compared with a visiting dress from the late 1890s¹¹⁹ from the Hermitage Museum. Both dresses are Princess style, with balloon sleeves, and flaring skirts. In particular, the patent in

discussion relates to “... devices for lifting the lower portion of a dress-skirt to clear it from the ground. Devices of this character have heretofore been made, but they have been so connected to a skirt that only a portion, say the rear portion thereof, could be elevated or lifted.” The patentee states the object of her invention: “... to provide a simple and comparatively inexpensive device by means of which all portions of the skirt may be lifted.” The skirt lifter was comprised of tapes or ribbons, and rings secured to the inner side of the skirt. The number of tapes employed on a dress equaled the number of breadths in a skirt. The rings were attached to each seam of the breadths. When the

¹¹⁸ Application date: November 10, 1896

¹¹⁹ [Online photo gallery]. The State Hermitage Museum, Russia. Available: http://www.hermitagemuseum.org/html_En/12/b2003/hm12_2_8_08_0.html [July 21, 2004]

tapes were simultaneously drawn upward the entire lower portion of the skirt was at once lifted. The tapes or ribbons were passed through the skirt and tied at the outer side in a "suitable knot," without carrying the tapes around the waist of the wearer.

(No Model.)

E. MANNING.
DRESS SKIRT LIFTER.

No. 586,446.

Patented July 13, 1897.

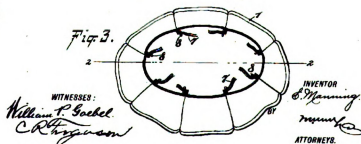
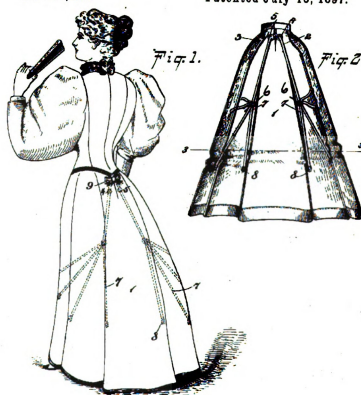


Figure 111.

Left: Broadcloth visiting dress that belonged to Empress Alexandra Fiodorovna, second half of the 1890s

Right: Patent 586,446 – Dress-Skirt Lifter, 1897

By the mid-1890s the skirt became a smooth, many-gored, funnel-shaped skirt, flaring out sharply from waist to floor with extra fullness at the back (Russell, 1983). The expansion of the skirt away from the body was achieved through ingenious solutions. One of them is presented in patent 554,998 from 1896, Figure 112 – Center. Also in this figure are shown a museum artifact,¹²⁰ and a fashion illustration¹²¹ that embody the flared skirt design from late 1890s.

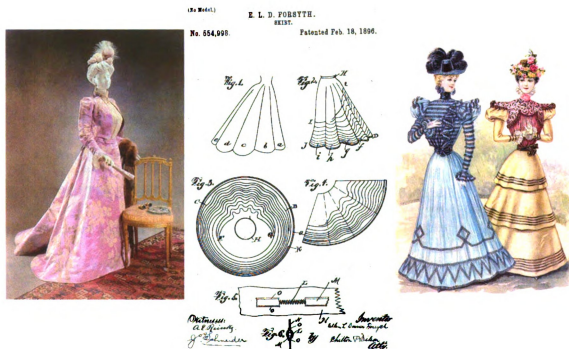


Figure 112. Left: Worth Afternoon Dress, 1896; Center: Patent 554,998 – Skirt, 1896; Right: *Delineator*, July 1897

Patent 554,998 – Skirt (1896) refers to a petticoat comprised of a plurality of gores that took the form of organ-pipe plaits because of the sustaining spring wires, which produced a double curvature, and added to the weight of the skirt. The spring

¹²⁰ [Online photo gallery]. The Museum of the City of New York. Available: <http://www.mcny.org/Collections/costume/worth/costume25.htm> [July 22, 2004]

¹²¹ [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/victorian/women/fashionplates/acarter/june99/1897july.jpg> [July 22, 2004]

wires were very small coils of fine, flexible wires. They were inserted in pockets sewn in sinuous lines around the garment, the highest points of the waves being in the middle of the gores' width, and the lowest points being at the seams between consecutive gores.

"This cause[d] the several gores to stand out in the form of 'organ-pipe' plaits, ... with a tendency to throw the seams inward at the junctions of the gores respectively." A single gore of "exceptional breadth" formed the front of the skirt. This gore was designed in an arc of a circle, with the wave lines less curved than the other gores. The spring wires were massed toward the bottom in front and at the sides to stiffen the edge. The skirt was heavier in the back than in front because of the spring-wire distribution, and also flared slightly greater in the lower part than at waist, thus producing a bell-shaped¹²² look.

Another ingenious solution for distending the skirt is offered in patent 549,26 from 1895. The patent's drawings are presented in Figure 113, together with an illustration of a gored, funnel-shaped skirt from *Delineator*¹²³ (1898).

The problem the inventor wanted to solve in patent 549,269 was to lower the cost of the distender by designing a replacement of the usual stiffening lining of the skirt.

"This invention relates to a device for improving the hang of skirts. In making that kind of dress-skirts popularly known as 'organ-pipe' or 'goddet' skirts or skirts having organ-pipe or goddet backs –that is, having large folds or plaitings extending from at or near the waist to the bottom of the skirt, and which may be formed only in the back of the skirt or may extend a greater or less distance around the skirt or even entirely around the skirt– it has been customary to provide the skirt with a lining of haircloth or other suitable stiffening material extending from at or near the waist to the bottom of the skirt and part

¹²² By a "bell-shaped" appearance the patentee described what it is now termed as a "funnel-shaped" skirt.

¹²³ [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/victorian/women/fashionplates/1890s/1898delin1.jpg> [July 22, 2004]

(No Model.)

M. P. C. HOOPER.
ATTACHMENT FOR SKIRTS.

No. 549,269.

Patented Nov. 6, 1895.

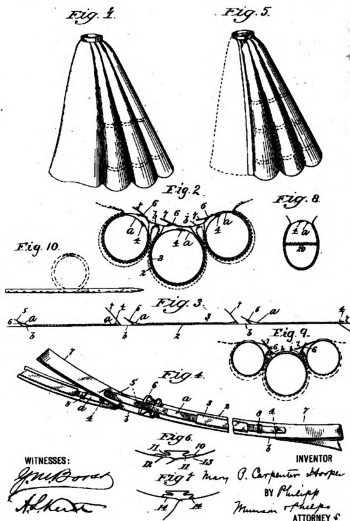


Figure 113.

Left: Patent 549,269 –
Attachment for
Skirts, 1895

Right: *The Delineator*, 1898

way or entirely around the skirt, according as the large or organ-pipe folds or goddets are to extend part way or entirely around the skirt. This lining is made of a material, such as hair-cloth, of sufficient thickness to cause the skirt to hang in the desired large folds, and consequently makes the skirt very heavy, and therefore uncomfortable and fatiguing to

wear. It should also be as elastic as possible, so as to cause the skirt to return to its proper arrangement after the folds have been disarranged. The best material heretofore used for the purpose has been hair-cloth; but this is very expensive, and even it will after a short time become creased and lose its elasticity, and the folds will become broken and out of shape.”

The novelty brought by this innovation was a series of spring rods made of flat spring-steel or whalebone that were inserted in parallel horizontal pockets secured inside the skirt, thus causing the skirt “to hang in the desired folds, ... without the use of a stiffening-lining.” Also, “light india-rubber tubing is a good material of which to make the rings or bows, as it is very elastic and will properly extend the folds, and yet is very flexible and practically unbreakable, and it is not affected by moisture and is therefore particularly well adapted for use at the bottom of the skirt.” Each spring was then bent to form a ring and its ends were hooked together. The springs were arranged “periphery to periphery” and adjusted by ‘draw-back straps’ and buckles. This arrangement of spring rods was easy to remove, “allowing the skirt to be readily folded without injury” for packing. For deeper folds, spiral springs were connected across the rings from side to side, which narrowed the rings in one direction and lengthened them in the other. The outside of the skirt was tacked between, or in the recesses of the folds of the back piece. For light summer dresses and washable dresses, it was found desirable to use a complete underskirt that included the back piece, because it could replace the hoop-skirts by attaining the lateral extension of the skirt without the rigidity of the hoops.

Toward the end of 1890s, walking skirts were only ankle length, and flared moderately. Sports such as golf and tennis became favorites for leisure time, and these

practical skirts were incorporated in female sportswear. In the last years of the 19th century, the *Gibson Girl* became an idealized symbol of the American woman: self confident, in total control, active in sport, and adored by men. In Figure 114, one of Charles Dana Gibson's drawings¹²⁴ is presented along with a drawing from patent

No. 709,862.

C. W. BAUGHMAN.

SKIRT HOLDER.

(Application filed Dec. 1, 1900.)

Patented Sept. 30, 1902.

(No Model.)



Fig. 1.

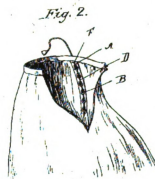


Fig. 2.



Fig. 3.



Fig. 4.

Figure 114.

Left: The Gibson Girl,
1890-1910

Right: Patent 709,862 –
Skirt-Holder, 1902

Witnesses
Clarence Shaw
A. M. Magruder

Inventor
C. W. Baughman
By
Oscar K. Gittens

¹²⁴ [Online photo gallery]. Fashion-Era. Available:
<http://www.fashion-era.com/images/Edwds1890-1915/gibsonmarbx30.jpg> [July 21, 2004]

709,862 issued in 1902¹²⁵ that depicts a woman dressed in a shirtwaist and a plain skirt.

This type of skirt was also used by many working women, which in this period of industrial growth entered the workforce. Some skirt patents from this period reflect both fashion and societal changes. They refer to adjustable skirts that maintained a neat appearance of the wearer at the work place, as well as on their way from work. In patent 601,434 – Skirt, 1898, the patentee stated: “...it will also be observed that the skirt is especially adapted for working girls and women who may have one side of the flaps outwardly while at work and may prior to leaving for home adjust the flaps, so as to bring their opposite sides outwardly and form a clean dressy skirt.”

At the beginning of the 1900s the ‘health’ corset appeared, which pushed the bust forward and the hips backward to create an S-line. In Figure 115, a fashion illustration¹²⁶ from 1901 is presented side by side with a drawing from patent 769,970 – Skirt Supporter, having the application date 1902 (the approval date was 1904). Both pictures depict the monobosom and the pouter pigeon effects created by this new corset.

Patent 769,970 deals with a stylish device for supporting the skirt: “In the art to which the present invention relates it has been common to provide various means for supporting a portion of the skirt by securing a supporting device at the waistband and having a biting portion engaging the skirt, the elements or members making up the biting portion being at all times exposed, and my object primarily ... is to provide a skirt-supporter which shall embody all of the valuable features of prior supporters and in addition to provide such a construction as to have the appearance of a watch-fob, the biting or engaging members being concealed.” The device was comprised of a strip of

¹²⁵ Application date: December 1, 1900

¹²⁶ [Online photo gallery]. Bishop, C. (2004). Available: http://www.vintagevictorian.com/costume_1900.html [July 22, 2004]

ribbon, and an ornamental front plate that covered a clamping device, thus producing the appearance of a watch-fob.



Figure 115.
Left: Harper's Bazar, December 1901
Right: Patent 769,970 – Skirt
Supporter, 1904

At the beginning of the 20th century bustles became less fashionable, however padding was in vogue because it reduced the appearance of the figure in comparison with the bustle. Pads could be detachable¹²⁷ or not (Figure 116). Interestingly, the inventor

¹²⁷ English Skirt pad and small bustle, 1890-1905 [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=400137&refable=ecatalogue&refirm=14508> [July 18, 2004]

No. 790,299.

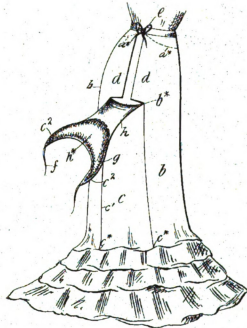
PATENTED MAY 23, 1905.

E. E. HARMAN.
SKIRT.

APPLICATION FILED JAN. 11, 1904.

3 SHEETS-SHEET 2.

Fig. 3.



Witnesses:
Felix M. Goodwin
Robt. Hunter

Inventor Emma Elizabeth Harman
by her attorney
J. E. Long

No. 353,881.

BUSTLE
Patented Dec

Fig. 1

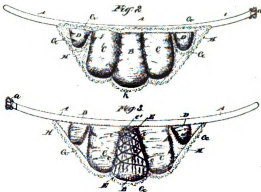


Figure 116.

Upper Left: English Skirt Pad
and Small Bustle, 1890-1905

Lower Left: Patent 353,881 –
Bustle, 1886

Right: Patent 790,299 – Skirt, 1905

Witnesses:
Charles K. Kaskela
Munroe, Edman

Inventor
E. Thompson Phillis
by attorney
Thomas D. Bates

of the patent 790,299 (5/23/1905) was an English woman.¹²⁸ The patent presents a skirt with a placket-opening at the back, and provided with an integral flap portion arranged to cover the placket-opening. "The back flap may be so padded or constructed that it may form a hip-pad and dress-improver [bustle] combined, thereby imparting to the figure the necessary fullness at the back and hips where hollows occur, to set off the figure, and consequently the garment, to the best advantage." Padding might have been replaced "by using any suitable resilient material or combination of materials –such as whalebone, steel, wire coils, and like– or even by means of a pneumatic pad arranged in any convenient manner." The skirt depicted in the drawing was smooth over the hips, had a minimum of fullness above the knees, then flared outward by use of ruffles. The back pad accentuated the S-shaped stance of the body.

An earlier patent describing a small bustle is patent 353,881 – Bustle, 1886. This bustle had oval pockets of muslin different in length, and partially stuffed with deer's hair, moss, or other light and permanently elastic material. The central pocket was the longest, and the adjacent pockets were equipped with cords so attached as to form loops. A lacing permanently attached to these pockets was roved through the loops, extending diagonally across from one side to the other. By taking the lacing up or letting it out, the central pocket expanded or flattened, varied the fullness of the bustle at the back.

Most gowns were floor length. Afternoon or evening gowns had also a train. In Figure 117 an evening dress,¹²⁹ a dinner dress,¹³⁰ and a patent for protecting the dress train are shown. The German inventor of the Skirt-Protector – patent 707,387 (1902),

¹²⁸ Emma Elizabeth Harman, of Southsea, England.

¹²⁹ [Online photo gallery]. The Museum of the City of New York. Available: <http://www.mcny.org/Collections/costume/worth/costume21.htm> [July 21, 2004]

¹³⁰ [Online photo gallery]. The Museum of the City of New York. Available: <http://www.mcny.org/Collections/costume/worth/costume22.htm> [July 21, 2004]

assigned his rights to an Austro-Hungarian person, and not to an American company or person. The patentee stated the reason for inventing this train protector: "In ladies' gowns which are not foot-free, and especially those having trains, the disadvantage is noticeable that the contact with the floor or pavement of the under side of the gown causes the threads to wear through and ruins the dress... The dust and mud cling directly to the stuff, rendering the same hard and liable to break and also rendering the cleaning very difficult. Hitherto a braid or ruche or brush-like trimming...has been attached around the edge of the dress and train; but this does not effectually fulfill the purpose in view, because it does not protect the point of contact of the gown with the floor."

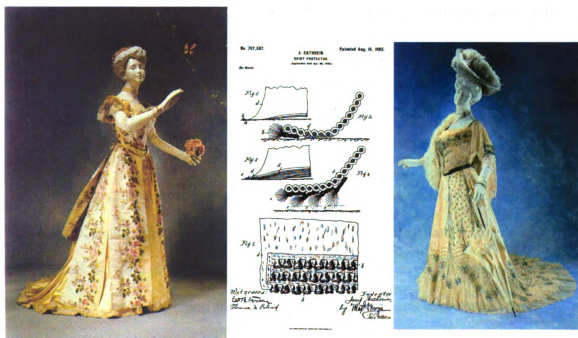


Figure 117. Left: Worth Evening Dress, ca. 1900; Center: Patent 707,387 – Skirt-Protector, 1902; Right: Worth Dinner Dress, ca. 1900

The protector was made of three or more rows of brush-like braid or ruche secured to the interior lower part of the gown, the bristles of each row overlapping the adjacent row. "The brushes inside the train will pass gently over the pavement and will

not raise the dust in the same manner as would the gown on contact with the street. The brush trimming... may be very easily cleaned when muddy, wet, or dusty. The material of which the dress is made will be entirely prevented from contact with the street or floor, being carried by the brush-like trimming ... and the train will fall in a graceful sweep instead of undulating or with a rising edge.”

By 1908 the silhouette became slimmer, relatively cylindrical, the bust higher and more prominent, and the hips narrower and tightly constricted by the sheath corset (Russell, 1983). The skirts decrease in length, and therefore they did not touch the floor.

In Figure 118, a comparison could be made between a fashion plate from Delineator, 1909,¹³¹ an artifact¹³² from the Smithsonian Institution (1908), and a skirt patent (1909). Patent 914,414 – Skirt, presents a maternity skirt having the same characteristics with the examples from the fashion plate and photo: less fullness, and higher waistline. This particular skirt was adapted "to be worn during the period of pregnancy, and immediately thereafter while the form is returning to normal condition, and, accordingly, is so made that its girth or length can be increased or diminished from time to time, as the changes in the wearer's condition may necessitate, it can, nevertheless, be worn at any other time. [...] In addition to serving the specific purpose above stated, these skirts, being adapted equally well for general use, can be sold advantageously by dealers who do not care to carry a large assortment of sizes in ready-made clothing, for they can be assured of their ability to provide their customers with well-fitting garments even with only a small stock from which to select, for the herein

¹³¹ [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/20thcent/1900s/fashionplates/1909delinbeach.jpg> [July 21, 2004]

¹³² [Online photo gallery]. Smithsonian National Museum of American History, Behring Center. Available: <http://americanhistory2.si.edu/costume/object.cfm?recordnumber=371581.0> [July 22, 2004]

described skirts can be so adjusted as neatly to fit almost any person.



Figure 118.

Upper Left: *Delineator*, 1909

Lower Left: Dress, 1908

Right: Patent 914,414 – Skirt,
1909

World War I: Pre Art Deco (1911 – 1920)

World War I (1914-1918) and women's suffrage marked this period. In fashion, the female image changed from the corseted silhouette of the previous era, to the *femme fatale* of the dance craze era. The silhouette became little shaped, with few seams and trimmings. Skirts were very narrow at the hem (hobble skirt), which made it difficult for a woman to walk. In patent 1,072,466 – Lady's Apparel (1913), the inventor explains the reason for designing a divided skirt: "With garments as thus constructed the necessity for lifting the skirts is entirely obviated; the wearer is permitted the utmost freedom of limb movement and may, with skirts apparently conforming to the narrow type of the day, readily take long steps, and enter cars or buildings having high steps without danger of being tripped or having their movements unexpectedly arrested."

A special attention was given to the movement of dress –especially when dancing, by adding fringes or pleats. An example is given in patent 1,104,319 – Skirt, 1914 (Figure 119): "This invention relates to a skirt of novel construction, which is adapted to closely hug the figure of the wearer, and at the same time permits the free movement of the limbs during walking and dancing. The invention is particularly adapted for underskirts, but may if desired, also be applied to overskirts." At the lower edge of the tight fitted skirt, above the knees, was formed a continuous tubular pocket within which was housed an "endless elastic shirring tape or string," that snugly encircled the limbs. From the tubular pocket there was "attached an accordion plaited laterally extensible flounce, which is of pronounced length, extending from a point above the knees, to the proper elevation above the shoes. [...] Thus during walking or dancing, the flounce will become alternately expanded and contracted, closely clinging at all times to

the body of the wearer, and following every movement thereof. If the skirt is worn as a petticoat, for which use it is more especially adapted, it will at all times neatly sheath the limbs, and combine with a very pleasing effect the additional advantage that it will not unduly inflate the outer garments. So also the flounce owing to its extensive length, is free to fan out freely during more violent movements."

A direct influence of the Art Deco was the increase in the functionalism and efficiency of dress. In Figure 120, the functional purpose of

the invention presented in patent 1,037,331 – Skirt (1912) was to protect skirts from being soiled. "The object of the invention is to provide an improved garment in the nature of a combined skirt and bloomers wherein the bloomers may be secured, permanently or temporarily and adjustably, to the inner face of the bottom of the skirt and normally extending from the skirt when the combined garment is not in use but adapted to receive the limbs of the wearer and to be secured thereto at or about the knee, whereby, when the skirt is adjusted and supported from the waist or otherwise, the bloomers will be inverted and will form the inside, of a pocket, of which the skirt will form the outside,

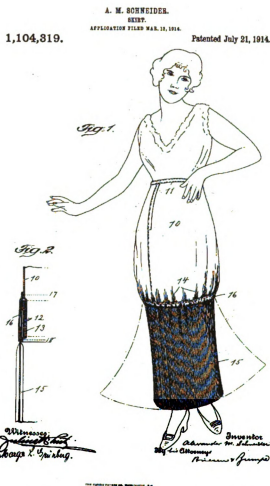


Figure 119. Patent 1,104,319 – Skirt, 1914

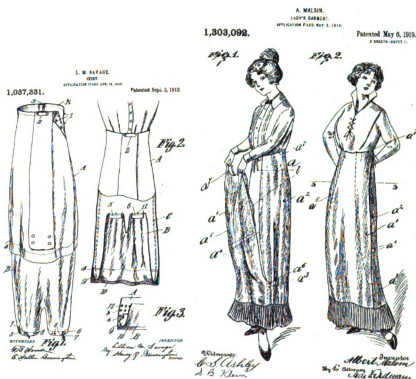


Figure 120. Upper Left: Evening Dress, ca. 1910–1914, by Callot Soeurs; Upper Right: *La Mode*, May 1912; Lower Left: Patent 1,037,331 – Skirt, 1912; Lower Right: Patent 1,303,092 – Lady's Garment, 1919

to receive and protect the lower ends or bottoms of the underskirts and protect them from soiling and wear. Incidentally, the skirt, or the bloomers, or both may be made of waterproof material, if desired. [...] To don the combined garment, the wearer will take the garment in the condition ... with the bloomers extended, and draw the skirt over the feet, and over any other skirts which may be worn at the time, projecting the feet and limbs through the legs of the bloomers, and then draw the bands [of the bloomers] to the knees where they may be adjusted to hold them up, by means of the straps and snap buttons, or like fasteners.”

The second patent presented in Figure 120 is Lady's Garment (#1,303,092), 1919. Indeed, the patent application for this adjustable maternity skirt is dated 1914. “The present invention relates to ladies' garments and particularly to petticoats or the like, and has for its object to provide a construction whereby the garment can be made to fit any size of waist or hip measure as well as during pregnancy. ... The wearer can step into it, like into pantaloons, thereby avoiding the need of slipping it over one's head, which is especially objectionable [‘for the reason that it upsets the coiffure and for hygienic reasons’] during the period of pregnancy. To render the garment adjustable for various waist sizes it has been provided with ribbon or tape drawn through the waist line on which the material of the garment can be rolled up or stretched according to the size required. But such method is disadvantageous because the fullness formed by the rolling up of the garment renders the latter clumsy. Another method of accomplishing the same object is by providing the garment with elastic parts. This method is just as disadvantageous as the former, if not more, because of the uncomfortable pressure of the elastic on the body of the wearer. [...] The new garment is composed of two parts, the

front and the back, which are united only at or near the bottom of the garment. The longitudinal edges of each half are more or less curved outwardly or convex, and the width of each part is made larger than one half of the total largest width of the body of the wearer. ... Owing to this construction the longitudinal edges of the two parts when the garment is applied will always overlap one another irrespective of the size of the wearer, leaving no open slit. [...] The edges at the waist line are not cut straight but in a concave curve... so that irrespective of whether the figure is small or large the said edges will always perfectly engage around the waist line. Fastened at the waist line to each part of the garment may be bands or ribbons whereby each part can be independently tied around the waist of the wearer.”

Though the functional aspect of the dress played an important role in these patents, the distinctive fashionable traits of the time, like the empire waistline, and the tubular shape of the skirt were not neglected in the patent drawings. For comparison, an exhibit,¹³³ and a fashion plate¹³⁴ are presented in Figure 120.

During World War I, straight lines, simple cut, and a boxier look characterized the silhouette. Skirts began to rise above the ankle, and elements from military uniforms were included in dress. In Figure 121, the reciprocal influence between fashion trends as presented in magazine illustrations,¹³⁵ and uniforms worn by women, such as the YMCA uniform¹³⁶ in photo, could be observed. A patent drawing showing a costume used in

¹³³ [Online photo gallery]. The Metropolitan Museum of Art – The Costume Institute. Available: <http://www.metmuseum.org/collections/view1zoom.asp?dep=8&zoom=0&full=1&mark=1&item=1981%2E380%2E2> [July 21, 2004]

¹³⁴ [Online photo gallery]. Chancey, J.E. (2004). Available: <http://www.sensibility.com/vintageimages/1900s/images/may1912lamodecentera.jpg> [July 21, 2004]

¹³⁵ [Online photo gallery]. Angell K.G. Available: <http://employees.oneonta.edu/angellkg/1910.HTML> [July 18, 2004]

¹³⁶ [Online photo gallery]. The Museum of the City of New York. Available: <http://www.mcny.org/Collections/costume/worth/costume29.htm> [July 18, 2004]

athletic activities or walking is also presented in Figure 121 (patent 1,280,963,¹³⁷ – Garment, 1918). The patentee said: “This invention relates to garments, and particularly to that class of female apparel known as ‘sport costumes,’ and is adapted particularly to be worn during indoor and outdoor exercises, horseback riding, and which is also suitable for street wear. The primary object of the invention is to provide a garment of this character which is constructed of one piece and includes a waist and skirt portion, and which enables the free use of the limbs during athletic exercises or contests. ... A still further and particular object of the invention is to provide an athletic garment of one piece, whereby the same is suspended from the shoulders, thus avoiding wadding of the garment at the waist line, which is of simple construction, and which is of light weight, which is easily adjusted to and removed from the body, which is conservative in appearance, and which will prove thoroughly efficient for the uses for which it is designed.”

The novelty of this invention was in the construction of the garment: “The material of which the garment is formed may be of khaki, silk poplin, or any other suitable material. The waist portion is preferably cut so as to produce a loose fitting effect, and has its sleeves slitted longitudinally from the cuff portions thereof, snap fasteners or the like being provided to secure the same properly about the fore arm. This construction enables the sleeves to be readily rolled when it is desired to have free use of the arms.”

The leg portions were not sewn to the waist portion at the back, but formed a flap that was secured by snaps. The leg portions were of “a length preferably to terminate at

¹³⁷ Application date: July 29, 1916

Figure 121.

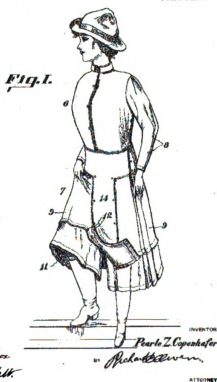
Upper Right: Fashion illustration, ca. 1914

Lower Left: YWCA Overseas Uniform, label Worth, 1918

Lower Right: Patent 1,280,963 – Garment, 1918



P. Z. COPENHAVER,
GARMENT.
APPLICATION FILED JULY 29, 1918.
1,280,963.
Patented Oct. 8, 1918.
2 SHEETS-SHEET 1.



WITNESSES
Theodore H. Hines
Arthur H. Hines

INVENTOR
P. Z. Copenhafer
BY R. H. Copenhafer
ATTORNEY

their lower extremities approximately midway the knee and ankle, and within each of these skirt portions [was] arranged a web or diaphragm, having a central aperture through which the limb extends, and the edges defining the opening [were] adapted to snugly engage with the leg of the wearer. ... This construction prevent[ed] riding up of the leg or skirt portions of the garment, and maintain[ed] the divided skirt in proper position at all times. It [was] also obvious that such construction prevent[ed] dirt and dust passing beyond the knee portion of the garment.”

The function of the sport costume is also stated: “It is obvious that a garment of the above described character is capable of being readily adjusted to the body or removed therefrom, and while presenting a neat and attractive appearance, permits of the body of the wearer bending or twisting in various positions such as might be required in athletic activities. Free use of the limbs is always assured with the garment, and derangement of the same upon the body is prevented.”

T-shaped front and back panels were unbuttoned from the leg covering skirts according with the garment’s function. When it was used as a riding habit, the lower portions of the panels were detached as much as to have “free use of the legs in mounting and dismounting” the horse. “In athletic games, such as tennis, basket ball and the like wherein free use of the legs [was] required, the panel portions [were] unbuttoned, while when used as a walking costume, the panels [were] fastened in proper position and the costume present[ed] a plain and conservative appearance.”

Bicycle and Horse Riding Skirts

In the last decade of the 19th century, sports like tennis, swimming, bicycle and

horse riding were favorites for leisure time. Women's sporting activities were encouraged, particularly bicycling. The 'drop frame' bicycle for women brought about an upsurge of bicycle skirt patents. In only four years, between 1895 and 1898, 42 bicycle skirt patents were granted out of 69 total. The peak of patenting activity for riding skirts was in 1901-1903, when 10 patents were granted out of 27 total. More than half of the total bicycle patents were issued to women, but there were no women patentees for riding skirts.

Bicycle Skirts

Patent 546,496 – Bicycle and Walking Costume (1895) gives a glimpse of bicycle skirt models worn by women in mid 1890s: “Heretofore bicycle costumes have comprised either long skirts, which are awkward to wear upon the wheel, short skirts, which, however, are embarrassing to wear either when riding or more particularly when off the wheel temporarily, or bloomers, which are open to similar and still greater objections than the latter.”

Solutions were patented for converting the bloomers in a walking skirt after the rider dismounted from the bike. One of them is presented in patent 567,979 – Cycling-Skirt, 1896 (Figure 122). The divided skirt was provided with knife-plaits at front and back, and it had “two enlarged leg-sections loosely and completely surrounding each leg, fastening devices on the front and rear for connecting the two sections below the crotch-line to form a skirt with a double partition between the said leg-sections, draw-stings adapted to gather the leg-sections at the bottom (when said fastening devices are loosened) and to secure them at any height about the leg to form bloomers.” Bloomers

were readily converted into a skirt by bringing together and buttoning the knife-plaits.

The Columbia cycling outfit¹³⁸ presented in photo (Figure 122 – Right) was made of blue wool poplin, and the bloomers had elastic at the hem.

(No Model.)

P. B. HERGHT.
CYCLING SKIRT.

3 Sheets—Sheet 1.

No. 567,979

Patented Sept. 22, 1896.



WITNESSES:
Richard B. Smith
John H. Schenck

INVENTOR
Pauline B. Herght



**Figure 122. Left and Center: Patent 567,979 – Cycling-Skirt, 1896
Right: Columbia Cycling Outfit ca. 1895, American**

¹³⁸ [Online photo gallery]. The Kyoto Costume Institute, Japan. Available:
http://www.kci.or.jp/cgi-bin/collection.cgi?lang=e&path=1890/08-005629_a [July 18, 2004]

Though bloomers¹³⁹ proved to be practical, at the beginning of 1910s they continued to be denounced by the society. A comment from patent 1,072,466 – Lady's Apparel (1913) is an example: "The invention ...may ... be applied to full skirts and still obtain the advantages of a complete, modest, protective garment, but without making the wearer conspicuous or presenting the immodest appearance of a completely divided skirt or bloomers such as have been suggested, and to some extent utilized for ladies' wear."

Bicycling became even more popular with the advent of the pneumatic tires in 1889, which smoothed out the ride. As a result, fashion advertisements for clothing that could be adapted for bicycling, exercising activities, or walking were presented more frequently in fashion magazines. These types of skirts were usually shorter, divided only at back or front, or bifurcated. Women bicyclists,¹⁴⁰ as well as the patentees, followed closely the ads¹⁴¹ (Figure 123).

In Patent 567,069 – Bicycle-Skirt (1896), the patentee asserts: "It is my purpose ... to provide a dress-skirt [...] whereby it may be used as the skirt of a golf, tennis, or bicycle costume or of a street-dress... The length of the skirt is that adopted in the tennis, golf, and bicycle costumes worn by ladies, in which the hem is six inches or thereabout from the ground, so as to leave the lower extremities entirely free and unimpeded, avoid all danger of tripping, and hang clear of the sprocket-gearing of the bicycle as well as the pedals."

Devices were invented for keeping the skirt in proper position when riding the

¹³⁹ "Athletic costumes and generally that class of such costumes were worn when riding bicycles, and they were known as *knickerbocker-suits*" {patent 548,613 – Skirt, 1895}.

¹⁴⁰ [Online photo gallery]. The Wheelmen. Available: <http://www.thewheelmen.org/sections/photographs/pneumatic/regviews/pneumatic11v.jpg> [July 15, 2004]

¹⁴¹ [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/victorian/women/fashionplates/1894delineator2.jpg> [July 15, 2004]

bicycle, like the Bicycle-Skirt Adjuster, patent 582,091 (1897): “By using the [‘skirt adjuster’], the ordinary bicycle-skirt is rendered quite as convenient as a divided skirt and wheeling is made both safe and pleasurable in an ordinary walking-costume and all necessity for weighted skirts or skirts made of heavy material is done away with.”

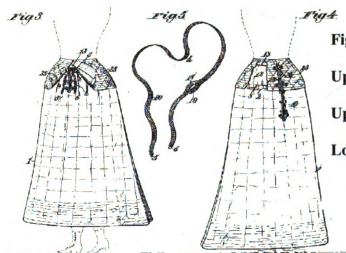


Figure 123.

Upper Left: *The Delineator*, 1894

Upper Right: Undated Photo

Lower Left: Patent 567,069 –
Bicycle-Skirt, 1896

In Figure 124 two illustrations¹⁴² from 1896 are compared with a bicycle skirt

¹⁴² [Online photo gallery]. Maginnis, T. (2004). Available: (left) <http://www.costumes.org/history/victorian/women/fashionplates/1896cyclingdress.jpg> (right) <http://www.costumes.org/history/victorian/women/fashionplates/1896bikedress2.jpg> [July 15, 2004]



H. LUEY.
BICYCLE HABIT.

No. 540,173.

Patented May 28, 1895.

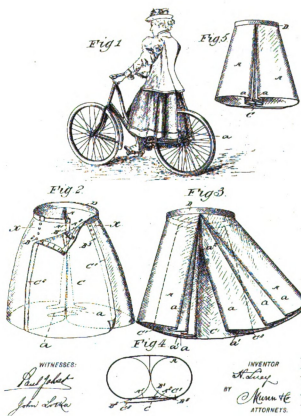


Figure 124.
Upper Row: Bicycle Dresses, 1896
Lower Row Left: Patent 540,173 –
Bicycle Skirt, May 1895
Lower Row Right: Undated Photo

patent from 1895, and a photograph.¹⁴³ Patent 540,173¹⁴⁴ mentions: “A skirt divided at the back and made with folds at the rear which are so combined with the interior partitions forming leg portions that when the garment is in use on the cycle the limbs are free to work the pedals, the fold falling on each side of the saddle and when the lady steps from the machine the rear folds close into the appearance of an ordinary skirt and no difference from the ordinary skirt ca be detected either at the front or rear.”

In Figure 125 a visual comparison could be made between the 1896 magazine illustration¹⁴⁵ from left top row and the picture below,¹⁴⁶ and the patent from 1896 from right top row and the picture¹⁴⁷ below it. The inventor of patent 568,943 – Skirt for Riding-Habits, 1896, states the problem that needed to be corrected: “This invention relates to skirts of riding-habits for women, and, while adapted equally for use upon the conventional sidesaddle for horseback-riding, is adapted for use upon bicycles, as well as for walking and house skirts. It is acknowledged that the most picturesque and generally desirable skirt for use upon bicycle is what is known as an ordinary ‘round’ skirt, but various objections attend the use of the same, and therefore ‘bloomers’ and what are known as ‘divided skirts’ have come somewhat into use. One of the principal objections to the ordinary round skirt lies in the fact that the rider must gather and raise the same at the back in order to properly sit upon the bicycle, and this leaves an unusual fullness toward the front and either on one side or the other, which is easily caught by the wind,

¹⁴³ [Online photo gallery]. The Wheelmen. Available: <http://www.thewheelmen.org/sections/photographs/pneumatic/regviews/pneumatic22v.jpg> [July 15, 2004]

¹⁴⁴ The patent was issued in short time: approval date–May 1895, and application date–March 1895.

¹⁴⁵ [Online photo gallery]. Maginnis, T. (2004). Available: <http://www.costumes.org/history/victorian/women/fashionplates/1896bikedress3.jpg> [July 15, 2004]

¹⁴⁶ [Online photo gallery]. The Wheelmen. Available: <http://www.thewheelmen.org/sections/photographs/pneumatic/regviews/pneumatic29v.jpg> [July 15, 2004]

¹⁴⁷ [Online photo gallery]. The Wheelmen. Available: <http://www.thewheelmen.org/sections/photographs/hardtired/regviews/hardtired1v.jpg> [July 15, 2004]

(No Model.)

3 Sheets—Sheet 1.

A. S. GREENLEAF.
SKIRT FOR RIDING HABITS.

No. 568,943.

Patented Oct. 6, 1896.



Fig. 1



Figure 125. Upper Left: Bicycle Dress, 1896

Upper Right: Patent 568,943 – Skirt for Riding-Habits, 1896

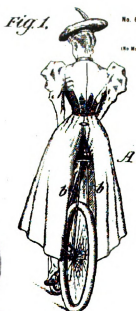
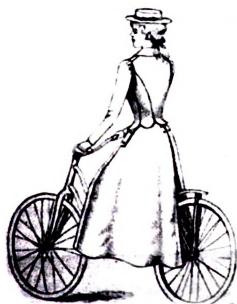
Lower Row: Undated Photos

and thus even in a light wind, the edge of the skirt is being constantly raised, so as to expose to view unnecessarily the limbs of the rider, while in a very strong or head wind the latter gets under the skirt, fills it, and extends it balloon fashion, thus making a very unsightly appearance and also causing great inconvenience to the rider.”

The riding-skirt was composed of two skirts preferably joined together at the waistband. The outer skirt had a special feature consisting of the omission of the rear gore that left the back of the skirt open “through which the full portion of the under skirt [might] project.” The front gore of underskirt, made of cambric, was cut away above the knee in arc shape “to provide perfect freedom of movement for the limbs of the wearer. [...] In mounting a bicycle the wearer will of course lift one of the rear edges of the outer skirt sufficiently to enable her to sit upon the bicycle-saddle fairly upon the under skirt.... In this position the rear lower edges of the outer skirt hang gracefully on either side of the rear wheel, and have a gentle and graceful wave movement as the wearer proceeds on her ride.” The outer skirt was stiffened with two strips of featherbone extending over the hips from the pocket opening to the hem, which were “concealed from view or ... placed upon the outside of the skirt and covered with suitable trimming, such as leather or the like, as an ornament or trimming to the skirt.” If the outer skirt was not made of heavy fabric, auxiliary weights were added to its hem.

One of the Delineator’s advertisements¹⁴⁸ (Figure 126) from May 1899 gave “fresh ideas” for “the new cycling season ... in regard to suitable attire,” and described the cycling skirt as follows: “A most practical innovation in skirts consists of joined saddle-breaths that are arranged under the back-gores, the latter being left free at the

¹⁴⁸ [Online photo gallery]. Harris, K. (2003). Available: <http://www.geocities.com/vintageconnection/VintageConnection--VictorianBicycleDress.html> [July 18, 2004]



No. 616,026.
BICYCLE SKIRT.
(No Model.)

U. STEIN.
BICYCLE SKIRT.
(Appl. filed Nov. 15, 1898.)

Patented Dec. 13, 1899.
3 Sheets—Sheet 1.

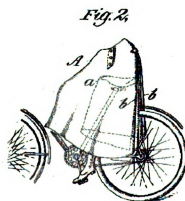


Figure 126. Upper Row and Lower Row, Left: Cycling Attire – *Delineator*, May 1899; Lower Row, Center and Right: Patent 616,026 – Bicycle-Skirt, December 1898

center and falling loosely over the breaths underneath. The effect of a divided skirt, when the wearer is mounted, is in this way produced; and thus is filled an increasing demand for the comfort of a round skirt coupled with the exact effect of the divided style, which is by far the more graceful.”

Patent 616,026 – Bicycle-Skirt (1898) describes the bicycle skirt in similar terms: “The skirt is made with the usual continuous front and sides and ornamented or draped as desired. At the back is a deep inward extension made of same material as the skirt to form a seat portion.” When the wearer was not seated on a bicycle, the extension was supported by a strap “secured to the extension inside the skirt and connected with the front of the skirt ... so as to pass between the limbs of the wearer. [...] Whether the wearer is walking, standing, or sitting the extension maintains its place and is entirely concealed within the skirt and does not interfere with the graceful hanging of the skirt or its drapery. When the wearer is seated on a bicycle, the extension fits over the saddle ... and enables the rider to sit free and unhampered and without any binding of the skirt about the body or limbs.”

As a remark, the praise of the innovation in the patent above resembles the one in patent 540,173 from 1895 (page 227). Though a four-year gap exists between these two patents, the similarities are apparent. An explanation might be that successful clothing designs were recycled from one year to another, with small modifications (e.g., adjusted skirt pattern, or decrease puffiness of the sleeves, etc.). Photos¹⁴⁹ in Figure 127 show the popularity of the bicycles among women, and the pride to own them. Women were so

¹⁴⁹ [Online photo gallery]. The Wheelmen. Available:
(left) <http://www.thewheelmen.org/sections/photographs/pneumatic/regviews/pneumatic6v.jpg>
(right) <http://www.thewheelmen.org/sections/photographs/pneumatic/regviews/pneumatic1v.jpg>
[July 18, 2004]

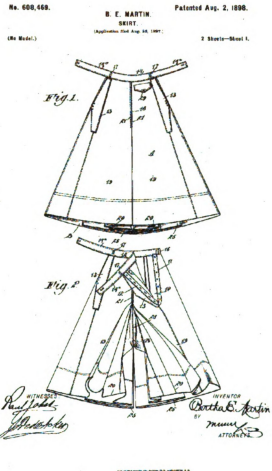
eager to immortalize their precious possessions that they even took their bicycles to the photo studios.



Figure 127. Undated Photos

In Figure 128, patent 608,469 – Skirt (1898), plaits of different widths covered the opening at the front and the back of the skirt. They were stitched together part way down “to keep the skirt in place over the knees as well as over the saddle.” The skirt’s ‘seat’ was practically a gusset in the shape of a diamond, and the inner seams of the sections of the skirt were connected to it. The gusset enabled the garment “to properly adjust itself to the saddle and prevent[ed] any pulling or drawing from any part of the garment when the rider [was] mounted and while machine [was] in motion.” The English cycling outfit

in the photo¹⁵⁰ presents a similar design.



**Figure 128. Left: English Cycling Outfit, 1895-1900
Right: Patent 608,469 – Skirt, 1898**

Riding Skirts

An English riding habit¹⁵¹ from the 1880s, and an American patent from 1886 are presented in Figure 129. The outfit depicted in the patent' drawing has a close

¹⁵⁰ [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=2121> [July 18, 2004]

¹⁵¹ [Online photo gallery]. Manchester Gallery of Costume, England. Available: (front) <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=400200> and (detail back) <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=400202> [July 18, 2004]

resemblance with the English outfit, especially its fitted bodice. The patentee stated:

“The object of this invention is to produce a riding-habit for ladies which shall fit closely around the elevated knee when the wearer is seated on the saddle, and along the raised leg, and in which the unsightly wrinkles at the back and in front shall be avoided. [...] As a result greater convenience in riding will be produced and a much handsomer appearance. [...] The invention substantially consists in constructing such a habit with a bulge for the knee and with a bagging portion for the back, both of which are produced by the peculiar cut of the patterns or pieces from which the garment is made....”

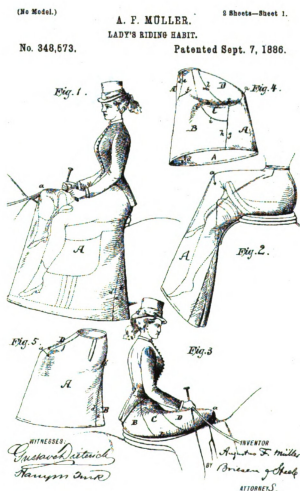


Figure 129.
Left: English Riding Habit, 1880-1890
Right: Patent 348,573 – Lady's Riding-Habit, 1886

In Figure 130, a photograph¹⁵² of such riding habit is offered.



Figure 130. English Riding Habit, 1880-1890

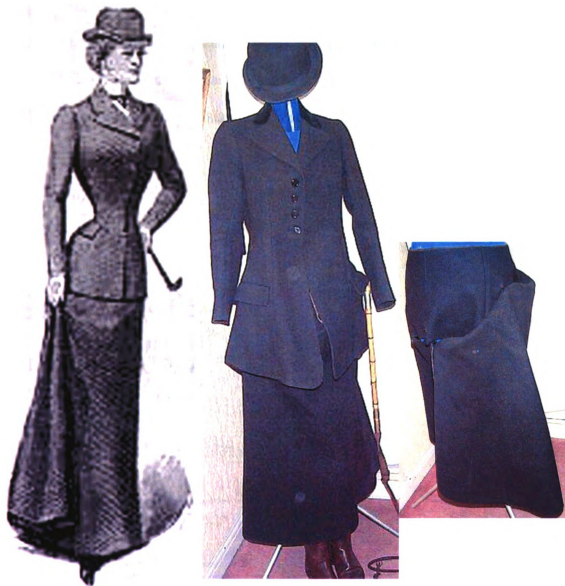
In Figure 131, an English advertisement¹⁵³ for a sidesaddle outfit, and an actual sidesaddle habit¹⁵⁴ from the beginning of the 1910s are shown. The long jacket replaced the fitted bodice. In time, a riding apron was introduced along with the classical riding

¹⁵² [Online photo gallery]. Manchester Gallery of Costume, England. Available: <http://www.manchestergalleries.org/mcgweb/objects/common/webmedia.php?irn=400813> [July 18, 2004]

¹⁵³ [Online photo gallery]. Corsets and Crinolines, England. Available: <http://www.corsetsandcrinolines.com/testdb1.php?index=190059> [July 18, 2004]

¹⁵⁴ [Online photo gallery]. Corsets and Crinolines, England. Available: (front) <http://www.corsetsandcrinolines.com/testdb1.php?index=191044> and (back) <http://www.corsetsandcrinolines.com/timelinepix/1910/ridinghabit5.jpg> [July 18, 2004]

skirt. The apron was fastened at the back when the rider was dismounted from the horse, and unfastened when mounted. "Dark wool or chamois breeches would have been worn underneath the apron for modesty" (Corsets & Crinolines, 2004).



**Figure 131. Left: Sidesaddle Outfit from an English advertisement, 1911
Right: English Wool Sidesaddle Habit, ca. 1911-1913**

Patent drawings presented in Figure 132 for a safety riding skirt (1899), and for an apron-type riding skirt (1915) which resemble the design shown in Figure 131 (page 237). In the first patent, Safety Hunting-Skirt – patent 631,949, the patentee stated: “My invention relates to an improvement in riding-skirts which are used by ladies while hunting. The objection to the skirts heretofore used is that in case of an accident or the throwing of the rider from the animal the skirt caught in the pommel of the saddle and held the rider to the horse and in many instances has been the cause of the death of the rider. [...] In ordinary skirts the inner or saddle side of the skirt was closed, and in the

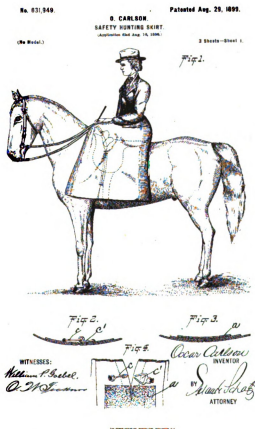
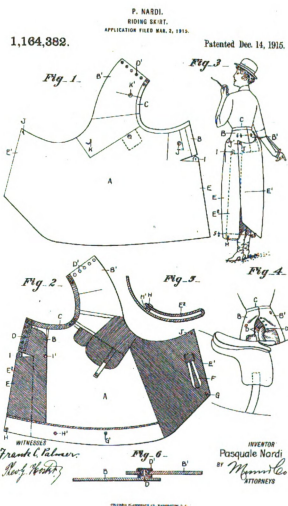


Figure 132.

Left: Patent 631,949 – Safety Hunting-Skirt, 1899

Right: Patent 1,164,382 – Riding-Skirt, 1915



falling of the rider the skirt became entangled with the pommel, and being of one piece it did not give way, and consequently the rider was held in a position with head down and could not release herself from the entanglement of the skirt to the pommel, often with serious results.” The patentee asserts that the construction of his skirt “is such that while it is sufficient to keep the two parts in their proper positions, yet in case of a fall of the animal or the rider being thrown the two parts held together by the hook and eye... will be easily torn apart and the skirt cannot positively retain a hold on the pommel, since the hooks or the parts are so arranged that the skirt will separate and release the rider.” The skirt was provided with a slit for the pommel on the tearing line that run “close to the bend in the skirt which conform[ed] to the outline of the limb when the rider [was] in the saddle.” A strip of material that was “of a nature to be easily torn” kept both sides of the skirt together. The eye fastener was “stamped out of metal and [was] separated at its extreme end, forming a shackle, the object of that being to let the hook pass in between the two prongs of the eye, which [were] just far enough apart to pass it over the flattened part of the hook, but being smaller than the neck portion of the hook it [was] held in place and [was] sufficiently strong to keep the parts of the skirt in their normal positions.”

In patent 1,164,382 – Riding-Skirt (1915), the skirt was built especially for hunting in the fields. “Often when taking a jump (say over a fence) the rider coming back misses her seat thus causing her skirt to get caught on the top pommel, but with this new invention, the rider is immediately freed and saved from a serious fall while hunting.” The novelty brought by this invention consisted of making the skirt in one piece having a front apron and side flaps adapted to extend over the hips and the back. The skirt was fastened at the back with stud and socket members to allow quick opening

of the skirt in case it got caught under the pommel. Additionally, a foot strap was provided at the inner right side in the vicinity of another fastening member of stud and socket type, so that in case of an accident the exerted foot pressure readily disconnected them, and allowed to free the leg of the rider.

CONCLUSIONS

The present study brings new information regarding fashion and function in women's dress as revealed in bustle, hoop and skirt patents issued between 1846 and 1920. The examined data pinpoint clearly the beginning and the end of the hoop and bustle trends, as well as their evolution in time.

In the *Apparel* and *Foundation Garments* classes there are more than 16,000 utility patents and even more design patents, all issued at the end of 19th century and the beginning of the 20th century. These patents yield a large variety of information that awaits scholars' consideration. The goal of this study was to make known the creative effort that was underway between 1846 and 1920 in the patenting activity of the Nether Garment subclass, and to correlate the clothing inventions from this subclass with the fashion history time line. For this purpose, basic information about each patent was introduced into a database (title, number, patentee, assignee, and application and approval dates). Additional information was provided for the patents studied in depth, such *Problem to Solve*, *Novelty of the Invention*, *Functional Purpose*, and *Fashion*.

Content analysis was completed for nine subclasses pertaining to the Nether Garments class. All clothing patents from these subclasses were included in the study, except for 33 patents that were misclassified, therefore the generalization of the results was not needed and the external validity was implicitly insured.¹⁵⁵

¹⁵⁵ In summarizing pertinent information, I adopted a critical attitude toward all the documents reviewed. The patents are undoubtedly genuine (external criticism) because all of them were patented after the Patent Office great fire of 1836, and also accurate (internal criticism). Welsh (1965) ascertains that "Frequently, it is argued that for the period before 1836 the drawings are reconstructions of those destroyed in the Patent Office fire and, therefore, not valid as source material."

The quantitative analysis of 864 utility patents revealed trends in patent activity by region, gender of patentee, type of invention, cycles of patent activity, the productivity of certain inventors, and the ownership of the patents' rights. Also, two interesting and unexpected aspects resulted from the analysis: a) a discrimination tendency toward women, who waited a longer time than men to be granted patents; b) during the 'bicycle craze,' the peak of patenting activity for bicycle skirts preceded by two years the peak of patenting activity for bicycles per se and their accessories.

The qualitative analysis of 311 utility patents, of which 15% were given as examples, exposed problems that existed in the functionality of women's dress, methods to remedy these deficiencies, and patentees' interest in fashion novelties. Other valuable information was also revealed about the patenting process, and the qualities of the new products.

This study was focused on answering six research questions. A summary of the research results is presented in connection with each question.

Research Question 1:

What patents indicate the functioning of the "fashion process" as it existed in 19th century America? How do patents relate to fashion cycles as described in current fashion history scholarship?

The framework developed by Roach and Musa (1980), and the Symbolic Interactionist Theory formulated by Kaiser, Nagasawa, and Hutton (1995) helped in answering this question.

The bustle, skirt and hoop patents followed closely the fashion cycles. When comparing the patent drawings and specifications with the American fashion

plates/illustration from the same time period, it seems that the patentees were very well attuned to the latest fashion novelties. Until the 1870s, the American designs seemed to lag behind the European ones by 2-3 years, in both fashion illustration and –implicitly– in the renderings presented in clothing patents. After that, the differences became minimal due to the intensification of culture contact and trade with the Old Continent. Since 1849 transatlantic packet lines sailed regularly from New York to Liverpool,¹⁵⁶ and in 1866, “a cable was laid across the Atlantic between England and the United States, bringing the two countries closer” (Schlesinger & Bowman, 1993). By the 1870s the Erie Canal¹⁵⁷ became an important factor in the extremely rapid commercial growth of the US, the most important railroads were completed,¹⁵⁸ and improvements in printing technologies¹⁵⁹ were introduced. The telegraph and telephone inventions also speeded up communication. Moreover, Congress mandated several times free delivery of mail by the Federal Post Office: in larger cities – 1865, in all communities of 10,000 and over – 1887, and rural communities – 1896, which facilitated the dissemination of information, including that of fashion news.

The number of registered¹⁶⁰ utility patents per year was quite a sensitive indicator of economical and political events that took place in US history. The peaks and valleys of the graph presented in Figure 61 reflect to a certain extent the good economic times, as well as the bad ones. The depression of 1857, which caused widespread unemployment,

¹⁵⁶ In 1849, the average travel time shortened to 33.3 days down from an average of 39 days around 1820. In 1907, the *Lusitania*, the largest steamship in the world, set a new speed record of five days and 54 minutes between Queenstown, Ireland, and New York (Schlesinger & Bowman, 1993).

¹⁵⁷ Opened in 1825, between Buffalo to Albany.

¹⁵⁸ Since 1838 the Congress designated all parts of the rapidly expanding railroad system as postal routes

¹⁵⁹ Later on, in 1884, the linotype machine to set type was patented, which speeded up even more the printing process.

¹⁶⁰ Since 1873, when the application date began being included on the granted patents, the distribution per year of the patent approvals in the Nether Garment class closely followed the distribution per year of the patent applications.

might explain the valley of the graph before the Civil War. At the outbreak of the Civil War, there was a great decrease in the activities of the Patent Office, though the economy was relatively resilient to the war's hardships: "Receipts [fell] off, and as the statutes [forbade] a deficit in the Patent Office, a number of minor employees [were] dismissed and many examiners [were] reduced in grade." As soon as the war was over, there was a noticeable increase in patent applications (USPTO, 1988). Then, the next dip of the graph line corresponds to the 'Black Friday' of 1869.¹⁶¹ After the recovery that followed the Civil War, a six year depression¹⁶² followed (1873-1879). The reverberations of this depression were felt in patenting activity especially in 1879-1881, when only five applications and seven approvals were listed, the lowest numbers for any other three consecutive years of the period studied. The growth of the 1880s was followed by the panic of the 1893-1896, one of the worst depressions, which was accompanied by labor unrest.¹⁶³ As a measure of protection of American prosperity, in 1897 tariffs were raised on some goods, including woolen goods.¹⁶⁴ The Tariff Act of 1913 reversed them, and brought down the duties on 958 articles, including clothing and raw materials. Rates on cotton were cut 50% and on woolens over 50%, with the purpose of stimulating the competitiveness of American products (Schlesinger & Bowman, 1993). The beginning of the 20th century brought a new financial panic (1907), strikes¹⁶⁵ of the textile and garment workers, and World War I (1914-1918). As a consequence, between 1904 and 1920 only 104 patents (12%) were approved out of 864 issued in the 75 years between

¹⁶¹ In 1869, the price of gold rose to panic-causing heights as the gold necessary for day-to-day business operation went out of the reach of small merchants (Schlesinger & Bowman, 1993).

¹⁶² The Stock Exchange was closed for an unprecedented 10 days.

¹⁶³ Strikes took place in 1891, 1892, 1894, 1897, and 1899.

¹⁶⁴ On woolen goods they were raised 91%.

¹⁶⁵ In 1904 and 1913, respectively.

1846 and 1920.

The availability of natural resources was a factor that dictated what materials were incorporated in clothing: paper, straw, cane, rattan, wool, cotton, seal skin, whalebone, leather, india-rubber, etc. The rapid advance in technology in the second part of the 19th century generated an increased number of manufactured goods, like steel wires, clasps, elastic, rubber cloth, oiled silk, and featherbone, which in turn were used in improving clothing products. Also, the machinery used in the textile and apparel industries grew in complexity and performance. For example, one of the 1870s patents mentions that felt was replaced by knit cloth of cotton, which was produced in tubes of 40 inches in circumference.¹⁶⁶

The nether garments patents had claims for improvements in products' functions, like protection of the garment and/or of the body, adjustability, interchangeability, convertibility, etc.. Most of the patents addressed problems caused by the weight and fullness of the skirts, and methods to support them still maintaining a degree of comfort to the wearer. Patent specifications portrayed what the new products –as means of communication to others– should possess, e.g., proper shape and perfect fit of the dress, suitable types of attachments and ornamentations, etc..

The patents' designs followed the same discrete erosion of aesthetic preference that brought about fashion change in dress. If a patent proved to be successful, its functional principle was recycled with different designs. For example, in Figure 133 various bustles¹⁶⁷ made of strips of flexible material and tapes are represented. Changes were made gradually because different solutions were tested on the market at the same

¹⁶⁶ Patent 189,119 – Improvement in Skirts (4/3/1877)

¹⁶⁷ Two models were detachable (in Figure 133, extreme left and right).

JULIA S. COLBY.
Poetry.
Published August 18, 1877.
\$6 164,705.

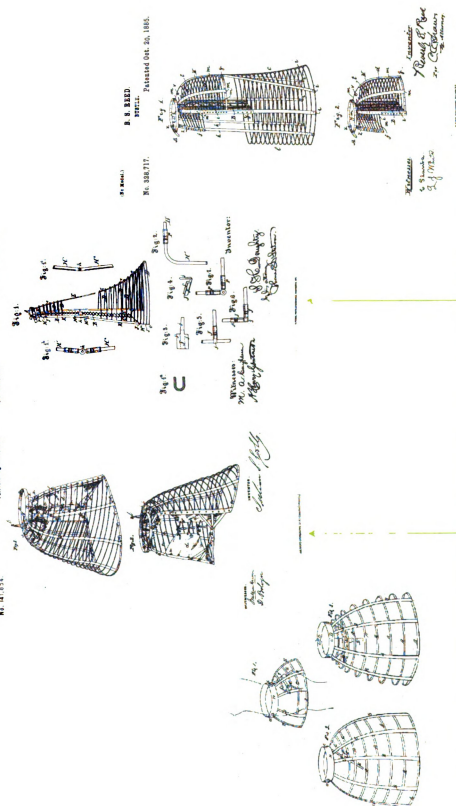


Figure 133. Different bustle designs based on the same construction principle

time. As exemplified in Figure 134, a protruding type of bustle was patented in the same year¹⁶⁸ when a more restrained type was also patented, which contributed to the ambiguity of the styles. Continuing with the bustle

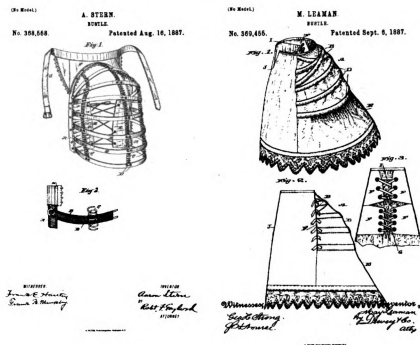


Figure 134. Different bustle designs issued in the same year (1887)

examples, the patents show –with the passing of time– an increase in the complexity of bustles’ shapes and functions (Figure 135), and an increase in the variety of their designs (Figure 136).

In Figure 137, the function of protecting and supporting the skirt’s train (Right: Dress-Train Supporter) is incorporated in the pannier, which also prevented the dragging on the ground of the skirt and protected its lower edge, besides its main function as a shaping device for the skirt. Indeed, there was a tendency of combining functions of different items in one garment, like bustles that were built-in hoop-skirts and skirt distenders, or pads that were included in the skirts. Another example is patent 436,749 – Combined Skirt-Lifter and Bustle, 1890. This invention relates to “a combined bustle and skirt-lifter that has a spring adjustment which may be entirely collapsed, so as to

¹⁶⁸ Also, both applications were dated 1887.

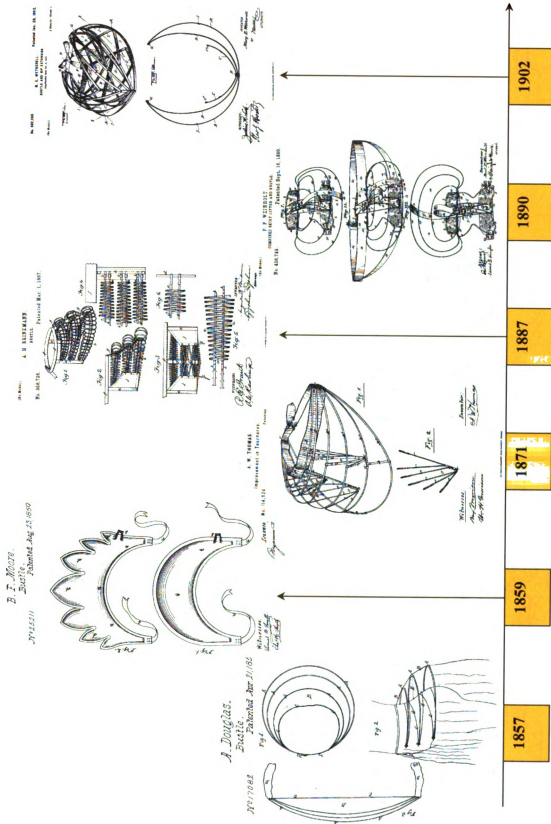


Figure 135. The increase in bustles' complexity over time

M. ROSENSTOCK.
Panniers.
No. 197,409. Patented Nov. 20, 1877.

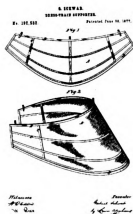
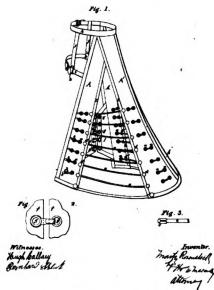


Figure 137. Support and protection for skirt's train in two 1877 patents
Left: Pannier
Right: Dress-Train Supporter

form only the appearance of an elegant puff at the skirt-seam, may be partially elevated to form a bustle, or in its third position, may be sprung up to its extreme height for use as a skirt-lifter while passing over muddy crossings, wet grass, &c."

(No Model.)
A. M. BEIDER.
PATEL.
No. 336,332. Patented Jan. 12, 1895.



(No Model.)
M. P. C. HOOPER.
ATTACHMENT FOR SKIRTS.
No. 549,289. Patented Nov. 5, 1895.

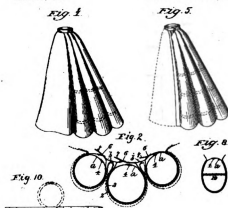


Figure 138. Use of same type elements in different apparel items
Left: Bustle - 1886
Right: Attachment for Skirts - 1895

Occasionally, the same elements were reused in different apparel items. In Figure 138, the tubular wires of the 1886 bustle (Left) were later on, in 1896, used as distenders. In the

latter case the diameter of the circle was adjustable, and the function of the tubes changed from supporting and shaping the back of the skirt near the waist, to enhancing the shape of the skirt into folds or gores, at the lower part of the skirt. In both cases the springs were kept in place by transverse straps.

In other patents, the function of a product was not altered, nor combined with other products' functions. For example, in Figure 139 three edge binding patents are presented that were issued between 1874 and 1920. All three edge bindings were made of metal, and were intended to protect the edges of the garments.

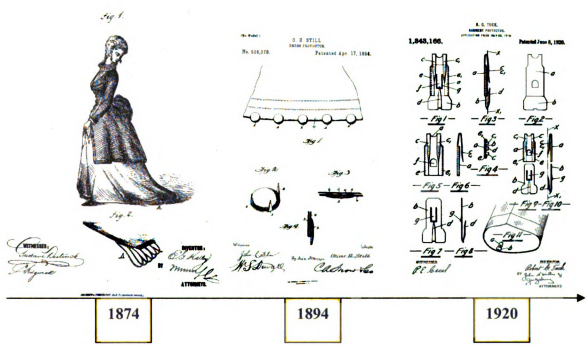


Figure 139. Metallic edge bindings

Hoop-skirts practically disappeared by 1885,¹⁶⁹ the second bustle period ended by 1890,¹⁷⁰ skirts with pads or distenders were out of fashion by 1907, lifters and holders ceased to be patented by 1912 when the skirts became shorter, and by 1915 riding skirts

¹⁶⁹ Only four more hoop patents were issued between 1886 and 1907.

¹⁷⁰ Thirty more bustle patents were issued between 1891 and 1912.

were no longer patented because bifurcated garments became more accepted for sport activities, and leisure time included the automobile.

In conclusion, the patents give a glimpse about the technology in the *Capitalist Marketplace*, the availability of *Appearance-modifying commodities*, the *Symbolic ambiguity in appearance*, and the ongoing dialectic between ambivalence and style change. The *Human ambivalence* per se, and the *Meaning negotiation and style adoption* could not be inferred only from patents without the support of large scale sociological studies. The advent of new shapes of hoops, bustles or skirts was not sudden, but it evolved step by step, mostly by trial and error, and it was built on previous knowledge and in accordance with the fashion of the time.

Research Question 2:

What patents serve as indicators of the importance of fashionable features of women's dress (i.e., bustles, floor length skirts)?

Although only utility patents were studied (and not design patents), they were important indicators of fashionable features. By definition, hoop-skirts, bustles, and skirts with pads and distenders were articles for shaping the dress. The uses of skirt lifters and holders, as well as edge bindings or protectors at certain points in time, help to understand the difficulties encountered due to the skirt's length (e.g., the longer the skirt, the more necessary was the use of lifters, or edge bindings).

In the 1850s, hoop-skirts, bustles, and skirt-distenders seemed to have mainly the function of supporting the ladies' skirts in a 'fashionable position,' and to prevent the skirts from resting upon the abdomen and hips, which might have caused women's feet to get entangled in the skirts while 'ascending or descending stairs, and getting in and out of

carriages.’ Several hoop-skirts and distenders had built-in bustles, which were used to enhance even more the shape of the skirts, and also to lift the back of the skirts from the ground when necessary. The skirt-supporter presented in patent 25,905 (1859) was constructed in such manner as “to relieve the waist and hips of unnecessary pressure, and bring the entire weight of the skirts upon the buttock, while at the same time it serves the purpose of a bustle which may be made adjustable to or from the body for giving either a gentle or abrupt curve to the dress below the waist, for varying the height of the dress to suit long or short waisted dresses, for preserving a proper form to the dress with the waist thereof either close to the body or perfectly loose, and for setting out the waist of the dress away from the body at every side so that the body may not be closely confined by several thicknesses of material, and lastly so the lady may prevent her dress and under-dresses from flying up in front or dragging behind.” Another description of a 1859 skirt is given in patent 23,841 – Lady’s Hoop-Skirt: the skirt had a “bishop” shape, which had the fullness of the skirt extended at the back, while the front of the skirt hung “perfectly straight, and always retaining this same graceful shape, never [flattened] down.”

Different hoop-skirt designs were sought to prevent the ‘painful swinging or wiggling of a lady’s dress,’ like the use of oblique arrangements of the tapes between the horizontal strips. Big problems were the breaking of hoops, and the discomfort they caused when the person was sitting down. In the first case, elastic materials replaced brittle ones, or hoop-wires were arranged close together in sections (in this configuration the hoops being less liable to break), or joined semi hoops were used instead of circular ones to better yield to pressure. In patent 42,677 – Improvement in Hoop-Skirts (1864) the patentee said: “In my invention the joints are perfectly free, yielding to the slightest

pressure, so that no attention from the wearer is required and no inconvenient position can be assumed by the clothing in passing through a narrow place, sitting in an arm-chair, or entering a carriage, neither can the hoops be placed in any shape from which they will not return when released, so that when the pressure is removed no attention is required to cause the garment to return to its symmetrical shape.” To alleviate the discomfort generated by the hoops when the person was seated, wires were omitted at the seat portion of the hoop-skirt, or the hoops at the knee level were made of two parts connected by solders that gave them the flexibility to suit the position of the wearer.

Some hoop-skirts were not round but asymmetrical, and some were opened in front all the way down so as not to interfere with the motion of the feet. Patentees also showed interest in the adjustability of the hoop, in both vertical and horizontal directions. One solution was the use of hinged hoop supporters for increasing/reducing the size of the hoop-skirt vertically, and of metallic slides for varying the size horizontally. Most hoop-skirts were adjustable only in one direction, and they employed simple solutions (like hooks and eyes, or clasps).

Attention was paid by patentees not to add to the weight or warmth of the clothing with their new inventions. They presented designs that not only looked ‘neat and elegant,’ but also ‘light and cool.’ One of the solutions for keeping the body cool, particularly in the hot season, was to replace the fabric of the petticoat in which the hoops were inserted, with a combination of ‘close texture’ and ‘open gauze net-work’ fabrics.

Another issue addressed by the inventors was the accessibility to the hoops when they were set in a petticoat, for their easy removal when the petticoat needed to be laundered. Also, the patentees looked for solutions to facilitate doffing. One design

made use of special fasteners that allowed the person to unfasten the whole front of the hoop-skirt. Most of the improvements were made having in mind the economic impact of the patent on the manufacturer, and on the consumer. Many patent specifications mention the low cost of the new and improved article, along with the benefits resulting from the use of that invention.

By 1868, when the patent activity for hoop-skirts began to dwindle and the patent activity for bustles started to increase, a change intervened in the description of the bustle's function. The description of the hoop-skirts' function remained quite the same – to support and distend the skirts in such a manner as not to come in contact with the limbs of the wearer¹⁷¹ – but more often references were made concerning ways to accommodate the bustle, and methods to attach the support for the trail. Devices for accentuating, or reinforcing the bustle of the hoop-skirt were patented. A short description of such an invention is given in patent 84,149 – Improvement in Hoop-Skirts (1868): “It forms a very light [hoop-] skirt, and one which readily permits a change in the form of bustle and flounce to suit the whims of fashion.” By 1870, the preponderant hoop-skirts were formed of two ‘nests of hoops,’ the upper set of hoops constituting the bustle, and a lower set forming the skirt. The claimed advantages were a greater durability, and economy in cost and time in the manufacture of the article. Sometimes, diagonal braces connected the two sets of hoops, which had the purpose to better control the bustle, and to maintain the shape of the entire hoop-skirt in the absence of the middle hoops. By simply removing these hoops, the hoop-skirt became lighter than the previous ones, and the new model eliminated the problems caused when the person was seated, as well when she was

¹⁷¹ In patent 277,263 – Hoop-Skirt (1883), the lower portion of the hoop-skirt was provided with strips of whalebone incased in pockets instead of hanging them on straps to avoid the hoop-skirt crawling up the front, and because “bare hoops are likely to catch on snags or nails in walking and trip the wearer.”

kneeling.

An indirect reference to the narrow skirts of the *hourglass* silhouette (~ 1876-1883) is given in patent 277,263 – Hoop-Skirt (1883): to give room for a long step “over a ditch or up into a carriage,” or “climbing a fence,” the lower portion of the hoop skirt was provided with a back slit having wires that widened the hoops “so they will easily slide and give room for a long step, and then fall back to their normal position.”

A hoop-skirt that was still fashionable, but having the unusual function of life preserver is presented in patent 105,730 – Improved Life-Preserving Skirt (1870): “The pieces of cork, of which the hoops are formed, are perforated and strung on to a wire or cord, or inclosed in a tube formed of muslin or any other suitable material. [...] Again, upon the water, if an accident suddenly occurs which renders it necessary to abandon the ship or vessel, a lady can throw herself fearlessly into the water without a moments preparation. On such occasions, females are usually, to a great extent, paralyzed with fear and excitement, and if they have a life-preserver or inflated skirt to look up, prepare, and adjust to their person, their chances of safety are very much lessened, if not destroyed.”

On the other hand, by 1874, the description of the bustles’ function became focused more on the proper set or shape of the dress at the back, and much less on protecting and freeing the body of the wearer. The main concern was the collapse of the bustle under the weight of the dress. Also, this weight created pressure over the hips, which was ‘greatly injurious to the health of the wearer.’ Though rare among the studied patents, the latter inconvenience was removed in part by supporting the skirt from the corset or from the shoulders, and not merely suspending it by the waistband, “especially

with the present style of heavily-trimmed dresses” (Patent 155,480 – Improvement in Bustles, 1874).

Many inventions dealt with methods to obtain the desired curvature of the bustle, “so as to give different degrees of prominence to the dress resting upon it, or so as to be conformed to varying styles of dress” (Patent 141,854 – Improvement in Paniers, 1873). The bustles were supposed to be light and elastic, to allow free circulation of air, to ‘properly expand the dress and accommodate itself with facility to every posture,’ to ‘more effectively support and uphold the clothing of the wearer and give... a neat appearance,’ to give a ‘graceful form to skirts resting over upon the bustle,’ and ‘to have the proper set and graceful fall of the back drapery.’

At the height of the second bustle period (1883-1889), the patentee of Bustle (patent 368,558 from 1887) states the problem that existed with the extreme bustle: “With many of the common bustles, the side pieces end in the waistband or strap, and this makes the form of the top of the bustle more or less square and angular in outline, and the dress... has not the continuous gradual curve from the shoulders to below the waist that is requisite in improving the figure of a person.” The inventor came up with a bustle curved “gradually and regularly away from the person, not only downwardly, but rearwardly and laterally,” and fitted closely the person at the back of the waist.

Some bustles combined fashionability with practicality: in one case, the bustle had added hip extensions, and in another case –stocking-supporters in connection with suspenders. Patent 382,059 – Bustle, 1888, had an unusual combination of functions. This bustle had a double role: to hold out the upper part of the back of the skirt, and to be used “as a sack or pocket in which the wearer could stow away things inconvenient to

carry in the hands –such as a gum rain-mantle.¹⁷²,”

Most references to the length of the skirts are found in patents for skirt lifters and holders, and edge bindings or protectors. “As fashion now prevails for trained dresses, there is a necessity for an efficient and convenient skirt-elevator, to be attached to every such dress, for the convenience of the lady in case she is overtaken by a storm, or even when the weather is pleasant overhead, but the streets dirty, damp, or muddy. If, on such occasions, one attempt to elevate the dress in her hand, it becomes much wrinkled, besides being a burden” (patent 149,911 – Improvement in Dress-Elevators, 1874). Skirt elevators helped to convert a ‘train-dress into a walking-dress, and vice versa,’ by ‘temporarily or permanently shortening the garment at will.’ “By this device a skirt with long train may be made to hang gracefully when elevated, and answer all the purposes of a walking-dress, and look well as to the set of the skirt” (Patent 172,072 – Improvement in Skirt Elevators and Adjusters, 1876). Many skirt elevators were detachable, thus ‘making one elevator answer for many dresses.’

Different materials were used for protecting the lower edge of the skirt. One of them is described in patent 155,534 – Improvement in Skirt-Protectors (1874): “Heretofore skirt-protectors have been made of a plaited or fluted strip of ‘wiggan’ or other fabric stiffened with starch, which, upon becoming wet, gets limp, loses its shape, and absorbs the dirt, besides being objectionable on account of the harsh scraping noise it makes upon the pavement.” Metal strips were patented as skirt protectors, as in patent 145,429 – Improvement in Skirt-Protectors (1873). They were colored to correspond with the skirt’s fabric, and they were crimped, fluted, plaited, gathered, or used plain.

¹⁷² Several spring-ribs were formed out of flat strips of elastic metal in convex shape riveted to the waistband, and covered by a sack or pocket of textile fabric, that could be closed by buttoning.

“The advantages of this improvement are mainly as follows: Durability – the edge of the facing, being metal, is able to endure much more wear than an edge of any textile or felted fabric. Economy – when the metal edging is used a cheaper and lighter fabric can be employed for the body of the article, the metal edging costing a mere trifle. The metal edge prevents the protector from losing its shape if dampened, and gives it the properties of accommodating, conforming, and retaining any fullness or shape of the skirt to which it may be applied.” Another ingenious solution for protecting the skirt is given in patent 147,648 – Improvement in Dress-Protectors (1874), in which a spring was attached to the edge of the skirt: “The moist dirt dries quickly, and detaches itself readily by the stretching motion imparted to the elastic spring-protector, while its light and neat construction makes it easier and more convenient for handling and taking up the dress.” Even if the skirt protector was resistant to abrasion, the seams by which it was attached to the fabric were not protected: “...soon [the seams] become worn, allowing the protector to become detached, which gives the dress an unsightly appearance and necessitates constant attention and renewal” (Patent 153,314 – Improvement in Skirt-Protectors, 1874). As a remedy, a strip of waterproof material was stitched to the skirt to cover and protect these seams.

In 1877-1878, detachable train-supporters, which were devices for “holding the train of a lady’s dress extended and supported, so as to preserve its symmetry and prevent unseemly dragging,¹⁷³” were also protected at their lower edge. The new train-supporter “only extend[ed] a short distance up the skirt or dress, according as the prevailing fashion, taste, or convenience may require” (patent 192,532 – Improvement in Dress-Train Supporters, 1877).

¹⁷³ Patent 199,170 – Improvement in Dress-Train Supporters, 1878

In 1887, patent 365,147 – Woven Fabric for Skirt-Facings (1887) advanced the idea of replacing the skirt facing, which was usually made of muslin at the upper part and of buckram at the lower part of the foundation, with a single fabric having different thickness. The problem created by the use of two fabrics for lining was that “The lower stiff material, by reason of the action of the body in walking rapidly or running up or down stairs, owing to the abrupt termination of the lower thickness, will curl upward and remain in such position, destroying the appearance of the dress.” The solution was a gradual thickness of the foundation, which was achieved “by introducing into the warp successively threads of increasing coarseness,” or by multiplying the number of threads. The greatest pliability of the woven fabric was at the upper section, and the maximum degree of stiffness was at the lower section.

Some skirt protectors had the wearing surface made of pressed braided rattan (1891). Also, the old ‘wig[g]an’ was improved by covering its outer side and hem with rubber cloth or oiled silk (patent 458,039 – Skirt-Protector (1891). This skirt-protector made of wiggan was pleated, and it had two or more double box-plaits in the center for raising the dress from the ground where it was most likely to sweep. “In the skirt-protector of this construction the wigan or foundation fabric is preserved from the absorption of dirt and moisture and the lower portion of the dress is effectively protected from soiling and wear, while the arrangement of the plaits imparts a graceful and stylish set or contour to the drapery, which adds much to the appearance of a dress provided with this skirt-protector.”

Cords were added at the hem, but the skirt facings were easily frayed, and therefore the cords were likely to drop down and sag, “and if caught in the heel or in any

obstruction the core [was] drawn out and tend[ed] to trip the wearer” (patent 607,555 – Corded Skirt-Facing, 1898). As a solution to this problem, a waterproof cord was patented, and made to adhere to the skirt’s fabric through a heating process.

Chenille or tufted cord that resembled hairs of a circular brush were used as protectors, too. The specifications of patent 614,481 – Skirt-Protector (1898) indicate that chenille resists “wear and tear in every direction and present to the attacking obstacles or attacking forces always another side, but of same resisting property, whether the dress be pulled forward or backward or slides on the ground in a more or less horizontal direction, and it will equally well resist wear and tear when the dress is held in a vertical direction, standing, as it were, on the dress-guard itself. ... These hairs, however, not only protect the edge of the dress..., but at the same time they cover the thread by means of which the chenille has been attached to the band or ribbon, forming together with it the dress-guard, and thus protect said thread from wear and tear.” The chenille-hairs were made of “good quality ... stiff wool” that could be colored, thus forming “a nice ornamental edge for the dress.”

Toward the end of 1880s, in a few instances, the patentees thought that it would be better not only to protect the edge of the skirt, but to enclose the entire skirt, or part of it, in a waterproof material (gossamer or rubber cloth) to prevent the skirt becoming ‘soiled or muddied’ during inclement weather. Also, some lifters had an additional role as holders of the skirt. The advantage of the holders was that women had “the free use of both hands while her skirt is so elevated” (patent 709,862 – Skirt-Holder, 1902).

In regard to skirt shape, a few patents mention the ‘gored skirt’ (1895), the ‘round skirt’ (1896), the ‘objectionable fullness’ of the skirt over the hips (1898), the ‘lily shape’

(1903), and the ‘narrow skirt’ (1913). The ‘lily shape’ description is given in patent 735,023 – Skirt: “By providing the flounce of a skirt with a lining ... and providing flexible flaring portion at the bottom thereof the following advantages are secured: first, a beautiful and artistic lily shape is given to the skirt, and this will remain in any position the wearer may assume, owing to the resiliency of the lining-flounce; second, all other linings heretofore used to give body to a skirt, as well as petticoats or other garments worn for the same purpose, may be dispensed with, thus taking a great weight off the limbs of the wearer and tending to her comfort, and yet the style, shape and graceful appearance of the outer garment will be preserved.”

In patent 686,068 - Skirt-Support (1901), the inventor gives an additional reason for patenting his idea, besides the length of the skirt: the skirt-support was “required to be readily adjusted with gloved hands,” which serendipitously brought up information about the fashion of the time, in ensemble.

So much attention among dress historians has been focused on the dysfunctional features of the corset; however, nothing chronicles so well the dysfunctional features of the skirt as nether garment patents. The skirt, and all of its fashionable variations, was such a strong symbol of womanhood, that rather than do away with it, a great deal of invention related to making it more functional. It not only required shaping, but lifting, supporting, and protecting.

Research Question 3 is a multiple question, therefore the answer is divided in two sections, **a** and **b**.

Research Question 3a:

What clothing inventions were patented to aid in the physical functioning of women's

apparel (i.e., skirt lifters, skirt protectors)?

The main functions of the nether garments studied were: 1) to protect the body of the wearer, and/or to protect the garment; and 2) to modify the silhouette of the dress. The physical functioning of women's dress was achieved through continuous innovation in almost all subclasses of nether garments. In the absence of patents that derived from this innovative effort, women's health would have been less protected, and the life of the garments would have been shortened. As presented at Research Question 2, the hoop-skirts, the bustles of the first period, and the skirt-distenders had the function to free women's movements from the cumbersome and heavy skirts.

The skirt lifters permitted elevating a trained skirt for conversion to a walking skirt, and vice versa, 'with little exertion on the part of the lady.' Lifters were made of cords, eyelets and rings,¹⁷⁴ and were placed inside or outside the skirt. They were used in any weather to protect the skirt from soiling and wear. Safety pins were used often as securing devices for lifters and holders, so one lifter/holder sufficed a whole wardrobe.

During the bicycle craze, many skirt holders changed their function from keeping the skirts up from the ground, to dividing and transforming them in bloomers. A cord or a belt attached from the waist was drawn between the legs of the wearer when the skirt was used for cycling, or sports in general. When the cord was removed, the skirt was easily changed back into a walking skirt. Holders that were attached from the leg of the wearer, top of the shoe, boot, stocking, or legging had the function to keep the skirt down. The free use of the limbs when sitting down or walking was contingent upon the elasticity of the materials of which the holders were made.

A combination of functions of different articles reduced the weight of the dress.

¹⁷⁴ Sometimes skirt lifters had interlocking devices, too.

Some bustles were designed to serve also the function of skirt lifters; some holders were equipped with a hook for supporting a satchel. A few examples exist of leggings/gaiters that were cut in one piece with the skirt. These types of skirts were used in ‘vigorous’ sports like skating, or horse riding ‘that added to the enjoyment of sports without injury.’

Different types of protectors accomplished the task of protecting the person, as well as the garment, from elements. For example, a blanket made of impervious material was adapted to protect the horse rider from “inclemency of the weather, mud and dirt from the roads, from injury by contact with bushes, branches, &c., in riding” (patent 346,006 – Lap-Robe and Splatter-Dasher, 1886). Other times, the protection was confined to the bottom of the skirt, which was made of water-proof material (like a thin strip of rubber), so that it would not absorb the moisture from walking in dirt, mud and snow, and when soiled it could be ‘wiped clean with a sponge.’ Most of the protectors were placed inside the skirt, but others extended and turned over the outside of petticoats and skirts. The protectors were usually sewn to the skirt; however some protectors were completely or partially detachable.

The edge bindings increased the use of the garment for a longer time by protecting the fabric from soiling, and preventing it from fraying. The materials used for edge bindings were: wiggan, varnished paper, oiled-silk, leather, india-rubber, metal strips, metal disks, wire springs, and cords. The cords were either plain, or covered with rubber cloth or gutta-percha, or made in the form of brushes. Because “the binding [was] expensive, and require[d] time and care to sew it on the skirt,” patent 112,625 – Improvement in Skirts (1871) suggested the use of an imitation of binding, which was printed on a wide strip of fabric in “variegated or plain colors.” This patent, though

unique, shows the prevalence of appearance over function, by choosing a solution that was detrimental to the garment in the long run.

Research Question 3b:

Were there patents that indicated specialized apparel to facilitate women's roles (maternity, participant in sports activities, specialized occupations for women)?

Most of the patents from subclasses 212 (Combined bifurcated), 213 (Convertible bifurcated) and 214 (Riding), issued between 1895 and 1905, are for skirts used in bicycling, golf, tennis, basketball, skating, horse riding, climbing, and exercising. All these skirts, divided or not, were designed to facilitate the movement of the wearer, and at the same time to have the appearance of a full skirt to avoid an 'immodest appearance.' Simply shortening the skirts by lifting them, or by detaching their bottom flounce, allowed the free use of the limbs. Some skirts were worn with bloomers, because bloomers alone were objectionable "for their lack of artistic appearance, and because of their mannish look" (patent 570,676 – Bicycle-Suit, 1896).

Bicycle skirts were constructed as: two skirts attached, a skirt opened only in front, a skirt opened only at back, a skirt with trousers connected to it, or a skirt with interior dividing panels and provided with buttons for conversion to a walking skirt. Usually, plaits or a front panel concealed the opening to maintain a 'plain and conservative appearance,' thus avoiding attracting 'special attention to the wearer as a bicycle-garment would attract in the absence of a bicycle.' A few models had a supplementary saddle cushion attached inside the skirt.

Some skirts were convertible, such as a dress skirt which could be modified into a bicycling, climbing, or exercising costume; or a skirt with a yoke which could be

transformed into a cloak 'at the rougher part of the way' in a tramping expedition. And a divided skirt could be changed into bloomers for gymnasium use by gathering the bottoms of the bifurcations around the limbs.

A special safety issue was the object of many riding skirt patents. The riding skirt had a bulge for the knee when riding sidesaddle. It was fitted over the pommel of the saddle without causing any crease about the pommel, and under the buttock of the rider. In case of an accident, the rider's life was in danger because of the tight fitting of the skirt about the pommel. As a result, safety skirts were patented. They had burst seams that made it easier for the rider to be disengaged from the saddle, and to fall to the ground while the skirt was 'left hanging from the pommels of the saddle.'

Special skirts were designed for travel. Patent 1,196,324 – Lady's Traveling-Skirt (1916) is a special case in which the function of the skirt is described in detail: "The object of the invention is to provide a skirt which is light in weight, inexpensive to make up, and neat in appearance, having concealed yet readily accessible receptacles for conveniently and safely carrying money, in the form of bank drafts, travelers' checks, bills or specie, also for jewelry, tickets and the like valuables, which valuable receptacles are so arranged that they do not detract from the appearance of the wearer's gown, or afford a source of annoyance or discomfort to the wearer whether standing or sitting. [...] At the back inside of the concealing flap is a pocket of considerable length. In this pocket are elastic straps under which long railroad tickets, drafts or the like may be placed without folding."

In comparison with the leisure/sport skirts, references to occupational skirts are fewer. They are mostly reversible skirts, with concealed aprons or pockets. In patent

601,434 – Skirt (1898), a skirt for working girls and women had flaps of a different color than the skirt. “It will be appreciated [by the wearer] that the operation of changing the exterior of the skirt from one color or material to another color or material may be expeditiously carried out, and in consequence a woman may go out with a skirt having an exterior of one color or material and come back with a skirt having an exterior of another color or material.” Patent 723,191 – Woman's Skirt (1903) had also a simple solution: “[The flounce of the skirt] can be worn from the home to places of business or amusement and be detached and laid aside during working hours or times of amusement and again attached before returning to the home.” Patent 1,022,190 – Garment (1912) targeted saleswomen. By this invention the new garment “obviate[d] the necessity for using an apron while working,” yet protecting the wearer from injury or soiling. Under ordinary circumstances, the “garment present[ed] the appearance of the usual style and construction, which at other times present[ed] the appearance and has the characteristics of a special working garment,” with concealed pockets. For female employees in “restaurants and like places, where the front breadth of a garment is apt to be frequently soiled, four changes can take place before there is any need of washing or renovating the garment” (patent 1,076,124 – Reversible Skirt, 1913). The skirt was made of a double-faced material, and the front breadths could be buttoned in either direction. In patent 1,265,492 – Woman's Work and Sport Garment (1918), presented a skirt worn with bloomers, the skirt being “folded readily and quickly when desired to expose the bloomers when engaged in house-work, gardening, sports and the like.” It seems that the description of this patent is addressed mainly to homemakers, because it speaks about an “enlarged pocket across the front portion of the body of the wearer, capable of utilization

as a clothes pin pocket,” and the garment being “provided with a centrally located [detachable] water proof apron.”

In the Nether Garments class, a very small number of patents issued in 1907 and 1919 are dealing with maternity skirts. Their main characteristic was their adjustability both in length and girth. Solutions were given for avoiding the unevenness of the skirt at the hem caused by the changes of the body. The skirt in patent 914,414 – Skirt (1907) was adapted “particularly to be worn during the period of pregnancy, and immediately thereafter ... it [could], nevertheless, be worn at any other time.” The explanation for the reduced number of maternity skirts in this class is that they are part of class 69, Body Garments, Union type, Skirted, namely in *subclass 76 – Waistband: adjustable or elastic* (34 patents from the earliest date until 1920).

The bulk of patent activity related to specialized function was intended to introduce adjustability and convertibility (class 211). The majority of patents in classes 212, 213, and 214 were designed to make skirts more functional for sports. Travel, occupational, and maternity uses also appeared to a lesser degree in class 211. The peak period for patenting activity was 1895-1905, reflecting increased emphasis on sports activity for women, especially bicycling. Overall, there was not a great emphasis on radical changes – a skirt still had to look like a skirt even though it was bifurcated to increase mobility for sports.

Research Question 4:

Does the patent record show evidence of inventions intended for ready-to-wear production?

Among the utility patents studied in depth, the term ‘ready-made’ appeared for the first time in 1907 (Table 38).

Table 38. References to ready-to-wear production of women clothing

DIRECT REFERENCE TO READY-TO-WEAR PRODUCTION OF WOMEN CLOTHING					
Application Date	Approval Date	Patentee's Name	Patentee's City/State	Patent #	Patent Title Comments
6/5/1907	3/9/1909	Walter William Hook	Spokane, W/A	914,414	"In addition to serving the specific purpose above stated [maternity], these skirts, being adapted equally well for general use, can be sold advantageously by <u>dealers who do not care to carry a large assortment of sizes in ready-made clothing</u> , for they can be assured of their ability to provide their customers with well-fitting garments even with only a small stock from which to select, for the herein described skirts can be so adjusted as neatly to fit almost any person."
8/24/1908	4/4/1911	Mary E. Kelsey	Boston, MA	988,350	My invention relates to improvements in skirts, petticoats and like garments, and <u>especially to "stock" or ready made skirts.</u>
INDIRECT REFERENCE TO READY-TO-WEAR PRODUCTION OF WOMEN CLOTHING					
Application Date	Approval Date	Patentee's Name	Patentee's City/State	Patent #	Patent Title Comments
N/A	9/14/1858	Samuel Beberdy	Philadelphia, PA	21,479	Lady's Hoop-Skirt "It is likewise found that ... less number of pieces have to be handled and adjusted, ... which are by no means of slight importance, when we consider the fact that <u>hundreds of dozens of skirts are made in some large factories per day...</u> "

Table 38. References to ready-to-wear production of women clothing

INDIRECT REFERENCE TO READY-TO-WEAR PRODUCTION OF WOMEN CLOTHING						
Application Date	Approval Date	Patentee's Name	Patentee's City/State	Patent #	Patent Title	Comments
10/19/1886	5/3/1887	John C. Betten	Eureka Springs, AR	362,055	Bustle	The bustle had the advantage to be "more readily and closely folded and compressed together to occupy but a small space in packing large numbers of the same within a <u>very small space for storage and transportation.</u> "
7/2/1897	7/19/1898	August Allgoever	New York, NY	607,633	Skirt-Protector	Protectors having inverted L-shape, and not inverted T-shape, "when rolled for <u>packing to store it up for transportation</u> such binding is flattened out and will not always and in every place of its length regain its original form, which is necessary to its usefulness."
11/13/1905	8/14/1906	Alexander Living Sykes	Brooklyn, NY	828,345	Woman's Underskirt	<u>Manufacturers had stocks of large assortment of skirts, large number of different lengths and waist measures, that required a large amount of space and a larger investment at all times.</u> This invention was designed "to enable the number of skirt lengths carried to be very largely reduced by providing means on the skirt-body for shortening the same, so that it will be necessary only for the manufacturer and dealer, as well as the wearer, to carry in stock only full-length skirts, which can be shortened by the wearer to suit her figure."

Table 38. References to ready-to-wear production of women clothing

INDIRECT REFERENCE TO READY-TO-WEAR PRODUCTION OF WOMEN CLOTHING						
Application Date	Approval Date	Patentee's Name	Patentee's City/State	Patent #	Patent Title	Comments
6/16/1904	8/29/1911	Samuel, and William Epstein	New York, NY	1,001,940	Self-Fitting Petticoat	Two or three sizes sufficient to <u>cover all the many sizes manufactured under the old system.</u>
3/25/1908	12/1/1908	Nels Johnson	Grove City, MN	905,705	Supporter	The two clamps [of the supporter] were pivotally connected together at their inner ends by means of a pin, thus <u>allowing the supporter to be folded when</u> desired to carry it in a purse, or when <u>it was stored or shipped.</u>

Because there are earlier references to quantities of articles manufactured, or their transportation and storage from which the conversion from custom to ready-made production could be inferred, Table 38 was divided accordingly (Direct – Indirect References).

Overall, the patent record does not provide in depth information about how nether garment inventions were to be integrated into or facilitate the manufacturing of women's apparel. In the evidence found, references were made to transportation and storage issues, and manufacturing in large quantities. Most appear after 1885. The number of patents with assignees was 190 (22%) of 864 in the classes studied. This shows that some inventors sold their patents for eventual mass production.

Research Question 5:

How many patents relate to the healthiness of women's dress (i.e., undergarments, specialized clothing for invalids)?

In assessing the healthiness of women's dress over time, a differentiation should be made between the meanings of the term 'healthiness' as it was viewed in the end of 19th century, and the way it is viewed today; same for terms like 'useful,' or 'functional,' etc. In the modern times, very few of the nether garment innovations studied would present some practical value, because they do not respond to our present necessities for comfort and protection. In contrast, for the 19th century women, these patents greatly contributed to their comfort and safety, when long and heavy trimmed skirts were a given.

Many patent specifications, especially for hoop-skirts, bustles, and skirt-distenders include comments regarding the healthiness of women's dress and ways to improve it, still maintaining a fashionable look. The main concern was the weight of the skirts at the waistline, and the pressure it exerted over the abdomen and hips. The redistribution of the weight was obtained by supporting the skirt from the shoulders, and the pressure was alleviated by using hoop-skirts, and sometimes bustles. In patent 26,491 – Skirt-Supporter (Corset), 1859, the skirt was supported by a bustle that was attached to a dress-waist or corset. The dress-waist was made "to fit the body of the wearer, and should, for health's sake be so loose as to allow of free and unconstrained motion or turning of the body, but tight enough so as to fit smoothly and without wrinkles." To reduce the weight of petticoats, hoop-skirts were invented. In time they became lighter and lighter, by using tapes or mesh fabric in between the horizontal strips. In an 1864

patent, a felted skirt was promoted as having the advantage of being worn without the inconvenience of the hoops.

The heat and constriction of garments around the waist and hips was also addressed in many bustle patents. By the 1880s, advertisements for the *health bustle* recommended the new ‘scientific’ bustle made of braided wire –instead of the bustles of the 1870s made of horsehair– as being “less heating to the spine than any others” (Laver, 1988). As result, patents of bustles made of mesh wire were issued at this time,¹⁷⁵ as well as many other light and cool prototypes. With the passing of time, the fabrics used in the manufacture of skirts or petticoats became much lighter, and more breathable, thus providing ‘the ready passage and circulation of air between and through the underskirt and the outer skirt,’ (patent 1,350,848 – Underskirt, 1920).

The patents from subclasses Combined and Convertible bifurcated skirts mostly addressed the freedom of movement of the body and the limbs. Evidence that the freedom of movement was very important to women is reflected in the number of patents issued to women, which exceeded the number of patents issued to men in these two subclasses.

Keeping the garments clean –especially when trained skirts were in fashion– was a requirement for neatness, and also for the health of the wearer. In patent 203,607 – Improvement in Skirts (1878) the patentee explains: “The ordinary underskirt, in wet weather, is liable to become soiled around the bottom with mud and dirty water, and it can be cleaned only by being removed from the wearer and washed, which operation is objectionable because of its tendency to shrink and thus reduce the size of the skirt.

¹⁷⁵ Patent 334,707 – Bustle, 1886 is presented in the Qualitative Analysis chapter.

Besides this, the ordinary skirt, when wet around the bottom, is not only uncomfortable to the wearer, but it is also dangerous to the health of the person.”

Though abdomen supporters are not part of this study, yet some could be found among nether garment patents, in combination with skirt supporters. The abdomen supporter patents constitute a large part of the Class 450, *Foundation Garments*, an aspect that could open a large area of investigation in women’s health issues¹⁷⁶ in the 19th century. Specialized clothing for invalids was not addressed in any of the studied patents; this category is more likely to be found in Class 604, *Surgery*.

Research Question 6:

What other themes related to women’s fashionable dress exist in the patent record?

The patentees praised their inventions by emphasizing the improvements they brought to the ‘figure of the wearer,’ and to the product per se. The appearance of the garment was key in enhancing the ‘figure.’ The proper shape of the dress was characterized by gentle sweep, neatness and/or tasty appearance, desired hang and fullness, and graceful fall of the back drapery; no sagging or dropping was allowed. Perfect fit was paramount: no wrinkles, creases, or drawing in front. Concealing attachments, like ruffles, dress guards, or elastic bands were used to avoid unsightliness if undergarments, or feet/legs became exposed (like in riding). Different methods for dress ornamentation were used, like printing, embossing, and embroidering. Bows and ruffles were placed even on undergarments. Cast metal, or imitations of fancy items (like a watch fob) were used to conceal lifters. Attention was given to protect women’s coiffure

¹⁷⁶ Health issues created by multiple births (like *prolapsus uteri*), or by the use of constricted corsets (pressure upon viscera), etc.

when slipping into narrow skirts. In this case, the skirts were designed to be donned from the bottom up, and not over the head.

In all patents, an abundance of praises were brought to the products per se. Some referred to their *general qualities*: strong, light, durable, simple, practical, elastic, pliable, effective construction, general usefulness, valuable garment for all purposes, superior, protect the limbs, more convenient, save material, retain shape, give stability, keep warm, applicable to any skirt, prevent discomfort of the wearer, avoid the danger of catching the shoes when entering or leaving a carriage/car, avoid the increase in waist measure, safe, beautiful and artistic, natural flare, elegant and graceful appearance, pleasurable.

Also, numerous *structural qualities* were enumerated: rigidity and resistance to uphold the weight of the skirt, yet retaining its form; easy modifiable to different shapes, lengths, or degrees of curvature; adjustable to different forms, or sizes of persons; adaptable to the movement of the person; secured from corset, waist, or shoulders; detachable for quickly application and removal (e.g., bustles/pads, skirt panels, or devices for skirts' adjustments), by using buttons/buttonholes, safety pins, spring/socket clasps, snappers, glove fasteners, hooks and eyes; ventilated – perforations provided in skirts or bustle covers; interchangeable between same type of garments; easy to transform the existent garment in a timely manner, 'without requiring that the wearer retire from the presence of other persons.'

Safety qualities included in the patent specifications dealt mostly with the construction methods that created garments free from danger or injury to the wearer¹⁷⁷ when sitting or kneeling (as in the hoop-skirts case), or when riding bicycles (as tripping,

¹⁷⁷ The wearer was not the only person to be injured by the broken hoops, as patent 92,811 – Improvement in Hoop-Skirts (1869) reveals: "... the wires [are] liable to injure children in the lap, as sometimes occurs with the common form [of hoop-skirt]."

or catching the skirt in the wheels or pedals), or when a horse riding accident happened (like catching the skirt in the pommel). The new articles were also designed not to cause themselves damage to clothing.

Ease of cleaning and storing was mentioned in a few patents. Laundering was made easier when the garment had removable or detachable parts,¹⁷⁸ and the fabric did not have the tendency to shrink. To avoid laundering all together, a paper skirt was invented in 1866, and a bustle made of strips of pasteboard or paper was invented in 1872. The patentee of the bustle considered that “when soiled, [the bustle] can be thrown away, and which is free from all danger of injuring the person wearing the same if from some external pressure one of the springs or coils should break [...] the worst that may happen is to spoil its shape.” The inventor argues that it was less expensive to replace the paper bustle when soiled than to clean one of the ordinary bustles with metal rings or wires, (patent 130,345 – Improvement in Bustles). Ironing was facilitated if skirts could be opened flat. The use of eyes and strings at the waistband, instead of sewn gathers that formed creases, was a solution given for ironing an expensive fabric, like velvet. For plaits, coiled wires were invented to keep them in place after they were ironed. Other praised qualities of the product were the space that the garment occupied in a storage trunk (for safe-keeping, or for traveling), and if it could be stored in a distended form.

Other themes, though not directly related to women’s fashionable dress, are important in their own merit for clarifying the *patenting process*. Some inventors exposed at the beginning of their patent specifications the reasons for patenting improved articles. From their statements, the opposite qualities of a fashionable dress could be

¹⁷⁸ Like removable metallic springs, or detachable flounces

inferred. These *reasons* were linked to: a) unsatisfactory garments, which were stiff, obtrusive, heavy, bulky, uncomfortable, cumbersome, rigid, impracticable, or disagreeable; b) materials, which were expensive, not durable, required time and care to sew; c) appearance, which was altered when the skirt was losing its shape because a supporting garment did not answer to the purpose it was made, or interfered with the set of the dress, or made ‘harsh scraping noise upon the pavement’ resulting in an ‘awkward and ungainly appearance;’ and d) maintenance of the garment, which was difficult to wash and iron.

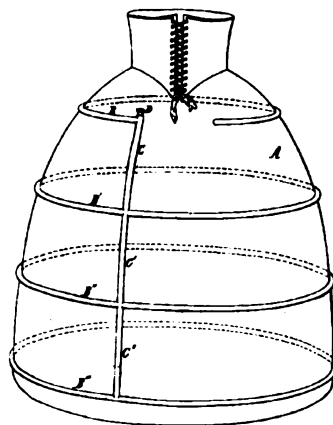
Few inventors mentioned that *experiments* were made with their new products before patenting them. Some inventors used their personal experience, and some inventors tested the product on other people. Two examples of patentees from the first category follow: “I find, too, in practice, that any movement of either leg in walking, climbing, treading the pedals of a wheel, or in mounting is followed by the skirt, the latter being thus caused to hang in natural and graceful folds instead of wrapping around the legs of the wearer” (Skirt supporter, Sarah M. Smith, patent 569,356 – 1896). Or, “The experience of years, and very much of practical experiment has shown to the inventor of the “self adjusting skirt,” that this method of attempting to effect spring is fallacious...” (patent 4,897 – Lady's Skirt, Sewall Folsom, 1846). An example of experimenting with the product on others is presented in patent 631,949 – Safety hunting skirt, Carlson Oscar (1899): “... positively and absolutely prevent ... an accident as has been proven by a number of persons who have worn this skirt in an experimental way.”

By the late 1850s, an ingenious and bold solution was tested for replacing the complex constructions of hoop-skirts and bustles. The construction principle was based

on inflatable structures. In Figure 140 are presented two patents, one of a hoop with inflatable tubes, and one of a bustle with inflatable crescent shapes. In patent 17,24 – Lady’s Skirt (1857), the patentee explains the reasons for using air tubes instead of regular hoops: “The purpose of expansion ... is now attained by the use of cords, hoops, canes, steel springs and other appliances, some of which are objectionable on account of their rigidity and others on account of their weight being oppressive to the wearer, which objections are evidently overcome by my improvement, as it is not only much lighter in weight than those in which the articles named are used, but is also perfectly elastic in its conformation and can be compressed together with slight effort by its wearer in case of mud, and will return to its original position on the removal of the pressure, and does not discompose or disarrange the dress of the wearer when sitting down with it, and can be folded and packed up

in a small space when not in use by permitting the air to escape from the tubes by opening the stop valve.” The description of the invention states: “The nature of my invention consists in attaching to the body

H.C. Tranhagen
Hoop Skirt
Nº 17241 Patented May 5 1857



B. F. Moore.
Bustle.
Nº 25211 Patented Aug 23 1859.

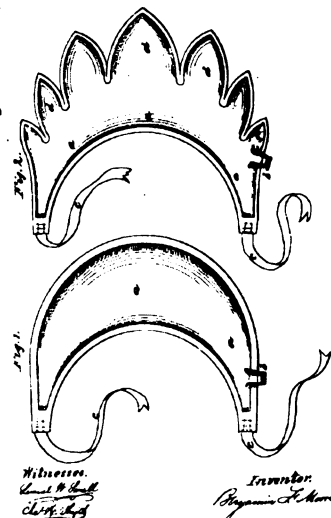


Figure 140.

Left: Patent 17,241 – Lady’s Skirt, 1857

Right: Patent 25,211 – Improvement in Ladies' Bustles

of a skirt or petticoat a series of air-tight tubes to be inflated with air for the purpose of expanding the surface of the skirt to give a 'set' to the dress similar to that effected by the use of hoops, cords and other devices now in use. [...] The tubes may be attached to and held in place upon the body of the skirt by gumming them to the cloth or inclosing them in a piece of cloth sewed to the body of the skirt or by any other means that may be preferred." All tubes could be inflated and expanded at one operation, or the vertical or horizontal tubes could be "used independently of each other, and be filled and expanded separately by placing a stop valve on each one of them."

In patent 17,241 – Lady's Skirt (8/23/1859) the invention consists in forming an "inflated bustle, of India-rubber or equivalent material in a crescent shape, with projecting hollow points or nipples of such a length that the compressed air within shall act to give a more gentle sweep to the dress and keep it farther away from the person. My bustle, being inflated with air, is easily compressed into a small space when sitting down, and it is cool, light, and comfortable." The basic shape of the bustle was formed by attaching together two crescent-shaped pieces at their edges so as to be air-tight, and "when inflated through the valve or mouth-piece they will assume a full round form that tapers and curves toward the ends, where straps or tapes [were] provided for attaching to the person." These two patents (of hoop-skirt, and bustle) with inflatable structures are the only ones among the patents studied. They might not have been successful when tested on the market, and therefore the idea on which they were based was not developed further. A clue about what might have caused their rejection is given in patent 18,013 – Hoop for Ladies' Skirts (1857), in which the patentee stated that "the smell of india rubber or gutta percha" was objectionable, and therefore these materials were not

included in the construction of his hoop-skirt.

The *claims* made in each *patent specification* covered as many aspects as possible, e.g., multiple functions of the product, substitute materials that could be used, or alternative methods of construction.

It seems that some of the *patent drawings* were made in colors. For example, in patent 25,073 – Skeleton Skirt (1859), the patentee mentions: “... Fig. II represents it [the extension section] in blue lines as applied to an ordinary elastic circular extending skirt, shown in red lines to afford clearer distinctions to the drawing.” Another example is patent 49,447 – Improvement in Hoop-Skirt Joints (1865): “The black lines therein are those showing the ordinary condition of the joint when seen from above, whether the hoop is plane or folded. The red outlines show the only motion horizontally which the parts are capable of.” Patent 83,986 – Improvement in Hoop-Skirts (1868) was also bi-color: “... said trail may either be let down, as represented by black lines in the drawing, to perform its function as a trail, or be raised up and thrown back against the skirt, so as to be out of the way, as represented by red lines...”

The patentees thought a priori how to construct their invention ‘with the least possible waste of time, [and] labor.’ Some patentees planed to *manufacture* their invention, and they stated so in the text of the patent, besides the listing of assignees (if any) in the title rows. An example is in patent 153,314 – Improvement in Skirt-Protectors (1874), in which the patentee said: “I intend to manufacture the protector in continuous strips or band, so that the same may be made and sold by the yard, as an article of manufacture.”

Replacing more expensive materials with combinations of cheap and more

expensive fabrics reduced the *manufacturing cost*. Also, fabrics of ‘two thicknesses,’ or double-faced materials economized the cost of production. Similar materials used in other industries were incorporated in the nether garment products, like the umbrella ‘paragon’ spring – used in pannier, and the watch spring – inserted in hoop-skirt. Some springs used in the construction of bustles –though not spelled out by the patentees– resembled carriage and mattress springs. Some materials forming meshes for hoop-skirts were ‘very different from a knit or woven fabric,’ but similar to that adopted in making fishing nets. An explanation might be that male patentees, who were the preponderant force of the patent activity, had a closer connection with the industrial activity. Indeed, one of them described the cut of his improved skirt by making association with the way a funnel would be cut from a sheet of metal.¹⁷⁹

Making the garment patterns in fewer pieces –some in one piece, reduced the cost of labor. Also, fewer seams were meant to avoid the additional clumsiness that hurt the wearer, and to prevent accidental opening of the fasteners. The patentees emphasized the low costs of manufacture and sale of their products. Ultimately, these costs were reflected in lower prices for the consumers, which were defined by terms such as: less expensive, inexpensive, cheap, exceedingly cheap, or costing a mere trifle.

In summary, the patents issued between 1846 and 1920 indicate an evolutionary functioning of the “fashion process.” Each patent was designed based on the previous knowledge in the field, on the available technology and materials, and on the

¹⁷⁹ “The peculiar manner of cutting the material” consisted in cutting the breadths of “a tapering form toward the top and not so wide as at the bottom, and then forming the upper end upon the arc of a circle precisely as in the formation of a sheet of metal to make a funnel,” patent 143,198 – Improvement in Skirts, 1873.

manufacturing possibilities. The purpose of each innovation was to increase women's comfort, safety, and/or protection, still maintaining the social conformity in appearance. This polarity –functionality versus conformity– created ambivalence, which consequently generated a large variety of utility patents for hoop-skirts, bustles, and skirts. They were appearance-modifying commodities, whose symbolic ambiguity was then negotiated in the social interaction. Designs that became meaningful were adopted, the others being discarded. When new-patented models of nether garments appeared on the market, they triggered the ongoing dialectic between ambivalence and style change.

The quantitative analysis of data shows with clarity when the hoop-skirts, bustles, and bicycle skirts were most fashionable. It also reveals information about patenting activity by gender, geographical region, patentee, and assignee. The percentage of female patentees for nether garments was higher than the percentage of female patentees for all types of patents reported in the literature, that is, one in five patentees of nether garments was a woman in comparison with one in 100 in the second case. The number of female patentees exceeded the number of male patentees only for bicycle skirt patents. Very few women patented hoop-skirts, and no women patented riding skirts. The data show a delay of 70 days in patent granting time for female patentees when compared with the granting time for male patentees. The patenting activity was concentrated in the Northeast (76% of all patents), and Midwest (14% of all patents). Only four patentees (three bustle patentees, and one hoop-skirt patentee) had 10 or more patents granted per person. From the total number of patents, 22% were assigned to companies, or persons. Usually the assignees were from the same geographical region with the patentees from which they bought the patent rights. A comparison between patenting activity for bicycle

skirts, and women's bicycles in 1894 -1900 revealed that the peak of patent distribution for bicycle skirts occurred two years in advance than the peak of patent distribution for women's bicycles.

The qualitative analysis showed patentees' keen awareness of fashion news. The evaluation of the outcomes resulted from both quantitative and qualitative analyses demonstrate that the utility patents relate closely to fashion cycles, as they are described in specialized literature.

Garments' functionality and appearance were equally addressed in patents. Hoop-skirts, bustles, and skirt distenders proved not to be only whims of fashion, but indispensable articles for the physical functioning of women's dress. Also, skirt lifters and holders, as well as skirt binders or protectors improved both the function and the appearance of the garments. Simple solutions were sought for keeping the manufacturing costs low.

The present study was conducted with scientific rigor, yet potential biases exist. Biases could be caused by the method employed for selecting the patents used in the in-depth research, or by the method applied in discerning the gender of the patentees (i.e., based only on their first names). These biases might pose a threat to the internal validity of the study. This weakness could be avoided through an additional evaluation, by criss-crossing the present research findings with those of other independent observers (e.g., patent experts, professors, and specialists in clothing history). For improving the reliability of the study, additional information should be gathered from primary sources other than patents (like autobiographies, correspondence, legal cases, censuses, material

artifacts, and 19th and early 20th century newspapers and journals), and then corroborated with information from the patents studied.

Future research should include at least the *design patents* for skirts (D02/851+). These patents would give a more complete overview of the fashion cycles, and it would facilitate a better understanding of the functioning of the fashion process. Also, the skirt classification proposed in this study should be reviewed: first, a preliminary classification in overskirts and underskirts is necessary; second, all patents having the same function should be grouped in a separate subclass, to facilitate their access by apparel historians. For example, all the divided skirt patents from classes 211, 212 and 213 designed for bicycling or other sports should be grouped in a common subclass. Additionally, a more thorough research of bicycle patents is required to validate the results of the present research regarding the timeline of patent activity for bicycles and bicycle skirts. Other studies could be focused on Class 450 – *Foundation Garments*, or in subclasses pertaining to clothing from Class 604 – *Surgery*.

Future studies might include what technical advancements influenced the improvements proposed in the apparel patents, the number and type of patents that were actually manufactured, the impact apparel patents had on economy through their usefulness and marketability, the potential for patentees' and assignees' financial gain, or the role played by the 19th century science clubs and inventors' organizations¹⁸⁰ in stimulating the patenting activity. Interdisciplinary research could be made in relation to women's history, material culture, theatrical design, fashion design, and business history.

¹⁸⁰ During the 1890s, a brief and short-lived movement to organize women inventors was led by Charlotte Smith.

The patents studied provide a window on the progress achieved over time in the functionality and healthiness of the dress. Indirectly, they also provide a window in women's life, and the changes they encountered (like entering the labor force, or becoming active participants in sport activities). The utility patents also represent the ingenuity of the inventors in transforming of what is viewed today as 'dysfunctional garments' –like bustles or hoop-skirts– in functional, more comfortable, and wearable garments.

The present study brings a wealth of information from the analysis of 864 utility patents issued between 1846 and 1920 in the Nether Garments class, adding to the knowledge already existent in the field. This study will be a useful tool for apparel college professors involved in teaching and research of historic costumes from the second part of the 19th century and early 20th century, and for museum curators and costume historians engaged in restoration and preservation. Also, students in fashion, theatre or decorative arts could use this research as a starting point in finding accurate sources of inspiration for designing movie/theatre costumes.

REFERENCES

- Albrecht, J., Farrell-Beck, J., & Winakor, G. (1988). Function, fashion and convention in American women's riding costume, 1880-1930. *Dress*, 14, 56-67.
- Angell K.G. Fashion 224 History of Costume Homepage. [Online]. State University of New York, College at Oneonta, NY. Available: <http://employees.oneonta.edu/angellkg/1890.HTML> [2004, July 15].
- Baker, H.E. (1969). *The colored inventor*. New York: Arno Press.
- Ballin, A. (2003). Health issues and dress reform. In K.K.P. Johnson, S.J. Tortore, & J.B. Eicher (Eds.), *Fashion foundations: Early writings on fashion and dress* (p. 13). New York: Berg.
- Beal, W.J. (1915). *History of the Michigan Agriculture College and biographical sketches of trustees and professors*. East Lansing, MI: Agricultural College.
- Benedict, R. (2003). Dress. In K.K.P. Johnson, S.J. Tortore, & J.B. Eicher (Eds.), *Fashion foundations: Early writings on fashion and dress* (p. 33). New York: Berg.
- Bijker, W.E. (1995). *Or bicycles, bakelites, and bulbs: Toward a theory of sociotechnical change*. Cambridge, MA: MIT Press.
- Bishop, C. (2004). Period Fashions Reference Library of Vintage Victorian. [Online]. Available: <http://www.vintagevictorian.com/Fashion.html> [2004, July 15].
- Breeden, R. (Ed.). (1971). *Those inventive Americans*. National Geographic Society.
- Chancey, J.E. (2004). Sense and Sensibility Patterns. [Online]. Available: <http://www.sensibility.com/> [2004, July 15].
- Clayton, N. (1994). *Early bicycles: Shire Album 173*. Buckinghamshire, England: Shire Publication Ltd., Cromwell House.
- Corsets & Crinolines. (2004). [Online]. Available: <http://www.corsetsandcrinolines.com/> [2004, July 18].
- Doyle New York. [Online]. Available: <http://www.doylenewyork.com/> [2004, July 21].
- Farrell-Beck, J., & Gau C. (2002). *Uplift: The bra in America*. Philadelphia: University of Pennsylvania Press.

- Fashion-Era. (2004). [Online]. Available: <http://www.fashion-era.com> [2004, July 21].
- Friedel, R. (1994). *Zipper: An exploration in novelty*. New York: W.W. Norton & Company.
- Godey's Lady's Book. (1995). [Online]. Available: <http://www.history.rochester.edu/godeys/> [2004, July 15].
- Greenberg, H. (2000). *Hope hall for the humanities: Gallery, Godey's Lady's Book*. [Online]. University of Vermont, VT. Available: <http://www.uvm.edu/~hag/godey/images/picscolor.html> [2004, July 15].
- Griswold, R.E. (2004). *Digital archive of documents on weaving, textiles, lace, and related topics*. [Online]. University of Arizona, AZ. Available: <http://www.cs.arizona.edu/patterns/weaving/illustrations.html> [2004, July 15].
- Hanks, D.A. (1981). *Innovative furniture in America from 1800 to the present*. New York: Horizon Press.
- Harris, K. (2003). Vintage Connection. From Delineator, May 1899. *The latest for cycling*. [Online]. Available: <http://www.geocities.com/vintageconnection/VintageConnection--VictorianBicycleDress.html> [2004, July 15].
- Helvenston, S. (2002). *Late 19th and early 20th century technology in garment stiffeners and its relation to plastics technology*. Paper presented at the meeting of the Costume Society of America, Chicago, IL.
- Johnson Lewis, J. (2004). *Women's History*. [Online]. Available: <http://womenshistory.about.com/library/weekly/aa050900a.htm> [2004, March 15].
- Joslyn-Gage, M.E. (1870). *Woman as inventor*. Fayetteville, NY: New York State Woman Suffrage Association, F.A. Darling.
- Kaiser, S.B., Nagasawa, R.H., & Hutton, S.S. (1995). Construction of an SI theory of fashion: Part I. Ambivalence and change. *Clothing and Textiles Research Journal*, 13(3), 172-183.
- Katherine's Dress Site: Fashion Plates and Photographs. (2004). [Online]. Available: http://www.koshka-the-cat.com/fashion_plates.html [2004, July 15].
- Kidwell, C.B. (1979). *Cutting a fashionable fit: dressmakers' drafting systems in the United States*. Washington: Smithsonian Institution Press.

- Laver, J. (1988). *Costume and fashion: A concise history*. New York: Thames and Hudson.
- Macdonald, A.L. (1992). *Feminine ingenuity: Women and invention in America*. New York: Ballantine Books.
- Maginnis, T. (2004). *Time line of costume history: 19th Century Western costume, hoop era (1850 to 1870)*. [Online]. University of Alaska, AK. Available: <http://www.costumes.org/history/100pages/timelinepages/1860to65.htm> [2004, July 15].
- Manchester Gallery of Costume, England. [Online]. Available: http://www.manchestergalleries.org/html/costume/goc_home.jsp [2004, July 18].
- Marks, P. (1990). *Bicycles, bangs, and bloomers: The new woman in the popular press*. Lexington, KY: University Press of Kentucky.
- McCord Museum, Canada. [Online]. Available: <http://www.mccord-museum.qc.ca/> [2004, July 18].
- Metz Bicycle Museum in Freehold, NJ. [Online]. Available: <http://www.metzbicyclemuseum.com/bicycles3.htm> [2004, April 02].
- Meyers, M. (1960). *The Jacksonian persuasion, politics and belief*. Stanford, CA: Stanford University Press.
- Pedaling History Bicycle Museum, Orchard Park, NY. *A quick history of bicycle*. [Online]. Available: <http://www.pedalinghistory.com> [2004, April 02].
- Philadelphia Museum of Art, PA. (2004). [Online]. Available: <http://www.philamuseum.org/main.asp> [2004, July 18].
- Picken, M.B. (1973). *The fashion dictionary: Fabric, sewing, and apparel as expressed in the language of fashion*. New York: Funk & Wagnalls.
- Pilato, D.E. (1998). *The retrieval of a legacy: Perspectives on presence and progress of nineteenth century women inventors in American culture*. Unpublished Ph.D. thesis, Michigan State University, East Lansing, Michigan.
- Portland Online. *The Middletown Tribune, 1896*. [Online] Available: <http://www.portlandct.org/History1896/Intro.htm> [2004, April 02].
- Roach, M.E., & Musa, K.E. (1980). *New perspectives on the history of Western dress*. New York: NutriGuides.

- Roth, R. (1981). Nineteenth-century American patent furniture. In D.A. Hanks, *Innovative furniture in America from 1800 to the present* (pp. 23-46). New York: Horizon Press.
- Russell, D.A. (1983). *Costume history and style*. Englewood Cliffs, NJ: Prentice-Hall.
- Schlesinger, Jr., A.M. and Bowman, J.S. (Eds.). (1993). *The almanac of American history*. New York: Barnes & Noble Books.
- Schmookler, J. (1972). *Patents, invention, and economic change. Data and selected essays*. Zvi Griliches and Leonid Hurwicz (Eds.). Cambridge, MA: Harvard University Press.
- Scientific American*. Cornell University Library. (2004). [Online]. Available: <http://campusgw.library.cornell.edu/> [2004, August 17].
- Smithsonian National Museum of American History, Behring Center. (2004). [Online]. Available: <http://americanhistory2.si.edu/costume/> [2004, July 22].
- Stanley, A. (1993). *Mothers and daughters of invention*. Metuchen, NJ: Scarecrow Press, Inc.
- The American Heritage Dictionary of English Language* (Fourth Ed.). (2000). Boston, MA: Houghton Mifflin Company.
- The Historic Costume & Textiles Collection. [Online]. Ohio State University, OH. Available: <http://costume.osu.edu/> [2004, July 23].
- The Kyoto Costume Institute, Japan. (2004). [Online]. Available: <http://www.kci.or.jp/> [2004, July 18].
- The Metropolitan Museum of Art – The Costume Institute. (2004). [Online]. Available: http://www.metmuseum.org/Works_Of_Art/department.asp?dep=8 [2004, July 22].
- The Museum of the City of New York. [Online]. Available: <http://www.mcny.org/> [2004, July 15].
- The Oxford Dictionary and Thesaurus, American Edition*. (1996). New York: Oxford University Press.
- The State Hermitage Museum, Russia. (2004). [Online]. Available: http://www.heritagemuseum.org/html_En/index.html [2004, July 21].
- The Wheelmen Organization, Wilmington, DE. (2004). [Online]. Available: <http://www.thewheelmen.org> [2004, April 02].

Trescott, M.M. (Ed.). (1979). *Dynamos and virgins revisited: Women and technological change in history - an anthology*. Metuchen, NJ: Scarecrow Press, Inc.

United States Patent and Trademark Office. (2002). *Patent Classification*. [Online database]. Washington, D.C.: USPTO - SIRA - Office of Patent Automation - Reference Tools Project. Available: <http://www.uspto.gov/web/patents/classification/uspcindex/indexa.htm> [2003, February 10].

United States Patent and Trademark Office. (2001). *Basic facts about trademarks*. Washington, D.C.: U.S. Patent and Trademark Office.

United States Patent and Trademark Office. (1999). *Celebrating American ingenuity: The United States Patent and Trademark Museum, Washington, D.C.*. Washington, D.C.: U.S. Department of Commerce, Patent and Trademark Office.

United States Patent and Trademark Office. (1999). *Basic facts about patents & A supplement highlighting new legislation*. Washington, D.C.: U.S. Department of Commerce, Patent and Trademark Office.

United States Patent and Trademark Office. (1999). *Leading American innovation*. Washington, D.C.: U.S. Department of Commerce, Patent and Trademark Office.

United States Patent and Trademark Office. (1992). *Highlights in patent activity*. Washington, D.C.: U.S. Department of Commerce, Patent and Trademark Office.

United States Patent and Trademark Office. (1988). *The story of the U.S. Patent and Trademark Office*. Washington, D.C.: U.S. Department of Commerce, Patent and Trademark Office.

United States Patent Office. (1965). *The story of the United States Patent Office, with a special supplement: Patents in action*. [Washington]: Pharmaceutical Manufacturers Association.

University of New Hampshire Museum, NH. [Online]. Available: <http://www.izaak.unh.edu/museum/index.htm> [2004, July 18].

Velorama National Bicycle Museum, Holland. [Online]. Available: <http://www.velorama.nl/engels/museum> [2004, April 02].

Victoria and Albert Museum, England. [Online]. Available: <http://www.vam.ac.uk/> [2004, July 18].

Welsh, P.C. (1965). *United States patents, 1790-1870: New uses for old ideas*. Washington: Smithsonian Institution.

Wolverines Year Book. (1919). East Lansing, MI: Michigan State University Archives.

Young, A.B. (1966). *Recurring cycles of fashion, 1760-1937*. New York: Cooper Square Publishers, Inc.

APPENDICES

DEFINITIONS¹⁸¹

- ✱ A **patent** protects an invention, and it is granted by the Government to an inventor to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States. A valid patent may not be obtained if the invention was in public use or on sale in the U.S. for more than one year prior to the filing of a patent application. A U.S. patent protects the invention in this country only. The cost of a patent varies by type of patent, whether the applicant is a small entity,¹⁸² or a corporation, and several other factors. In 1999, for a utility patent, the basic filing fee, the issue fee, and the maintenance fees¹⁸³ during the patent term would total approximately \$4,000 for a small entity. Charges for design and plant patents are slightly lower. Fees are adjusted annually.
- ✱ **Utility patents** protect useful processes, machines, articles of manufacture, and compositions of matter. Utility patents are granted for a term that begins on the date of the grant and ends 20 years from the date the patent application was first filed.
- ✱ **Design patents** guard the unauthorized use of new, original, and ornamental designs for articles of manufacture. (First issued in 1842.) Design patents are granted for a term of 14 years from the date of the grant.
- ✱ **Plant patents** are the way to protect invented or discovered, and asexually reproduced any distinct and new varieties of plants. (First issued in 1930.) Plant patents are granted for a term that begins on the date of the grant and ends 20 years from the date the patent application was first filed.
- ✱ **Trademarks (TM)** protect words, names, symbols, sounds, or colors that distinguish goods and services of one party from those of others. Most applicants base their application on their current use of the mark in commerce, or their intent to use their mark in commerce in the future.¹⁸⁴ Trademarks are important in building up industrial recognition and goodwill. They serve to indicate to purchasers that the quality of the goods bearing the mark remains constant, and it serves as the focal point of advertising disseminated to create and maintain a demand for the product. Trademarks, unlike patents, can be renewed forever as long as they are being used in business.
- ✱ A **service mark (SM)** is the same as a trademark, except that it identifies and distinguishes the source of a service rather than a product.

¹⁸¹ USPTO, 1999; USPTO, 2001; USPO 1965; USPTO, 1992; USPTO, 2002.

¹⁸² Small entities consist of independent inventors, small businesses with less than 500 employees or non-profit organizations.

¹⁸³ Maintenance fees are due at 3.5, 7.5 and 11.5 years following the date of patent issue; patents are subject to expiration if fees are not received within six months following the due date. Maintenance fees for larger entities are twice those of small entities (USPTO, 1992).

¹⁸⁴ A Certificate of Registration is issued for applications based on use, or a Notice of Allowance is issued for intent-to-use applications.

- ✳ **Copyrights** protect works of authorship, such as writings, music, and works of art that have been tangibly expressed. The Library of congress registers copyrights which last for the life of the author plus 50 years.
- ✳ **Trade secrets** are information that companies keep secret to give them an advantage over their competitors.
- ✳ **Applications** are **patentable** if they present something new, useful, and involve invention. The patent gives the inventor the right to exclude all others from making, using, or selling his invention for 20 years. Methods of doing business, a mere idea or suggestion, or printed matter cannot be patented. A patent holder loses exclusive right of the invention when the term expires or when periodic maintenance fees are not paid.
- ✳ A **provisional application** for a patent establishes a filing date but does not begin the examination process. It provides the inventor with a one-year period to further develop the invention, determine marketability, acquire funding or capital, or seek licensing agreements. To obtain a patent, the inventor must file a nonprovisional application within 12 months of the filing date of the provisional application.
- ✳ A **nonprovisional application** begins the examination process that may lead to a patent. The application must include: a specification (a satisfactory description of the invention with at least one claim), a drawing where necessary, an oath or declaration, and the filing fee required by law.
- ✳ **Claims** are used to judge the patentability of an invention, and they are the most important part of a nonprovisional application. A concisely written claim describes an invention without unnecessary details and recites all essential features necessary to distinguish the new invention from what is old. Many inventors make a search of issued patents to be sure that someone else has not already patented their idea. Claims continue to be important once the patent is granted, because questions of infringement are judged by the courts on the basis of claims.
- ✳ **Assignment** is the transfer of property rights from one person to another. The **assignor** is the owner (patentee) of the patent, and he/she is the one that makes an assignment. The **assignee** is the party to which a transfer of property, rights or interest is made. A patent is personal property and may be sold to others or mortgaged; it may be bequeathed by a will; and it may pass to the heirs of a deceased patentee. The patent law provides for the transfer or sale of a patent by an instrument in writing. Such an instrument is referred to as an assignment and may transfer the entire interest in the patent. The assignee, when the patent is assigned to him or her, becomes the owner of the patent and has the same rights that the original patentee had.
- ✳ **Reissued application** is an application for a patent to take the place of an unexpired patent that is defective in one or more particulars
- ✳ **Renewal application** is a sworn document, filed by the owner of a registration, to avoid the expiration of a registration.

- ✱ The terms: **patent pending** or **patent applied for** may be used by a manufacturer or seller of an article to inform the public that a pending provisional or nonprovisional application for that article is on file.
- ✱ **Manual Classification** is a loose-leaf volume listing the numbers and descriptive titles of more than 400 classes and 200,000 subclasses used in the subject classification.
- ✱ **Apparel** (class 2): This is the generic class for garments and other devices to be worn by mankind to adorn, cover or protect the body or person. Included within the class are (1) such garments or devices, per se, (2) combinations of such garments or devices with other things where the combination is not elsewhere provided for, (3) processes of, and patterns for making such garments or devices, (4) subcombinations of garments and the like, not elsewhere provided for and processes of manufacture relating to such subcombinations, and (5) garment supporters and retainers.
- ✱ **Foundation Garments** (class 450): This class includes devices which are specifically designed to fit the human body to protect, compress, support, restrain or alter the configuration of the body torso or a portion thereof, e.g., the female mammae, or those portions of the body lying below the mammae and extending along a line below the abdomen portion of the body to the region of the thighs.
- ✱ **Knitted Garments** (subclass 66/171): The manufacture of fabric structures from strands by forming loops and drawing the bights thereof through previously-formed loops.
- ✱ **Life Preservers** (subclass 441/88): Device worn by a user and including buoyancy means to sustain the user floating in a body of water.
- ✱ **Boots, Shoes and Leggings** (class 36): This class is intended to receive foot coverings which are generally provided with reinforced tread surfaces.
- ✱ **Parachutes Attached to Garments** (subclass 244/143): Devices having umbrella-like canopies of such area that their resistance to motion through the air will cause persons or objects attached to them to be lowered slowly to the ground.
- ✱ TM and SM may be used when claiming the rights in a mark, regardless of whether an application with the USPTO was filed. However, the applicant may use the **federal registration symbol** ® only after the USPTO actually registers a mark, and not while an application is pending.
- ✱ For the purpose of obtaining federal registration, **commerce** means all commerce that the U.S. Congress may lawfully regulate. **Use in commerce** must be a bona fide use of the mark in the ordinary course of trade, and not use simply made to reserve rights in the mark.
- ✱ When two inventors apply for a patent for the same invention, an **interference** is declared. Testimony may be submitted by each applicant and the Patent Office decides which one made the invention first (not which one made the application first) and grants him the patent.

- ✱ The **Index of Utility Patent Activity** measures the extent to which patent activity is concentrated in each state and the District of Columbia. This index compares the percent distribution of patents, by state, to the percent distribution of population by state. A state with an index value greater than 1.00 means proportionately more patents are granted to inventors residing in that particular state compared with other states.¹⁸⁵
- ✱ A **country's activity index for a class** is determined by taking the proportion of utility patents granted in the class that originated in the country and dividing it by the proportion of all utility patents granted in all classes, which originated in that country.¹⁸⁶ Only classes for which at least 200 patents were granted have been included in the calculation of the index.

¹⁸⁵ A high index value of patent activity does not necessarily imply that inventive activity is widely dispersed throughout a state's population. A high index value could result from a large number of patents granted to many inventors, or a large number of patents granted to just a few inventors.

¹⁸⁶ For example, apparel class received lesser patenting emphasis between 1980 and 1990 for residents of the United States, the activity index dropping from 0.491 to 0.467, respectively (USPTO, 1992).

SELECTIVE NOTES FROM THE HISTORY OF PATENTS¹⁸⁷

1790 Act, April: The subject matter of a United States patent is defined as “any useful art, manufacture, engine, machine, or device, or any improvement thereon not before known or used.

To apply for a patent a specification and drawing, and –if possible– a model, must be presented.”

For a fee between \$4 and \$5 a patent was issued for a period not to exceed 14 years.

Also in 1790, in May, the Congress enacts the first Federal copyright law.

The Act of **1793**: “An application is no longer examined for novelty and usefulness, but a patent is granted to anyone who applies, submits the proper drawings and pays the necessary fee.”

The application fee is changed to \$30.

1794: Eli Whitney receives a patent for his cotton gin,¹⁸⁸ which made possible “the great textile industry of later years, ...a vital bearing on American civilization.”

1800: “Aliens are given the right to obtain patents provided they have resided in this country for 2 years and have declared their intention of becoming citizens.”

1802: The Patent Office becomes a separate unit within the Department of State.¹⁸⁹

1802: Mary Kies, of Killingly, Windham County, Connecticut, is the first woman to obtain a United States patent. Her invention relates to weaving straw with silk or thread.

1834: Cyrus H. McCormick of Virginia receives a United States patent for his reaper, “which is one of America’s greatest contributions to agricultural advance, makes the vast grain fields of the West available for full production and assures a sufficient supply of cereals for the world’s needs.”

¹⁸⁷ USPTO, 1988.

¹⁸⁸ A controversy arises regarding who was he first to invent the cotton gin. Joslyn-Gage (1870) asserts that a woman made this important invention that impacted the American economy. “This great mechanical triumph of modern times was due to Catharine Littlefield-Greene. The great difficulty of separating cotton from the seed was at that time a consistent subject of complaint among cotton-planters. To separate a pound of seed was a “Negro’s task for a day.” By means of this invention, an extraordinary impetus was given to the culture of cotton. Instead of one pound a day, as formerly cleaned by hand, 300 pounds were cleaned by the gin, and in a much better manner than hand work could do. Every cotton-mill throughout the world ... is indebted to Mrs. Greene for its activity. [...] With regard to the utility of this discovery ... the invention of this machine at once opened views to [the inhabitants of the Southern States] that set the whole country in active motion. ... Individuals who were depressed with poverty and sunk in idleness have suddenly risen to wealth and respectability. ... We cannot express the weight of the obligation which the country owes to this invention.”

¹⁸⁹ Nowadays, USPTO is an agency of the U.S. Department of Commerce.

1835: “Henry Blair, of Glen Ross, Maryland, receives a patent for an improved corn planter. He may have been the first black inventor to receive a patent.”

1836: Samuel Colt, of Hartford, Connecticut, receives a patent on a “Revolving Gun,” the first of the famous “Six-Shooters.”

Act of 1836: Vital changes are made in the patent laws, this being “the most important patent law ever enacted by the United States, with the exception of the original Act of 1790. The patent laws of today ... are based upon the principles set forth in this act.”

The Act of 1836 reestablishes the “examination” system in effect before 1793. “As a result the patent system functions smoothly, the courts are relieved of countless unnecessary patent cases, and a patent becomes a far more valuable asset to its owner.” When issued, the patent is good for 14 years, subject to an extension of 7 years. For the first time appeals are permitted if the Examiner or Patents refuse to issue a patent.

“The application fee is \$30 for citizens, and \$500 for British subjects, and \$300 for all other aliens. This apparent discrimination results from similar treatment of American citizens in foreign patent offices.”

“Employees of the Patent Office are henceforth forbidden to acquire any interest in a patent, except by inheritance or bequest.”

“The Commissioner is to provide for the arrangement and classification of models in galleries where they are to be displayed to the public.” The display of models “was one of the greatest tourist attractions in Washington. After 1880, however, models were no longer required. The historically most interesting of these models were used for exhibition purposes by the Smithsonian Institution, where they may be seen today.”

“The present system of numbering patents consecutively begins with the patents issued under the new law [of 1836]. Previously issued patents are not numbered.”

1836: The great fire destroyed the Patent Office completely. The loss was estimated at 7,000 models, 9,000 drawings, and 230 books, plus the loss of all records of patent applications and grants.

1837: “The act requires that two sets of patent drawings be furnished by the inventor, one to be attached to the patent itself and one to be filed at the Patent Office. In this manner a double record—a safeguard against future fires—is kept.”

1840: Samuel F. B. Morse, of New York, receives patent for “Telegraph Signs.”

1842: Designs are made patentable. The term of a design patent is 7 years.

1844: Charles Goodyear of New York receives patent for an “Improvement in the manner of preparing fabrics of caoutchouc or India-rubber.” “The vulcanization of rubber, which Goodyear’s process made possible, gives rise to great industries in the years to come.”

1846: Elias Howe, Jr., of Cambridge, Massachusetts, receives a patent for an “Improvement in Sewing Machines.” By inventing a “new and useful machine for sewing seams in cloth or other articles,” Howe gives a new stimulus to industry.

1853: “Commissioner Mason, . . . , employs women clerks to work in a Government office. Prior to this time some women had been employed to do clerical work such as copying in their own homes. A great deal of objection was raised to the innovation in the Patent Office, but Commissioner Mason steadfastly adhered to his plans.”

1861: The Act of 1861 increases the term of a patent grant from 14 to 17 years, at the same time withdrawing the power of the Commissioner of Patents to extend patents for an additional 7 years.

1861-1865: Due to the outbreak of the war there is a great decrease in the activities of the Patent Office.

1865: As soon as the war is over there is a noticeable increase in patent applications.

1868: Patent granted to Christopher L. Sholes and others for a Typewriter.

1869: The merit system is introduced for selecting appointees to the technical staff of the Patent Office. Also, all drawings must conform to uniform standard – to simplify the process of reproduction.

1870: John W. Hyatt, Jr., and Isaiah S. Hyatt, of Albany, N.Y., receives a patent for “Improvements in Treating and Molding Pyroxyline.” From this invention springs the great celluloid industry, supplying toilet articles, camera film, and thousands of other articles.

1871: Congress directs the Commissioner of Patents to have copies of patents printed, some for free distribution to libraries and others to be offered for sale to the public at a nominal charge.¹⁹⁰

1872: The first *Official Gazette of the United States Patent Office* is issued. Published weekly thereafter, it has systematically recorded excerpts from patents, the more important decisions concerning Patent Office practice and related matters.

1873: The Appropriation Act of 1873, in its provisions for assistant examiners states that two of these positions may be held by women. Anna R. G. Nichols, of Melrose, Mass., becomes the first woman patent examiner.

1874: Joseph F. Glidden, of De Kalb, Illinois, receives a patent for an “Improvement in Wire Fences.” His improvement becomes known as barbed wire, and “makes possible

¹⁹⁰ Hitherto, in order to study the patents, it had been necessary to consult the original drawings and specifications in the Patent Office, or have copies made at considerable expense.

the cheap and efficient fencing of vast areas of western farm lands.”

1876: “Centennial Exhibition held at Philadelphia. The wonders of the industrial progress of the last century are shown to the public.”

1876: Alexander Graham Bell, of Salem, Massachusetts, receives a patent on “Telegraphy,” known as the telephone.

1878: Thomas A. Edison, of Menlo Park, New Jersey, receives a patent for a “Phonograph or Speaking Machine.” (Edison obtained 1,093 patents, four being issued posthumously.)

1880: Thomas A. Edison, of Menlo Park, New Jersey, receives a patent for “An Electric Lamp for Giving Light by Incandescence.”

1881: The first constitutional trademark registration act was passed. Its provisions referred to trademarks used in commerce with foreign nations and with the Indian tribes.

1881-1891: This was one of the greatest decades of invention of all time. The trolley car, the incandescent light, the automobile, the cash register, the dynamo, the pneumatic tire, smokeless powder, transparent film, electrical welding, the cyanide process, the steam turbine, the aluminum manufacturing process, and the electric furnace, all were invented or introduced in this time period.

1885: Sarah E. Goode is the first black woman to obtain a United States Patent. She receives a patent for a “Folding Cabinet Bed.”

1887: The United States becomes a member of the International Convention for the Protection of Industrial property (patents and trademarks), formed in Paris in 1883. “This Convention becomes an important instrumentality for protecting the patent and trademark right of Americans in foreign countries and of foreigners in the United States. Each member of the Convention gives to nationals whose governments belong to the Convention the rights it gives to its citizens.”

1888: Nikola Tesla of New York receives a patent for the “Electrical Transmission of Power.” This invention is the genesis of the induction type of electric motor, so widely used in modern industry.

1890: Ottmar Mergenthaler, of Baltimore, Maryland, receives a patent for a “Machine for Producing Linotypes, Type Matrices, etc.” The cheap and rapid reproduction of newspapers, books, and magazines is largely dependent on Mergenthaler’s invention of the linotype.

1893: Frederic E. Ives, of Philadelphia, receives a patent for a “Photogravure Printing Plate.” The cheap, rapid reproduction of illustrations for newspapers, magazines, and

books is made possible by this invention. The process of reproduction becomes known as “ half-tone printing.”

1893: Patent No. 504,038 granted to Whitcomb L. Judson, for “Slide Fastener” (now commonly known as the zipper).

1897: “Guglielmo Marconi, a subject of the King of Italy, receives a patent for “New and Useful Improvements in Transmitting Electrical Impulses and Signals and in the Apparatus Thereof... by means of oscillations of high frequency.” In other works, wireless telegraphy.”

1898: Rudolph Diesel of Berlin, Germany, receives a patent for “New and Useful Improvements in Internal-Combustion Engines.”

1898: Henry Ford, of Detroit, Michigan, receives a patent for “New and Useful Improvements in Carburetors... especially designed for use in connection with gas or vapor engines.” In 1901 he receives a patent for “New and Useful Improvements in Motor-Carriages.” Ford was granted a total of 161 U.S. patents.

1899: Ferdinand Zeppelin, of Stuttgart, Germany, receives a patent for “Improvements in and Relating to Navigable Balloons.”

1900: “Since 1809 approximately 1 out of every 1,000 patents has been issued to a woman inventor.”

1905: A new trademark act authorizes “the registration of trademarks used in interstate commerce (as well as in commerce with foreign nations and with the Indian tribes).”

1906: Orville and Wilbur Wright, of Dayton, Ohio, receive a patent for certain “New and Useful Improvements in Flying-Machines.”

1909: Leo H. Baekeland, of Yonkers, New York, receives a patent for “New and Useful Improvements in Condensation Products and Method of Making Same.” Bakelite is the direct result of this invention, and the modern plastics industry – producing thousands of articles for industrial and home use – is greatly indebted to Baekeland’s discoveries.

1917: An Army and Navy patent Board is organized at the Patent Office to determine the possible military value of new patent applications. An Act of Congress gives the Federal Trade Commission, and later the Commissioner of Patents, the power to order kept secret and withhold from publication any invention disclosed in a patent application whose disclosure might “be detrimental to the public safety... assist the enemy, or endanger the successful prosecution of the war.” During the war about 2,100 applications –of which some 1,000 were patentable– were kept secret under these laws.

1921: Harry Houdini, the magician, receives a patent for a “Diver’s Suit,” enabling the wearer “to quickly divest himself of the suit while being submerged and to safely escape

and reach the surface of the water,” (patent #1,370,316).

1906-1921: “During the last 15 years approximately 1.5 percent of all United States patents have been issued to women inventors.”

1923: Garrett Morgan receives a patent for his traffic signal, the forerunner of the modern “stop light.”

1925: “George Washington Carver receives a patent for his “Paint and Stain Process.” Dr. Carver was born in slavery, and famous for his agricultural research work at Tuskegee Institute where he developed hundreds of products from peanuts, sweet potatoes and pecan nuts.

1926: “The Patent Office conducts an exhibit at the Philadelphia Sesquicentennial Exposition. Thousands of visitors see a collection of old Patent Office models and show interest in the patent system.”

1930: Plants are now patentable.

1930: Albert Einstein of Berlin, Germany, receives, with his coinventor, a patent for “An apparatus for Producing Refrigeration.”

1934: “Florence E. Allen of Ohio is appointed to the U.S. Circuit Court of Appeals and becomes the first woman to sit as a judge in patent cases.”

1937: “Alfred E. Ischinger of Mount Penn, Pa., receives the largest patent heretofore granted by the Patent Office. The patent, on “Uninterrupted Knitting of Shaped Fabrics,” includes 170 sheets of drawings and 146 pages of specifications.”

1940, April 10: President F.D. Roosevelt, designated this day as “Inventors’ and Patent Day” to commemorate the sesquicentennial anniversary of the signing of the first patent act.

1940: “Congress passes an act giving the Commissioner of Patents temporary authority to order defense inventions to be kept secret. Amended from time to time, this authority is now a permanent part of the patent law.”

1942: Dr. Charles R. Drew, a black physician from Washington, D.C., receives a patent for “Apparatus for Preserving Blood.” His method of preserving blood aided in the treatment of thousands of soldiers during World War II.

1946: “The postwar surge in the number of patent applications filed results in 91,972 applications filed this year.”

1953: “Mrs. Robert W. (Daphne) Leeds takes oath of office as Assistant Commissioner, being the first woman appointed to that position.”

1955: “Congress appropriates \$14 million for operation of the patent Office for the fiscal year 1955....1956, the largest appropriation in history. The allowance of this amount approves expansion of the examining staff to initiate a program extending over a number of years to reduce the backlog of pending applications....”

After World War II, inventions related to atomic energy (1955 – “Neutronic Reactor” by Enrico Fermi), electronics, flight within and outside the earth’s atmosphere, etc. are patented.

Many conventions, agreements and international treaties regarding the protection of intellectual and industrial property, patent classification, trademark registration, etc. are ratified.

1967: The largest number of invention patents in history, 70,028 are granted.

1973: The National Inventors Hall of Fame is founded for the purpose of honoring the Nation’s inventors. Thomas A. Edison is the first inductee into the Inventors Hall of Fame.

1975: The name of the “Patent Office” is changed to the “Patent and Trademark Office,” and the title “Commissioner of Patents” to the “Commissioner of Patents and Trademarks.”

1982: 124,800 patent applications and 73,621 applications for the registration of trademarks.

1982: “A master plan is submitted to Congress calling for complete automation of the Office’s operations by 1990.”

1986: The first stage of an automated patent search system, which will revolutionize the patent examination process is inaugurated at the Patent and Trademark Office (PTO).

1987: The PTO announces that it will consider “applications for patents on new types of animals produced by human intervention (patent on a method of inducing sterility in oysters by applying hydrostatic pressure).”

1987: Foreign residents received 46.6% of the patents, with Japan accounting for the largest number (19.3% of the total patents).

1991: PTO starts to fully fund its operations with the fees paid by customers for its products and services. As a result, the PTO operates in much the same way as a private business (USPTO, 1999).

1999: There are nearly 800,000 registered trademarks in use today, out of 1,400,000 that have been registered (USPTO, 1999).

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EARLY AFRICAN-AMERICAN PATENTEES

Henry E. Baker worked for more than 35 years in the Patent Office. He started in 1877 as a copyist, graduated from the Harvard University's Law School in 1881, completed post-graduate courses, and finally rose to the position of Second Assistant Examiner. In his book *The Colored Inventor* (reprinted in 1969) Baker shows that African-Americans "contributed mightily to the important field of invention in the short period since their liberation." Baker's book was published for the first time in 1913, on the fiftieth anniversary of the Emancipation Proclamation,¹⁹¹ and it sought to establish African-Americans' participation, which was little known. The author tried to collect the data by correspondence from patentees themselves, patent attorneys throughout the country, popular and influential newspapers, as well as from owners of large manufacturing industries. He was not very successful in his attempt mostly because the patentees were reluctant to give personal information, and many lawyers doubted to exist African-American inventors. For example, on June 24, 1913, a patent lawyer from Chattanooga, Tennessee, answered to Baker's request the following: "I never knew a Negro to even suggest a new idea. Much less try to patent one. And I have dealt with them all my life. P.S. I have asked other lawyers around me for data of Negro inventions. And they take it as a joke."

Information from African-American inventors themselves was equally difficult to get because "many of them refused to acknowledge that their inventions are in any way identified with the colored race, on the ground, presumably, that the publication of that fact might adversely affect the commercial value of their invention" (Baker, 1969). Therefore, much of Baker's compilation was incomplete, because it was mostly based on his own work experience. However, he concluded: "the nearly 800 verified patents do not represent more than one-half of those that have been actually granted to colored inventors."

Even the first patent acts were based on the principles of race, class, and gender equality, there were exclusionary limitations to whom was actually awarded a patent. From the early patents, additional information about African-American patentee's status might be inferred, because the law was so interpreted at that time as to bar the issuance of a patent to a slave. So, it transpired the presumption that the applicant was at least a "free person of color."

¹⁹¹ "...Abraham Lincoln issued that famous edict known as the Emancipation Proclamation, by which physical freedom was vouchsafed to the slaves and the descendants of slaves in this country" (Baker, 1969).

BUSTLES (tables)

Table 29. Changes in bustle classification

Researched Patents		Year
* Bustle with shoulder support		1850s-1880s
* Detachable bustle		1850s-1880s
* Material of bustle	Whalebone	1850s
	Pasteboard	1870s
	Other vegetable fibers	1880s
	Stiffened fabric	1870s
	Rubber	1850s-1880s
	Mesh wire	1880s
	Flat spring	1850s-1900s
	Wire spring	1870s-1890s
	Combination flat & wire springs	1870s-1890s
	Stuffing	1880s
	Combination wire spring & stuffing	1890s
* Material of pannier	Flat spring	1870s-1880s
	Wire spring	1880s
	Combination flat & wire springs	1870s-1880s
* Bustle cover		1880s-1900s

Table 30. Selected list of bustle patentees and their assignees

Table 30. Selected list of bustle patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Taylor	Thomas P.	Male	Connecticut	Bridgeport			355,573	74
2	Taylor	Thomas P.	Male	Connecticut	Bridgeport			358,130	80
3	Taylor	Thomas P.	Male	Connecticut	Bridgeport			359,231	131
4	Taylor	Thomas P.	Male	Connecticut	Bridgeport			359,232	71
5	Taylor	Thomas P.	Male	Connecticut	Bridgeport			361,336	165
6	Taylor	Thomas P.	Male	Connecticut	Bridgeport			364,870	130
7	Taylor	Thomas P.	Male	Connecticut	Bridgeport			366,276	85
8	Taylor	Thomas P.	Male	Connecticut	Bridgeport			370,103	92
9	Taylor	Thomas P.	Male	Connecticut	Bridgeport			374,214	103
10	Taylor	Thomas P.	Male	Connecticut	Bridgeport			374,216	71
11	Taylor	Thomas P.	Male	Connecticut	Bridgeport			374,642	141
12	Taylor	Thomas P.	Male	Connecticut	Bridgeport			376,272	185
13	Taylor	Thomas P.	Male	Connecticut	Bridgeport			634,153	113
Average Days Elapsed T. Taylor = 111									
1	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		359,240	101
2	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		359,711	193

Table 30. Selected list of bustle patentees and their assignees

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#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
3	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		365,045	69
4	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		370,181	160
5	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		370,927	108
6	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		372,116	81
7	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		373,050	216
8	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		375,922	78
9	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		375,923	78
10	Canfield	Henry O.	Male	Connecticut	Bridgeport	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]		375,924	71

Table 30. Selected list of bustle patentees and their assignees

Table 30. Selected list of bustle patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
Average Days Elapsed H. Canfield = 116									
1	Thomas*	Amos W.	Male	Pennsylvania	Philadelphia			114,624	
2	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			128,337	
3	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			140,966	40
4	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			164,339	234
5	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			164,340	35
6	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			180,172	320
7	Thomas	Amos W.	Male	Pennsylvania	Philadelphia			377,652	206
8	Thomas	Amos W.	Male	Pennsylvania	Philadelphia		RE4,903		
9	Thomas	Amos W.	Male	Pennsylvania	Philadelphia		RE5,563		64
Average Days Elapsed A. Thomas = 150									
1	Taylor	Henry H.	Male	Connecticut	Bridgeport			601,361	123
2	Taylor	Henry H.	Male	Connecticut	Bridgeport			617,452	132
3	Taylor	Henry H.	Male	Connecticut	Bridgeport			645,634	237
4	Taylor	Henry H.	Male	Connecticut	Bridgeport			658,599	35
5	Taylor	Henry H.	Male	Connecticut	Bridgeport			704,146	120
6	Taylor	Henry H.	Male	Connecticut	Bridgeport			714,532	52
7	Taylor	Henry H.	Male	Connecticut	Bridgeport			741,184	67
Average Days Elapsed H. Taylor = 109									

Table 30. Selected list of bustle patentees and their assignees

Table 30. Selected list of bustle patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Buschmann	Victor H.	Male	Maryland	Baltimore	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]		344,767	157
2	Buschmann	Victor H.	Male	Maryland	Baltimore	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]		358,800	235
3	Buschmann	Victor H.	Male	Maryland	Baltimore	Augustus H. Brinkmann, of same place [Baltimore, Maryland]		374,519	43
4	Buschmann	Victor H.	Male	Maryland	Baltimore	Augustus H. Brinkmann, of same place [Baltimore, Maryland]		385,296	124
5	Buschmann	Victor H.	Male	Maryland	Baltimore	Augustus H. Brinkmann, of same place [Baltimore, Maryland]		396,025	50
Average Days Elapsed V. Buschmann = 122									
1	Carpenter**	Charles C.	Male	New York	New York			324,226	87
2	Carpenter	Charles C.	Male	New York	New York			366,378	76
3	Carpenter	Charles C.	Male	New York	New York			379,001	187
4	Carpenter	Charles C.	Male	New York	New York	C. C. Carpenter		419,181	270
5	Carpenter	Charles Clarence	Male	New York	New York			334,638	123
Average Days Elapsed C. Carpenter = 149									

Table 30. Selected list of bustle patentees and their assignees

Last Name #	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Jeffery	Frank M.	Male	New Jersey	Jersey City		378,964	131
2	Jeffery	Frank M.	Male	New Jersey	Jersey City		379,516	77
3	Jeffery	Frank M.	Male	New Jersey	Jersey City		386,249	342
4	Jeffery	Frank M.	Male	New Jersey	Jersey City		390,973	280
Average Days Elapsed F. Jeffery = 208								
1	Weldon	Elizabeth S.	Female	New York	New York		173,700	115
2	Weldon	Elizabeth S.	Female	New York	New York		173,701	115
3	Weldon	Elizabeth S.	Female	New York	New York		173,702	253
4	Weldon	Elizabeth S.	Female	New York	New York		185,150	75
Average Days Elapsed E. Weldon = 140								
1	Reed***	Beverly S.	Female	Massachusetts	Boston		328,717	153
2	Reed	Beverly S.	Female	Massachusetts	Boston		331,821	208
3	Reed	Beverly S.	Female	Massachusetts	Boston		344,860	169
Average Days Elapsed B. Reed = 177								

Note: * Thomas had a 10th patent Improvement in Dress-Train Supporters, #199,170 (1/15/1878)

** Carpenter also received patent# 324,300 for Pannier or Pannier-Skirt

*** Reed had a fourth patent for Hoop-Skirt, # 323,963 (8/11/1885)

The following male patentees were not included in the list:

Robert Biering from New York, New York, three patents: #160,048 (2/23/1875), #168,130 (9/28/1875), and #170,807 (12/7/1875); **Caleb E. Brown** from Jackson, Michigan, three patents: #300,565 (6/17/1884), #306,899 (10/21/1884), and #329,270 (10/27/1885). Caleb had a fourth patent for Hoop-Skirt, #329,271 (10/27/1885); **Sherman H. Hubbard** of Bridgeport, Connecticut, three patents: # 372,800, # 372,801, and # 372,802 (11/8/1887); **Amos H. Jackson** of Fremont, Ohio, three patents: #369,943 (9/13/1887), #384,850 (6/19/1888) and #386,827 (7/31/1888); **George O. Schneller**, three patents: #373,687, 373,688, 373,689 (11/22/1887); **Christopher C. Shelby** of Paterson, New Jersey, three patents: #361,969 (4/26/1887), #374,632 (12/13/1887), and #395,183 (12/25/1888)

Table 31. List of Assignees – Class 210, Bustles

Table 31. List of Assignees – Class 210, Bustles

No.	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
1	25,786	Improvement in Bustles	Assignor to himself and Charles A. Durgin	
2	25,865	Improvement in Bustles	Osborn & Vincent, of New York, N.Y.	
3	127,832	Improvement in Bustles	Assignor to himself and James L. Harlem, of same place [Brooklyn, New York]	
4	165,069	Improvement in Bustles	Leonard Winship and Samuel E. Barney of same place [New Haven, Connecticut]	29
5	266,185	Bustle	Charles W. Higby, of same place [Jackson, Michigan]	99
6	287,029	Bustle	James Stuart, of same place [Brooklyn, New York]	561
7	292,453	Bustle	Assignors to the Coronet Corset Company, of same place [Jackson, Michigan]	332
8	321,408	Bustle Attachment for Corsets	Al Waterhouse, of Durham, Maine	243
9	324,338	Bustle	Chas. [Charles] C. [Clarence] Carpenter, of same place [New York, New York]	75
10	325,031	Bustle	The Weston & Wells Manufacturing Company, of Camden, N.J.	133
11	341,082	Bustle	Jacob W. Truxel, of same place [Sedalia, Missouri]	126
12	344,767	Stiffening and Distending Spring for Garments	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	157
13	346,436	Bustle	James Fant, of same place [Joliet, Illinois]	218
14	350,111	Bustle	Assignor, by Mesne Assignments, to Emerson C. Felton, of Chicago, Illinois	557
15	358,712	Bustle	The Weston & Wells Manufacturing Company, of Camden, N.J.	113
16	358,800	Bustle	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	235
17	359,240	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	101

Table 31. List of Assignees – Class 210, Bustles

Table 31. List of Assignees – Class 210, Bustles

No.	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
18	359,302	Bustle	Simeon Rheuben Payne, of same place [Fayette, Missouri]	89
19	359,711	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	193
20	360,726	Bustle	Assignors, by Mesne Assignments, to William Meyst, Walter A. Holbrook, and Richard Klau, all of the same place [Milwaukee, Wisconsin]	141
21	361,762	Bustle	Assignor of three-fifths to Jacob Stetheimer, Jr., of same place [New York, New York]	78
22	363,458	Bustle	Henry B. Harford, of Scott County, Iowa	208
23	365,045	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	69
24	370,181	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	160
25	370,927	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	108
26	371,742	Bustle	John R. Deatherage, of same place [Fayette, Missouri]	174
27	372,098	Bustle	Simeon Rheuben Payne, of same place [Fayette, Missouri]	217
28	372,116	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	81
29	372,183	Bustle	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	92
30	372,633	Bustle	One-half to Ralph Rees of same place [Minneapolis, Minnesota]	144
31	372,800	Bustle	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	75
32	372,801	Bustle	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	75
33	372,802	Bustle	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	73
34	373,050	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	216
35	374,519	Bustle	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	43

Table 31. List of Assignees – Class 210, Bustles

Table 31. List of Assignees – Class 210, Bustles

No.	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
36	374,660	Bustle	Said Olive J. Decker assignor to James Ayres and Peter Ayres, of same place [Keokuk, Iowa]	57
37	375,318	Bustle	Assignor, by Mesne Assignments, to Wallace C. Sexton, of same place [Chicago, Illinois]	407
38	375,922	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	78
39	375,923	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	78
40	375,924	Bustle	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	71
41	378,134	Bustle	I. Newman & Sons, of New Haven, Connecticut	76
42	378,187	Bustle	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	96
43	378,439	Bustle	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	74
44	382,378	Bustle	Charlotte Abair, of same place [Denver, Colorado]	272
45	383,421	Bustle	One-half to Richard S. Mallary, of same place [Detroit, Michigan]	147
46	385,296	Bustle	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	124
47	391,757	Bustle	The Weedsport Skirt and Dress Company, of same place [Weedsport, New York]	243
48	396,025	Bustle	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	50
49	404,798	Bustle	The Rheubottom & Teall Manufacturing Company, of same place [Weedsport, New York]	99
50	406,553	Bustle	One-half to Myron G. Wood, of Hillsdale, Michigan	199
51	419,181	Bustle	C. C. Carpenter	270

Table 31. List of Assignees – Class 210, Bustles

Table 31. List of Assignees – Class 210, Bustles

Utility No.	Patent #	Title of Patent	Assignor to	Days Elapsed
52	436,748	Combined Skirt-Lifter and Bustle	George H. Engelman, of same place [St. Louis, Missouri]	129
53	436,749	Combined Skirt-Lifter and Bustle	George H. Engelman, of same place [St. Louis, Missouri]	73
54	457,172	Bustle	Isaac B. Kleinert, of New York, N.Y.	195
55	626,207	Bustle	August H. Brinkmann, of same place [Baltimore, Maryland]	222
56	692,095	Bustle and Hip Extension	Sophia H. Sawyer, of Wellfleet, Massachusetts	115
57	776,115	Bustle	One-half to John P. Platte, of Grand Rapids, Michigan	50
58	838,722	Bustle	The Warner Brothers Co., of Bridgeport, Connecticut, a corporation of Connecticut	73
Out of 267 patents issued in Bustle Class, 21.72% were assigned to persons or corporations.				
General <i>Average Days Elapsed</i> between Application and Approval dates for all patents in class 210 = 186.89 days <i>Average Days Elapsed</i> between Application and Approval of patents not assigned, class 210 = 197.73 days <i>Average Days Elapsed</i> between Application and Approval of assigned patents for class 210 = 152.96 days The difference <i>Average Days Elapsed</i> between not assigned–assigned patents is = 44.77 days				
Bustle patents assigned to persons or corporations were approved in 22.64% less time than those with no assignee(s).				

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

#	Assignor to	Utility Patent #	Patentee's Gender (1)	Patentee's Gender (2)
1	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	373,050	Male	
2	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	365,045	Male	
3	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	372,116	Male	
4	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	375,922	Male	
5	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	370,927	Male	
6	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	375,924	Male	
7	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	370,181	Male	
8	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	359,711	Male	
9	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	359,240	Male	
10	The Canfield Rubber Company, of same place [Bridgeport, Connecticut]	375,923	Male	
1	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	378,439	Male	
2	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	372,183	Male	
3	Thomas P. Taylor, of same place [Bridgeport, Connecticut]	378,187	Male	
4	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	372,802	Male	Male
5	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	372,801	Male	Male
6	Assignors to Thomas P. Taylor, of same place [Bridgeport, Connecticut]	372,800	Male	Male
1	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	358,800	Male	

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

#	Assignor to	Utility Patent #	Patentee's Gender (1)	Patentee's Gender (2)
2	One-half to Augustus H. Brinkmann, of same place [Baltimore, Maryland]	344,767	Male	
3	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	374,519	Male	
4	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	396,025	Male	
5	Augustus H. Brinkmann, of same place [Baltimore, Maryland]	385,296	Male	
6	August H. Brinkmann, of same place [Baltimore, Maryland]	626,207	Male	
1	The Weston & Wells Manufacturing Company, of Camden, N.J.	358,712	Male	
2	The Weston & Wells Manufacturing Company, of Camden, N.J.	325,031	Male	
1	Simeon Rheuben Payne, of same place [Fayette, Missouri]	359,302	Male	
2	Simeon Rheuben Payne, of same place [Fayette, Missouri]	372,098	Male	
1	George H. Engelman, of same place [St. Louis, Missouri]	436,748	Male	
2	George H. Engelman, of same place [St. Louis, Missouri]	436,749	Male	
1	Chas. [Charles] C. [Clarence] Carpenter, of same place [New York, New York]	324,338	Female	
2	C. C. Carpenter	419,181	Male	Female
1	The Weedsport Skirt and Dress Company, of same place [Weedsport, New York]	391,757	Male	

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

#	Assignor to	Utility Patent #	Patentee's Gender (1)	Patentee's Gender (2)
1	The Warner Brothers Co., of Bridgeport, Connecticut, a corporation of Connecticut	838,722	Female	
1	The Rheubottom & Teall Manufacturing Company, of same place [Weedspport, New York]	404,798	Male	
1	Sophia H. Sawyer, of Wellfleet, Massachusetts	692,095	Female	
1	Said Olive J. Decker assignor to James Ayres and Peter Ayres, of same place [Keokuk, Iowa]	374,660	Male	Female
1	Osborn & Vincent, of New York, N. Y.	25,865	Male	
1	One-half to Richard S. Mallary, of same place [Detroit, Michigan]	383,421	Female	
1	One-half to Ralph Rees of same place [Minneapolis, Minnesota]	372,633	Male	
1	One-half to Myron G. Wood, of Hillsdale, Michigan	406,553	Female	
1	One-half to John P. Platte, of Grand Rapids, Michigan	776,115	Male	
1	Leonard Winship and Samuel E. Barney of same place [New Haven, Connecticut]	165,069	Male	
1	John R. Deatherage, of same place [Fayette, Missouri]	371,742	Female	
1	James Stuart, of same place [Brooklyn, New York]	287,029	Male	
1	James Fant, of same place [Joliet, Illinois]	346,436	Male	
1	Jacob W. Truxel, of same place [Sedalia, Missouri]	341,082	Male	
1	Isaac B. Kleinert, of New York, N. Y.	457,172	Male	
1	I. Newman & Sons, of New Haven, Connecticut	378,134	Female	
1	Henry B. Harford, of Scott County, Iowa	363,458	Male	
1	Charlotte Abair, of same place [Denver, Colorado]	382,378	Female	
1	Charles W. Higby, of same place [Jackson, Michigan]	266,185	Male	

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

Table 32. List of Number of Patents per Assignee – Class 210, Bustles

#	Assignor to	Utility Patent #	Patentee's Gender (1)	Patentee's Gender (2)
1	Assignors to the Coronet Corset Company, of same place [Jackson, Michigan]	292,453	Male	Male
1	Assignor to himself and James L Harlem, of same place [Brooklyn, New York]	127,832	Male	
1	Assignor to himself and Charles A. Durgin	25,786	Male	
1	Assignor of three-fifths to Jacob Stietheimer, Jr., of same place [New York, NY]	361,762	Male	
1	AI Waterhouse, of Durham, Maine	321,408	Male	
a	Assignors, by Mesne Assignments, to William Meyst, Walter A. Holbrook, and Richard Klau, all of the same place [Milwaukee, Wisconsin]	360,726	Male	Female
b	Assignor, by Mesne Assignments, to Wallace C. Sexton, of same place [Chicago, Illinois]	375,318	Male	
c	Assignor, by Mesne Assignments, to Emerson C. Felton, of Chicago, Illinois	350,111	Male	

* *Mesne Assignments* facilitated the transfer of these patents' rights from the patentee(s) to other persons.

Primary patentee's gender for class 210:

Gender	No.	%
Female	8	13.79
Male	50	86.21
Total	58	100.00

The patentees' gender of the 58 assigned *Bustle* patents researched is:

Gender	No.	%
Female	11	16.92
Male	54	83.08
Total	65	100.00

Secondary patentee's gender for class 210:

Gender	No.	%
Female	3	42.86
Male	4	57.14
Total	7	100.00

Conclusion: The percent of female patentees for assigned patents is close to the overall percentage of females that patented bustles (16.92% versus 18.60%).

211 -
211 -
211 -
211 -
211 -
211 -
212
214
215
217
217
222
222

SKIRTS (tables)

Table 33. Changes in skirt classification

Researched Patents*		Year
211 – Material of skirt** (felt, paper, fur, knitted fabric)		1860s-1900s
211 – Adjustability / versatility of the skirt	Ornamental purpose	1890s
	Functional purpose	1890s-1910s
211 – Cut of fabric/Shape of the garment		1880s-1910s
211 – Fitting of garment		1870s-1910s
211 – Dress guard/form		1880s-1920
211 – Safety skirt		1880s-1910s
212 & 213 – Bicycle skirts	212 –Combined bifurcated	1890s-1910s
	213 –Convertible bifurcated	1890s-1910s
214 – Riding skirts (USPTO classification unchanged)		1880s-1910s
215 – Skirt supporter or distender		1850s-1910s
217 – Skirt holders		1890s-1910s
217 – Skirt lifters	Placed inside the skirt	1860s-1900s
	Placed outside the skirt	1860s-1900s
222 – Edge bindings		1870s-1920
222 – Skirt protectors		1870s-1910s

Notes:

* Most of the patents pertain to more than one category.

** These patents were selected for being made of less common choices of materials.

Table 34. Selected list of skirt patentees and their assignees

Table 34. Selected list of skirt patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	Patentee State 1	Patentee City 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Weber*	Aaron M.	Male	Wisconsin	Oshkosh			632,382	144
2	Weber	Aaron M.	Male	Wisconsin	Oshkosh			562,943	43
3	Weber	Aaron M.	Male	Wisconsin	Oshkosh			562,992	241
4	Weber	Aaron M.	Male	Wisconsin	Oshkosh			610,780	342
5	Weber	Aaron M.	Male	Wisconsin	Oshkosh			632,383	144
6	Weber	Aaron M.	Male	Wisconsin	Oshkosh	Christopher E. Hertlein, of New York, N. Y.		638,193	71
Average Days Elapsed A.M. Weber = 164									
1	Ondrak	Jacob A.	Male	New York	New York			689,215	162
2	Ondrak	Jacob A.	Male	New York	New York			689,216	162
3	Ondrak	Jacob A.	Male	New York	New York			693,428	225
4	Ondrak	Jacob A.	Male	New York	New York			742,349	216
Average Days Elapsed J.A. Ondrak = 191									
1	Padernacht	William	Male	New York	New York			929,106	180
2	Padernacht	William	Male	New York	New York			929,163	180
3	Padernacht	William	Male	New York	New York	Anna Padernacht, of New York, N.Y.		929,476	196
4	Padernacht	William	Male	New York	New York	Anna Padernacht, of New York, N. Y.	RE13,238		335
Average Days Elapsed W. Padernacht = 223									

Table 34. Selected list of skirt patentees and their assignees

Table 34. Selected list of skirt patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	Patentee State 1	Patentee City 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Hay	William J.	Male	Wisconsin	Oshkosh			612,417	109
2	Hay	William J.	Male	Wisconsin	Oshkosh			634,264	244
3	Hay	William J.	Male	Wisconsin	Oshkosh			704,033	40
Average Days Elapsed W. J. Hay = 131									
1	Malsin	Albert	Male	New York	New York			1,139,881	903
2	Malsin	Albert	Male	New York	New York	Lane Bryant, Inc., of New York, N. Y., a corporation of New York		1,293,152	1,306
3	Malsin	Albert	Male	New York	New York	Lane Bryant, Inc., of New York, N. Y., a corporation of New York		1,303,092	1,646
Average Days Elapsed A. Malsin = 1,285									
1	Moschcowitz	Louis	Male	New York	New York			362,391	276
2	Moschcowitz	Louis	Male	New York	New York			365,147	325
3	Moschcowitz	Louis	Male	New York	New York			394,593	318
Average Days Elapsed L. Moschcowitz = 306									
1	Schwab	Gabriel	Male	New York	New York			180,939	40
2	Schwab	Gabriel	Male	New York	New York			192,532	45
3	Schwab	Gabriel	Male	New York	New York			211,188	372
Average Days Elapsed G. Schwab = 152									

Table 34. Selected list of skirt patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	Patentee State 1	Patentee City 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	Taylor	George H.	Male	New York	New York			515,027	167
2	Taylor	George H.	Male	New York	New York			560,241	56
3	Taylor	George H.	Male	New York	New York	The Kursheedt Manufacturing Company, of same place [New York, NY]		615,323	556
Average Days Elapsed G.H. Taylor =									260

* Weber had a seventh patent Improvement in Bustles, #155,480, (9/29/1874)

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
1		58,336	Improvement in Ladies' Skirts	Assignor to himself and Geo. R. Bailey, of same place [Derby, Connecticut]	
2		61,011	Improvement in Skirt Supporters	Ellen A. Vail, of Southold, New York	
3		80,196	Improvement in Dress and Satchel-Holder Combined	Assignor to himself and Richard Austin, of Plymouth, Connecticut	
4		101,195	Improvement in Hoop-Skirts	Waterman & Mayer, of same place [New York, NY]	
5		151,039	Improvement in Skirt-Protectors	Assignor to himself and Seth M. Blackmer, of same place [Hyde Park, Massachusetts]	174
6		175,674	Improvement in Skirt-Protectors	Sallie V. Day, of same place [Elizabeth, New Jersey]	26
7		176,020	Improvement in Skirt-Protectors	James W. Chisholm, of Brooklyn, N. Y.	38
8		278,805	Under-Garment	Assignor of one-half to Louis Dannhauser, of same place [New York, NY]	112
9		320,954	Lady's Riding Habit	Hughes & Müller, of same place [Philadelphia, Pennsylvania]	351
10		343,974	Dress-Skirt	Assignor of one-half to Horace Grant, of same place [Worcester, Massachusetts]	344
11		345,199	Protector and Stiffener	Assignor of one-half to Horace Grant, of same place [Worcester, Massachusetts]	131
12		358,372	Dress-Supporting Device	Assignor of one-half to Edward Benjamin, of same place [New York, NY]	179

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
13		361,982	Spring or Reed for Supporting Garments	Assignor of one-half to Edward Benjamin, of same place [New York, NY]	136
14		396,184	Dress-Supporting Steel	Assignor, by Mesne Assignments, to Mary Agnes Whalen, of same place [New York, NY]	327
15		406,155	Folding Dress-Extender	Said Jacob W. Weeks assignor to said Lulu A. Weeks [Detroit, Michigan]	129
16		410,416	Garment-Protector	Harry S. Hansbury, of same place [Philadelphia, Pennsylvania]	85
17		425,558	Dress-Steel	Assignor, by Mesne Assignments, to Mary Agnes Whalen, of same place [New York, NY]	929
18		518,378	Dress-Protector	Assignor of one-half to William R. Lamb, of same place [East Greenwich, Rhode Island]	402
19		548,613	Skirt	Assignor of one-half to Christian Haas, of same place [Chicago, Illinois]	94
20		555,682	Skirt-Supporter	Assignor of one-half to Charles H. Kahler, of same place [Grand Rapids, Michigan]	231
21		564,292	Divided Skirt	Assignor of one-half to Simon Bernstein, of New York, N. Y.	143
22		565,759	Dress-Protector	The Lip Garment Guard Company, of New York, N. Y.	319
23		566,369	Bicycle-Skirt	Assignor to the Spalding-Bidwell Company, of same place [New York, NY]	207
24		570,676	Bicycle-Suit	Assignor one-half to Frank L. Darrow, of same place [Minneapolis, Minnesota]	432
25		574,131	Skirt-Distender	Assignor of one-half to Charles Amos and N.S. Moore, of same	143

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
				place [Frankfort, Indiana]	
26		577,819	Dress-Skirt	Assignor, by Mesne Assignments, to the Stadler & Falk, of New York	363
27		579,061	Cycling Skirt	David F. Hirsh, of same place [York, Pennsylvania]	348
28		579,145	Bicycle-Skirt	Charles Cohn & Co., of Baltimore, Maryland	94
29		581,884	Skirt-Elevator	Assignor of forty-nine one-hundredths to Harry G. Hilbert, of Pittsburg, Pennsylvania	321
30		606,876	Skirt-Protector	The Hensel Colladay Company, of Pennsylvania	132
31		614,158	Dress-Raising Device	Assignor of one-half to Mary J. Darling, of same place [Providence, Rhode Island]	106
32		615,323	Trimming	The Kursheedt Manufacturing Company, of same place [New York, NY]	556
33		616,026	Bicycle-Skirt	Julius Stein & Co., of same place [New York, NY]	909
34		619,984	Facing for Garments	Assignor of one-half to R.L. McLaughlin, of same place [Paterson, New Jersey]	137
35		633,144	Facing for Garments	Assignor of one-half to Robert L. McLaughlin, of same place [Paterson, New Jersey]	192
36		638,013	Skirt-Protector	The Hensel, Colladay Company, of Pennsylvania	129
37		638,193	Edge-Protector for Garments	Christopher E. Hertlein, of New York, N. Y.	71
38		662,714	Skirt	The Elmira Skirt company, of same place [Elmira, NY]	62

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

No.	RE Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
39		698,238	Skirt-Protector	Aaron M. Weber, of Oshkosh, Wisconsin	894
40		707,387	Skirt-Protector	Ignaz Friedinger, of Oberthal, Near Linz, Austria-Hungary	113
41		710,687	Skirt-Protector	Hensel-Colladay Company, a corporation of Pennsylvania	42
42		715,248	Protective Garment	Assignor of one-half to Mary Tucker Ruple, of Cleveland, Ohio	304
43		723,191	Woman's Skirt	Assignor of one-fourth to H.T. Lemons, of Tacoma, Washington	372
44		735,023	Skirt	The Royal Pattern Company, of New York, N.Y.	292
45		744,882	Skirt-Former	Assignor of two-thirds to George A. Knight and W.W. Swarts, of Balbec, Indiana	209
46		769,970	Skirt Supporter	Assignor, by Mesne Assignments, to Appel Manufacturing Company, of New York, N. Y., a Corporation of New York	671
47		793,625	Spring-Wire Catch	Assignor of one-fourth to John Charles McLeod, of Philipsburg, Montana	50
48		795,788	Pivoted Clasp	Assignors to Pearl Togle Company, of Chadwicks, New York	73
49		855,885	Lady's Skirt	Assignor to himself, Theodore Greenwald, and Max Greenwald, Trading as Greenwald Bros., of Philadelphia, Pennsylvania	130
50		895,430	Underskirt	Viola C. Herzer, of Milwaukee, Wisconsin	200
51		913,815	Skirt	Assignor by Mesne Assignments, to the Warren Featherbone Company of Michigan, of Three Oaks, Michigan, a corporation of Michigan	2265
52		923,345	Combination-Trousers	Assignor of forty-nine one -hundredths to Edward G. Siggers, of Washington, District of Columbia	1413

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
53		923,468	Roll-Carpet Fastener	Said Chickering assignor to said White	393
54		929,476	Skirt	Anna Padernacht, of New York, N.Y.	196
55		1,031,112	Skirt	Assignor of one-half to Samuel Erdreich, of New York, N.Y.	892
56		1,072,466	Lady's Apparel	Claire V. Watskey, of Richmond, Virginia	116
57		1,076,264	Woman's Outing-Suit	William Ellery, of San Francisco, California	518
58		1,082,467	Skirt	Assignor to Metcalfe Baldock & Company, of London, England	463
59		1,091,827	Divided Skirt	Assignor of one-half to Samuel Neiman, of New York, N. Y.	196
60		1,125,903	Lady's Garment	Said Fatherson assignor to said Hogan	88
61		1,221,198	Floenced Skirt	Reichenbach & Co., of New York, N.Y.	117
62		1,265,492	Woman's Work and Sport Garment	Assignor of one-third to Nelson M. Eddy, of Apena, Michigan	216
63		1,265,870	Adjustable Skirt	Boston Superior Petticoat Company, of Boston, Massachusetts, a firm	1456
64		1,293,152	Lady's Garment	Lane Bryant, Inc., of New York, N. Y., a corporation of New York	1306
65		1,303,092	Lady's Garment	Lane Bryant, Inc., of New York, N.Y., a corporation of New York	1646
66	RE13,238		Skirt	Anna Padernacht, of New York, N. Y.	335
Out of 370 patents issued for Skirts (classes 211 to 215, 217, and 222 combined), 17.84% were assigned to persons or corporations.					

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

Table 35. List of Assignees – Skirts, classes 211 to 215, 217, and 222 combined

RE Utility No. Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
General <i>Average Days Elapsed</i> between Application and Approval dates for all patents in skirt classes = 280.38 days <i>Average Days Elapsed</i> between Application and Approval of assigned patents for skirt classes = 376.10 days <i>Average Days Elapsed</i> between Application and Approval of patents not assigned, skirt classes = 259.78 days The difference <i>Average Days Elapsed</i> between assigned–not assigned patents is = 116.32 days				
Skirt patents assigned to persons or corporations were approved in 44.78% more time than those with no assignee(s).				

Table 36. Selected list of hoop patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
1	De Forest*	Thomas B.	Male	Connecticut	Birmingham			31,876	
2	De Forest	Thomas B.	Male	Connecticut	Birmingham	Assignor to American Press and Clasp Company, of Bridgeport, Connecticut		58,540	
3	De Forest	Thomas B.	Male	Connecticut	Birmingham			59,895	
4	De Forest	Thomas B.	Male	Connecticut	Birmingham			61,169	
5	De Forest	Thomas B.	Male	Connecticut	Birmingham			61,170	
6	De Forest	Thomas B.	Male	Connecticut	Birmingham			63,145	
7	De Forest	Thomas B.	Male	Connecticut	Birmingham			74,672	
8	De Forest	Thomas B.	Male	Connecticut	Birmingham	Assignors, by Mesne Assignments, to Alexander K. Young	RE5,334		
9	De Forest	Thomas B.	Male	Connecticut	Birmingham	Assignors, by Mesne Assignments, to Robert N. Bassett, of same place [Birmingham, Connecticut]	RE8,378		35
Average Days Elapsed T.B. De Forest = -									
1	Neumann	Caesar*	Male	New York	New York			25,136	
2	Neumann	Caesar	Male	New York	New York			25,976	
3	Neumann	Caesar	Male	New York	New York			26,514	
4	Neumann	Caesar	Male	New York	New York		RE1,755		

Table 36. Selected list of hoop patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
5	Neumann	Cásar**	Male	New York	New York			40,355	
6	Neumann	Cásar	Male	New York	New York			56,787	
7	Neumann	Cásar	Male	New York	New York			61,088	
8	Neumann	Cásar	Male	New York	New York		RE1,703		
9	Neumann	Cásar	Male	New York	New York		RE991		
Average Days Elapsed C. Neumann = -									
1	Day	Theodore D.	Male	New York	Brooklyn			38,377	
2	Day	Theodore D.	Male	New York	Brooklyn			44,287	
3	Day	Theodore D.	Male	New York	New York			45,392	
4	Day	Theodore D.	Male	New York	New York			49,732	
5	Day	Theodore D.	Male	New York	New York			56,016	
6	Day	Theodore D.	Male	New York	New York			63,865	
7	Day	Theodore D.	Male	New York	New York			63,866	
8	Day	Theodore D.	Male	New York	New York			86,910	
Average Days Elapsed T.D. Day = -									
1	Atwood	E. G.	Male	Connecticut	Derby			21,806	
2	Atwood	E. G.	Male	Connecticut	Derby			30,907	
3	Atwood	E. G.	Male	Connecticut	Derby	The Shelton & Osborn Skirt Manufacturing Company, of Birmingham, Connecticut	RE784		

Table 36. Selected list of hoop patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
4	Atwood	E.G.	Male	Connecticut	Derby	The Shelton & Osborn Skirt Manufacturing Company, of Birmingham, Connecticut	RE785		
Average Days Elapsed E.G. Atwood = -									
1	Houston	William E.	Male	Connecticut	Birmingham	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]		64,870	
2	Houston	William E.	Male	Connecticut	Birmingham	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]		64,871	
3	Houston	William E.	Male	Connecticut	Birmingham	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]		64,872	
4	Houston	William E.	Male	Connecticut	Birmingham	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]		64,873	
Average Days Elapsed W.E. Houston = -									
1	Schoenhof	Jacob	Male	New York	New York			257,769	56
2	Schoenhof	Jacob	Male	New York	New York			273,165	300

Table 36. Selected list of hoop patentees and their assignees

#	Last Name Patentee 1	First Name Patentee 1	Gender Patentee 1	State Patentee 1	City Patentee 1	Assignor to	RE Utility Patent #	Utility Patent #	Days Elapsed
3	Schoenhof	Jacob	Male	New York	New York			308,996	361
4	Schoenhof	Jacob	Male	New York	New York			312,518	69
Average Days Elapsed J. Schoenhof = 197									
1	Sanders	Leopold	Male	New York	New York			40,363	
2	Sanders	Leopold	Male	New York	New York	Thomas B. De Forest, of Birmingham, Connecticut		42,736	
3	Sanders	Leopold	Male	New York	New York			43,710	
Average Days Elapsed L. Sanders = -									

* De Forest had two other patents for Improvement in Bindings for Skirts, #61,171 (1/15/1867), and #61,172 (1/15/1867).

** Neumann, Caesar and Neumann, César seem to be the same patentee.

Note: Alexander Douglas had a total of three patents: two hoop patents #22,355 (12/21/1858) and #21,747 (10/12/1858), and one bustle patent #17,082 (4/21/1857).

Table 37. List of Assignees – Class 216, Hoops

RE Utility No. Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
1	20,681	Skirt-Hoop	L.A. Osborn, of Newark, New Jersey, and I.J. Vincent of New York, N. Y.	
2	22,051	Skeleton Hoop-Skirt	L.A. Osborn and I.J. Vincent, of same place [Brooklyn, NY]	
3	24,777	Clasp for Skirt-Hoops	Willoughby H. Reed and Geo. W. Ziegler, of New York, N.Y.	
4	25,374	Skeleton Skirt	Jos. B. Wesley, of same place [Providence, Rhode Island]	
5	25,701	Skeleton Skirt	Assignor to himself and Samuel H. Doughty, of same place [New York, NY]	
6	25,870	Clasp for Skeleton Skirts	Assignor to A. B. Chapman, of same place [New York, NY]	
7	26,876	Clasp for the Ends of Bustle-Hoops	Assignor to A.B. Chapman, of New York, N. Y.	
8	28,941	Skeleton Skirt	Assignor to himself and Alexander Douglas, of same place [New York, NY]	
9	34,182	Improvement in Skeleton Skirts	Assignor to himself and Adolph Oppen and Leo Popper, of same place [New York, NY]	
10	36,061	Improvement in Skeleton Skirts	Assignor to himself and E.D. Bell, of Malden, Massachusetts	
11	36,384	Improvement in Skeleton Skirts	Assignor to Horace Carpenter & Co., of same place [New York, NY]	
12	36,510	Improvement in Fastening Hoop Ends in Tabs of Bustles	Assignor to himself and Thomas B. De Forest, of same place [Birmingham, Connecticut]	
13	36,979	Improvement in Hooped-Skirts	William T. Hopkins	

Table 37. List of Assignees – Class 216, Hoops

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
14		37,256	Improvement in Skeleton Skirts	Assignor to himself and Daniel D. Winant, of Brooklyn, N. Y.	
15		37,374	Improvement in Hooped Skirts	Assignor to himself and Alexander Douglass, of English Neighborhood, New Jersey	
16		40,985	Improvement in Hoop-Skirts	Assignor to himself and Alexander Douglas, of English Neighborhood, New Jersey	
17		41,809	Improvement in Hoop-Skirts	Theodore D. Day and Gilbert Horton, of the city of New York	
18		42,736	Improvement in Hoop-Skirts	Thomas B. De Forest, of Birmingham, Connecticut	
19		44,841	Improvement in Hoop-Skirts	Assignor to himself and Joseph Mayer, of Brooklyn, N. Y.	
20		52,637	Improvement in Hoop-Skirts	Assignor to himself and Henry Hemenway, of same place [Clinton, Massachusetts]	
21		52,639	Improvement in Clasps for Skirt-Hoops	Assignor to himself and J. W. Osborne, of same place [Ansonia, Connecticut]	
22		54,055	Improvement in Clasps for Skirt-Hoops	Assignors to J. W. Osborne and G. W. Cheesman, of same place [Ansonia, Connecticut]	
23		54,998	Improvement in Hoop-Skirts	C.D. Clapp and H.J. Bardwell, of same place [Amherst, Massachusetts]	
24		55,768	Improvement in Hoop-Skirts	Assignor to himself and Perkins, Cook & Co.	
25		56,146	Improvement in Clasps for the Bottom Hoops of Skirts	Assignor to Frederick S. Otis, of same place [Brooklyn, NY]	
26		58,540	Improvement in Clasps for Skirt-Hoops	Assignor to American Press and Clasp Company, of Bridgeport, Connecticut	

Table 37. List of Assignees – Class 216, Hoops

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
27		59,711	Improvement in Hoop-Skirt Wire	Assignor to J.N. McNiire, of Brooklyn, New York	
28		60,969	Improvement in Hoop Skirts	Assignor to himself and Hugh B. Brown, of Brooklyn, New York	
29		63,253	Improvement in Skirt Wire	Assignor to himself, W.E. Houston, and J.R. Lattin, of same place [Birmingham, Connecticut]	
30		63,867	Improvement in Clasps for Hoop-Skirts	Assignor to Theodore D. Day, on New York City	
31		64,231	Improvement in Hoop-Skirts	Assignor to himself, E. Wooster & Company, and F. Hull & Company, of same place [Birmingham, Connecticut]	
32		64,870	Improvement in Hoop-Skirts	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]	
33		64,871	Improvement in Clasps for Hoop-Skirts	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]	
34		64,872	Improvement in Tapes of Hoop-Skirts	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]	
35		64,873	Improvement in Tapes of Hoop-Skirts	Assignor to himself, George W. Hubbell, and John R. Lattin, of same place [Birmingham, Connecticut]	
36		68,677	Improvement in Clasps for Hoop-Skirts	Assignor to the Colby Skirt Company	
37		84,492	Improvement in Clasps for Hoop-Skirts	Assignor to himself and Charles E.L. Holmes, of same place, assignors to Charles E.L. Holmes [New York, NY]	

Table 37. List of Assignees – Class 216, Hoops

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
38		90,673	Improvement in Hoop-Skirts	Assignor to himself and Julius Waterman, of New York City	
39		93,068	Improvement in Covered Clasps for Hoop-Skirts	Assignor to himself and Lyman H. Day, of same place [New York, NY]	
40		95,203	Improvement in Hoop-Skirt Fastenings	Assignor to himself and Lyman H. Day, of same place, assignors to Jason B. Loomis for one-half their right	
41		105,124	Improvement in Hoop-Skirts	Assignor to himself, M. Cohn & Co., of New York City, and the West, Bradley, and Carey Manufacturing Company, of same place	
42		112,681	Improvement in Hoop-Skirts	Assignor to himself and Downs & Bassett, of same place [Birmingham, Connecticut]	
43		113,854	Improvement in Hoop-Skirts	Charles C. Carpenter, of same place [New York, NY]	
44		116,411	Improvement in Hoop-Skirts	Charles C. Carpenter, of same place [New York, NY]	
45		116,507	Improvement in Hoop-Skirts	Charles C. Carpenter, of New York City	
46		139,510	Improvement in Hoop-Skirts	Assignors to C. C. Carpenter & Co., of same place [New York, NY]	78
47		146,866	Improvement in Hoop-Skirts	Assignor to himself and Downs & Bassett, or Birmingham, Connecticut	54
48		147,399	Improvement in Hoop-Skirts	Assignor to himself and John T. Hillhouse, of same place [Derby, Connecticut]	45
49		147,905	Improvement in Skeleton Hoop-Skirts	A. K. Young and Conant Manufacturing Company, of same place [Boston, Massachusetts]	17
50		187,350	Improvement in Hoop-Skirts	Assignor of two-thirds his right to William J. Miller and James	59

Table 37. List of Assignees – Class 216, Hoops

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
				M. Curtiss, of same place [Detroit, Michigan]	
51		324,300	Pannier or Pannier-Skirt	Said Lockwood assignor to said Carpenter [New York, NY]	77
52		839,931	Hoop-Skirt	Warren Featherbone Company, of Three Oaks, Michigan	295
53	RE1,655		Improvement in Tape for Spring-Skirts	L.S. Scofield, of Boston, Massachusetts	
54	RE2,046		Improvement in Skeleton Skirts	Assignor, by Mesne Assignments, to Samuel H. Doughty, of Cinton Township, Essex County, New Jersey	
55	RE2,634		Improvement in Skirts	Assignor, by Mesne Assignments, to J.E. Lucas, J.P. Arey, and Charles G. Howard, of Springfield, Massachusetts	
56	RE2,946		Improvement in Skirt-Hoops	E. Wooster and Company, and F. Hull and Company, of Birmingham, Connecticut	
57	RE3,360		Improvement in Skeleton-Skirts	Assignor, by Mesne Assignments, to Jason B. Loomis, of Chelsea, Massachusetts	
58	RE3,730		Improvement in Skeleton-Skirts	Marks Fishel, Adolph Oppen, and Leo Popper, of New York, N. Y., assignees of Marks Fishel	
59	RE3,731		Improvement in Skeleton-Skirts	Marks Fishel, Adolph Oppen, and Leo Popper, of New York, N. Y., assignees of Marks Fishel	
60	RE4,316		Improvement in Hoop-Skirts	The Vertical Hoop-Skirt Company, of same place [Boston, Massachusetts]	
61	RE5,334		Improvement In Skirt-Hoops	Assignors, by Mesne Assignments, to Alexander K. Young	
62	RE784		Improvement in Skeleton Skirts	The Shelton & Osborn Skirt Manufacturing Company, of Birmingham, Connecticut	

Table 37. List of Assignees – Class 216, Hoops

No.	RE Utility Patent #	Utility Patent #	Title of Patent	Assignor to	Days Elapsed
63	RE785		Improvement in Skeleton Skirts	The Shelton & Osborn Skirt Manufacturing Company, of Birmingham, Connecticut	
64	RE8,040		Improvement In Skirt-Hoops	Assignor to himself and John W. Labaree	38
65	RE8,378		Improvement In Skirt-Hoops	Assignors, by Mesne Assignments, to Robert N. Bassett, of same place [Birmingham, Connecticut]	35
66	RE870		Skeleton Skirt (Hoop ~)	Assignor to himself and S. H. Doughty, assignors to themselves and James Brown and Wm. King	
Out of 227 patents issued in Hoop Class, 29.07% were assigned to persons or corporations.					
General <i>Average Days Elapsed</i> between Application and Approval dates for all patents in class 216 = 150.16 days <i>Average Days Elapsed</i> between Application and Approval of patents not assigned, class 216 = 179.86 days <i>Average Days Elapsed</i> between Application and Approval of assigned patents for class 216 = 77.55 days The difference <i>Average Days Elapsed</i> between not assigned–assigned patents is = 102.31 days					
Hoop patents assigned to persons or corporations were approved in 56.88% less time than those with no assignee(s).					

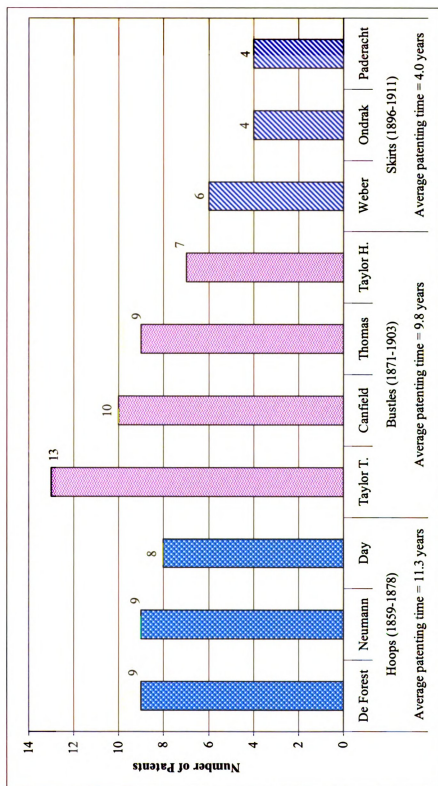


Figure 141. Average patenting time for the most prolific patentees of hoop-skirts, bustles, and skirts