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KEROSENE CARBURATORS

Lance W. Dunn

Clifford L. Bauer

1913

This thesis was contributed by

Mr. L. W. Dunn.

under the date indicated by the department stamp,
to replace the original which was destroyed in
the fire of March 5, 1916.

THE UNIVERSITY OF MICHIGAN

48

DAVID L. DAVIS JAMES H. DAVIS

A Thesis Submitted for the Degree
of
Bachelor of Arts
Michigan Agricultural College

Spring Term

1918

THESIS

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CONCLUSION The subject of this report is the automobile industry.

The automobile industry is one of the most important in the world. It is a major source of employment and a major source of revenue for the government.

INTRODUCTION At present, the automobile industry is in a state of transition.

With the coming of the electric car, it is likely that the automobile will soon be replaced. The electric car is a more efficient and more reliable than the gasoline car. It is also much cheaper to operate and maintain. The electric car is a more desirable mode of transportation for the individual and for the community as a whole.

For example, consider the amount of gasoline used by automobiles. In the United States, it is estimated that in 1940, the total amount of gasoline used by automobiles was 147,000,000 gallons. This is equivalent to 147,000,000 gallons of 30 horsepower per gallon. If the total amount of gasoline used in 1940 was 147,000,000 gallons, then the total amount of gasoline used in 1941 was 151,000,000 gallons. This is an increase of 2.7% per year.

The world production of automobiles was 1.0% from 1900 to 1910, 3.5% from 1910 to 1921. The production of automobiles was only 1% in the United States from 1900 to 1910 and only 5% from 1910 to 1921. The present production of automobiles is increasing rapidly. In other words, while the automobile has not yet been replaced, the production of automobiles is increasing at a rapid rate. Furthermore, the increase in production in this country between 1900 and 1921 was entirely due to the increased production of what was then called "oil", which is today the main source of the oil used in automobiles.

The utilization of fuel oil in the ... has been obtained.

Alcohol has been used ... fuel with satisfactory results but it is too expensive and will not be used until it can be produced at a price comparable with the price of other fuels.

Perosene is a fuel which is being used to a limited extent but with satisfactory results. It is about 50% as efficient as kerosene, a great problem we have in the ... it could be used in the ... engine.

The following ... This is taken from a ... and written by F. W. Scott.

- (1) ...
- (2) ...
- (3) ...
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- (5) ...
- (6) ...
- (7) ...

These three paragraphs are not numbered. The first paragraph is numbered 1 in the original. The second paragraph is numbered 2 in the original. The third paragraph is numbered 3 in the original. The fourth paragraph is numbered 4 in the original. The fifth paragraph is numbered 5 in the original. The sixth paragraph is numbered 6 in the original. The seventh paragraph is numbered 7 in the original. The eighth paragraph is numbered 8 in the original. The ninth paragraph is numbered 9 in the original. The tenth paragraph is numbered 10 in the original. The eleventh paragraph is numbered 11 in the original. The twelfth paragraph is numbered 12 in the original. The thirteenth paragraph is numbered 13 in the original. The fourteenth paragraph is numbered 14 in the original. The fifteenth paragraph is numbered 15 in the original. The sixteenth paragraph is numbered 16 in the original. The seventeenth paragraph is numbered 17 in the original. 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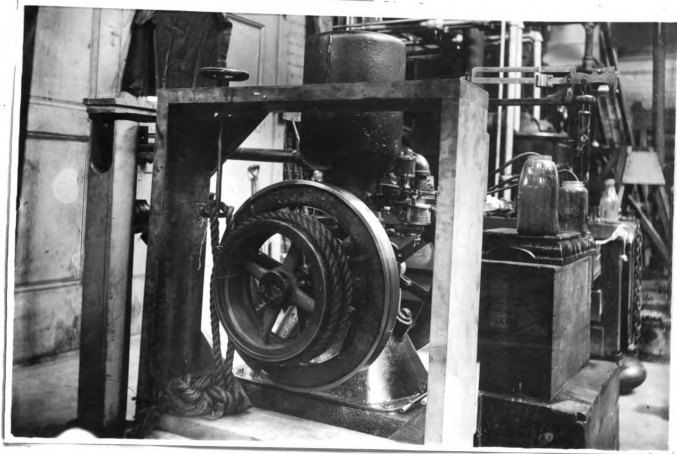
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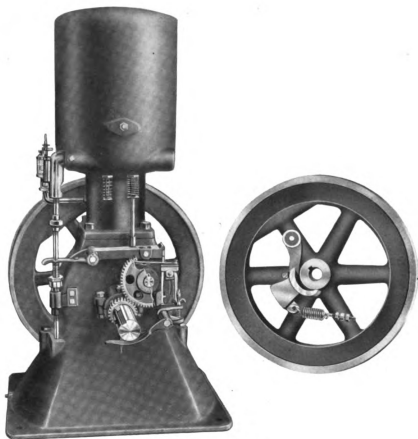
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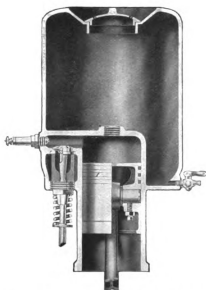
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Novo Engine with Governor Fly Wheel Removed

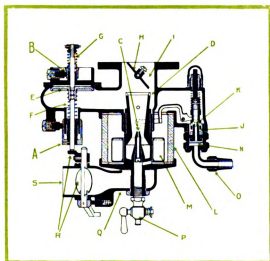
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Sectional View of Novo Cylinder, showing open top jacket for the cooling water



-3-



EXPLANATION

- | | |
|------------------------------------|------------------------------|
| A—Low speed adjusting nut. | K—Needle valve. |
| B—High speed adjusting nut. | L—Glass float chamber. |
| C—Spray nozzle. | M—Metal float. |
| D—Venturi tube. | N—Gasoline strainer. |
| E—Auxiliary air valve. | O—Gasoline line coupling. |
| F—Low speed spring. | P—Drain cock. |
| G—High speed spring. | Q—Hot-air horn. |
| H—Throttle valve. | R—Air shut-off for starting. |
| I—Mixing chamber. | S—Fixed air inlet. |
| J—Catch basin around needle valve. | |

-4-

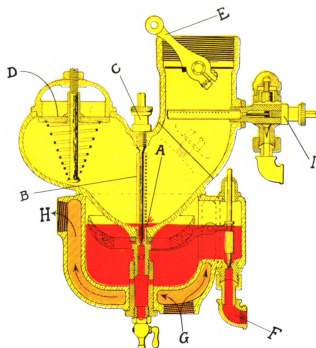


ILLUSTRATION No. 5
SLOW SPEED

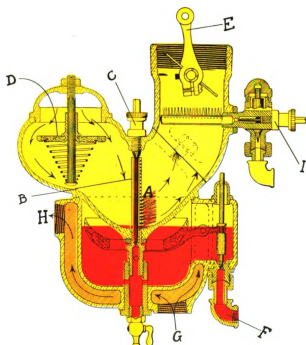


ILLUSTRATION No. 6
HALF SPEED

Bennett Kerosene Carburetor
FOR KEROSENE AND DISTILLATES

THE UNITED STATES OF AMERICA
DO hereby certify that
[Name] is a citizen of the United States of America.

Alcohol levels in blood were not found with satisfaction by roadside
but it is the only method available and it is possible that some of the
incidents were not caught with this procedure. Other methods.

Persons like Paul Smith are not good for the country but will do what they can. He about 35 years old, married, 4 children, a great girl, 12 years old, 1 boy 10 years old, 2 small ones, 4 and 5 years old. He is a good man, a good worker, a good citizen.

The following FBI letter to Bureau dated 11/20/64, is a copy of this letter from article in the April Number of "The Lawyer" and written by J. H. Scott.

• • • • •

[illegible]

(c)

[illegible]

(2) Intermittent - occurs irregularly, but with some regularity.

(c) 100 percent of the amount of the tax credit for the year in which the credit is claimed.

1. *Journal of the American Medical Association*, 273: 1033-1034, 1995.

(c) The 2016-2017 season was the first time in 10 years that the number of birds in the flock was less than 100. The flock size was 75 birds.

(1) In subsection (b)(1)(A) of the bill, "the" is inserted after "the" and "the" is inserted after "the" in the first sentence.

ALL OF THE ABOVE SUBJECTS ARE CURRENTLY EMPLOYED BY THE
FEDERAL BUREAU OF INVESTIGATION, AND ARE BEING CON-
SIDERED FOR PROMOTION TO THE RANK OF SENIOR SPECIAL AGENT,
AND ARE BEING CONSIDERED FOR PROMOTION TO THE RANK OF SENIOR
SPECIAL AGENT, AND ARE BEING CONSIDERED FOR PROMOTION TO THE RANK OF SENIOR
SPECIAL AGENT.

ing is still in effect. A wildcat is a wildcat, no matter how water
is added in the mill. This is a fact which is not to be
with water. It is without. It is not to be taken away
at all with the no load.

We are now aware that better results will be obtained
if the no load is better than of a 1 lb. of the horse power, but
we are not. The first 1 lb. and the second 1 lb. of the horse power
were therefore would be in the 1 lb. of the horse power to
keep the fuel from collecting in the mill.

CONCLUSION. Our results are as follows: very low, which
may be expected from a series of six hours. Some of our
first results are ^{good as} as follows, in relation to our 1 lb.
of experience. The fuel consumption was high and varied from .05
to 1.6 pounds per horse power hour. The results of the first 1 lb.
to fuel per unit of power varied from .05 to 1.6 pounds per
horse power per hour.

Taking the average which was the 1 lb. and the average of the
fuel consumption per horse power per hour, we found that the fuel consumption
increased with the amount of water furnished. The results of the first
1 lb. of the fuel consumption was lower than the average of the first
1 lb. of the fuel consumption. This is a fact which is not to be
taken away. The only way to prove the theory that the only way of
the water is to keep the cylinder of liquid from collecting and
from pre-ignition. The water is to be used more water than the
average to keep the fuel from collecting, but this was out of the
question. The engine would begin to work slowly and then slow
down. The results of the 1 lb. of the fuel consumption was just
about the same as the 1 lb. of the fuel consumption.

In going over the results obtained at the different test sessions, we found that the fuel and water consumption per brake horse power per hour was lower at the lower compression of 54 pounds. But more power could be obtained at the higher compression. As long as the compressor forced the air and to go against the loss water was required to keep the pre-ignition, this loss fuel was necessary.

The curves show that the fuel consumption decreased and the amount of water required remained nearly constant, as the point of ignition was advanced from 15° to 30° , also the power of the engine was increased by advancing the point of ignition between these limits. The curves on the total fuel and water consumption per hour show that the amount of water required increased faster than the fuel consumption, as the load was increased. This was caused by larger explosions being cut out at the larger loads and that there was water and steam for cooling the cylinder walls and the piston and connecting rod.

Not only was our fuel consumption high, but we were also unable to secure much better than 4 1/2 H.P. out of the engine. For any length of time, when using either the Bennett or Stevens carburetor with liquid fuel the fuel.

The main reason for our not getting the best power was that the carburetors were unable to keep the mixture of fuel and air properly adjusted. The inlet valve in the Bennett carburetor was not fully open. The inlet valve in the Stevens carburetor was also not fully open. The action which opened the inlet valve also had to open the valve in the carburetor. The lifting of the inlet valve by the action released the pressure at the carburetor and at the inlet, therefore the compression pressure would be lower. This would result in a loss of power. In this case the carburetor was the main cause of the

BENNETT CARBURETOR.

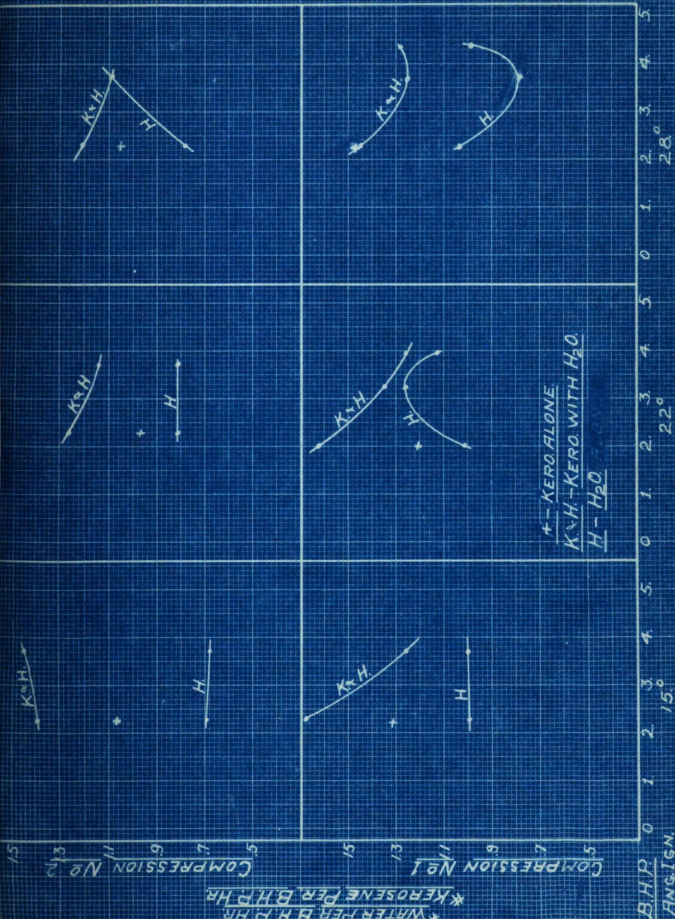
<u>NO</u>	<u>R.P.M.</u>	<u>B.H.P.</u>	<u>KERO.</u> <u>PER</u> <u>HR.</u>	<u>WATER</u> <u>PER</u> <u>HR.</u>	<u>KERO.</u> <u>B.H.P.</u> <u>HR.</u>	<u>WATER</u> <u>B.H.P.</u> <u>HR.</u>	<u>POINT</u> <u>IGNI-</u> <u>TION</u>	<u>COM-</u> <u>PRESS-</u> <u>ION</u>	<u>SPECI-</u> <u>FIG.</u> <u>GR.</u>
1	446		1.26	—	—	—	22°	66.6	.8099
2	444	1.981	2.40	—	1.21	—			.8119
3	435	1.94	3.405	1.245	1.754	.64			
4	444	1.981	3.225	1.71	1.628	1.015			
5	436	3.241	4.23	4.08	1.346	1.26			
6	432.7	3.875	4.873	4.378	1.257	1.13			
7	468.6	—	1.335	—	—	—	15°	66.6	.8119
8	442.6	2.22	2.94	—	1.313	—			
9	452.6	2.29	3.87	1.785	1.689	.998			
10	432.8	3.672	4.605	3.675	1.253	1.00			
11	449.3	—	1.58	—	—	—	28°	66.6	.8108
12	442.7	2.24	3.30	—	1.472	—			
13	442	2.23.5	3.255	2.325	1.456	1.04			
14	444	3.681	4.59	3.9	1.247	.787			
15	430.6	4.35	5.595	4.32	1.286	.993			
16	457.7	—	1.36	—	—	—	15°	54.4	.8109
17	448.2	2.265	2.43	—	1.073	—			
18	448	2.264	3.15	1.56	1.39	.688			
19	442	3.7	5.21	2.49	1.443	.673			
20	455.5	—	1.38	—	—	—	22°	54.4	.8113
21	449.2	2.273	2.19	—	.964	—			
22	447	2.26	2.85	1.845	1.264	.816			
23	441	3.69	4.265	3.015	1.14	.815			
24	461.7	—	1.36	—	—	—	28°	54.4	.8113
25	453	2.29	2.415	—	1.054	—			
26	450.8	2.278	2.745	1.77	1.205	.777			
27	445.6	3.73	4.05	4.08	1.085	1.094			
NO HEATING.									
28	449.7	—	1.14	—	—	—	28°	66.6	.8108
29	440	2.225	2.685	—	1.204	—			
30	436	2.205	3.30	2.38	1.495	.81			
31	432.4	3.62	4.155	3.96	1.147	1.094			
32	457.7	—	1.18	—	—	—		54.4	.8113
33	447.8	2.267	2.52	—	1.1	—			
34	446.6	2.257	3.06	2.49	1.355	1.103			
35	438.6	3.675	4.11	3.585	1.116	.977			
36	437	4.42	6.03	4.02	1.365	.91			

STROMBERG CARBURETOR.

<u>NO</u>	<u>R.P.M.</u>	<u>B.H.P.</u>	<u>KERO.</u> <u>PER</u> <u>HR.</u>	<u>WATER</u> <u>PER</u> <u>HR.</u>	<u>KERO.</u> <u>B.H.P.</u> <u>HR.</u>	<u>WATER</u> <u>B.H.P.</u> <u>HR.</u>	<u>POINT</u> <u>IGNI-</u> <u>TION</u>	<u>COM-</u> <u>PRESS</u> <u>ION</u>	<u>SPECI-</u> <u>FIC.</u> <u>GR.</u>
37	459.7	—	1.71	—	—	—	15°	66.6	.8110
38	450.6	2.279	3.00	—	1.317	—			
39	447.	2.26	3.30	2.40	1.46	1.061			
40	438	3.67	4.88	3.42	1.33	.932			
41	457.7	—	1.80	—	—	—	22°	66.6	.8109
42	448.4	2.234	2.865	—	1.281	—			
43	448.4	2.234	3.21	2.265	1.437	1.01			
44	441.2	3.694	4.425	4.84	1.183	1.283			
45	443	4.48	4.92	5.835	1.11	1.279			
46	443.8	—	1.095	—	—	—	28°	66.6	.8108
47	435.8	2.2	2.4	—	1.09	—			
48	435	2.19	2.76	1.92	1.26	.877			
49	440.6	3.685	4.215	4.32	1.142	1.171			
50	436	4.41	4.62	5.52	1.047	1.25			
51	419.4	4.25	5.40	4.98	1.129	1.171			
52	458.5	—	1.82	—	—	—	15°	54.4	.8109
53	450	2.265	2.565	—	1.125	—			
54	448	2.264	3.255	1.53	1.437	.675			
55	438.3	3.67	4.50	3.30	1.025	.90			
56	460.8	—	1.46	—	—	—	22°	54.4	.8109
57	451.	2.279	3.06	—	1.343	—			
58	448	2.267	3.255	1.68	1.434	.741			
59	440.8	3.688	5.07	3.54	1.373	.96			
60	459.3	—	1.22	—	—	—	28°	54.4	.8109
61	448	2.267	2.925	—	1.289	—			
62	448.6	2.27	2.925	1.515	1.288	.66			
63	441.2	3.682	4.125	3.555	1.105	.965			
64	435.8	4.41	4.80	4.23	1.088	.96			

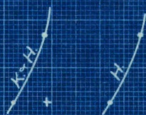
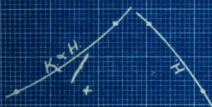
BENNETT CARBURETOR.

* WATER PER B.H.P.HR
* KEROSENE PER B.H.P.HR



STROMBERG CARBURETOR.

WATER PER B.H.P. HR.
KEROSENE PER B.H.P. HR.
COMPRESSION NO. 1.
COMPRESSION NO. 2.
B.H.P.
AVG. IGN.

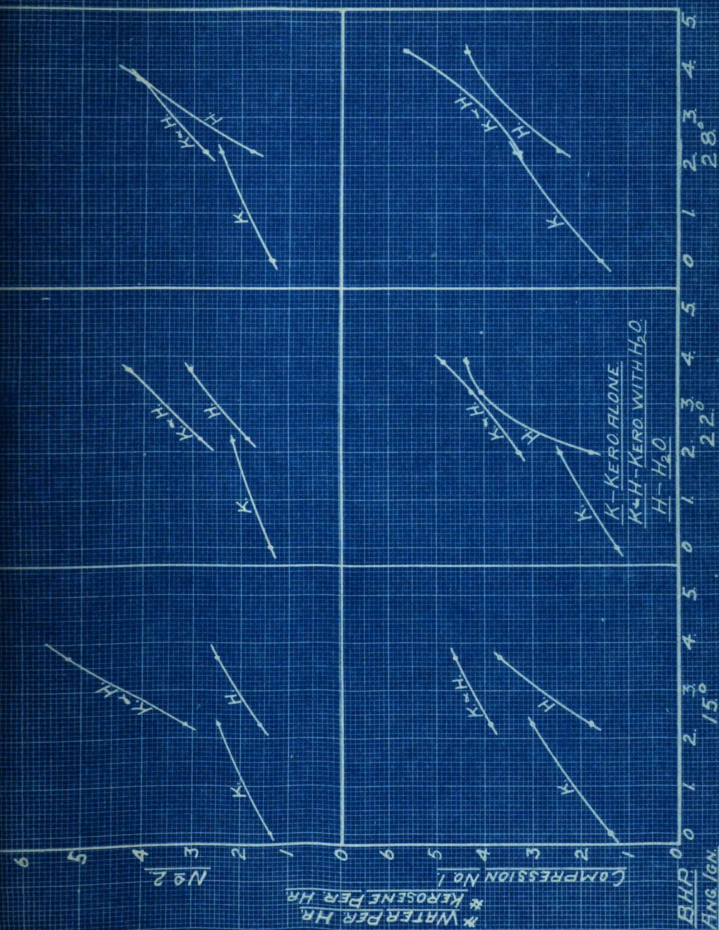


+ - KERO. ALONE
K~H - KERO. WITH H₂O
H - H₂O



28°
22°
15°

BENNETT CARBURETOR



STROMBERG CARBURETOR

× KEROSENE PER HR

COMPRESSION NO 1

NO 2

HP
vs. 16N

1.5%

5

0

1

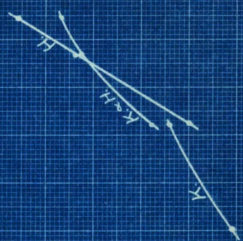
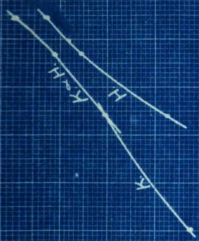
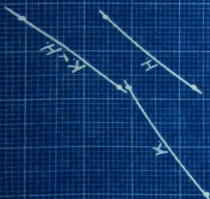
2

3

4

5

K - KERO. FLONE
K-H - KERO. WITH H₂O
H - H₂O



[illegible]

Using Guidelines. Again, according to the guidelines, the guidelines were
noted, but not the guidelines themselves. The guidelines were
being followed by the guidelines themselves.

[illegible]

ADDITIONAL Call Time for Test.

Accepted.....dated by the Registrar.

Compositions.....two.

Length of membership.....

1. Inventory of the property.....

- (a) Inventory of the property.....
- (b) Inventory of the property.....
- (c) Inventory of the property.....

which is a good illustration of the policy of the Prof. G. H. Moore in the journal of the American Society of Civil Engineers. A. I. E. E. Reports, March, 1918.

"Gasoline and the Motor", by H. H. Moore, The New York Times, February, 1918. This article is a good illustration of the fact that the gasoline engine is a very important part of the motor.

"The Gasoline Engine", by H. H. Moore, in The New York Times, March, 1918. This article is a good illustration of the fact that the gasoline engine is a very important part of the motor.

"The Gasoline Engine and the Motor", by H. H. Moore, in "Motor" Magazine, April, 1918. This article is a good illustration of the fact that the gasoline engine is a very important part of the motor.

"The Principles of the Gasoline Engine", by H. H. Moore. Article published in the March number of "The Motor" and was continued in the April number. The article gives a good illustration of the fact that the gasoline engine is a very important part of the motor.

"The Gasoline Engine and the Motor", by H. H. Moore in The New York Times, April 1918. This article is a good illustration of the fact that the gasoline engine is a very important part of the motor.

Table of Constants Table No. 1. Values of constants for the gasoline engine.

$$K.H.R. = \frac{0.0001 \times 1}{0.0001}$$

$$\text{Constant} = \frac{0.0001}{0.0001} = \frac{0.0001 \times 0.0001}{0.0001 \times 1} = 0.0001$$

$$\text{Table No. 2. Values of constants for the gasoline engine} = 7 \frac{1}{10}$$

$$\text{Constant} = \frac{0.0001 \times 7.000}{10 \times 0.0001} = 0.0001$$

STRAIN HIGH = 21.3 pounds absolute of the cylinder being
 11.625 cubic inches of filling at 1000 psi. At 1000 psi
 the sp. gr. is 13.54 pounds absolute per cubic inch of water
 1 inch. The volume of the cylinder which is displaced by the
 piston when at low pressure is equal to 17.40 cubic inches.
 Hence, a total volume of liquid is equal to 285.725 cubic inches.
 The volume of the above water is equal to 57.61 cubic inches. A
 water column absolute at the pressure of the oil of 11.625 cubic
 inches.

$$\text{Formula: } \frac{V_1}{V_2} = \left(\frac{P_2}{P_1} \right)^{\frac{1}{1.35}}$$

$$\frac{V_2}{V_1} = \left(\frac{57.61}{285.725} \right)^{1.35}$$

$$V_2 = 21.3 \text{ pounds absolute or } 21.3 \text{ psi } 10 \text{ gals.}$$

After increasing the above volume by putting in 5/8"
 bars between the cylinder and base, the compression figured out
 to be 22.1 pounds absolute or 22.1 psi 10 gals.

Method of Finding Specific Gravity of Petroleum Products.

Test Number 1.

$$3. \times 3 \text{ inches} = 10.000$$

$$.00 \times 1 \text{ " } = 0.400$$

$$1.075 \times 1 \text{ " } = 0.000$$

$$10.400$$

$$\text{Specific Gravity of Water at } 22.15^\circ \text{ C.} = 10.400 \text{ divided by}$$

$$50 = .2081$$

$$\text{Sp. Gr. water at } 15^\circ \text{ C.} = .99913$$

2

1. 1. 1.

7.

611

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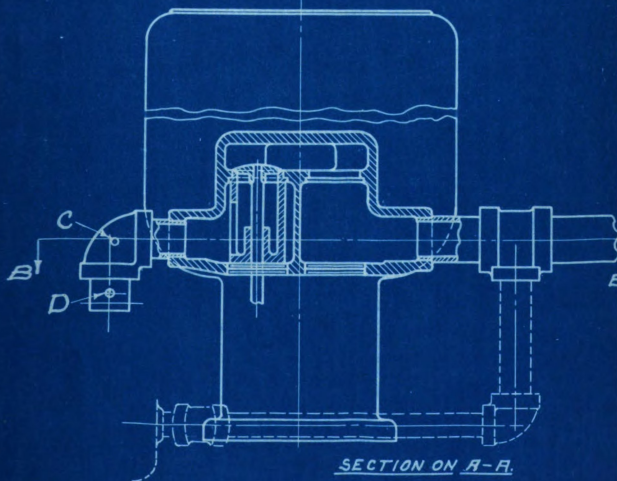
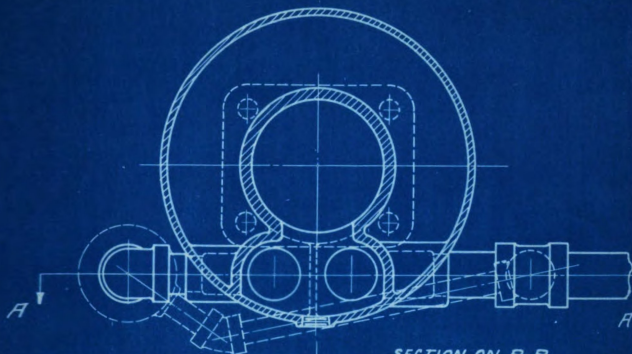
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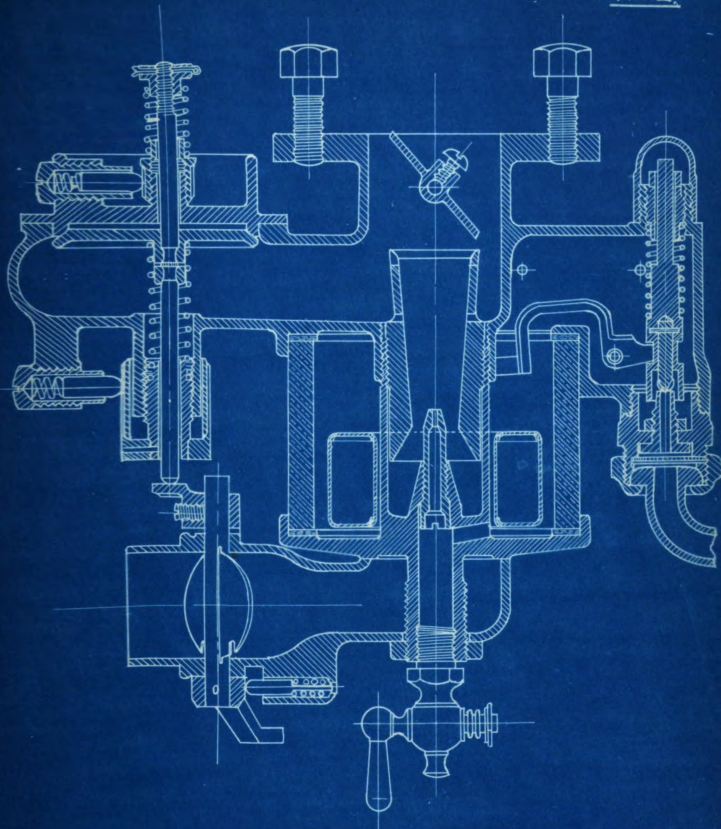
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SECTIONS THRU VALVES.
6 H.P.—Novo ENGINE.



STROMBERG — CARBURETOR

100

100

100

100

100

100

100

100

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

BENNETT CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN

C. L. BAUER

DATE 5/10 1913

TEST NO 13

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS
1	2-20	440	40	10.30	8.40	28°	1	4	
2	2-30	443							
3	2-40	442							
4	2-50	443							
5	3-00	442		8.13	7.85				
6				2.17	1.55				
7									
8									
									TEST NO 14
9	3-09	440	67	13.42	10.00	28°	1	4	MISSED ONE OUT
10	3-19	440							OF EVERY 4 EXP.
11	3-29	439							AV.
12	3-39	440							
13	3-49	440		10.36	7.40				
14				3.06	2.60				
15									TEST NO 15
16	3-55	450	0	10.39	0	28°	1	4	39 EXP. PER
17	4-05	450							MIN. BACKFIRED
18	4-15	448							SOME. DID NOT RUN
19	4-25	449		9.60					SMOOTHLY, BUT WAS
20				.79					NOT DUE TO COOLING
									OF CARBURETOR.

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

 RUNNING LOG OF NOVO GAS ENGINE
BENNETT CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN.

C. L. BAUER

DATE 4/26 1913

TEST No 5.

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS
1	1-17	434	75	12.03	5.15	22°	1	3	POUNDED SOME AFTER 3 OR 4 EXP- LOSIONS IN SUCCE- SSION. MISSED ONE EXP. OUT OF 7 AV. 1 st EXH. AFTER CUT OUT MOSTLY STEAM.
2	1-27	436							
3	1-37	436							
4	1-47	436							
5	1-57	438		9.21	2.43				
6				2.82	2.72				
7									
8									
9									
10	2-10	433	90	12.27	6.25	22°	1	3	ENGINE RUN NICELY UNTIL LAST 5 MIN. THEN FELL OFF IN SPEED - HOT. Av. Exp. BETWEEN CUT OUT 1-25.
11	2-20	437							
12	2-30	435							
13	2-40	426							
14	2-44			9.51	3.77				
15				2.76	2.48				
16									
17									
18									
19									
20									

TEST No 6

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE
STROMBERG CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS

C. L. BAUER
 L. W. DUNN.

DATE 5/13 1913

TEST No. 47

NO.	TIME	R.P.M.	BRAKE LOAD.	# KEROSENE.	# WATER.	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY.
1								
2	3:24	436	40	22.72	0	28°	1	4.
3	:34	435						
4	:44	438						
5	:54	435		21.52				

—REMARKS—
 POUNDED ALL
 TIME.
 CARB. WORKED
 FINE.

TEST No. 46

NO.	TIME	R.P.M.	BRAKE LOAD.	# KEROSENE.	# WATER.	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY.
7								
8	3:58	445	0	22.80	0	28°	1	4.
9	4:08	443						
10	:18	444						
11	:28	443						
12	:38	444		22.07				

TEST No. 48

NO.	TIME	R.P.M.	BRAKE LOAD.	# KEROSENE.	# WATER.	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY.
13								
14								
15	5:00	434	40	22.74	16.55	28°	1	4
16	:10	435						
17	:20	435						
18	:30	435						
19	:40	435		20.90	15.27			

COULD NOT USE
 ENOUGH H₂O TO
 STOP POUNDING
 IT WOULD STOP
 ENGINE.

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE
STROMBERG CARBURETOR.

IN CHARGE C. L. BAUER ASSISTANTS _____
 OBSERVERS { L. W. DUNN } _____ DATE 5/19 1913.
 TEST No 42

NO.	TIME	RPM.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	1:27	448	40	23.01	0	22°	1	6	POUNDED MORE THEN AT 15° AND LESS THEN AT 22°
2	:37	446							
3	:47	450							
4	:57	448							
5	2:07	450		21.10					
6									
7				TEST No 41					
8	2:12	458	0	22.78	0	22°	1	6	LEAKED KEROSENE. POPPED BACK THRU CARB.
9	:22	457							
10	:32	458		22.18					
11									
12				TEST No 43					
13	2:45	448	40	25.98	16.97	22°	1	6	
14	:55	448							
15	3:05	450							
16	:15	448							
17	:25	448		23.84	15.46				
18									
19									
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE
STROMBERG CARBURETOR

IN CHARGE C. L. BAUER ASSISTANTS _____
 OBSERVERS { L. W. DUNN } DATE 5/19 1913

TEST NO. 44

NO.	TIME	R.P.M.	BRAKE LOAD.	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY.	-REMARKS-
1	3:48	437	67	25.38	18.88	22°	1	6	
2	:58	436							
3	4:08	437							
4	:18	448							
5	:28	448		22.43	15.72				
6									
7									
									TEST NO. 45
8	4:45	443	80	25.96	23.26	22	1	6	PULLED FINE.
9	:55	443							
10	5:05	442							
11	:15	442							
12	:25	445		22.68	19.37				
13									
14									
15									
16									
17									
18									
19									
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

STROMBERG CARBURETOR

IN CHARGE C. L. BAUER ASSISTANTS _____
OBSERVERS { L. W. DUNN } DATE 5/21 1913
TEST No 57

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	COMPRESSION	POINT IGNITION	SPECIFIC GRAVITY	REMARKS
1	1:33	448	40	22.86	0	2	22°	6	
2	:43	450							
3	:53	452							
4	2:03	456							
5	:13	450		20.82					
6									
7				TEST No	56				
8	2:20	464	0	22.86	0	2	22	6	CARB. WORKED
9	:30	460							FINE.
10	:40	460							
11	:50	458		22.13					
12				TEST No	59				
13	3:00	442	67	25.92	18.60	2	22	6	
14	:10	441		2					
15	:20	440							
16	:30	440							
17	:40	441		22.64	16.24				
18									
19									
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

BENNETT

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN

C. L. BAUER

DATE 5/23 1913

TEST NO 17

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	2-51	448	40	10.39	0	15°	2	7	POUNDED MORE THAN WITH STROM- BERG. NOT MUCH SMOKING. CLOUDY, RAINY.
2	3-01	448							
3	3-11	449							
4	3-21	448							
5	3-31	448		8.77					
6				1.62					
7									TEST NO 16
8	3-35	460	0	10.35	0	15°	2	7	NOT MUCH SMOKING LEAKED SOME KEROSENE.
9	3-45	457							
10	3-55	458							
11	4-05	456		9.77					
12				.68					
13									TEST NO 19
14	4-13	442	67	13.39	7.40	15°	2	7	
15	4-23	442							
16	4-33	442							
17	4-43	442							
18	4-53	442		8.82	5.72				
19				3.47	1.66				
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

BENNETT CARBURETOR

IN CHARGE ASSISTANTS

OBSERVERS { L.W. DUNN } DATE 5/23 1913
 { C.L. BRAUER }

TEST NO 18

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	5-00	450	40	10.01	4.83	15°	2	7	
2	5-10	448							
3	5-20	446							
4	5-30	446							
5	5-40	450		7.91	3.79				
6				2.10	1.04				
7									

WOULD JUST CARRY 80# LOAD WITH NO H₂O , AND NO
 CUTTING OUT OF EXPLOSIONS.

11									TEST NO 21	5/24, 1913.
12	8-22	446	40	10.48	0	22°	2	8		
13	8-32	450								NOT MUCH SMOKE.
14	8-42	450								
15	8-52	448								
16	9-02	450		9.02						
17				1.46						
18										
19										
20										

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE
BENNETT CARBURATOR

IN CHARGE

ASSISTANTS

OBSERVERS

L.W. DUNN.

C.L. BAUER.

DATE 5/24 1913

TEST NO. 20

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	9-04	456	0	10.33	0	22°	2	8	
2	9-14	455							
3	9-24	455							
4	9-34	456		9.64					
5				.69					
6									
7	9-41	440	67	13.20	9.38	22°	2	8	
8	9-51	440							
9	10-01	442							
10	10-11	441							
11	10-21	442		10.39	7.37				
12				2.81	2.01				
13									
14	10-49	447	40	10.35	4.96	22°	2	8	
15	10-59	447							
16	11-09	447							
17	11-19	447							
18	11-29	447		8.45	3.73				
19				1.90	1.23				
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE
BENNETT CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS { L.W. DUNN
C.L. BAUER. }

DATE 7/24 1913TEST NO. 33

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	12-50	446	40	10.39	0	28°	2	8	
2	1-00	450							
3	1-10	450							BUT LITTLE
4	1-20	446							POUNDING.
5	1-30	447		8.71					
6				1.68					NO HEAT.
7									
									TEST NO 32
8	1-33	458	0	10.28	0	28°	2	8	
9	1-43	458							
10	1-53	458							
11	2-03	457		9.69					
12				.59					
13									TEST NO 35
14	2-09	441	67	13.58	9.39	28°	2	8	
15	2-19	438							
16	2-29	437							NOT MUCH
17	2-39	437							SMOKE.
18	2-49	440		8.36	3.30				
19				2.74	2.39				
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

BENNETT CARBURETOR.

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN.

C. L. BAWER.

DATE 5/24 1913

TEST NO 34

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS -
1	2-09	448	40	10.40	4.96	28°	2	8	NO HEAT
2	3-09	446							
3	3-19	445							
4	3-29	448							
5	3-39	446		8.36	3.30				
6				2.04	1.66				
7						TEST NO. 36			
8	3-52	440	80	13.62	11.13	28°	2	8	NO HEAT.
9	4-02	436							KEROSENE ON NOTCH
10	4-12	440							HIGHER
11	4-22	437							
12	4-32	434		9.60	8.45				
13				4.02	2.68				
14									
15									
16									
17									
18									
19									
20									

ON THIS LOAD OF 80# - BY WEAKENING INLET SPRING A LITTLE, IT WOULD CUT OUT 8 EXPLOSIONS PER MIN., WHILE BEFORE IT WAS CUTTING OUT ONLY FOUR.

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

BENNETT CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS { L. W. DUNN.
C. L. BAUER.

DATE 5/26 1913

TEST No 25

NO.	TIME	R.P.M.	BRAKE LOAD	# KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS
1	1-00	445	40	10.50	0	28°	2	8	NO HEAT
2	1-10	448							
3	1-20	452							
4	1-30	455							
5	1-40	455		8.89					
6				1.61					THERE WAS POPING BACK THRU CARBURETOR NO HEAT
7						TEST No 24			
8	1-43	462	0	10.06	0	28°	2	8	
9	1-53	462							
10	2-03	463							
11	2-13	460		9.38					TEST No 27
12				.68					
13									
14	2-19	446	67	13.25	8.37	28°	2	8	
15	2-29	445							
16	2-39	444							NO HEAT.
17	2-49	445							
18	2-59	448		10.55	5.65				
19				2.70	2.72				
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

 RUNNING LOG OF NOVO GAS ENGINE
BENNETT CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN.

C. L. BAUER.

DATE 5/27 1913

NO.	TIME	R. P. M.	BRAKE LOAD	# GASOLINE	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS
1	12-35	443	40	9.77	22°	1	9	
2	12-45	443						
3	12-55	445						
4	1-05	445						
5	1-15	443		8.10				
6				1.67				
7					TEST	Nº		
8	1-18	438	75	12.61	22°	1	9	STOPPED.
9	1-28	436						
10								
11					TEST	Nº		
12	5-22	435	80	12.45	22°	1	9	WOULD NOT HOLD UP.
13	5-41	434		11.19				
14				1.26				
15								
16								
17								
18								
19								
20								

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF NOVO GAS ENGINE

STROMBERG CARBURETOR

IN CHARGE

ASSISTANTS

OBSERVERS { L. W. DUNN

{ C. L. BAUER. }

DATE 5/27 1913

NO.	TIME	R.P.M.	BRAKE LOAD	# GASOLINE	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	REMARKS
1	2-23	431	90	19.85	22°	1	9	WOULD NOT HOLD UP LONGER.
2	2-35	430		18.69				
3				1.16				
4				TEST NO				
5	2-42	443	40	18.69	22°	1	9	GASOLINE FEED STOPEO.
6	2-52	445						
7	3-02	446						
8	3-16	450		17.19				
9				1.50				
10				TEST NO				
11	3-37	434	75	19.89	22°	1	9	RUN FINE.
12	3-47	432						
13	3-57	436						
14	4-07	434						
15	4-17	436		16.67				
16				3.22	(TEST NO	)		
17	4-21	447	40	19.96	22°	1	9	RUN FINE
18	4-31	445						
19	4-41	447						
20	4-51	447						
	5-01	447		18.08				
				1.88				

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

 RUNNING LOG OF NOVO GAS ENGINE
BENNETT CARBURETOR

	IN CHARGE	ASSISTANTS	
OBSERVERS	L. W. DUNN	{	DATE <u>5/26 1913</u>
	C. L. BAUER.		

NO.	TIME	R.P.M.	BRAKE LOAD	* KEROSENE	# WATER	POINT IGNITION	COMPRESSION	SPECIFIC GRAVITY	-REMARKS-
1	3-03	448	40	10.46	5.00	28°	2	8	NO HEAT
2	3-13	450							
3	3-23	452							
4	3-33	452							
5	3-43	452		8.63	3.82				
6				1.83	1.18				
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Remarks:

MECHANICAL ENGINEERING LABORATORY

MICHIGAN AGRICULTURAL COLLEGE

RUNNING LOG OF SPECIFIC GRAVITY

KEROSENE

IN CHARGE

ASSISTANTS

OBSERVERS

L. W. DUNN.

C. L. BAUER.

DATE

19

NO.	NO. TEST	WEIGHTS				TEMPERATURE
		5 GRAMS	.5 GRAMS	.05 GRAMS	.005 GRAMS	
1	1	8	—	9	1	21°
2		8	—	9	—	21°
3		8	—	9	—	21°
4	2	8	—	10	—	21°
5		8	—	10	—	21°
6		8	—	10	—	21°
7	3	8	—	10	1	21°
8		8	—	10	6	16.5°
9		8	—	10	7	17°
10		8	—	9	3	24°
11		8	—	9	1	24°
12		8	—	9	3	24°
13	5	8	—	9	6	23.8°
14		8	—	9	6	23.8°
15		8	—	9	6	23.8°
16	6	8	1	1	5	21°
17		8	1	1	5	21°
18		8	1	1	5	21°
19		8	1	1	5	21°
20		8	1	1	5	21°

Remarks:

ROOM USE ONLY

ROOM USE ONLY

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