An Economy Analysis of Automobile Engines by a New Method

A THESIS

PRESENTED BY

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OBJECT.

The object of this thesis is to develop a more comprehensive method of testing variable speed automobile engines. Up to the present time, the common method of testing variable speed automobile engines, using gasoline as fuel, has been to take the required readings under wide open throttle conditions, or at some more or less fixed partial load. It is obvious that the data thus obtained is very limited and do not simulate closely all of the actual conditions under which the engine operates. It is the aim of this thesis, therefore, to develop a system of taking data so that the results obtained would overcome the deficiencies outlined above,especial stress being laid on the study of the fuel economy.

Results of preliminary tests along these lines are found in the thesis of Cooban, Palmer and Stepanek, Class of 1915, Armour Institute of Technology.

PART 1.

AN ECONOMY ANALYSIS of AUTOMOBILE ENGINES by A NEW METHOD.

PART 1.

Chalmers 3400 R.P.M. Engine.

The engine used in these tests was a Chalmers 3400 R.P.M. engine: type 35A and number 15039. It is a six cylinder, four cycle, L head engine having a bore of 3-1/4 " and a stroke of 4-1/2 ". The six cylinders are cast enbloc. The valves are located on the right side looking from the front, and the pushrods are encased by removable cover plates. The engine has a thermo-syphon system of water cooling. The ignition consists of a six volt Remy battery distributor and coil system. The Bosch 7/8 " three point type spark plugs were used. The carburetors were heated by hot air from a stove on the exhaust manifold.

Electric Dynamometer.

The Sprague electro-dynamometer was used in the testing of the Chalmers 3400 R.P.M. engine. Briefly,

it consists of a one-hundred horse-power direct current inter-pole generator mounted on a cast iron bed plate. The torque is taken from knife edges screwed to the frame of the generator and transmitted thru a drawbar and spring balance scales to a set of chatillion scales. The length of this arm is equal to 1.315 feet, so that the torque multiplied by the R.P.M. and divided by 4000 gives the horse power developed. Ways are cast in the bed plate for holding down the engine stands; these stands can be adjusted so as to accomodate any size engine and have the engine lined up with the armature shaft in such a way that a flexible coupling can be inserted between the two. The switchboard is mounted on pipe stands within reach of the scale beam. It contains the control switches, field rheostat, circuit breaker, ammeter and voltmeter, and electro-tachometer. In order to maintain a steady field flux that will not vary with the speed, the field is separately excited. The drawing at the back of this thesis shwws the

electrical connections of the apparatus.

Water Cooling Apparatus.

Considerable difficulty was encountered in keeping the cooling water temperatures constant. Many methods of creating circulation were tried before the inlet temperature could be held at approximately 130 deg. fahr., and the outlet temperature at approximately 160 deg. fahr.

In all of the series of tests, the engine fan was disconnected and the radiator replaced by a cooling water tank.

Diagram A shows the water connections used on the preliminary test. The key to diagrams A, B, C, D, E and F, is as follows:

M - Engine

T - Cooling water tank

O - Overflow

V - Valve

J - Jet or nozzle

P - Pump (driven by an electric motor)

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H.C. - Heating coil.

Connections made as indicated in diagram A did not prove satisfactory in that the outlet water temperature was far above 160 deg. fahr., the normal running temperature. The jet (J) was used to create circulation in the direction of the arrows. The hot outlet water entered the tank (T) at the top connection, and any excess water drained off through the overflow (O).

Diagram B shows the addition of a circulating pump (P) to the inlet pipe. Although this was some improvement, it did not correct the wide variation in the two temperatures, and could not keep the temperatures constant throughout the run. When the outlet temperature was correct, the inlet temperature was far too low.

To raise the inlet temperature and still have enough circulation to keep down the outlet temperature, the pump was connected as in diagram C, which shows the hot outlet water being drawn through the

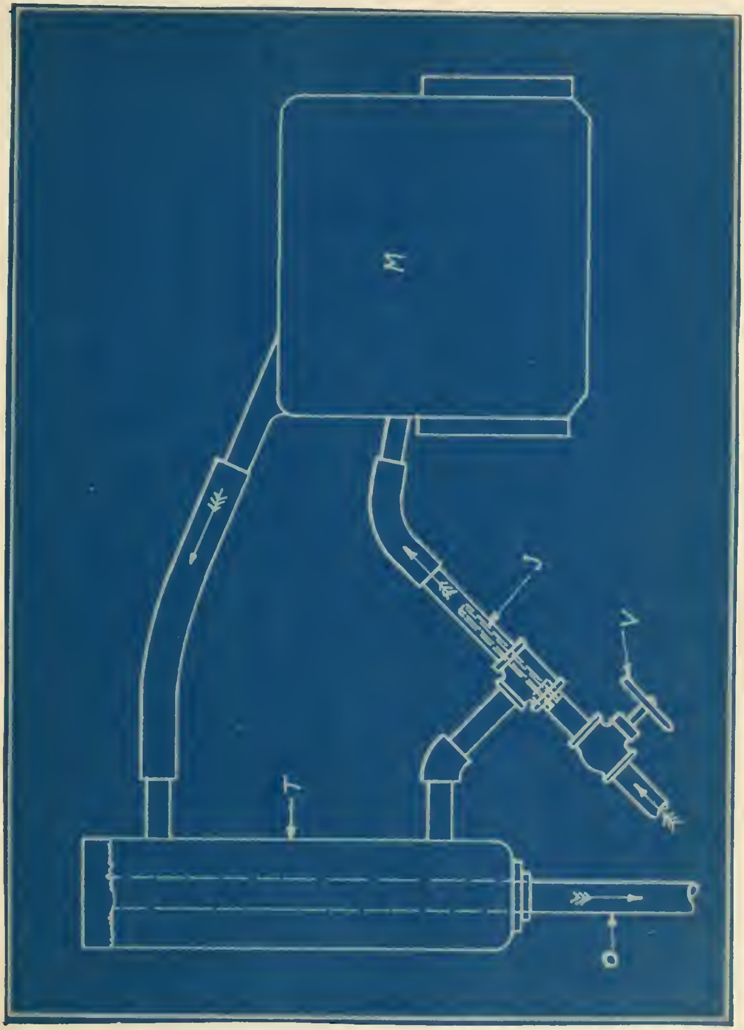

Diagram A

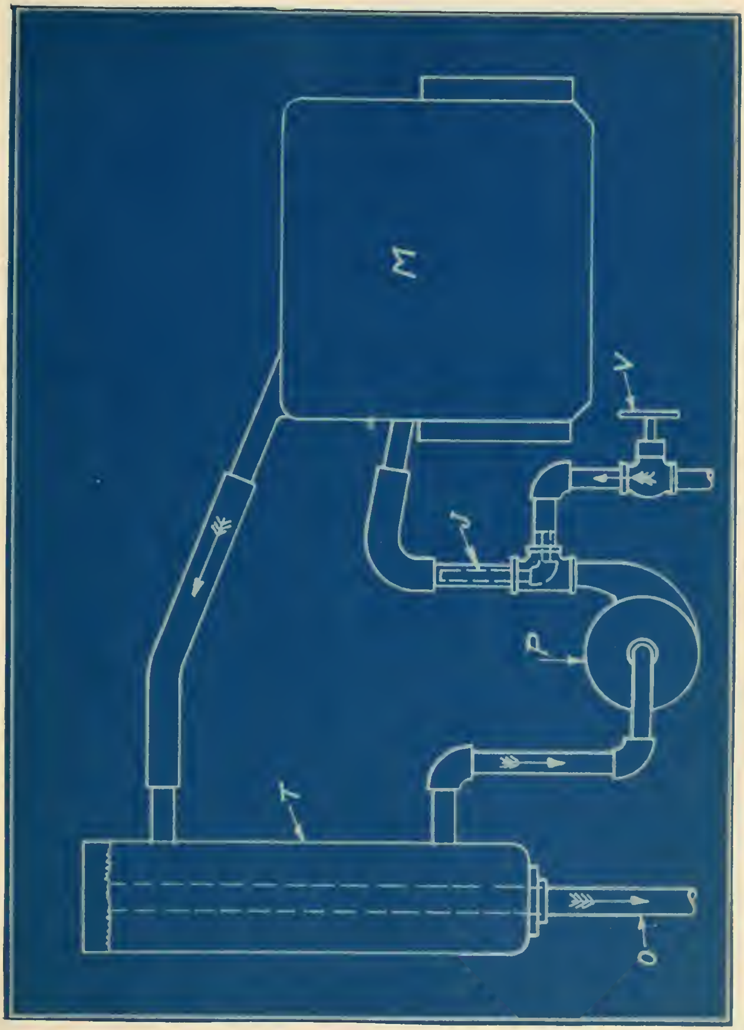

Diagram B

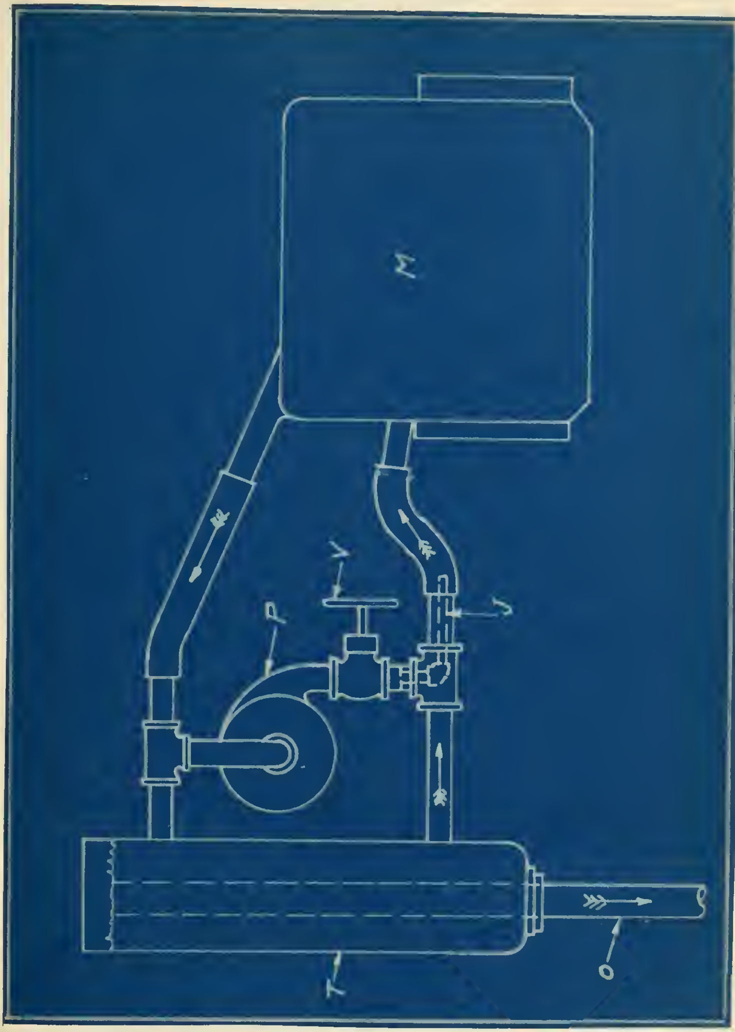

Diagram C

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pump in order to make the inlet temperature high enough. Although an improvement was shown in the temperatures, the connections were again changed as shown in diagram D.

The jet (J) was moved up to the outlet and in this manner relieved the inlet of a cold stream of water which held its temperature far too low. With the jet at the upper opening, the cold water in the tank entered the engine through the bottom connection and again the temperatures were not in accordance with those of the actual operating automobile engine.

The connections were next made as shown in diagram E, in which a water heating coil was used. The jet was brought down to the bottom in order to pull the jet of water through the heater. This method also proved unsuccessful.

When the connections were made as in diagram F, the temperatures of the inlet and outlet could easily be kept as desired. The jet and engine connections were just the same as those shown in diagram D,

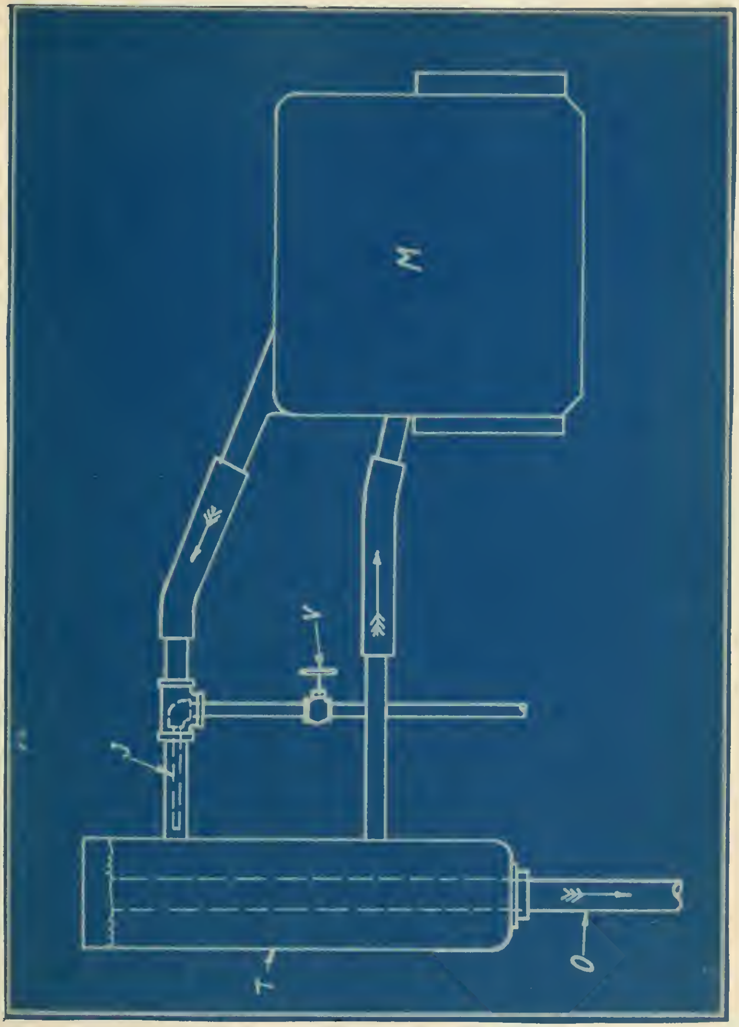

Diagram D

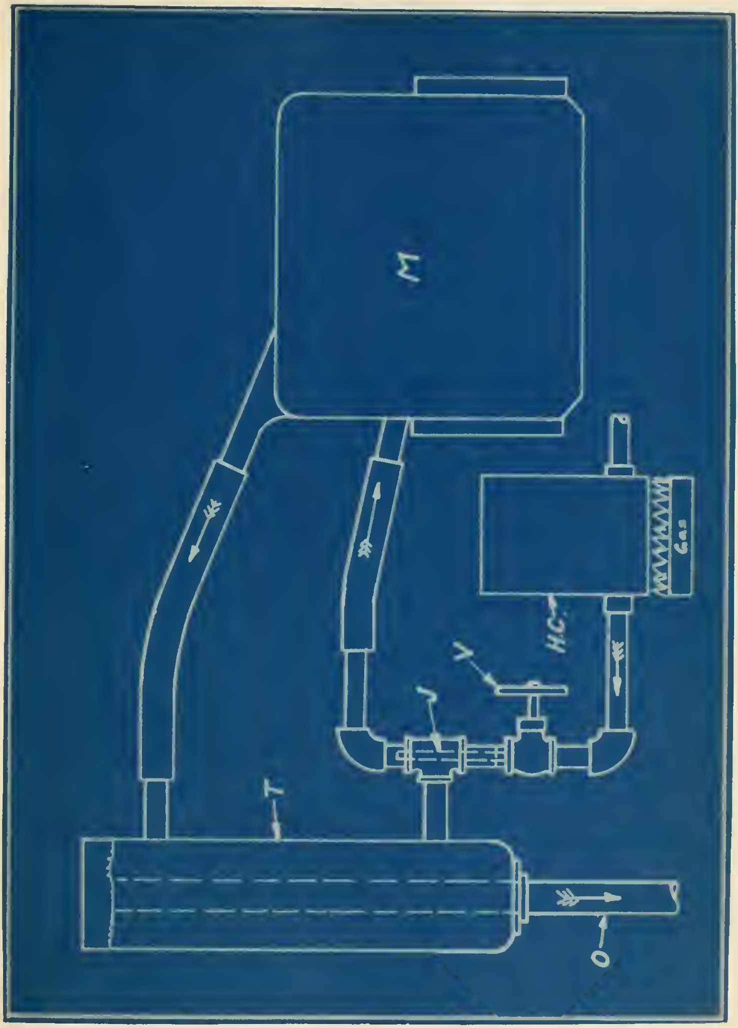

Diagram E

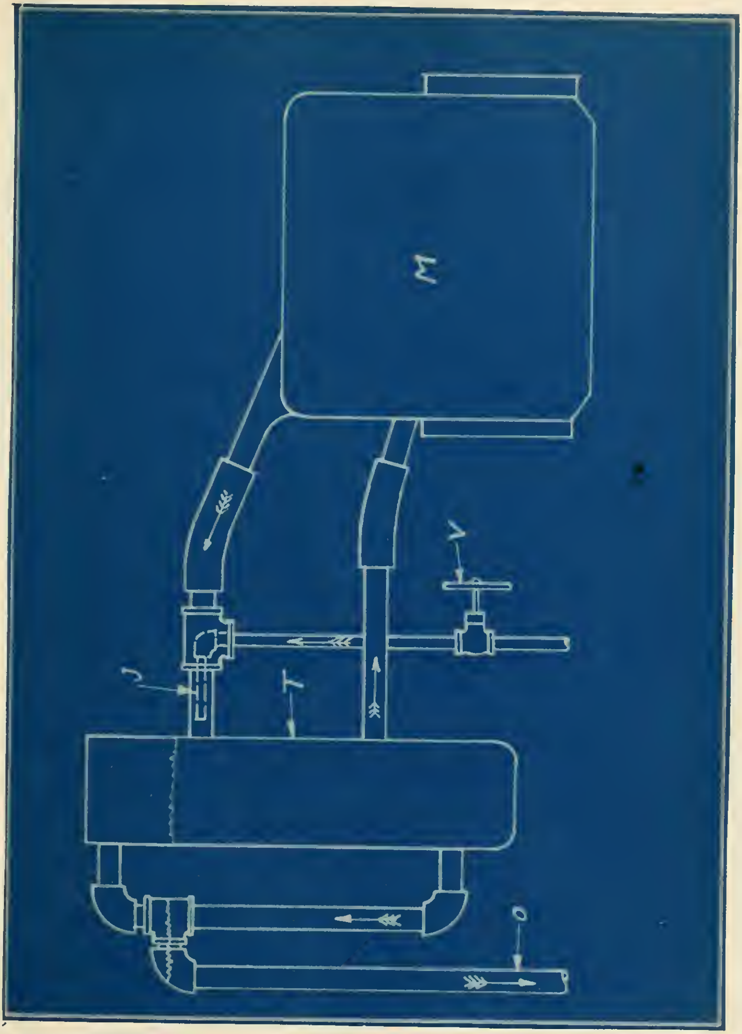

Diagram F

the only difference being in the draining of the tank. The overflow, as shown in diagram F, had two tank connections, one at the top above the water line, and one at the lowest possible point in the tank. The cold water in the bottom of the tank drained out of the lower outlet to the left and up to the overflow line. The upper tank outlet was used only to prevent the siphoning of all of the water in the tank into the overflow.

The connections made as shown in diagram F were used in the Stromberg test #2 and in the Rayfield test, and the desired temperatures were easily maintained.

Gasoline Weighing Apparatus.

Figure A shows clearly the construction of the gasoline weighing apparatus used in these tests. The gasoline tank shown near the center of the picture is mounted upon three legs. These legs are screwed tightly into the weighing platform of a small platform scale. Gasoline is poured into the top of the

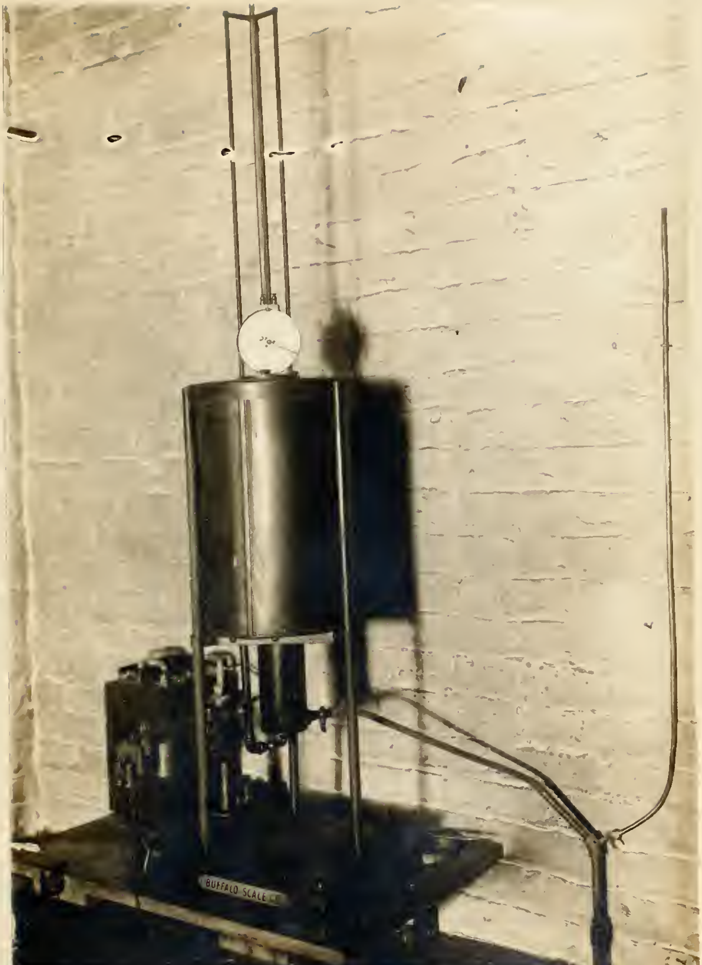

Fig. A

tank without removing the apparatus from its position on a shelf which is approximately two feet above the carburetor on the test engine. As the gasoline is consumed by the engine the gasoline in the tank draine down through the soft rubber hose connection shown just above the right hand corner of the supporting shelf. The vertical copper tube shown at the right of the picture is an atmospheric vent which allows any air bubbles in the gasoline line to escape. At the extreme end of the balance beam is an electrical contact which is made in two very small cups of mercury when the beam drops. This contadt rings an electric bell as soon as the beam drops. When a test is being made the gasoline is continuously flowing from the tank. When the weight of the gasoline and the tank just balance, the beam will start to drop and the alarm bell will ring. A stop watch is used and starts with the ringing of the bell. The slide weight is now pushed over until the weight of gasoline to be used in

the run has been accounted for on the beam slide weight. When that amount of gasoline is used up, the weight of the remaining gasoline and the tank will balance the beam again and the second alarm bell rings. The stop watch indicates the time that the engine takes to use up the given weight of gasoline.

Manifold Depression Apparatus.

The apparatus used for measuring the depression in the intake manifold consists of a "U" shaped manometer connected by means of a copper tube to a brass tube tapped into the intake manifold. Figure B shows the manometer mounted as it was in the test. The difference in heights of the two columns was measured with a steel scale with less than one-sixteenth inch error on average readings and within three-sixteenths of an inch on the sixteen and eighteen inch readings. In the constant manifold depression tests, the throttle and spark were adjusted until the difference in heights of the mer-

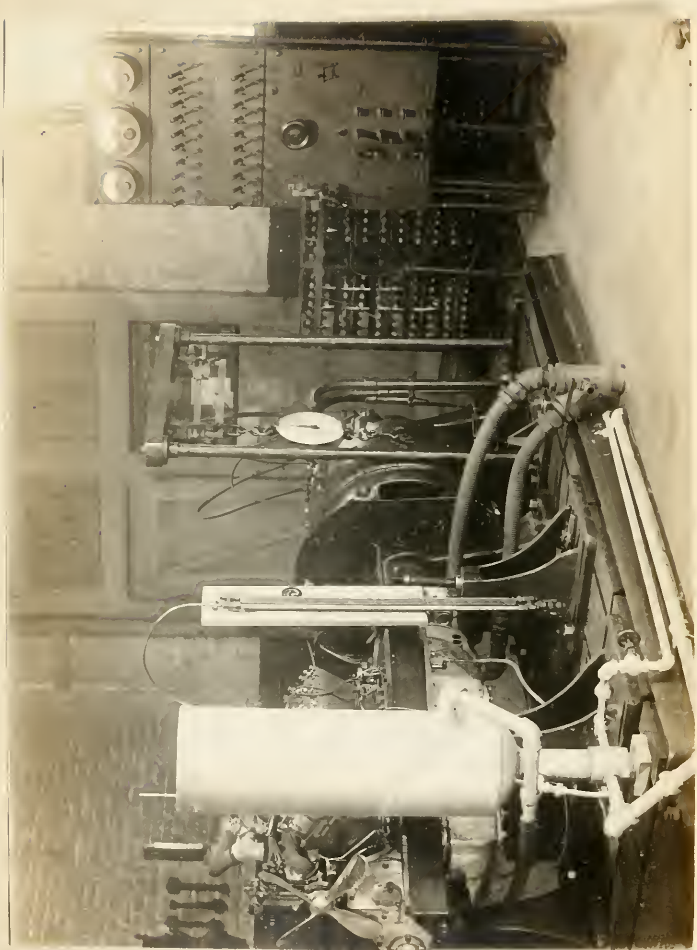

Fig. B

oury columns bedame constant and as high as required then the sotual run was made.

Spark Advance Mechanism.

Figure C shows the end of the crank shaft upon which the spark advance mechanism was mounted. This mechanism consists of a stationary ring about five inches in diameter as shown in the figure. The outer part of the face of this ring is divided into degrees from zero to 180 in each direction, each degree on the ring representing a degree of spark advance or retard. Fixed tightly onto the end of the crank shaft is a lever about two and one-half inches from the center to the end. A sharp pointed adjustable brass screw is near the end of this lever, the point of the screw being about three-sixteenths of an inch from the face of the ring. This lever being connected to the crank shaft is in the ground circuit of the engine. In order to get the spark advance for any particular run, a piece of secondary wire was connected from a binding post on the

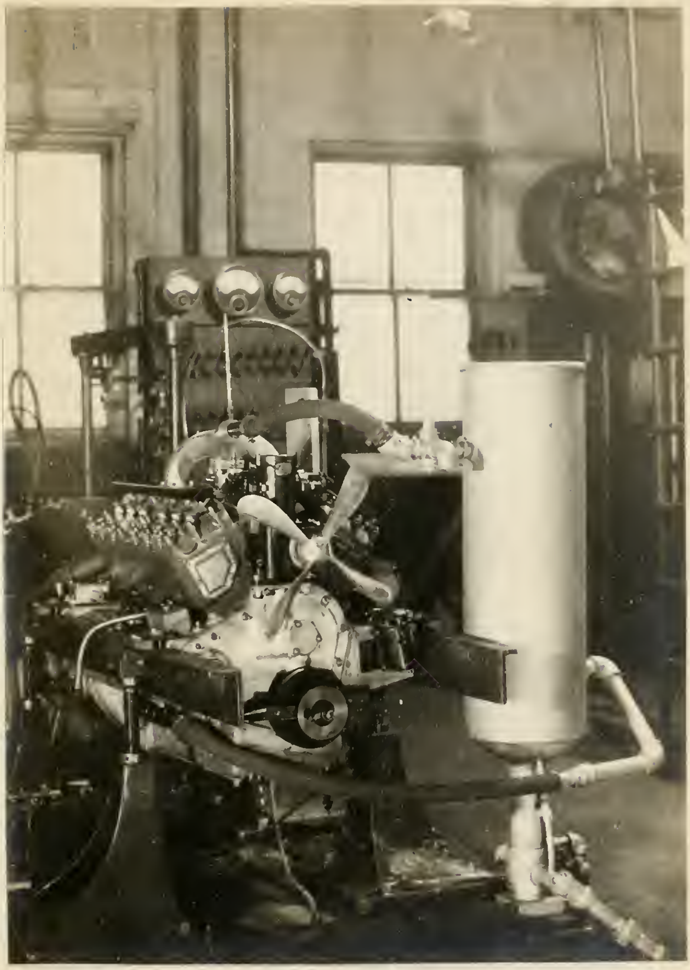

Fig. C

ring to the spark plug of a certain cylinder of the engine. This wire led the current down to the ring point where it jumped the gap instead of jumping the spark plug points. The zero of the ring divisions was set in such a position that the spark occured at zero when the piston of the chosen cylinder was at the end of its stroke.

Speed Counting Apparatus.

Figure D shows the speed counting apparatus attached to the end of the dynamometer shaft. The speed counting apparatus consists of a small revolution counting device (an odometer) the shaft of which can be connected or disconnected to the shaft of the dynamometer by means of a small electrically operated clutch. In order to get the number of revolutions that the engine is making per minute, the reading of the odometer is first noted and then a stop watch and an electric switch are pressed simultaneously. The current through the switch magnetizes the core of a solenoid and pulls the speed

Fig. D

counter clutch into place. At the end of a minute, as indicated on the stop watch, the switch is thrown out and the odometer reading is again taken. The difference between the two odometer readings is the number of revolutions per minute made by the engine.

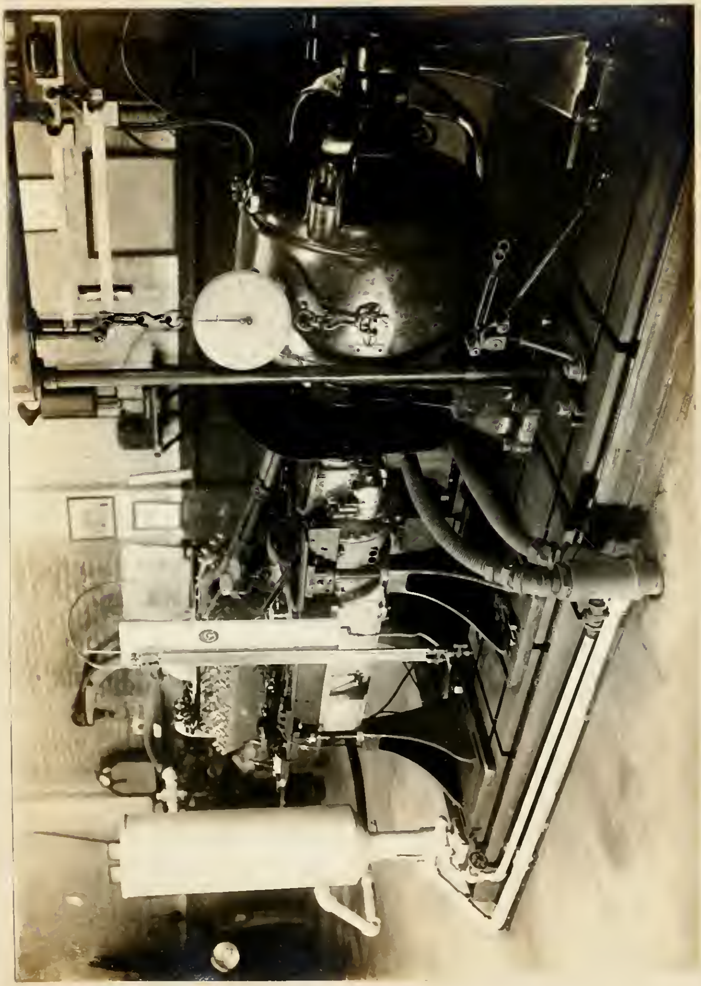

Fig. E

Fig. F

Fig. G

Fig. H

PART 11.

ECONOMY ANALYSIS.

Preliminary Observations.

Before beginning the actual test of this kind it is always desireable to take a preliminary set of runs to see that the engine is in the proper condition for testing.

Probably the best thing to examine first is the coupling between the engine and the dynamometer, and also the supports and fastenings of the engine. All of these should be tight and free from excessive vibration at high speeds and heavy loads.

The carburetor was the next thing in consideration. It was set to give fair acceleration, good economy and to allow the engine to throttle down nicely.

All of the instruments were now examined to see that they were in good working order and then a short run was made to see that everything was in condition for testing.

A set of runs was now taken for the purpose of obtaining the characteristics of the engine. As

the engine was fairly tight, no heavy loads were applied. However, a very brief run was made at wide open throttle, only the torque and R.P.M. being taken to determine whether the engine would develop as much power as we had reason to expect. Having seen that the engine and instruments were in good condition, the engine was ready for the first set of runs.

Before commencing the tests the specific gravity and the temperature of the gasoline were taken. The barometer was also read at the time of each test.

Method of Testing.

In pursuing these investigations, two methods of testing were employed, namely, constant suction and constant torque.

Tests number 1 and 2 were each made by taking a seried of runs each set being at a different constant manifold depression, except one set of runs which was made at wide open throttle, in this case the depression for each run was measured. This

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wide open throttle run was made to secure a brake horse-power curve that would serve as a limit for the other brake horse-power curves taken at the other manifold depressions. Each set of runs was composed of runs taken at various speeds. With each change in speed the load and throttle opening were changed so as to keep the manifold depression constant.

Test number 3 was made by taking a series of runs, each set of runs being taken at a constant torque, except one set of runs which was at wide open throttle. Each set of runs was composed of runs made at various speeds. As the speed was increased the throttle valve was opened so that a constant torque was maintained.

- The friction horse-power was secured by taking five sets of runs, each set being taken at nearly a constant speed. In each set of runs, the dynamometer, now acting as a motor was set to run at a certain speed. The depression in the manifold was

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set at the various settings used in the previous tests and the torque and R.P.M. recorded for each run. Readings for wide open throttle were taken first and then the throttle was gradually closed to secure each manifold depression. As the throttle was closed, the torque became larger and consequently the R.P.M. fell off a little in each set of runs. Readings could not be secured above 1200 R.P.M. because the current taken by the motor would exceed 120 amperes and the circuit breaker would go out. This made it necessary to extend the curves in order to get complete data.

In these tests the data was taken by starting the runs at the slower speeds and then increasing the speeds to about 2000 R.P.M., after which the engine was given a few minutes to cool off between each run. This cooling was done only on the wide open throttle and a few of the low depression sets of runs during which the exhaust manifold became red hot. The engine was not stopped during a set of

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runs. Cooling was accomplished by unloading the engine and letting it run at a slow speed.

The length of time required to take a run depended upon the rate of consumption of the gasoline. Weights of gasoline of one, five-tenths, and three-tenths pounds were usually used, the one pound weight being used for the higher speeds and loads, and the lower weights for the slower speeds and loads. The runs lasted between one and four minutes depending upon the rate of consumption of gasoline. The engine was first set for the required conditions and when it was observed that there was no variation in the running of the engine, the gasoline consumption was taken. This was done by taking the stop watch time for a given weight of gasoline to be consumed. As soon as this reading was taken, the engine was set for the next run and so on until high speeds were reached, where a little more time between the runs was allowed.

The spark advance was taken immediately after

each run before any conditions were changed. This was accomplished by disconnecting the wire leading to the spark plug in number one cylinder and touching it to the spark advance indicator and noting the angle indicated by the device. The wire was then returned to the spark plug and the next setting made.

The R.P.M. was taken by means of the electrically operated odometer. The time was taken for one minute by means of a stop watch.

The temperature of the water was controlled by the valve which controls the flow of cold water into the system. The temperatures at the inlet and outlet of the engine were held as nearly constant as possible. These were read at the end of each run.

The torque was taken directly from the beam of the scale for each run and in case of a variation of the torque during the run, an average was taken.

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Method of Procedure in Calculations.

During the test the following data were taken: torque, R.P.M., time required to consume a known weight of fuel, manifold depression (suction, inches of mercury), spark advance and inlet and outlet cooling water temperatures. These data are shown in tables 1-10 inclusive, 46-54 inclusive, and 71-79 inclusive. For the friction horse-power test the following data were taken: torque, R.P.M., manifold depression (suction, inches of mercury) and average inlet and outlet cooling water temperatures. These data are shown in tables 40-42 inclusive.

In calculating both the brake horse-power and the friction horse-power, the formula

$$B.H.P. = \frac{\text{Torque x R.P.M.}}{4000}$$

was used, the constant 4000 being composed of the factors $\frac{2\ R}{33000}$, where R is the lever arm of the brake, which in this case is 1.315 feet.

The pounds of gasoline per hour were calcu-

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lated from the formula:

$$\text{Lb. gas./hr.} = \frac{3600 \times W}{\text{Time in seconds.}}$$

in which W was the weight, in pounds, of gasoline used for that particular run.

In calculating the pounds of gasoline per hour per brake horse-power, the pounds of gasoline per hour were divided by the brake horse-power.

The mechanical efficiency was obtained by dividing the brake horse-power of each run by the sum of the brake and friction horse-powers of the same run.

The mean effective pressure net (M.E.P.) was obtained by multiplying the torque by the constant 0.886. This constant was obtained from the equality:

$$\text{B.H.P.} = \frac{P\ L\ A\ N}{33000} = \frac{\text{Torque} \times \text{R.P.M.}}{4000}$$

where P = mean effective pressure (lb./sq.in.)

L = stroke in feet

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$A =$ area of piston in square inches.

$N =$ explosions per min. $= 3/2 \times$ R.P.M.

$$\text{Therefore} \quad P = \frac{2 \times 33000}{3 \times 4000 \times L \times A} \times \text{torque}$$

$$= 0.886 \times \text{torque}$$

The thermal efficiency was calculated by means of the Sherman and Kropf formula for the heat value of gasoline:

$$\text{Therm. eff.} = \frac{2546}{M \times \left[18320 + 40\left(Be' - 10\right)\right]}$$

$$= \frac{2546}{M \times 20180}$$

where M is the pounds of gasoline per brake horse-power per hour.

The method of obtaining the constant R.P.M. curves for equal gasoline economy and equal mechanical efficiency was a follows: In the case of the former, the brake horse-power and the pounds of gasoline per hour per brake horse-power were "picked off" from the curves for each run in their re-

spective sets at arbitrarily chosen engine speeds. This data were then tabulated, and are shown in tables 21-25 inclusive for the Stromberg test #1, tables 55-59 inclusive for the Stromberg test #2, and tables 80-83 inclusive for the Rayfield test. In the case of the constant R.P.M. curves for equal mechanical efficiency, the brake horse-power and the mechanical efficiency were "picked off" from the curves for each run in their respective sets at predetermined engine speeds. This data were also tabulated, and are shown in tables 31-34 inclusive for the Stromberg test #1, and tables 64-67 inclusive for the Stromberg test #2.

The above data were then plotted as shown in figures 67, 69, 71 for the equal gasoline economy, and figures 35 and 56 for equal mechanical efficiency.

From these curves data were tabulated which was obtained in the following manner: A certain line of pounds of gasoline per hour per brake horse-

power or of mechanical efficiency was chosen, and then where ever this line cut a curve, the corresponding R.P.M. and brake horse-power were noted. For example, in figure 35, the line of 80% mechanical efficiency cuts the 1800 R.P.M. curve at 32.5 horse-power, and so on across the sheet (see table 37). This interpolation data from both the equal gasoline economy and equal mechanical efficiency curves were plotted and the curves in figures 33, 54, 66, and figures 55 and 34, respectively, were obtained.

Sample Calculations.

In the following sample calculations, run #6, Stromberg test #1 was used:

Brake horse-power:

$$B.H.P. = \frac{\text{Torque} \times R.P.M.}{4000}$$

$$= \frac{89.5 \times 1346}{4000} = 30.1$$

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Lb. gasoline per hour:

$$\text{Lb. gas./hr.} = \frac{3600 \times W}{\text{Time in sec.}}$$

$$= \frac{3600 \times 0.5}{75.2} = 23.90$$

Lb. gasoline per B.H.P. per hour:

$$\text{Lb. gas./B.H.P./hr.} = \frac{\text{Lb. gas./hr.}}{\text{B.H.P.}}$$

$$= \frac{23.90}{30.1} = 0.794$$

Mechanical efficiency:

$$\text{Mech. eff.} = \frac{\text{B.H.P.}}{\text{B.H.P.} \quad \text{F.H.P.}} \times 100$$

$$= \frac{30.1}{34.2} \times 100 = 88\ \%$$

Mean effective pressure net:

$$\text{M.E.P.} = 0.886 \times \text{Torque}$$

$$= 0.886 \times 89.5 = 79.4 \ \text{lb./sq.in.}$$

Thermal efficiency:

$$\text{Therm. eff.} = \frac{2546}{M \times 20180}$$

$$= \frac{2546}{0.794 \times 20180} = 15.9\ \%$$

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Final Observations.

After each test the engine was accelerated to determine whether it was as limber as at the start of the run. After test number one was completed, the spark plugs were replaced, the porcelain of one of them having been broken.

After completing the last test, the valve lift diagrams were taken. An examination of the cylinders showed that they were slightly scored.

PART 111.

ECONOMY ANALYSIS.

Discussion of Results.

In this test of the Chalmers 3400 R.P.M. engine, the primary object was to determine the performance and economy of the engine with two different makes of carburetors.

The Stromberg test #1 and the Stromberg test #2 were both made with the same carburetor, the only main difference being the temperature of the inlet and outlet cooling water. Test #3 was made with a Rayfield carburetor and with stimulated water cooling circulation.

In test #1, the wide range in temperature between the inlet and outlet cooling water did not make it possible to operate the engine in its most efficient manner. As can be seen from table 1, there was a range of approximately 65 deg. fahr. The data obtained under these conditions were so inconsistent that it was necessary to revise it by means of the curves. The data taken during the test were plotted and smooth curves, consistent with or-

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dinary practice, were drawn through these points. These curves were drawn so that they could not represent any impossible conditions. To illustrate this point, reference is made to figures 21 and 22. In figure 21 are the curves plotted from the data taken during the test. It is obvious, if the engine was running in a consistent manner, that the horse-power curves plotted from the data taken at 2, 4, 6, and 8 inch manifold depressions should not cross each other; and, furthermore, that, as the manifold depression in the wide open throttle test went as high as 6.5 inches of mercury, it could be assumed that the horse-power curves obtained from data taken at the 2, 4, and 6 inch manifold depressions should intersect and be limited by the points on the wide open throttle horse-power curve at which there was a 2, 4, and 6 inch manifold depression, respectively. It was with these assumptions in view that the curves in figure were drawn. In a like manner it was assumed that under consistent running conditions,

the engine could not have the same rate of fuel consumption at two different throttle openings and the same speed. Therefore, the pounds of gasoline per hour curves were made to conform with these assumptions. The data in tables 11-20 inclusive were obtained by means of these two sets of revised curves. The brake horse-power and the pounds of gasoline per hour were taken from these curves at every 200 R.P.M., and the pounds of gasoline per brake horse-power per hour were calculated from this data. The torque was obtained by multiplying the brake horse-power by 4000 and dividing by the R.P.M. The M.E.P. net and the thermal efficiency were obtained in the usual manner heretofore described, using the revised data. The mechanical effieiency was calculated by using the same friction horse-power, but the revised brake horse-power. The curves representing this data are shown in figures 22-33 inclusive.

The only fair comparison, therefore, as far as carburetors are concerned would be to use the Strom-

berg test #2 and the Rayfield test, as these were both made under the same water cooling conditions. With reference to figures 54 and 66, it will be observed that the characteristics of these two carburetors are very different. As can be seen from figure 54, in the case of the Stromberg carburetor, the zones of equal fuel consumption are very nearly parallel to the general direction of the wide open throttle horse-power curve. This condition would seem to indicate that for constant manifold depressions the fuel consumption would be nearly uniform. However, in the case of the Rayfield carburetor (fig. 66), with the sheet of combined horse-power curves in mind (fig.22), it can be seen that there is a wide range of manifold depression and speed at which there is practically a constant fuel consumption (below an economy of 0.9 lb./B.H.P./hr.). It would seem to indicate, from the curves, that the Rayfield carburetor would be the more economical at heavy loads and at any speed; whereas the Stromberg car-

buretor would appear to be more economical at light loads and at any speed. As far as brake horse-power is concerned, the maximum horse-power developed with the Stromberg carburetor on the engine was 37.8 (table 46); while the maximum horse-power developed with the Rayfield carburetor attached was 39.2 (table 71).

In general, it can be said that with a decrease in manifold depression there is an increase in thermal efficiency, or in other words, with a decrease in the manifold depression there is a decrease in the pounds of fuel used per brake horse-power per hour. This characteristic varies with different engines, as indicated by the slope and extent of the closed economy lines on the two contour curves under discussion. It has been observed that some engines will not give a closed economy line under any conditions. In this case the general statement holds true exactly.

It will be observed from figures 1, 36, and 57,

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that with wide open throttle the suction in the manifold increases. This is a measure of the resistance of the carburetor. In the design of a carburetor for maximum power, it is the aim to keep this suction as low as possible so as to avoid an insufficient supply of mixture, thereby reducing the weight of the charge and therefore the horse-power output.

During the progress of this thesis, several facts were brought out that would be an improvement in the method of plotting the final results. It was observed that a more comprehensive study of the characteristics of the engine could be made by plotting the final results on three co-ordinates, thus making a surface instead of a sheet of contour lines. The three variables to be used being: brake horse-power, R.P.M., and pounds of gasoline per brake horse-power per hour. Also, that under the present method, that is, plotting all results against R.P.M. and using total B.H.P., two different engines whose

bore and stroke differed could not be compared directly. It is therefore suggested that in the future theses along this line, the brake horse-power be reduced to brake horse-power per cubic inch piston displacement, and that all results be plotted against piston speed in feet per minute, thus giving a true commercial comparison between the two engines. It was also found that a certain number of inches of mercury depression in the manifold was not a true measure of the absolute pressure in the manifold, due to the changing of the barometric pressure. It is, therefore, suggested that in the future theses, the runs be made at constant absolute pressures in the intake manifold instead ot constant intake manifold depressions.

In concluding, it may be said that this method of testing promises to be the most concise and accurate means of determining and comparing the characteristics of variable speed automobile engines.

PART IV.

INDEX.

INDEX. (concluded)

Test No. 1. *Motor:* Chalmers *Date of Test:* 10 / 11 / 16

Object: Economy *Model:* 35 A. 3400 R. P. M. *Barometer* =29.42 *in. Hg*

Constant: Suction *Number:* 15039 *Room Temperature* °F

No. Cyl. 6. *Gasoline* 56.5°*B.* at 64°*F.*

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	526	92.0	12.1	0.8	12.9	93.6	81.5	61	130	1.0	.5	2:20.1	12.84	1.060	11.9	8
2	637	92.5	14.7	1.1	15.8	93.0	82.0	65	121	0.7	.5	2:28.2	12.14	0.823	15.3	10
3	800	92.0	18.4	1.6	20.0	92.0	81.5	68	121	0.9	.5	2:01.3	14.83	0.806	15.7	18
4	1020	93.0	23.7	2.6	26.3	90.1	82.4	69	121	1.3	.5	1:33.2	19.30	0.814	15.5	18
5	1154	92.5	26.7	3.2	29.9	89.4	81.5	68	129	1.6	.5	1:29.2	20.17	0.755	16.7	21
6	1346	89.5	30.1	4.1	34.2	88.0	79.3	68	131	2.0	.5	1:15.2	23.90	0.794	15.9	25
7	1575	87.5	34.3	5.5	39.8	86.2	77.5	67	136	2.7	.5	1:07.4	26.75	0.782	16.2	26
8	1765	83.0	36.6	7.1	43.7	83.8	73.6	68	129	3.5	.5	0:59.4	30.30	0.828	15.3	30
9	2130	72.5	38.6	10.9	49.5	78.0	64.2	69	123	4.8	.5	0:55.4	32.50	0.842	15.0	31
10	2490	57.0	35.6	15.8	51.4	69.2	50.5	69	133	6.5	1.0	1:35.4	37.80	1.062	11.9	31

Table 1

Test No. 1. Motor: Chalmers Date of Test: 10 / 12 / 16

Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.40 in. Hg

Constant: Suction Number: 15039 Room Temperature °F.

No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	595	77.5	11.5	1.2	12.7	90.5	68.7	72	130	2.0	.3	1:29.4	12.09	1.047	12.1	12
2	790	87.0	17.2	1.7	18.9	90.9	77.1	66	125	2.0	.5	2:01.0	14.89	0.867	14.6	21
3	855	89.0	19.1	2.0	21.1	90.4	78.9	62	127	2.0	.5	1:58.1	15.22	0.799	15.8	22
4	1187	91.0	27.0	3.4	30.4	88.9	80.6	62	132	2.0	.5	1:21.2	22.17	0.822	15.4	25

Table 2

Test No. 1.			Motor: Chalmers			Date of Test: 10 / 12 / 16	
Object: Economy			Model: 35 A. 3400 R. P. M.			Barometer = 29.40 in. Hg	
Constant: Suction			Number: 15039			Room Temperature °F	
			No. Cyl. 6.			Gasoline 56.5°B. at 64 °F.	

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm Eff.	Deg Spark
1	503	72.7	9.1	1.0	10.1	90.2	64.5	65	135	4.0	.3	2:24.3	7.48	0.817	15.5	12
2	615	80.0	12.3	1.3	13.6	90.4	70.9	63	125	4.0	.5	3:26.4	8.72	0.708	17.8	19
3	836	81.0	16.9	2.0	18.9	89.4	71.8	62	130	4.0	.5	2:01.4	14.81	0.875	14.5	20
4	1137	83.7	23.7	3.2	26.9	88.1	74.2	63	135	4.0	.5	1:24.6	21.26	0.896	14.1	23
5	1403	81.0	28.4	4.7	33.1	85.8	71.8	66	132	4.0	.5	1:15.4	23.90	0.842	15.0	28
6	1894	68.5	32.4	8.7	41.1	78.8	60.7	68	133	4.0	.5	0:58.1	31.00	0.958	13.2	32

Table 3

Test No. 1. Motor: Chalmers Date of Test: 10 / 12 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.40 in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	447	64.5	7.2	0.9	8.1	88.9	57.2	60	124	6.0	.3	1:18.7	13.73	1.910	6.6	20
2	617	68.0	10.5	1.4	11.9	88.4	60.2	60	128	6.0	.5	3:35.4	8.36	0.796	15.9	23
3	745	71.0	13.2	1.8	15.0	88.0	62.9	60	130	6.0	.5	2:56.8	10.18	0.770	16.4	26
4	1080	73.0	19.7	3.1	22.8	86.2	64.7	63	130	6.0	.5	1:29.7	20.06	1.019	12.4	22
5	1195	68.0	20.3	3.7	24.0	84.6	60.2	60	132	6.0	.5	2:23.2	12.58	0.618	20.4	26
6	1507	73.0	27.5	5.6	33.1	83.7	64.7	62	138	6.0	.5	1:19.9	22.50	0.818	15.4	31
7	1893	70.0	33.1	9.1	42.2	78.5	62.0	69	125	6.0	.5	1:02.7	28.70	0.866	14.6	37
8	2189	65.0	35.6	12.5	48.1	74.0	57.6	69	134	6.0	.5	0:55.4	32.50	0.913	13.8	40
9	2326	60.0	34.9	14.2	49.1	71.0	53.2	69	125	6.0	.5	0:39.0	46.20	1.323	9.5	41

Table 4

Test No. 1. Motor: Chalmers Date of Test: 10 / 11 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.42 in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline 56.5°B. at 64 °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	451	54.0	6.1	1.0	7.0	86.0	47.9	60	117	8.0	.3	3:07.2	5.77	0.948	13.3	13
2	756	59.2	11.2	1.9	13.1	85.9	52.5	66	114	8.0	.5	4:00.8	7.47	0.668	18.9	16
3	1000	64.5	16.1	2.9	19.0	84.6	57.2	70	111	8.0	.5	2:32.5	11.80	0.733	17.2	20
4	1280	62.2	19.9	4.3	24.2	82.2	55.2	69	123	8.0	.5	1:49.2	16.48	0.827	15.3	26
5	1588	66.7	26.5	6.4	32.9	80.6	59.2	67	128	8.0	.5	1:19.4	22.70	0.856	14.8	31
6	1926	65.0	31.3	9.4	40.7	76.9	57.6	69	127	8.0	.5	1:04.9	27.77	0.887	14.2	33
7	2364	55.7	32.9	14.6	47.5	69.2	49.4	70	129	8.0	.5	0:56.2	32.02	0.971	13.0	38

Table 5

Test No. 1. Motor: Chalmers Date of Test: 10 / 11 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.42 in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	506	45.5	5.7	1.3	7.0	82.3	40.3	60	122	10.0	.5	4:50.3	6.13	1.077	11.7	23
2	792	51.0	10.1	2.2	12.3	82.1	46.2	65	117	10.0	.5	3:32.3	8.48	0.841	15.0	28
3	1006	52.5	13.2	3.1	16.3	81.0	46.6	61	127	10.0	.5	2:32.1	11.83	0.896	14.1	35
4	1145	55.0	15.7	3.7	19.4	80.9	48.7	65	123	10.0	.5	2:12.1	13.65	0.868	14.5	32
5	1420	54.2	19.3	5.3	24.6	78.5	48.1	65	127	10.0	.5	1:47.0	16.82	0.873	14.5	35
6	1663	58.0	24.1	7.1	31.2	77.2	51.4	65	128	10.0	.5	1:23.4	21.59	0.895	14.1	34
7	1960	55.0	26.9	9.9	36.8	73.1	48.7	68	135	10.0	.5	1:13.6	24.44	0.909	13.9	37
8	2247	52.0	29.2	13.2	42.4	68.9	46.1	70	125	10.0	.5	1:03.8	28.20	0.965	13.1	39

Table 6

Test No. 1. Motor: Chalmers Date of Test: 10 / 12 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.40 in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	561	39.0	5.5	1.6	7.1	77.4	34.6	71	135	12.0	.3	3:12.3	5.62	1.029	12.3	31
2	703	41.5	7.3	2.0	9.3	78.2	36.8	61	128	12.0	.3	2:52.9	6.25	0.857	14.7	33
3	907	45.2	10.3	2.9	13.2	78.0	40.1	61	132	12.0	.3	2:09.4	8.35	0.813	15.5	36
4	1144	44.0	12.6	4.1	16.7	75.5	39.0	61	138	12.0	.3	1:52.2	9.62	0.765	16.5	42
5	1594	45.0	17.9	6.8	24.7	72.5	39.9	61	130	12.0	.3	1:02.1	17.39	0.968	13.0	45
6	2110	40.0	21.1	10.6	31.7	66.5	35.4	63	140	12.0	.5	1:15.6	23.80	1.130	11.2	47
7	2324	35.0	20.3	14.4	34.7	58.5	31.3	66	138	12.0	.5	1:03.9	28.20	1.389	9.1	52

Table 7

Test No. 1. Motor: Chalmers Date of Test: 10 / 12 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.40 in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb per Hour	lb/HP per Hr.	Therm Eff.	Deg. Spark
1	539	30.7	4.1	1.5	5.6	73.5	27.2	67	150	14.0	.2	3:01.9	3.98	0.960	13.2	35
2	853	36.2	7.7	2.8	10.5	73.5	32.2	61	138	14.0	.2	1:16.1	9.46	1.223	10.3	39
3	1100	37.5	10.3	4.1	14.4	71.7	33.3	61	135	14.0	.3	1:56.2	9.29	0.901	14.0	42
4	1326	37.0	12.3	5.5	17.8	69.0	32.8	61	142	14.0	.3	1:47.3	10.05	0.820	15.4	46
5	1634	37.5	15.3	7.9	23.2	65.9	33.3	62	140	14.0	.3	1:15.1	14.38	0.937	13.5	48
6	2082	36.0	18.7	12.6	31.3	59.8	31.9	63	143	14.0	.3	0:55.6	19.40	1.034	12.2	51
7	2328	29.2	17.0	15.7	32.7	52.1	25.9	68	128	14.0	.4	0:50.9	28.30	1.660	7.6	55

Table 8

Test No. 1. Motor: Chalmers Date of Test: 10 / 12 / 16

Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.42 in. Hg

Constant: Suction Number: 15039 Room Temperature °F.

No. Cyl. 6. Gasoline 56.5°B. at 64°F.

Run	R.P.M.	Torque	Brake	Frict.	B.HP + F.HP	Mach.	M.E.P. Net	Jacket Temp.		Intake Suct.	Gasoline		lb. per	lb./HP	Therm.	Deg
No.		lb.	HP	HP		Eff	lb/□"	In.	Out.	In. Hg	lb.	Time	Hour	per Hr.	Eff.	Spark
1	657	25.0	4.1	1.7	5.8	70.7	22.2	76	145	16.0	.2	2:15.6	5.31	1.295	8.8	30
2	807	25.0	5.0	2.7	7.7	65.0	22.2	61	128	16.0	.2	2:09.9	5.50	1.092	11.6	41
3	1088	27.0	7.8	4.2	12.0	65.1	23.9	62	138	16.0	.2	1:30.8	7.94	1.011	12.5	48
4	1630	29.2	11.9	8.0	19.9	59.9	25.9	61	134	16.0	.2	1:02.9	11.45	0.960	13.2	58
5	1826	27.0	12.3	10.0	22.3	52.8	23.9	65	137	16.0	.3	1:22.2	13.14	1.068	11.8	61
6	2319	21.5	12.5	16.2	28.7	43.5	19.1	65	139	16.0	.3	0:55.8	19.35	1.551	8.2	63

Table 9

Test No. 1.	Motor : Chalmers	Date of Test 10 / 12 / 16
Object : Economy	Model: 35 A. 3400 R. P. M.	Barometer = 29.42 in. Hg
Constant : Suction	Number : 15039	Room Temperature °F.
	No. Cyl. 6.	Gasoline 56.5°B. at 64°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	646	12.5	2.1	2.1	4.2	50.0	11.1	63	128	18.0	.3	3:20.0	5.40	2.595	4.9	38
2	1036	14.7	3.8	4.0	7.8	48.9	13.1	61	146	18.0	.3	2:38.2	6.83	1.790	7.1	45
3	1643	16.0	6.6	8.4	15.0	43.9	14.2	63	140	18.0	.5	3:10.8	9.44	1.434	8.8	60
4	2362	14.2	8.4	17.0	25.4	33.1	12.6	63	158	18.0	.5	2:16.6	13.20	1.568	8.0	65

Table 10

Test No. 1. Revised. Motor: Chalmers Date of Test:
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = in. Hg
Constant: Suction Number: 15039 Room Temperature °F.
No. Cyl. 6. Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	400	82.0	8.2	0.6	8.8	93.2	72.6			1.2						
2	600	93.3	14.0	1.1	15.1	92.6	82.6			0.8			12.7	0.908	13.9	12
3	800	95.9	19.2	1.7	20.9	91.9	85.0			0.9			13.6	0.708	17.8	15
4	1000	95.5	23.9	2.4	26.3	90.9	84.6			1.2			16.8	0.718	17.6	19
5	1200	94.2	28.3	3.4	31.7	89.2	83.4			1.6			21.0	0.744	17.0	22
6	1400	90.6	31.7	4.4	36.1	87.8	80.3			2.2			24.8	0.783	16.1	24
7	1600	86.7	34.7	5.8	40.5	85.6	76.8			2.9			28.0	0.807	15.6	27
8	1800	82.9	37.3	7.5	44.8	83.2	73.4			3.6			30.4	0.814	15.5	29
10	2000	77.0	38.5	9.4	47.9	80.4	68.2			4.4			31.9	0.829	15.2	30
10	2200	70.0	38.5	11.7	50.2	76.7	62.0			5.3			34.9	0.906	13.9	32
11	2400	61.7	37.0	14.2	51.2	72.2	54.7			6.1			36.8	0.994	12.7	32

Table 11

Test No. 1. Revised — Motor: Chalmers — Date of Test:

Object: Economy — Model: 35 A. 3400 R. P. M. — Barometer = in. Hg

Constant: Suction — Number: 15039 — Room Temperature °F.

No. Cyl. 6. — Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	400	70.0	7.0	0.6	7.6	92.1	62.0			2.0						
2	600	84.6	12.7	1.2	13.9	91.3	74.9			2.0			12.3	0.968	13.0	16
3	800	90.4	18.1	1.8	19.9	91.0	80.1			2.0			15.0	0.828	15.2	20
4	1000	92.4	23.1	2.6	25.7	89.9	81.8			2.0			18.0	0.779	16.2	23
5	1200	92.3	27.7	3.5	31.2	88.7	81.7			2.0			21.4	0.773	16.3	25
6	1349	91.4	30.8	4.2	35.0	88.0	81.0			2.0			24.1	0.783	16.1	

Table 12

Test No. 1. Revised					Motor: Chalmers								Date of Test:				
Object: Economy					Model: 35 A. 3400 R. P. M.								Barometer = in. Hg				
Constant: Suction					Number: 15039								Room Temperature °F				
					No. Cyl. 6.								Gasoline °B. at °F.				
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark	
1	400	60.0	6.0	0.8	6.8	88.2	53.2			4.0							
2	600	75.9	11.4	1.2	12.6	90.5	67.2			4.0			9.3	0.816	15.5	18	
3	800	81.9	16.4	1.9	18.3	89.5	72.5			4.0			13.9	0.847	14.9	19	
4	1000	84.7	21.2	2.6	23.8	89.0	75.1			4.0			17.7	0.835	15.1	21	
5	1200	85.3	25.6	3.5	29.1	88.0	75.6			4.0			21.0	0.820	15.4	23	
6	1400	84.6	29.6	4.6	34.2	86.5	74.9			4.0			24.0	0.811	15.6	25	
7	1600	83.3	33.3	6.0	39.3	84.7	73.8			4.0			26.8	0.799	15.8	28	
8	1800	81.3	36.6	7.8	44.4	82.5	72.1			4.0			29.6	0.809	15.6	31	
9	1900	80.0	38.0	9.9	47.9	79.4	70.8			4.0			30.8	0.810	15.6	34	

Table 13

Test No. 1. Revised					Motor: Chalmers					Date of Test:					
Object: Economy					Model: 35 A. 3400 R. P. M.					Barometer = in. Hg					
Constant: Suction					Number: 15039					Room Temperature °F.					
					No. Cyl. 6.					Gasoline °B. at °F.					
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In:	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	400	52.0	5.2	0.8	6.0	86.7	46.1			6.0			10.0	1.926	6.6	
2	600	66.0	9.9	1.4	11.3	87.6	58.5			6.0			12.3	1.242	10.2	21
3	800	73.0	14.6	2.0	16.6	87.9	64.7			6.0			14.2	0.972	13.0	23
4	1000	75.5	18.9	2.8	21.7	87.1	66.9			6.0			16.4	0.868	14.5	25
5	1200	75.9	22.8	3.8	26.6	85.8	67.2			6.0			18.7	0.820	15.4	27
6	1400	76.0	26.6	4.8	31.4	84.7	67.3			6.0			21.0	0.789	16.0	29
7	1600	74.5	29.8	5.3	35.1	84.8	66.0			6.0			23.9	0.802	15.7	32
8	1800	72.7	32.7	8.1	40.8	80.1	64.4			6.0			27.4	0.837	15.1	35
9	2000	70.2	35.1	10.2	45.3	77.5	62.2			6.0			32.2	0.924	13.7	38
10	2200	66.9	36.8	12.6	49.4	74.4	59.2			6.0			38.5	1.047	12.1	42
11	2380	62.4	37.1	15.0	52.1	71.2	55.2			6.0			45.0	1.213	10.4	45

Table 14

Test No. 1. Revised — Motor: Chalmers — Date of Test:

Object: Economy — Model: 35 A. 3400 R. P. M. — Barometer = in. Hg

Constant: Suction — Number: 15039 — Room Temperature °F.

No. Cyl. 6. — Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	MEP Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	400	43.0	4.3	0.9	5.2	82.7	38.1			8.0			5.0	1.163	10.9	11
2	600	56.0	8.4	1.4	9.8	85.7	49.6			8.0			6.0	0.714	17.7	14
3	800	62.4	12.5	2.0	14.5	86.2	55.3			8.0			8.0	0.641	19.7	17
4	1000	66.3	16.6	2.9	19.5	85.1	58.7			8.0			11.0	0.663	19.1	21
5	1200	68.7	20.6	3.9	24.5	84.1	60.9			8.0			14.6	0.708	17.8	25
6	1400	69.4	24.3	5.0	29.3	82.9	61.5			8.0			19.0	0.782	16.1	28
7	1600	69.0	27.6	6.4	34.0	81.2	61.1			8.0			22.5	0.815	15.5	31
8	1800	67.2	30.2	8.1	38.3	78.8	59.6			8.0			26.0	0.862	14.6	32
9	2000	63.6	31.8	10.2	42.0	75.7	56.4			8.0			28.5	0.896	14.1	34
10	2200	59.5	32.7	12.5	45.2	72.3	52.7			8.0			30.8	0.942	13.4	37
11	2400	54.5	32.7	15.1	47.8	68.4	48.3			8.0			32.0	0.978	12.9	40

Table 15

Test No. 1. Revised — Motor: Chalmers — Date of Test:

Object: Economy — Model: 35 A. 3400 R. P. M. — Barometer = in. Hg

Constant: Suction — Number: 15039 — Room Temperature °F

No. Cyl. 6. — Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	420	42.0	4.4	1.0	5.4	81.5	37.2			10.0			5.5	1.377	9.2	
2	600	48.0	7.2	1.5	8.5	82.7	42.5			10.0			7.0	0.972	13.0	26
3	800	52.9	10.6	2.3	12.9	82.1	46.9			10.0			9.1	0.859	14.7	30
4	1000	55.2	13.8	3.1	16.9	81.6	48.9			10.0			11.8	0.855	14.8	33
5	1200	56.2	16.9	4.0	20.9	80.8	49.8			10.0			14.7	0.870	14.5	34
6	1400	57.2	20.0	5.2	25.2	79.3	50.6			10.0			17.7	0.885	14.3	36
7	1600	57.0	22.7	6.6	29.3	77.5	50.3			10.0			20.2	0.890	14.2	37
8	1800	56.0	25.2	8.3	33.5	75.2	49.6			10.0			23.0	0.912	13.8	37
9	2000	54.2	27.1	10.4	37.5	72.2	48.1			10.0			25.3	0.933	13.5	37
10	2200	50.0	27.5	12.7	40.2	68.4	44.3			10.0			27.8	1.012	12.5	38
11	2360	43.2	25.5	14.7	40.2	63.4	38.3			10.0			29.2	1.146	11.0	39

Table 16

Test No. 1. Revised. Motor: Chalmers Date of Test:
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = in. Hg
Constant: Suction Number: 15039 Room Temperature °F
No. Cyl. 6. Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	460	32.2	3.7	1.3	5.0	74.0	28.5			12.0						
2	600	40.0	6.0	1.7	7.7	77.9	35.4			12.0			6.1	1.018	12.4	31
3	800	44.0	8.8	2.4	11.2	78.6	39.0			12.0			6.7	0.761	16.6	35
4	1000	46.0	11.5	3.3	14.8	77.7	40.8			12.0			8.0	0.696	18.1	38
5	1200	46.3	13.9	4.3	18.2	76.3	41.0			12.0			9.9	0.713	17.7	41
6	1400	46.0	16.1	5.4	21.5	74.8	40.8			12.0			12.2	0.757	16.7	43
7	1600	45.0	18.0	6.8	24.8	72.6	39.9			12.0			15.1	0.839	15.1	45
8	1800	43.6	19.6	8.5	28.1	69.7	38.6			12.0			16.7	0.954	13.2	45
9	2000	41.6	20.8	10.5	31.3	66.5	36.8			12.0			22.5	1.082	1177	47
10	2200	38.2	21.0	12.8	33.8	62.1	33.9			12.0			26.7	1.272	9.9	49
11	2330	34.3	20.0	14.4	34.4	58.1	30.4			12.0			29.2	1.461	8.6	52

Table 17

Test No. 1..Revised					Motor: Chalmers							Date of Test:				
Object: Economy					Model: 35 A. 3400 R. P. M.							Barometer = in. Hg				
Constant: Suction					Number: 15039.							Room Temperature °F.				
					No. Cyl. 6.							Gasoline °B. at °F.				
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net lb/"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	520	27.7	3.6	1.5	5.1	70.6	24.6			14.0			3.8	1.057	12.0	34
2	600	31.3	4.7	1.8	6.5	72.3	27.8			14.0			4.0	0.851	14.8	35
3	800	37.0	7.4	2.6	10.0	74.0	32.8			14.0			5.4	0.731	17.3	38
4	1000	39.2	9.8	3.6	13.4	73.1	34.8			14.0			7.4	0.755	16.7	41
5	1200	40.0	12.0	4.7	16.7	71.8	35.4			14.0			9.9	0.826	15.3	44
6	1400	40.0	14.0	6.0	20.0	70.0	35.4			14.0			12.2	0.872	14.5	46
7	1600	39.8	15.9	7.6	23.5	67.6	35.3			14.0			14.9	0.937	13.5	47
8	1800	39.1	17.6	9.5	27.1	64.9	34.6			14.0			17.4	0.989	12.8	48
9	2000	37.6	18.8	11.7	30.5	61.7	33.3			14.0			19.9	1.060	11.9	50
10	2200	33.6	18.5	14.1	32.6	56.7	29.8			14.0			22.0	1.190	10.6	52
11	2340	29.2	17.1	15.9	33.0	51.8	25.9			14.0			23.6	1.382	9.1	55

Table 18

Test No. 1. Revised — Motor: Chalmers — Date of Test:

Object: Economy — Model: 35 A. 5400 R. P. M. — Barometer = in. Hg

Constant: Suction — Number: 15039 — Room Temperature °F.

No. Cyl. 6. — Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	600	24.0	3.6	1.9	5.5	65.4	21.3			16.0			5.4	1.502	8.4	27
2	800	28.5	5.7	2.7	8.4	67.9	25.3			16.0			5.7	1.000	12.6	39
3	1000	30.0	7.5	3.7	11.2	67.0	26.6			16.0			6.1	0.813	15.5	47
4	1200	30.2	9.1	4.9	14.0	65.0	26.8			16.0			7.2	0.791	16.0	51
5	1400	29.7	10.4	6.2	16.6	62.7	26.3			16.0			9.0	0.866	14.6	55
6	1600	28.7	11.5	7.8	19.3	59.6	25.5			16.0			11.0	0.957	13.2	57
7	1800	27.1	12.2	9.8	22.0	55.4	24.0			16.0			13.2	1.082	11.7	58
8	2000	25.4	12.7	12.0	24.7	51.4	22.5			16.0			15.7	1.238	10.2	60
9	2200	23.1	12.7	14.6	27.3	46.5	20.5			16.0			18.0	1.418	8.9	62
10	2380	20.2	12.0	17.1	29.1	41.2	17.9			16.0			20.0	1.668	7.6	63

Table 19

Test No. 1. Revised	Motor: Chalmers	Date of Test:
Object: Economy	Model: 35 A. 3400 R. P. M.	Barometer = in. Hg
Constant: Suction	Number: 15039.	Room Temperature °F
	No. Cyl. 6.	Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	640	8.8	1.4	2.1	3.5	40.0	7.8			18.0			5.3	3.790	3.3	38
2	800	14.0	2.8	2.8	5.6	50.0	12.4			18.0			6.0	2.146	5.9	43
3	1000	17.6	4.4	3.8	8.2	53.7	15.6			18.0			7.0	1.592	7.9	47
4	1200	19.4	5.8	5.0	10.8	53.7	17.1			18.0			8.0	1.382	9.1	51
5	1400	20.0	8.0	6.4	13.4	52.3	17.7			18.0			9.0	1.288	9.8	54
6	1600	20.0	8.0	8.1	16.1	49.6	17.7			18.0			10.0	1.250	10.1	57
7	1800	19.4	8.7	10.0	18.7	46.6	17.1			18.0			11.0	1.264	10.0	60
8	2000	18.0	9.0	12.3	21.3	42.3	15.9			18.0			12.0	1.333	9.5	62
9	2200	16.2	8.9	14.7	23.6	37.7	14.4			18.0			12.8	1.438	8.8	65
10	2400	13.3	8.0	17.4	25.4	31.5	11.8			18.0			13.0	1.625	7.8	67

Table 20

CHALMERS 3400 R.P.M. MOTOR
Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

600 R.P.M.				800 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	14.0	13.4	0.956	W.O.	19.1	16.2	0.848
2	12.7	12.0	0.945	2	18.0	15.2	0.844
4	11.4	10.2	0.895	4	16.5	13.6	0.823
6	10.0	8.3	0.830	6	14.5	11.8	0.814
8	8.5	6.7	0.787	8	12.5	10.0	0.800
10	7.1	5.7	0.802	10	10.5	8.7	0.828
12	6.0	5.0	0.833	12	8.8	7.7	0.875
14	4.6	4.5	0.978	14	7.4	6.7	0.905
16	3.5	4.1	1.171	16	5.7	5.9	1.034
18	1.0	3.8	3.800	18	2.7	5.1	1.890

Table 21

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
1000 R.P.M.				1200 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	24.0	19.0	0.791	W.O.	28.2	21.7	0.720
2	23.1	18.4	0.796	2	27.7	21.4	0.744
4	21.1	17.0	0.806	4	25.6	20.2	0.789
6	18.8	15.1	0.803	6	22.9	18.4	0.804
8	16.6	13.3	0.801	8	20.6	16.5	0.801
10	13.8	11.6	0.840	10	17.0	14.6	0.853
12	11.5	10.3	0.895	12	13.9	12.8	0.920
14	9.8	8.8	0.898	14	12.0	11.0	0.917
16	7.5	7.6	1.012	16	9.1	9.3	1.022
18	4.4	6.3	1.432	18	5.8	7.5	1.292

Table 22

CHALMERS 3400 R.P.M. MOTOR
Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

1400 R.P.M.				1600 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	31.7	24.3	0.766	W.O.	34.8	26.9	0.773
2				2			
4	29.6	23.4	0.790	4	33.3	26.5	0.796
6	26.6	21.6	0.811	6	29.9	24.7	0.826
8	24.3	19.6	0.806	8	27.6	22.6	0.819
10	20.0	17.5	0.875	10	22.7	20.3	0.894
12	16.1	15.3	0.951	12	18.0	17.8	0.989
14	14.0	13.1	0.936	14	15.9	15.1	0.949
16	10.4	11.0	1.058	16	11.5	12.6	1.095
18	7.0	8.7	1.242	18	8.0	9.8	1.225

Table 23

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
1800 R.P.M.				2000 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	37.2	29.4	0.791	W.O.	38.6	31.9	0.826
2				2			
4				4			
6	32.7	27.7	0.846	6	35.1	30.6	0.871
8	30.1	25.6	0.851	8	31.9	28.5	0.892
10	25.2	23.1	0.917	10	27.1	25.9	0.955
12	19.6	20.2	1.030	12	20.7	22.6	1.091
14	17.5	17.1	0.977	14	18.8	19.1	1.017
16	12.3	14.2	1.163	16	12.7	15.8	1.243
18	8.7	10.9	1.254	18	9.0	12.1	1.344

Table 24

CHALMERS 3400 R.P.M. MOTOR
Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

2200 R.P.M.							
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	38.6	34.4	0.891	W.O.			
2				2			
4				4			
6	36.8	33.6	0.913	6			
8	32.7	31.4	0.960	8			
10	27.5	28.6	1.040	10			
12	21.0	24.9	1.186	12			
14	18.5	21.1	1.140	14			
16	12.6	17.4	1.380	16			
18	8.9	13.2	1.487	18			

Table 25

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.800			0.850		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.800	7.4	600	0.850	6.0	600
0.800	8.9	600	0.850	9.1	800
0.800	12.2	800	0.850	10.5	600
0.800	13.2	800	0.850	12.4	1000
0.800	21.0	1000	0.850	16.6	1200
0.800	25.2	1200	0.850	19.1	800
0.800	28.5	1400	0.850	22.4	1400
0.800	33.0	1600	0.850	27.3	1600
0.800	36.5	1800	0.850	32.0	1800
			0.850	36.9	2000

Table 26

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.900			1.000		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.900	5.3	600	1.000	4.4	600
0.900	7.5	800	1.000	6.0	800
0.900	10.3	1000	1.000	7.6	1000
0.900	11.6	600	1.000	9.7	1200
0.900	14.1	1200	1.000	12.7	1400
0.900	18.4	1400	1.000	15.6	1600
0.900	22.8	1600	1.000	18.2	1800
0.900	25.8	1800	1.000	23.2	2000
0.900	31.0	2000	1.000	31.3	2200
0.900	37.7	2200			

Table 27

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
1.100			1.200		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.100	3.9	600	1.200	3.4	600
1.100	5.2	800	1.200	4.6	800
1.100	6.3	1000	1.200	5.5	1000
1.100	7.6	1200	1.200	6.6	1200
1.100	9.3	1400	1.200	7.6	1400
1.100	10.7	1600	1.200	8.4	1600
1.100	13.1	1800	1.200	9.8	1800
1.100	17.1	2000	1.200	12.3	2000
1.100	23.2	2200	1.200	17.1	2200

Table 28

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
1.300			1.400		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.300	3.0	600	1.400	2.6	600
1.300	4.1	800	1.400	3.7	800
1.300	5.0	1000	1.400	4.5	1000
1.300	5.9	1200	1.400	5.3	1200
1.300	6.6	1400	1.400	6.0	1400
1.300	7.2	1600	1.400	6.5	1600
1.300	8.1	1800	1.400	7.1	1800
1.300	9.2	2000	1.400	8.2	2000
1.300	13.2	2200	1.400	10.4	2200

Table 29

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
1.500					
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.500	2.4	600			
1.500	3.4	800			
1.500	4.2	1000			
1.500	4.9	1200			
1.500	5.4	1400			
1.500	5.9	1600			
1.500	6.4	1800			
1.500	7.2	2000			
1.500	8.7	2200			

Table 30

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant B.P.M. curves for lines of equal Mechanical Efficiency.

600 R.P.M.			900 R.P.M.		
Suction	B.H.P.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	13.9	93.0	W.O.	20.7	92.0
2	11.5	90.8	2	20.3	90.5
4	11.6	90.8	4	18.6	89.3
6	10.2	88.2	6	16.5	88.0
8	8.5	86.0	8	14.2	85.5
10	7.1	82.2	10	12.1	82.2
12	5.9	78.0	12	9.9	78.0
14	4.7	73.6	14	8.5	73.2
16	3.8	70.0	16	6.6	68.8
18	1.0	50.0	18	3.5	49.7

Table 31

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.

1200 R.P.M.			1500 R.P.M.		
Suction	B.H.P.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	27.4	89.5	W.O.	33.3	86.2
2	27.4	88.8	2		
4	24.8	87.4	4	29.5	84.0
6	22.3	86.2	6	27.6	84.0
8	20.0	84.0	8	25.5	81.8
10	17.1	80.8	10	21.5	78.4
12	13.6	77.0	12	16.9	75.0
14	11.8	71.4	14	14.8	68.0
16	9.0	66.0	16	10.9	61.3
18	5.7	48.2	18	7.5	46.0

Table 32

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.					
1800 R.P.M.			2100 R.P.M.		
Suction	B.H.P.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
m W.O.	37.4	82.0	W.O.	38.6	76.8
2			2		
4	32.2	80.2	4	32.2	77.5
6	32.4	79.5	6	35.5	74.8
8	29.8	78.0	8	32.4	74.0
10	25.2	75.8	10	28.1	70.6
12	19.7	71.0	12	21.2	65.8
14	17.3	63.2	14	18.7	57.5
16	12.3	55.5	16	12.8	46.8
18	8.7	42.2	18	9.2	38.0

Table 33

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.

2400 R.P.M.					
Suction	B.HP.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	36.5	71.3			
2					
4					
6	34.0	69.5			
8	32.5	69.0			
10	30.2	67.0			
12	19.5	58.0			
14	16.5	50.5			
16	12.2	41.0			
18	8.0	32.3			

Table 34

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for lines of equal Mechanical Efficiency.

50 per cent			45 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
50.0	600	1.0	45.0	1800	9.9
50.0	900	3.5	45.0	2100	12.0
50.0	1200	6.0	45.0	2400	14.1
50.0	1500	8.5	40 per cent		
50.0	1800	11.5	40.0	2100	10.0
50.0	2100	14.0	40.0	2400	11.9
50.0	2400	16.2			

Table 35

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
90 per cent			85 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
90.0	600	11.2	85.0	600	8.1
90.0	900	19.2	85.0	900	13.6
			85.0	1200	20.6
			85.0	1500	31.5

Table 36

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
80 per cent			75 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
80.0	600	6.2	75.0	600	5.0
80.0	900	10.6	75.0	900	8.5
80.0	1200	16.1	75.0	1200	13.1
80.0	1500	23.1	75.0	1500	17.9
80.0	1800	32.5	75.0	1800	24.8
			75.0	2100	34.8

Table 37

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
70 per cent			65 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
70.0	600	4.0	65.0	600	3.1
70.0	900	6.6	65.0	900	5.2
70.0	1200	11.0	65.0	1200	9.2
70.0	1500	14.8	65.0	1500	12.9
70.0	1800	20.0	65.0	1800	17.4
70.0	2100	26.5	65.0	2100	21.5
70.0	2400	34.4	65.0	2400	26.6

Table 38

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
60 per cent			55 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
60.0	600	2.5	55.0	600	1.8
60.0	900	4.5	55.0	900	4.0
60.0	1200	8.0	55.0	1200	7.0
60.0	1500	11.3	55.0	1500	9.8
60.0	1800	15.3	55.0	1800	13.4
60.0	2100	18.6	55.0	2100	16.2
60.0	2400	21.2	55.0	2400	18.2

Table 39

Test No. 1 & 2 Date: 10/2/16
Motor–Chalmers Temp. 58°F
Friction HP Bar. 29.5 In. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp In	Jacket Temp Out
1	340	6.7	0.57	0.2	Average 82 deg. fahr.	Average 136 deg. fahr.
2	330	7.0	0.58	2.0		
3	325	7.3	0.59	4.0		
4	320	8.3	0.66	6.0		
5	315	9.0	0.71	8.0		
6	312	9.8	0.76	10.0		
7	310	10.8	0.84	12.0		
8	305	11.5	0.88	14.0		
9	312	12.0	0.94	16.0		
10	295	12.5	0.92	18.0		

Test No. 1 & 2 Date: 10/2/16
Motor–Chalmers Temp. 58°F
Friction HP Bar. 29.5 In. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp. In	Jacket Temp. Out.
1	540	7.0	0.95	0.4	Average 82 deg. fahr.	Average 136 deg. fahr.
2	535	7.3	0.97	2.0		
3	530	7.8	1.03	4.0		
4	525	8.5	1.12	6.0		
5	522	9.3	1.21	8.0		
6	520	10.3	1.33	10.0		
7	518	11.0	1.43	12.0		
8	515	11.8	1.51	14.0		
9	513	12.0	1.53	16.0		
10	510	12.8	1.63	18.0		

Table 40

Test No. 1 & 2 Date: [illegible]
Motor - CHALMERS Temp. 58 °F
Friction HP Bar. 29.58 in. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp In	Jacket Temp Out
1	795	8.5	1.69	0.8	Averagen 82 deg. fahr.	Average 136 deg. fahr.
2	792	8.8	1.73	2.0		
3	790	9.0	1.78	4.0		
4	790	9.5	1.88	6.0		
5	790	10.0	1.98	8.0		
6	790	10.8	2.13	10.0		
7	795	11.5	2.28	12.0		
8	785	12.5	2.46	14.0		
9	790	13.5	2.66	16.0		
10	790	14.5	2.86	18.0		

Test No. 1 & 2 Date: [illegible]
Motor - CHALMERS Temp. 58 °F
Friction HP Bar. 29.58 in. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp. In	Jacket Temp. Out.
1	1040	10.0	2.60	1.3	Average 82 deg. fahr.	Average 136 deg. fahr.
2	1030	10.5	2.70	2.0		
3	1040	10.8	2.80	4.0		
4	1020	11.3	2.87	6.0		
5	1050	12.3	3.22	8.0		
6	1040	13.0	3.38	10.0		
7	1040	13.5	3.51	12.0		
8	1060	14.5	3.64	14.0		
9	1035	15.3	3.95	16.0		
10	1040	16.3	4.07	18.0		

Table 41

Test No. 1 & 2 Date: 10/19/16
Motor - CHALMERS Temp. 58°F
Friction HP Bar. 29.58 in. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp In	Jacket Temp Out
1	1210	11.3	3.40	1.8	Average 82 deg. fahr.	Average 136 deg. fahr.
2	1200	11.5	3.45	2.0		
3	1200	11.8	3.53	4.0		
4	1200	12.5	3.75	6.0		
5	1200	13.0	3.90	8.0		
6	1200	13.5	4.05	10.0		
7	1210	14.5	4.38	12.0		
8	1200	15.5	4.65	14.0		
9	1200	16.3	4.88	16.0		
10	1200	16.8	5.03	18.0		

Test No. 1 & 2 Date: 10/19/16
Motor - CHALMERS. Temp. 58°F
Friction HP Bar. 29.58 in. Hg

Run No.	R.P.M.	Torque	F.H.P.	Intake Suct. In. Hg.	Jacket Temp. In	Jacket Temp. Out

Table 42

CHALMERS 3400 R.P.M. MOTOR

Interpolation data of friction torque above 1200 R.P.M. from extended curves, for determining friction horse power above 1200 R.P.M.

W.O. throttle			4" vacuum		
R.P.M.	Frict. torque	Frict. H.P.	R.P.M.	Frict. torque	Frict. H.P.
1500	13.5	5.1	1500	14.5	5.4
1800	16.5	7.4	1800	17.5	7.9
2100	20.0	10.5	2100	21.2	11.1
2400	23.7	14.2	2400	25.0	15.0
2" vacuum			**6" vacuum**		
1500	14.0	5.3	1500	15.1	5.7
1800	17.4	7.8	1800	18.2	8.2
2100	21.0	11.0	2100	21.5	11.3
2400	25.0	15.0	2400	25.2	15.1

Table 43

CHALMERS 3400 R.P.M. MOTOR

Interpolation data of friction torque above 1200 R.P.M. from extended curves, for determining friction horse power above 1200 R.P.M.

8" vacuum			12" vacuum		
R.P.M.	Frict. torque	Frict. H.P.	R.P.M.	Frict. torque	Frict. H.P.
1500	15.2	5.7	1500	16.4	6.2
1800	18.1	8.1	1800	19.0	8.5
2100	21.5	11.3	2100	22.1	11.6
2400	25.1	15.1	2400	25.5	15.3
10" vacuum			**14" vacuum**		
1500	15.6	5.9	1500	18.1	6.8
1800	18.5	8.3	1800	21.1	9.5
2100	21.7	11.4	2100	24.3	12.8
2400	25.4	15.2	2400	27.8	16.7

Table 44

CHALMERS 3400 R.P.M. MOTOR

Interpolation data of friction torque above 1200 R.P.M. from extended curves, for determining friction horse power above 1200 R.P.M.

16" vacuum			18" vacuum		
R.P.M.	Frict. torque	Frict. H.P.	R.P.M.	Frict. torque	Frict. H.P.
1500	18.6	7.00	1500	19.3	7.2
1800	21.7	9.8	1800	22.1	10.0
2100	25.2	13.2	2100	25.5	13.4
2400	29.1	17.5	2400	29.1	17.5

Table 45

Test No. 2.					Motor: Chalmers							Date of Test: 11 / 15 / 16				
Object: Economy					Model: 35 A. 3400 R. P. M.							Barometer = 29.68 in. Hg				
Constant: Suction					Number: 15039							Room Temperature 53 °F				
					No. Cyl. 6.							Gasoline 57 °B. at 43 °F.				
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	620	83.0	12.9	0.8	13.7	94.4	73.5	112	135	0.3	0.5	2:39.0	11.3	0.880	14.3	23
2	885	90.0	19.9	2.3	22.3	89.6	79.7	119	147	0.8	0.5	2:45.2	10.9	0.547	23.1	21
3	1114	89.8	25.0	3.0	28.0	89.3	79.5	122	156	1.3	1.0	2:59.7	20.0	0.602	15.8	20
4	1358	85.3	28.9	4.1	33.0	87.5	75.5	133	161	1.9	1.0	2:28.2	24.2	0.839	15.0	24
5	1685	80.3	33.8	6.4	40.2	84.5	71.1	137	164	2.9	1.0	2:14.8	26.7	0.790	16.0	30
6	1946	74.0	36.0	8.8	44.8	80.4	65.6	141	167	3.8	1.0	1:57.6	30.6	0.850	14.9	34
7	2143	70.6	37.8	11.0	48.8	77.5	62.6	127	151	4.6	1.5	2:47.3	32.2	0.653	14.8	36
8	2445	61.3	37.5	15.0	52.5	71.4	54.3	124	149	5.7	1.5	2:32.2	35.5	0.946	13.4	39

Table 46

Test No. 2. Motor: Chalmers. Date of Test: 11 / 16 / 16
Object: Economy. Model: 35 A. 3400 R. P. M. Barometer = 29.46 in. Hg
Constant: Suction. Number: 15039. Room Temperature 53°F.
No. Cyl. 6. Gasoline 57 °B. at 43°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	560	75.5	10.6	1.1	11.7	90.5	66.9	118	143	2.0	0.5	5:51.8	5.12	0.482	25.2	22
2	574	79.5	11.4	1.2	12.6	90.8	70.4	132	146	2.0	0.5	2:44.0	11.0	0.963	13.8	15
3	820	76.5	15.7	1.8	17.5	89.5	67.8	133	162	2.0	0.5	2:05.6	14.3	0.913	13.1	30
4	995	78.0	19.4	2.5	21.9	88.8	69.1	120	141	2.0	0.5	1:46.8	16.8	0.907	13.9	30
5	1235	83.0	25.6	3.6	29.2	87.6	73.5	125	153	2.0	0.5	1:26.6	20.7	0.810	15.6	29
6	1355	82.0	27.8	4.9	32.7	85.1	72.6	143	155	2.0	0.5	1:21.4	22.1	0.797	15.9	30

Table 47

Test No. 2.					Motor: Chalmers						Date of Test: 11 / 16 / 16					
Object: Economy					Model: 35 A., 3400 R. P. M.						Barometer = 29.46 in. Hg					
Constant: Suction					Number: 15039						Room Temperature 53 °F.					
					No. Cyl. 6						Gasoline 57 °B. at 43°F.					
Run	R.P.M.	Torque	Brake	Frict.	B.HP + F.HP	Mech.	M.E.P. Net	Jacket Temp.		Intake Suct.	Gasoline		lb. per	lb./HP	Therm.	Deg.
No.		lb.	HP	HP		Eff.	lb/□"	In.	Out.	In. Hg	lb.	Time	Hour	per Hr.	Eff.	Spark
1	537	67.0	9.0	1.1	10.1	89.2	59.4	116	129	4.0	0.5	4:44.0	6.4	0.705	17.9	18
2	684	76.0	13.0	1.5	14.5	89.6	67.4	118	130	4.0	0.5	3:12.0	9.4	0.722	17.5	18
3	867	76.0	16.5	2.1	18.6	88.8	67.4	126	158	4.0	0.5	2:29.4	12.1	0.730	17.3	20
4	990	76.5	18.9	2.6	21.5	88.0	67.8	138	171	4.0	0.5	1:50.4	16.3	0.861	14.7	25
5	1124	76.5	21.5	3.2	24.7	87.1	67.8	143	166	4.0	0.5	1:48.8	16.5	0.767	16.5	28
6	1300	76.5	24.9	4.1	29.0	86.0	67.8	143	160	4.0	0.5	1:34.4	19.1	0.765	16.5	32
7	1630	76.6	31.2	6.3	37.5	83.2	67.9	135	159	4.0	0.5	1:13.8	24.4	0.777	16.2	25
8	1820	74.0	33.7	8.0	41.7	80.7	66.6	137	157	4.0	0.5	1:06.2	27.2	0.807	15.6	27

Table 48

Test No. 2.					Motor : Chalmers							Date of Test : 11 / 16 / 16					
Object : Economy					Model: 35 A. 3400 R. P. M.							Barometer = 29.46 in. Hg					
Constant : Suction					Number : 15039							Room Temperature [illegible]3 °F.					
					No. Cyl. 6.							Gasoline 57 °B. at 43 °F.					
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark	
1	718	63.7	11.4	1.7	13.1	86.8	56.5	105	118	6.0	0.5	3:37.2	8.3	0.726	17.4	15	
2	872	64.0	14.1	2.3	16.4	86.0	57.2	107	126	6.0	0.5	2:49.8	10.6	0.753	16.8	20	
3	1100	69.3	19.1	3.3	22.4	85.5	61.4	114	137	6.0	0.5	1:53.4	15.9	0.832	15.2	25	
4	1305	68.0	22.2	4.3	26.5	83.7	60.2	120	149	6.0	1.0	3:16.2	18.3	0.821	15.4	25	
5	1440	68.0	24.4	5.1	29.5	82.7	60.2	131	157	6.0	1.0	2:55.2	20.5	0.842	15.0	28	
6	1925	68.5	33.0	9.4	42.4	77.8	60.7	120	143	6.0	1.0	2:13.8	26.9	0.816	15.5	30	
7	2340	64.0	36.4	14.4	50.8	71.7	56.7	126	158	6.0	1.0	1:47.0	33.6	0.923	13.7	32	

Table 49

Test No. 2. | Motor: Chalmers | Date of Test: 11 / 16 / 16
Object: Economy | Model: 35 A. 3400 R. P. M. | Barometer = 29.46 in. Hg
Constant: Suction | Number: 15039 | Room Temperature 53 °F
No. Cyl. 6. | Gasoline 57 °B. at 43 °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/"²	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	590	50.0	7.4	1.3	8.7	84.7	44.3	120	132	8.0	1.0	4:26.2	13.5	1.835	6.9	15
2	920	53.0	12.2	2.6	14.8	81.0	46.9	108	123	8.0	0.5	3:07.8	9.6	0.787	16.2	28
3	1167	56.8	16.6	3.8	20.4	81.4	50.3	114	126	8.0	0.5	2:27.9	12.2	0.735	17.2	30
4	1367	59.5	20.3	4.8	25.1	80.8	52.7	124	134	8.0	1.0	2:20.9	17.9	0.882	14.3	30
5	1974	58.5	28.9	9.9	38.8	74.5	51.9	131	148	8.0	1.0	2:21.0	25.5	0.884	14.3	32
6	2370	52.5	31.1	14.7	45.8	67.9	46.5	131	158	8.0	1.0	1:51.8	32.2	1.035	12.2	33

Table 50

Test No. 2. Motor: Chalmers Date of Test: 11 / 16 / 16

Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.43 in. Hg

Constant: Suction Number: 15039 Room Temperature 53 °F.

No. Cyl. 6 Gasoline 57 °B. at 43 °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	515	43.0	5.5	1.0	6.5	84.7	38.1	104	140	10.0	1.0	10:35	5.7	1.020	12.4	19
2	710	47.0	8.3	2.0	10.3	81.1	41.6	131	152	10.0	1.0	8:21.4	7.2	0.862	14.8	19
3	916	47.0	10.8	2.8	13.6	79.8	41.6	126	145	10.0	1.0	6:37.3	9.1	0.840	15.0	22
4	1210	49.5	15.0	4.1	19.1	78.5	43.8	121	143	10.0	1.0	1:11.2	11.6	0.774	16.3	25
5	1630	50.5	20.4	6.9	27.3	74.9	44.7	126	154	10.0	1.0	3:03.0	19.1	0.935	13.5	30
6	1920	49.0	23.5	9.5	33.0	71.2	43.4	137	159	10.0	1.0	2:38.2	22.8	0.969	13.0	28
7	2400	47.3	28.4	15.2	43.6	65.1	41.8	116	144	10.0	1.0	2:03.0	29.3	1.032	12.2	35

Table 51

Test No. 2.	Motor : Chalmers	Date of Test : 11 / 20 / 16
Object : Economy	Model: 35 A. 3400 R. P. M.	Barometer = 29.43 In. Hg
Constant : Suction	Number : 15039	Room Temperature 53 °F.
	No. Cyl. 6.	Gasoline 57 °B. at 43°F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net lb/in²	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	778	36.0	7.0	2.3	9.3	74.9	31.9	120	148	12.0	0.5	4:42.6	6.4	0.909	13.9	19
2	842	38.0	8.0	2.6	10.6	75.3	33.6	130	156	12.0	0.3	2:30.4	7.2	0.897	14.1	23
3	845	37.0	7.8	2.6	10.4	74.8	32.8	126	154	12.0	0.5	4:11.8	7.2	0.915	13.8	22
4	1056	39.0	10.6	3.6	14.2	74.6	34.5	126	153	12.0	0.5	3:10.8	9.4	0.892	14.1	24
5	1345	39.0	13.1	5.1	18.2	72.1	34.5	128	155	12.0	0.5	2:40.4	11.2	0.856	14.7	26
6	1539	40.5	15.6	6.4	22.0	70.9	35.9	129	154	12.0	0.5	2:18.4	13.0	0.832	15.2	28
7	1825	42.5	19.4	8.7	28.1	69.0	37.6	129	155	12.0	1.0	2:08.6	19.1	0.985	12.8	33
8	1830	40.0	18.3	8.8	27.1	67.5	35.4	132	160	12.0	1.0	2:50.9	21.1	1.150	11.0	30
9	2386	38.0	22.7	15.2	37.9	59.9	33.6	130	155	12.0	1.0	2:21.9	25.4	1.119	11.3	37

Table 52

Test No. 2.					Motor : Chalmers								Date of Test : 11 / 20 / 16			
Object : Economy					Model: 35 A. 3400 R. P. M.								Barometer = 29.43 in. Hg			
Constant : Suction					Number : 15039								Room Temperature 53 °F			
					No. Cyl. 6								Gasoline 57 °B. at 43 °F.			
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B HP + F. HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. in. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	625	26.0	4.1	1.6	5.7	71.0	23.0	120	145	14.0	0.5	5:23.4	5.6	1.368	9.2	22
2	862	31.5	6.8	2.9	9.7	70.3	27.9	130	155	14.0	0.3	2:35.5	7.0	1.024	12.3	25
3	1340	32.0	10.7	5.6	16.3	65.6	28.3	124	142	14.0	0.5	3:09.2	9.5	0.888	14.2	32
4	1973	33.0	16.3	11.4	27.7	58.9	29.2	121	144	14.0	0.5	2:11.8	13.7	0.841	15.0	36
5	2242	28.0	17.7	14.6	32.3	54.8	24.8	125	151	14.0	1.0	2:55.6	20.5	1.160	10.9	40

Table 53

Test No. 2. Motor: Chalmers Date of Test: 11 / 20 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer = 29.43 in. Hg
Constant: Suction Number: 15039 Room Temperature 53 °F.
No. Cyl. 6 Gasoline 57 °B. at 43 °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	380	12.0	1.1	0.9	2.0	57.3	10.6	131	153	16.0	0.3	5:36.2	3.2	2.820	4.5	23
2	1020	20.0	5.1	3.8	8.9	57.2	17.7	118	150	16.0	0.5	4:43.2	6.4	1.248	10.1	26
3	1210	25.0	7.6	5.0	12.6	60.4	22.2	136	160	16.0	0.5	3:14.2	9.3	1.230	10.3	32
4	1730	24.5	10.6	9.1	19.7	53.9	21.7	125	145	16.0	0.5	2:31.9	12.9	1.120	11.3	36
5	2275	21.0	11.9	15.6	27.5	43.4	19.6	122	144	16.0	1.0	2:54.7	15.3	1.285	9.6	42

Table 54

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

600 R.P.M.				800 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P: per hr.
W.O.	13.2	12.3	0.930	W.O.	17.6	15.1	0.855
2	9.2	10.4	1.134	2	15.0	13.8	0.918
4	10.2	8.1	0.794	4	14.7	11.6	0.787
6	9.3	5.9	0.635	6	13.1	9.4	0.717
8	9.0	4.9	0.544	8	12.0	8.2	0.678
10	6.7	4.4	0.656	10	9.4	7.3	0.771
12				12	7.3	6.5	0.890
14				14	6.0	5.8	0.967
16				16	4.3	5.1	1.174

Table 55

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

1000 R.P.M.				1200 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	21.8	17.9	0.821	W.O.	25.8	20.6	0.800
2	20.2	17.1	0.845	2	24.8	20.3	0.816
4	18.8	15.0	0.798	4	22.9	18.4	0.804
6	17.0	12.8	0.753	6	20.8	16.2	0.776
8	15.0	11.3	0.754	8	17.0	14.5	0.853
10	12.0	10.2	0.849	10	14.6	13.1	0.894
12	9.6	9.1	0.942	12	11.9	11.6	0.971
14	7.9	7.9	0.992	14	9.8	9.9	1.009
16	5.8	6.7	1.151	16	7.2	8.3	1.156

Table 56

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
1400 R.P.M.				1600 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	29.5	23.3	0.790	W.O.	32.6	25.9	0.794
2	28.5	23.3	0.817	2			
4	26.7	21.7	0.813	4	30.3	24.9	0.820
6	24.5	19.5	0.796	6	27.8	22.7	0.821
8	20.8	17.6	0.848	8	23.5	20.7	0.878
10	17.2	15.9	0.925	10	19.6	18.6	0.950
12	14.2	14.1	0.991	12	16.5	16.5	1.000
14	11.6	12.0	1.030	14	13.4	13.9	1.038
16	8.6	9.9	1.152	16	9.8	11.5	1.177

Table 57

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

1800 R.P.M.				2000 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	35.1	28.5	0.811	W.O.	37.0	31.0	0.837
2				2			
4	33.8	28.0	0.828	4	36.8	31.0	0.866
6	31.0	25.8	0.831	6	33.5	28.8	0.860
8	26.0	23.5	0.903	8	28.1	26.4	0.904
10	22.0	21.3	0.967	10	24.2	23.9	0.988
12	18.8	18.9	1.004	12	21.0	21.2	1.007
14	15.0	15.9	1.058	14	16.4	17.8	1.082
16	10.8	13.1	1.210	16	11.4	14.6	1.280

Table 58

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

2200 R.P.M.				2400 R.P.M.			
Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Suction	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
W.O.	37.8	33.5	0.887	W.O.	37.6	36.0	0.956
2				2			
4				4			
6	35.6	31.7	0.891	6	36.5	34.6	0.947
8	30.0	29.2	0.973	8	31.3	31.9	1.0200
10	26.3	26.5	1.010	10	28.1	29.0	1.032
12	23.2	23.5	1.052	12	25.5	25.7	1.007
14	17.5	19.7	1.123	14	18.2	21.5	1.180
16	11.8	16.1	1.362	16	11.3	17.6	1.556

Table 59

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.650			0.750		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas per B.H.P. per hr.	B.H.P.	R.P.M.
0.650	6.8	600	0.750	5.6	600
0.650	9.2	600	0.750	9.8	600
	0.700		0.750	9.9	800
0.700	6.2	600	0.750	14.1	800
0.700	9.5	600	0.750	15.1	1000
0.700	11.0	800	0.750	17.5	1000
0.700	13.0	800			

Table 60

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.800			0.850		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.800	5.1	600	0.850	4.7	600
0.800	8.9	600	0.850	8.0	800
0.800	10.3	600	0.850	10.9	600
0.800	13.1	1000	0.850	12.0	1000
0.800	14.7	800	0.850	15.2	800
0.800	16.9	1000	0.850	17.6	800
0.800	20.0	1200	0.850	18.1	1200
0.800	22.8	1200	0.850	20.3	1400
0.800	23.1	1400	0.850	24.2	1600
0.800	25.1	1400	0.850	28.5	1800
0.800	25.7	1200	0.850	37.0	2000
0.800	29.1	1400			
0.800	32.4	1600			

Table 61

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.960			1.000		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.900	4.3	600	1.000	3.7	600
0.900	7.0	800	1.000	5.6	800
0.900	10.7	1000	1.000	8.2	1000
0.900	12.1	600	1.000	10.3	1200
0.900	14.6	1200	1.000	13.7	1400
0.900	18.4	1400	1.000	16.8	1600
0.900	21.5	1600	1.000	19.4	1800
0.900	26.1	1800	1.000	21.8	2000
0.900	34.5	2000	1.000	27.3	2200
0.900	35.0	2200	1.000	33.3	2400

Table 62

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
1.100			1.150		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.100	3.2	600	1.150	4.4	800
1.100	4.7	800	1.150	5.6	1000
1.100	6.5	1000	1.150	7.2	1200
1.100	8.0	1200	1.150	8.6	1400
1.100	10.0	1400	1.150	10.2	1600
1.100	11.2	1600	1.150	11.9	1800
1.100	13.1	1800	1.150	13.9	2000
1.100	15.5	2000	1.150	16.0	2200
1.100	18.6	2200	1.150	19.5	2400
1.100	22.0	2400			

Table 63

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.

600 R.P.M.			900 R.P.M.		
Suction	B.H.P	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	13.2	95.0	W.O.	19.7	90.0
2	9.2	90.0	2	17.6	89.2
4	10.2	89.3	4	16.9	88.6
6			6	15.0	86.0
8	9.0	84.0	8	13.5	82.5
10	6.6	82.8	10	10.7	79.6
12			12	8.5	74.5
14	4.0	71.0	14	7.0	70.0
16	2.8	58.0	16	5.1	58.8

Table 64

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.					
1200 R.P.M.			1500 R.P.M.		
Suction	B.H.P.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	25.8	87.5	W.O.	31.1	86.0
2	24.8	87.2	2		
4	22.9	86.7	4	28.5	84.2
6	20.8	85.0	6	26.2	83.4
8	18.0	80.5	8	22.0	78.2
10	14.6	78.0	10	18.4	75.8
12	11.9	74.0	12	15.3	72.0
14	9.8	67.8	14	12.5	64.4
16	7.3	58.5	16	9.3	57.0

Table 65

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal Mechanical Efficiency.					
1800 R.P.M.			2100 R.P.M.		
Suction	B.H.P.	Mech. Eff.	Suction	B.H.P.	Mech. Eff.
W.O.	35.1	83.5	W.O.	37.6	78.8
2			2		
4	33.7	81.3	4		
6	31.0	81.9	6	34.6	79.0
8	26.0	76.0	8	29.2	76.0
10	22.0	73.1	10	25.3	69.4
12	18.8	67.8	12	22.0	60.0
14	15.0	61.2	14	17.0	56.8
16	10.7	54.0	16	11.6	47.5

Table 66

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for lines of equal Mechanical Efficiency.

90 per cent			85 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
90.0	600	9.8	85.0	600	7.7
90.0	900	19.7	85.0	900	13.7
			85.0	1200	20.3
			85.0	1500	26.6

Table 67

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
80 per cent			75 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
80.0	600	7.0	75.0	600	4.9
80.0	900	10.8	75.0	900	8.6
80.0	1200	15.8	75.0	1200	12.9
80.0	1500	22.5	75.0	1500	18.5
80.0	1800	29.0	75.0	1800	24.4
			75.0	2100	28.7

Table 68

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for lines of equal Mechanical Efficiency.

70 per cent			65 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
70.0	600	4.0	65.0	600	3.4
70.0	900	7.3	65.0	900	6.2
70.0	1200	10.7	65.0	1200	9.0
70.0	1500	15.5	65.0	1500	12.8
70.0	1800	20.5	65.0	1800	17.1
70.0	2100	25.0	65.0	2100	22.0

Table 69

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal Mechanical Efficiency.					
60 per cent			55 per cent		
Mech. Eff.	R.P.M.	B.H.P.	Mech. Eff.	R.P.M.	B.H.P.
60.0	600	3.0			
60.0	900	5.3			
60.0	1200	7.5			
60.0	1500	10.5			
60.0	1800	14.0	55.0	1800	11.2
60.0	2100	19.0	55.0	2100	16.0

Table 70

Test No. 3. Motor: Chalmers Date of Test: 11 / 9 / 16
Object: Economy Model: 35 A. 3400 R. P. M. Barometer =29.37 in. Hg
Constant: Torque Number: 15039 Room Temperature 58 °F.
No. Cyl. 6. Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	596	83.5	12.4	0.8	13.2	93.9	74.0	120	141	.7	.3	2:23.0	7.6	0.609	20.7	19
2	870	82.5	16.1	1.6	17.7	90.9	73.1	121	138	1.0	.5	2:56.4	10.2	0.636	19.8	19
3	1024	85.5	21.9	2.6	24.5	89.6	75.8	122	141	1.3	.5	1:47.7	16.7	0.762	16.6	22
4	1291	84.5	27.3	3.8	31.1	87.8	74.9	123	144	1.8	1.0	3:42.5	16.2	0.592	21.3	26
5	1831	80.0	36.6	7.7	44.3	82.7	70.9	132	157	3.1	.5	1:11.6	25.1	0.685	18.4	34
6	1990	77.5	38.6	9.3	47.9	80.6	68.7	123	143	3.7	1.0	2:21.6	25.4	0.658	19.2	32
7	2325	67.5	39.2	13.3	52.5	74.7	59.8	125	146	4.6	1.0	2:26.4	24.6	0.628	20.1	35

Table 71

Test No. 3.
Object: Economy
Constant: Torque

Motor: Chalmers
Model: 35 A. 3400 R. P. M.
Number: 15039
No. Cyl. 6

Date of Test: 11 / 9 / 16
Barometer = 29.37in. Hg
Room Temperature 58 °F.
Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	465	80.0	9.3				70.8	129	152	2.2	.3	2:14.3	8.0	0.865	14.6	9
2	530	80.0	10.6				70.8	127	147	1.0	.3	2:12.6	8.2	0.769	16.4	14
3	857	80.0	17.1				70.8	127	155	1.1	.3	1:17.2	14.0	0.817	15.5	18
4	1081	80.0	21.6				70.8	129	154	1.8	.5	2:15.2	13.3	0.615	20.5	21
5	1301	80.0	26.0				70.8	131	155	2.1	.5	1:52.4	16.0	0.615	20.5	27
6	1492	80.0	29.8				70.8	131	155	2.2	.5	1:38.6	18.3	0.612	20.6	34
7	1831	80.0	36.6				70.8	132	157	3.1	.5	1:11.6	25.1	0.685	18.4	34

Table 72

Test No. 3. Motor: Chalmers Date of Test: 11 / 9 / 16

Object: Economy Model: 35 A. 3400 R. P. M. Barometer =29.37 in. Hg

Constant: Torque Number: 15039 Room Temperature 58 °F

No. Cyl. 6 Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B HP + F. HP	Mech Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	651	70.0	11.4				62.0	112	137	4.5	.3	1:31.7	11.8	1.033	12.2	18
2	659	70.0	11.6				62.0	121	152	4.5	.3	2:13.3	8.1	0.702	18.0	18
3	821	70.0	14.4				62.0	114	127	5.0	.3	1:54.3	9.4	0.657	19.2	23
4	1082	70.0	19.0				62.0	122	143	5.1	.3	1:20.3	13.5	0.709	20.5	30
5	1416	70.0	24.8				62.0	124	141	4.5	.3	1:15.4	14.4	0.578	21.9	33
6	1767	70.0	30.8				62.0	127	147	4.4	.5	1:30.1	20.0	0.649	19.5	35
7	1972	70.0	34.6				62.0	131	150	4.7	.5	1:14.7	24.1	0.636	18.1	39
8	2345	70.0	40.8				62.0	132	167	4.7	.5	0:59.6	30.2	0.740	17.1	45

Table 73

Test No. 3 — Motor: Chalmers — Date of Test: 11 / 9 / 16

Object: Economy — Model: 35 A. 3400 R. P. M. — Barometer = 29.37 in. Hg

Constant: Torque — Number: 15039 — Room Temperature 58 °F.

No. Cyl. 6 — Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	639	60.0	9.5			53.2	53.2	127	154	7.2	.3	2:24.4	7.5	0.783	16.1	18
2	865	60.0	13.0				53.2	125	151	7.2	.5	3:04.8	9.7	0.752	16.8	20
3	1065	60.0	16.0				53.2	126	145	7.2	.5	3:35.6	11.6	0.723	17.5	23
4	1319	60.0	19.8				53.2	126	144	6.7	.3	0:54.4	19.9	1.003	12.6	27
5	1750	60.0	26.3				53.2	129	150	7.8	.5	2:15.6	13.3	0.506	24.9	32
6	2091	60.0	31.4				53.2	117	150	7.6	.3	0:52.2	20.7	0.660	19.1	36
7	2168	60.0	32.5				53.2	127	156	7.0	.5	1:13.8	24.4	0.751	16.8	41

Table 74

Test No. 3. Motor : Chalmers Date of Test : 11 / 7 / 16
Object : Economy Model: 35 A. 3400 R. P. M. Barometer = 29.36 in. Hg
Constant : Torque Number : 15039 Room Temperature 58 °F.
No. Cyl. 6 Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	618	50.0	7.7				44.3	125	149	8.8	.3	3:37.6	5.0	0.643	19.6	18
2	995	50.0	12.5				44.3	124	139	9.9	.3	2:29.0	7.3	0.582	21.6	22
3	1486	50.0	18.6				44.3	120	145	10.3	.3	1:28.8	12.2	0.656	19.2	30
4	1914	50.0	23.9				44.3	122	147	10.4	.3	1:10.1	15.4	0.644	19.6	35
5	2194	50.0	27.4				44.3	125	152	10.6	.3	0:47.6	22.7	0.800	15.8	40

Table 75

Test No. 3 | Motor: Chalmers | Date of Test: 11 / 7 / 16
Object: Economy | Model: 35 A. 3400 R. P. M. | Barometer = 29.36 in. Hg
Constant: Torque | Number: 15039 | Room Temperature 58 °F.
No. Cyl. 6 | Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	638	40.0	6.4				35.4	124	147	11.7	.3	4:22.8	4.3	0.669	18.8	20
2	1125	40.0	11.3				35.4	124	151	12.5	.3	1:46.8	10.1	0.900	14.0	26
3	1698	40.0	17.0				35.4	124	149	12.9	.3	1:20.5	13.4	0.791	16.0	32
4	2328	40.0	23.3				35.4	127	156	12.1	.3	0:38.0	28.4	1.220	10.3	44

Table 76

Test No. 3				Motor: Chalmers							Date of Test: 11 / 7 / 16					
Object: Economy				Model: 35 A. 3400 R. P. M.							Barometer = 29.36 in. Hg					
Constant: Torque				Number: 35 A. 3400 R.P.M.							Room Temperature 58 °F.					
				No. Cyl. 6							Gasoline °B. at °F.					
Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B.HP + F.HP	Mech. Eff.	M.E.P. Net. lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	574	30.0	4.3				26.6	132	165	14.0	.3	3:49.2	4.7	1.090	11.6	22
2	1021	30.0	7.7				26.6	136	164	15.0	.3	2:56.0	6.1	0.801	15.7	28
3	1447	30.0	10.8				26.6	132	153	15.1	.3	2:09.8	8.3	0.767	16.4	38
4	1693	30.0	12.7				26.6	125	147	15.0	.3	1:28.4	12.2	0.962	13.1	40
5	2004	30.0	15.0				26.6	125	148	15.0	.3	1:23.5	12.9	0.860	14.7	45
6	2340	30.0	17.6				26.6	125	148	14.2	.3	1:06.4	16.5	0.939	13.4	51

Table 77

Test No. 3 | Motor: Chalmers | Date of Test: 11 / 7 / 16
Object: Economy | Model: 35 A. 3400 R. P. M. | Barometer = 29.36 in. Hg
Constant: Torque | Number: 15039 | Room Temperature 53 °F.
No. Cyl. 6 | Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	M.E.P. Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb./HP per Hr.	Therm. Eff.	Deg. Spark
1	545	20.0	2.7				17.7	125	148	16.1	.3	4:22.5	4.1	1.510	8.4	21
2	955	20.0	4.8				17.7	126	152	17.1	.3	2:56.8	6.1	1.280	9.9	26
3	1138	20.0	5.7				17.7	127	151	17.0	.3	3:03.8	5.9	1.034	12.2	33
4	1492	20.0	7.5				17.7	126	152	17.2	.3	2:25.4	7.4	0.995	12.7	38
5	2089	20.0	10.4				17.7	126	152	17.0	.3	1:33.0	11.6	1.110	11.4	41
6	2350	20.0	11.8				17.7	126	152	16.3	.3	1:26.4	12.5	1.063	11.9	48

Table 78

Test No. 3.
Object: Economy
Constant: Torque

Motor: Chalmers
Model: 35 A. 3400 R. P. M.
Number: 15C39
No. Cyl. 6.

Date of Test: 11 [illegible] 16
Barometer = 29.36 in. Hg
Room Temperature 58 °F.
Gasoline °B. at °F.

Run No.	R.P.M.	Torque lb.	Brake HP	Frict. HP	B. HP + F. HP	Mech. Eff.	MEP Net lb/□"	Jacket Temp. In.	Jacket Temp. Out.	Intake Suct. In. Hg	Gasoline lb.	Gasoline Time	lb. per Hour	lb/HP per Hr.	Therm. Eff.	Deg. Spark
1	803	10.0	2.0				8.9	102	143	17.4	.3	3:54.9	4.6	2.290	5.5	20
2	1123	10.0	2.8				8.9	126	156	18.0	.3	3:03.0	5.9	2.100	6.0	26
3	1357	10.0	3.4				8.9	117	138	17.9	.3	2:38.1	6.8	2.020	6.2	38
4	1629	10.0	4.1				8.9	137	158	18.4	.3	2:09.6	8.3	2.040	6.2	35
5	2069	10.0	5.2				8.9	130	156	18.3	.3	1:52.5	9.6	1.970	6.4	42

Table 79

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
600 R.P.M.				900 R.P.M.			
Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Torque	B.H9P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
10	1.5	3.9	2.600	10	2.3	5.0	2.220
20	3.0	4.1	1.360	20	4.5	5.5	1.230
30	4.5	4.4	0.987	30	6.8	6.1	0.904
50	7.5	4.8	0.644	50	11.3	6.7	0.598
60	9.0	7.2	0.798	60	13.5	10.1	0.749
70	10.5	7.4	0.705	70	15.8	10.5	0.665
W.O.	12.5	7.7	0.619	W.O.	19.1	11.4	0.596

Table 80

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
1200 R.P.M.				1500 R.P.M.			
Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
10	3.0	6.2	2.060	10	3.8	7.4	1.975
20	6.0	7.0	1.162	20	7.5	8.5	1.130
30	9.0	7.7	0.857	30	11.3	9.6	0.849
50	15.0	9.1	0.608	50	18.8	11.9	0.636
60	18.0	12.9	0.715	60	22.5	15.9	0.707
70	21.0	13.6	0.647	70	26.3	16.9	0.644
W.O.	25.5	15.2	0.599	W.O.	31.5	19.0	0.604

Table 81

CHALMERS 3400 R.P.M. MOTOR Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.							
1800 R.P.M.				2100 R.P.M.			
Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
10	4.5	8.6	1.912	10	5.3	9.8	1.870
20	9.0	10.0	1.111	20	10.5	11.7	1.110
30	13.5	11.5	0.855	30	15.8	13.8	0.878
50	22.5	15.2	0.676	50	26.3	18.9	0.721
60	27.0	19.0	0.705	60	32.0	22.4	0.701
70	31.5	20.6	0.654	70	37.3	24.7	0.663
W.O.	36.3	22.9	0.630	W.O.	39.2		

Table 82

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for constant R.P.M. curves for lines of equal lbs. gasoline/B.H.P./hr.

2400 R.P.M.							
Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.	Torque	B.H.P.	Lbs. gas. per hr.	Lbs. gas. per B.H.P. per hr.
10	6.0	11.1	1.850				
20	12.0	13.5	1.121				
30	18.0	16.3	0.906				
50	30.0	22.8	0.758				
60	36.0	26.2	0.728				
70	42.0	29.9	0.711				
W.O.	38.5						

Table 83

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.

0.650			0.700		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.650	8.1	600	0.700	7.1	600
0.650	9.6	800	0.700	8.1	800
0.650	10.1	600	0.700	9.1	1000
0.650	11.2	1000	0.700	10.2	1200
0.650	11.4	800	0.700	11.6	1400
0.650	11.6	1000	0.700	11.8	600
0.650	13.4	1400	0.700	13.3	1600
0.650	14.6	1600	0.700	14.4	800
0.650	22.3	1200	0.700	17.3	1800
0.650	27.0	1800	0.700	18.8	1000
0.650	29.5	1400	0.700	27.0	2000
0.650	33.5	1800	0.700	31.1	1400
0.650			0.700	37.1	2200
0.650			0.700	39.5	2000

Table 84

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
0.800			0.900		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
0.800	6.0	600	0.900	5.3	600
0.800	6.8	800	0.900	6.1	800
0.800	7.8	1000	0.900	7.1	1000
0.800	8.8	1200	0.900	8.0	1200
0.800	10.2	1400	0.900	9.4	1400
0.800	11.7	1600	0.900	10.6	1600
0.800	13.8	1800	0.900	12.3	1800
0.800	16.6	2000	0.900	14.1	2000
0.800	27.2	2200	0.900	17.0	2200

Table 85

CHALMERS 3400 R.P.M. MOTOR

Interpolation data for lines of
equal lbs. gasoline/B.H.P./hr.

1.000			1.200		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.000	4.8	600	1.200	4.2	600
1.000	5.7	800	1.200	5.0	800
1.000	6.5	1000	1.200	5.8	1000
1.000	7.5	1200	1.200	6.6	1200
1.000	8.7	1400	1.200	7.6	1400
1.000	9.8	1600	1.200	8.5	1600
1.000	11.3	1800	1.200	9.8	1800
1.000	12.7	2000	1.200	10.8	2000
1.000	14.5	2200	1.200	12.1	2200

Table 86

CHALMERS 3400 R.P.M. MOTOR Interpolation data for lines of equal lbs. gasoline/B.H.P./hr.					
1.400			1.600		
Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.	Lbs. gas. per B.H.P. per hr.	B.H.P.	R.P.M.
1.400	3.7	600	1.600	3.4	600
1.400	4.5	800	1.600	4.0	800
1.400	5.1	1000	1.600	4.5	1000
1.400	5.8	1200	1.600	5.0	1200
1.400	6.5	1400	1.600	5.5	1400
1.400	7.4	1600	1.600	6.3	1600
1.400	8.4	1800	1.600	7.1	1800
1.400	9.3	2000	1.600	7.8	2000
1.400	10.4	2200	1.600	8.8	2200

Table 87

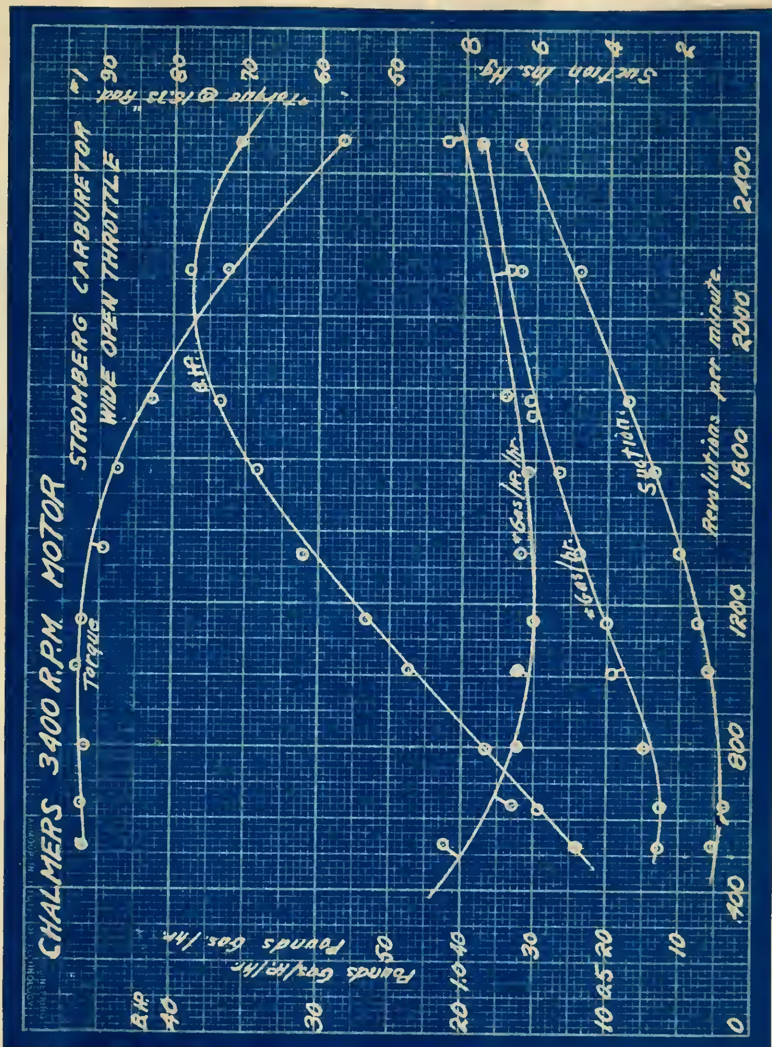
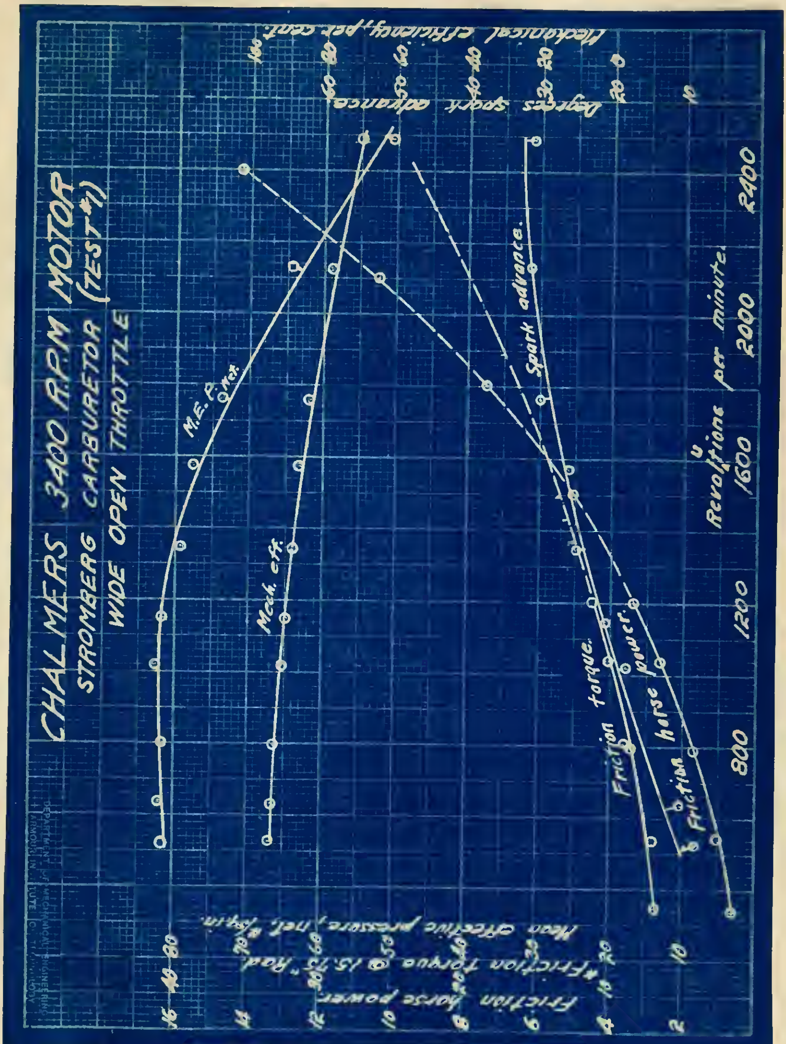
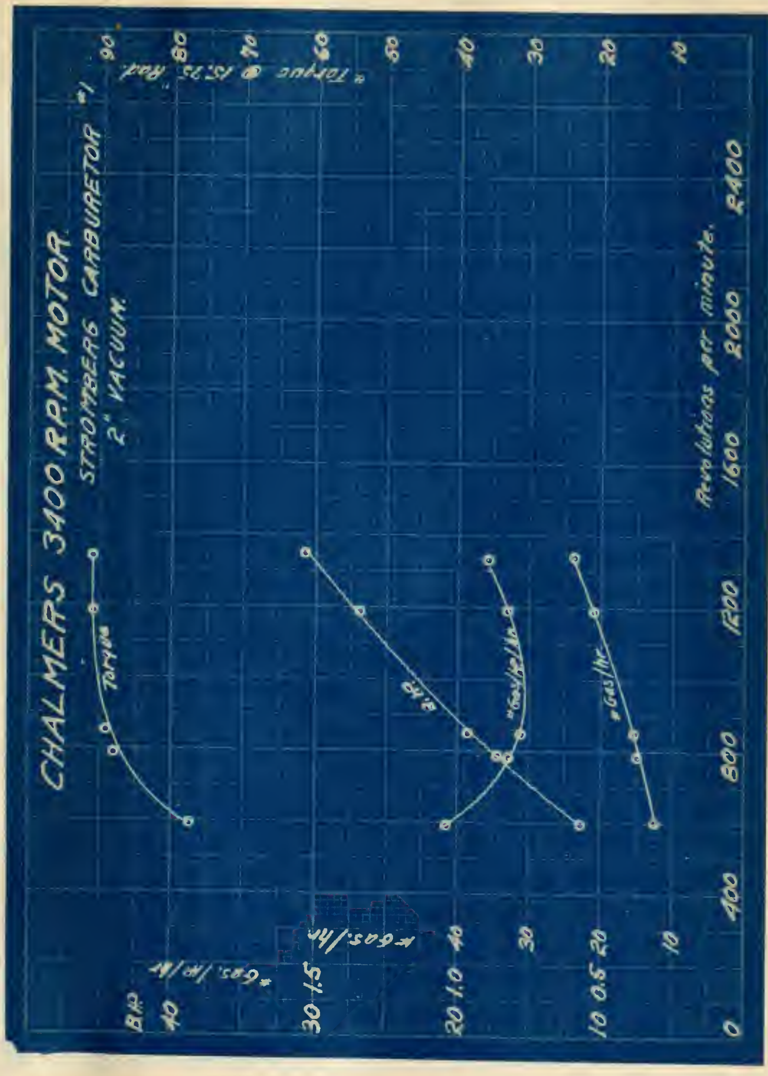

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR #1
WIDE OPEN THROTTLE
Torque
B.H.P.
Suction
Suction ins. Hg.
Revolutions per minute.
Pounds Gas/HP/Hr.
Pounds Gas/Hr.

Fig. 1



CHALMERS 3400 R.P.M MOTOR
STROMBERG CARBURETOR (TEST #1)
WIDE OPEN THROTTLE
M.E.P. net
Mech. eff.
Spark advance.
Friction torque.
Friction horse power.
Revolutions per minute.
800
1200
1600
2000
2400
Mechanical efficiency, per cent.
Degrees spark advance
Mean effective pressure, net, #/sq.in.
Friction horse power

Fig. 2



CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR #1
2" VACUUM.
Torque
B.H.P.
Revolutions per minute.
0
400
800
1200
1600
2000
2400

Fig. 3

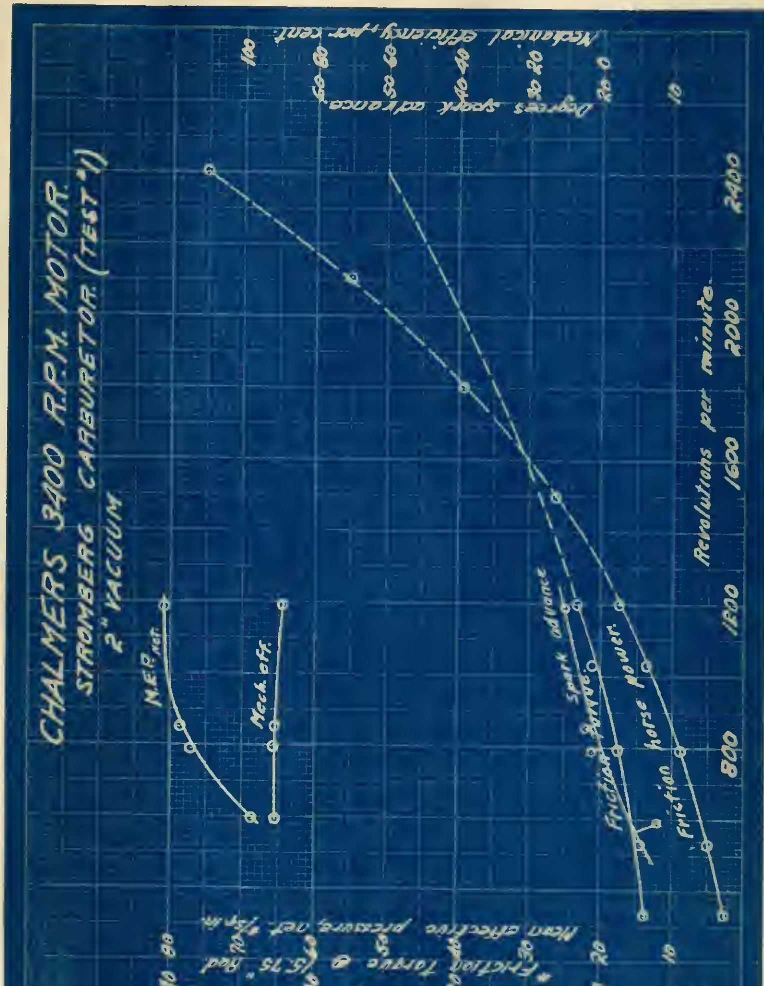

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
2" VACUUM
M.E.P. net.
Mech. eff.
Spark advance
Friction torque
Friction horse power.
Revolutions per minute
Mechanical efficiency, per cent.
Degrees spark advance.
Mean effective pressure, net #/sq. in.
*Friction Torque @ 15.75" Rad.
Friction horse power

Fig. 4

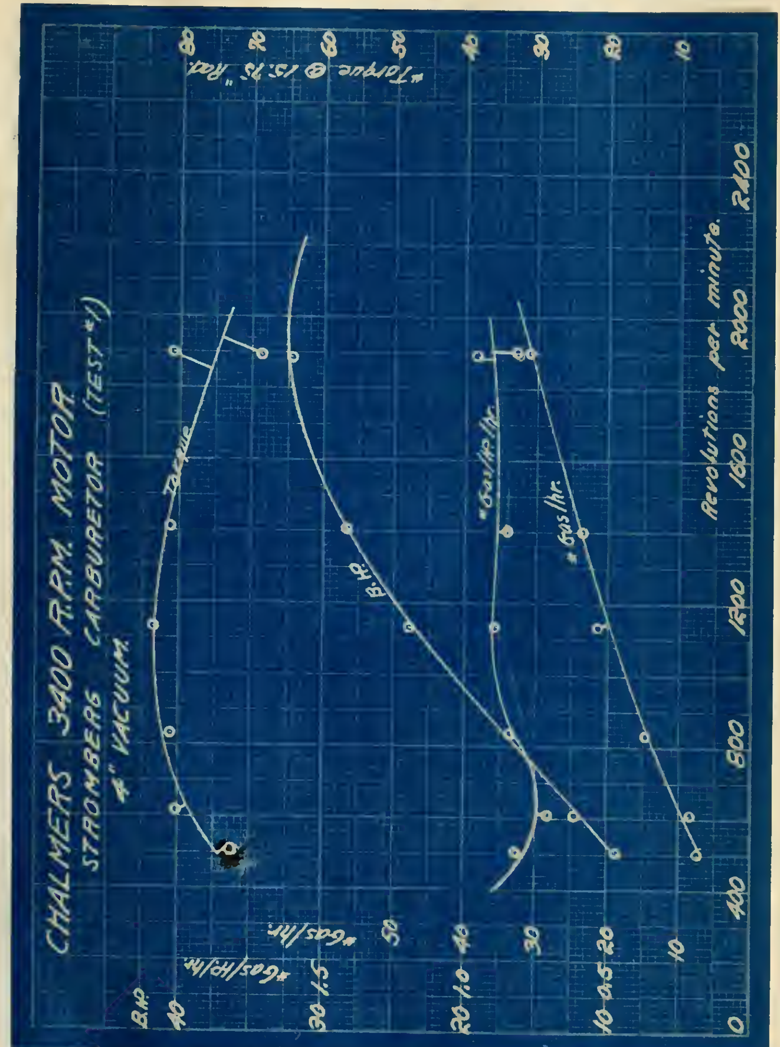

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
4" VACUUM
Revolutions per minute.
B.HP.
Torque
#Gas/hr.
#Gas/Hp/hr.
#Torque @ 15.75" Rad.

Fig. 5

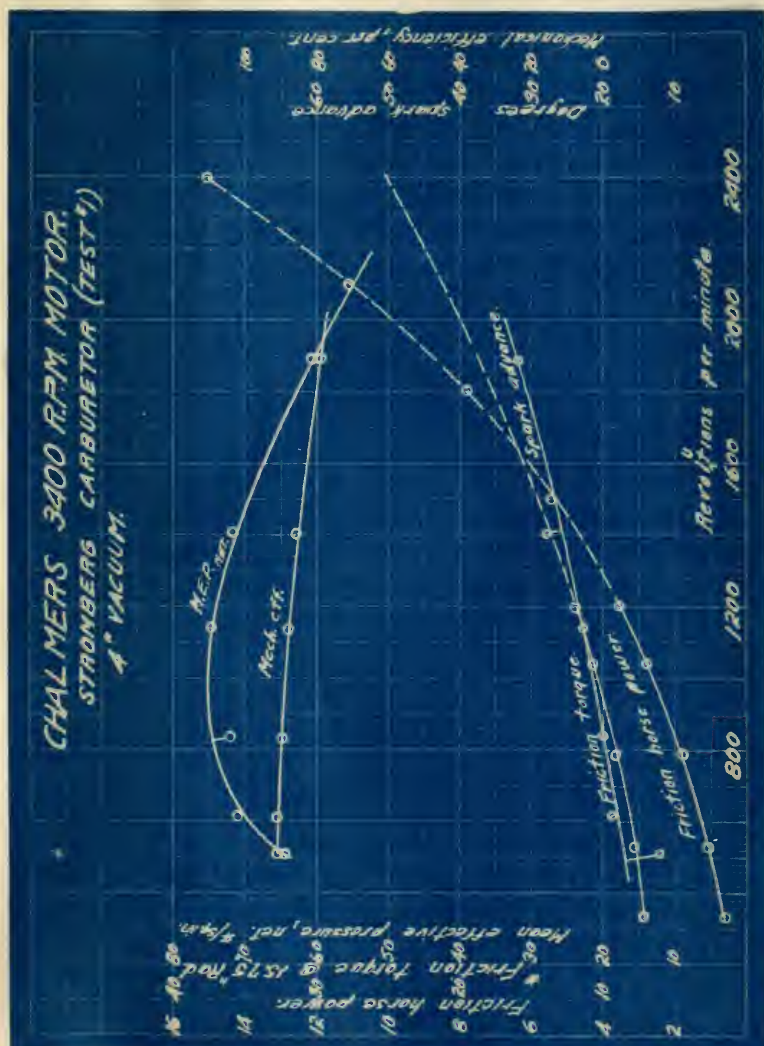

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
4" VACUUM.
M.E.P. net
Mech. eff.
Spark advance
Friction torque
Friction horse power
Revolutions per minute
Mechanical efficiency, per cent
Degrees spark advance
Friction horse power
* Friction torque @ 15.75" Rad.
Mean effective pressure, net. #/sq.in.

Fig. 6

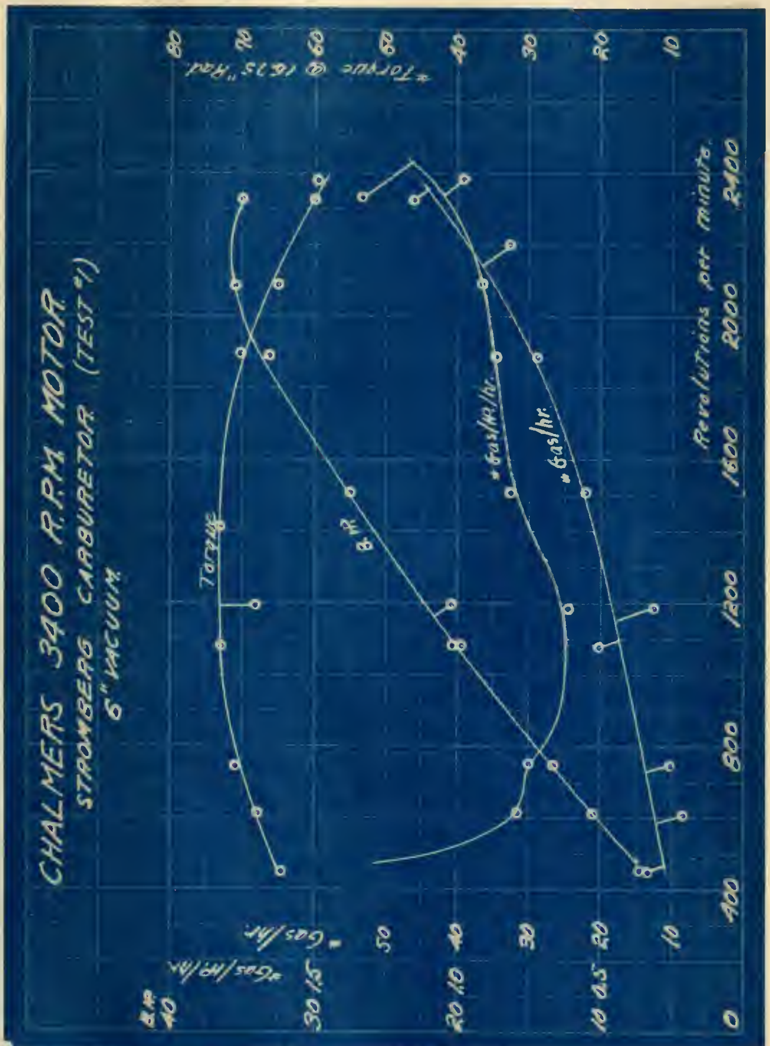

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
6" VACUUM
Torque
B.H.P.
*Gas/HP/hr.
*Gas/hr.
Revolutions per minute

Fig. 7

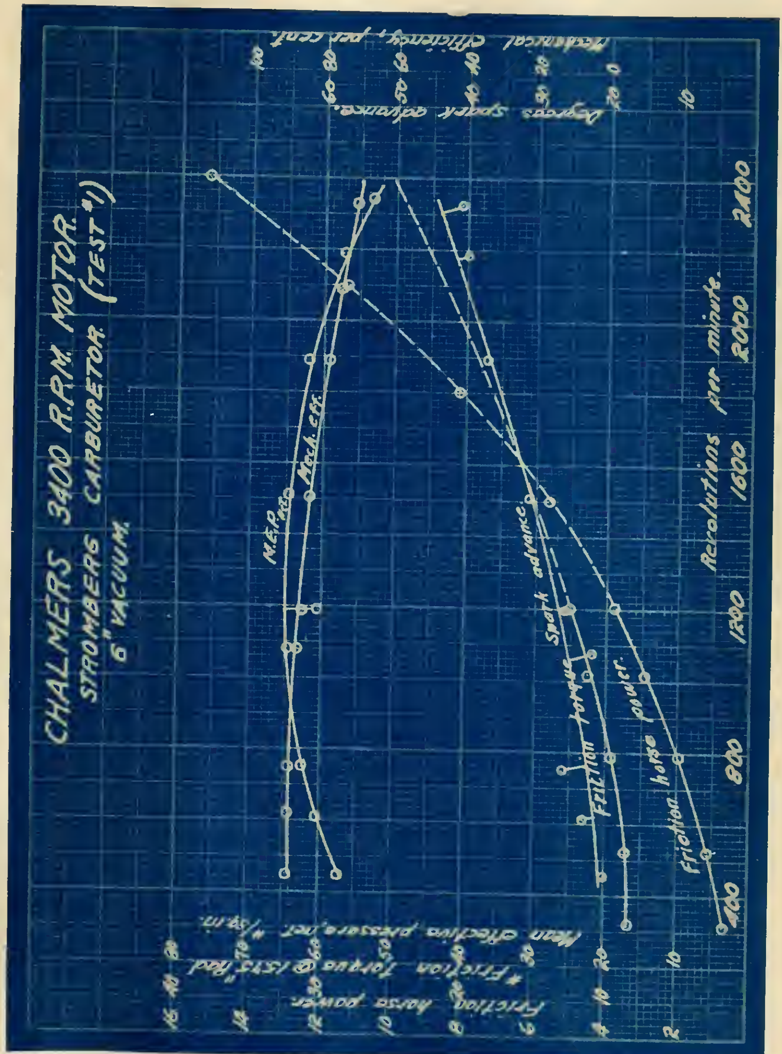
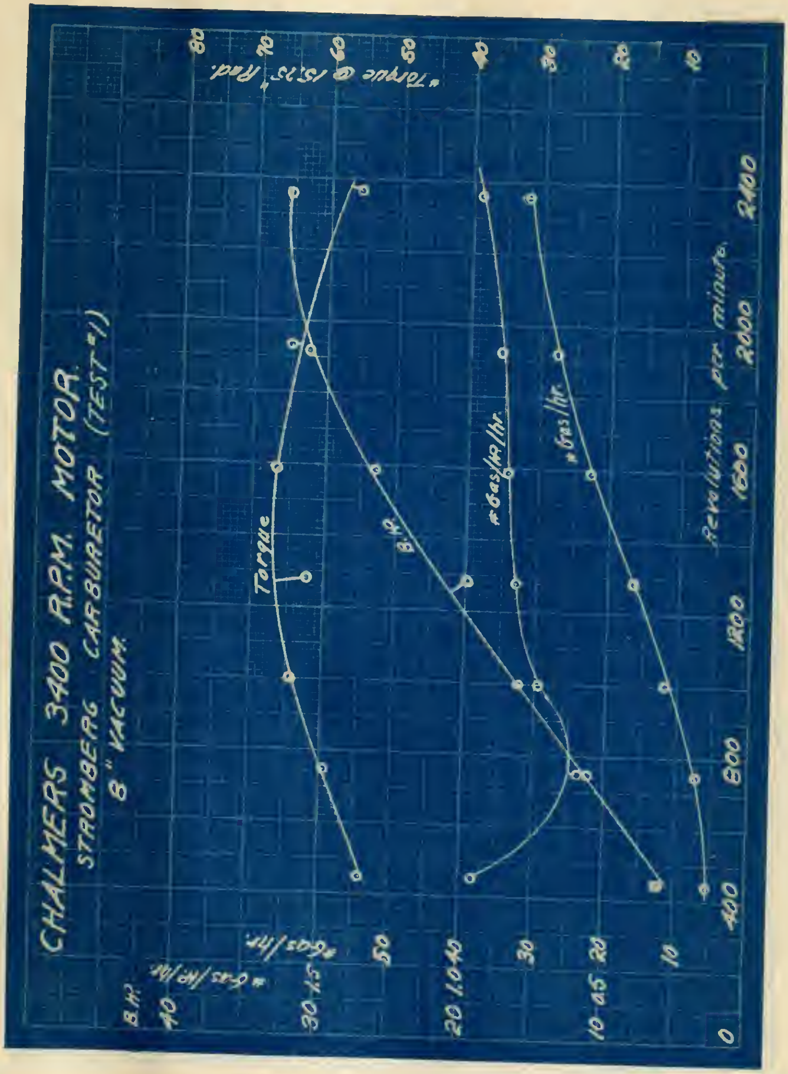

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
6" VACUUM.
Revolutions per minute.
M.E.P.
Mech. Eff.
Spark advance.
Friction torque
Friction horse power.
Degrees spark advance.
Mechanical efficiency, per cent.
Mean effective pressure, per #/sq.in.
Friction horse power

Fig. 8



CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
8" VACUUM
#Torque @ 15.75" Rad.
Torque
B.H.
#Gas/HP/hr.
#Gas/hr.
Revolutions per minute
B.H.
#Gas/HP/hr.
#Gas/hr.
0
400
800
1200
1600
2000
2400

Fig. 9

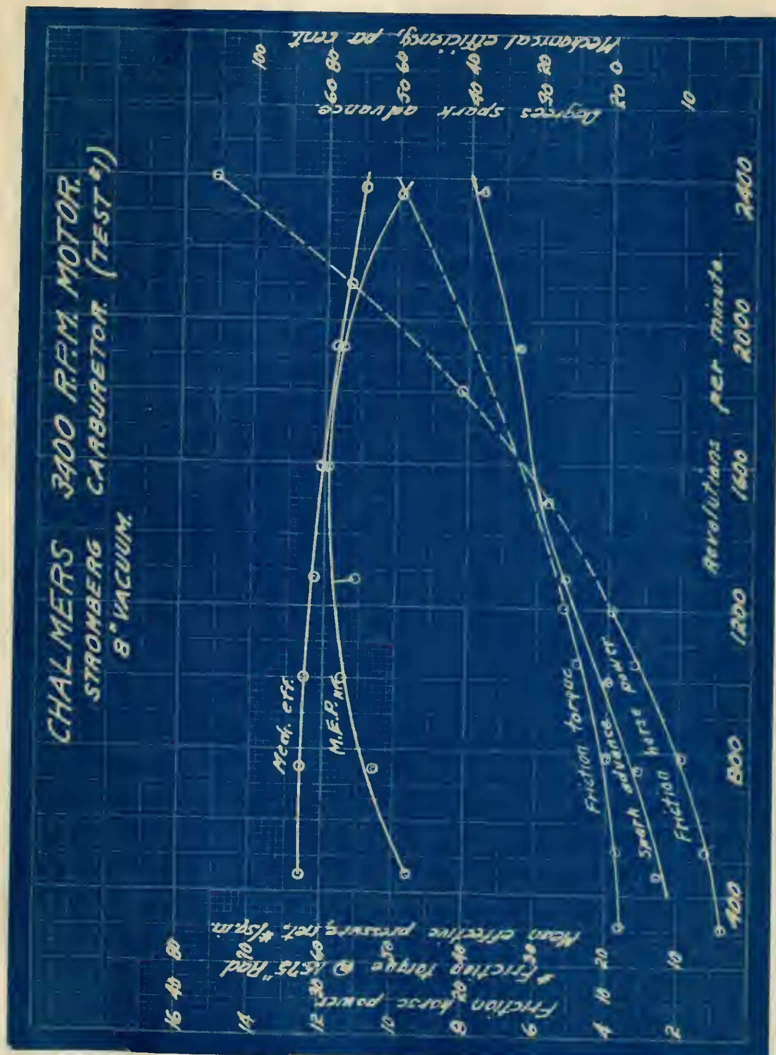

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
8" VACUUM.
Mechanical efficiency, per cent.
Degrees spark advance
Revolutions per minute.
Mech. eff.
M.E.P. NET
Friction torque
Spark advance
Friction horse power
Mean effective pressure, net. #/sq.in.
Friction horse power

Fig. 10

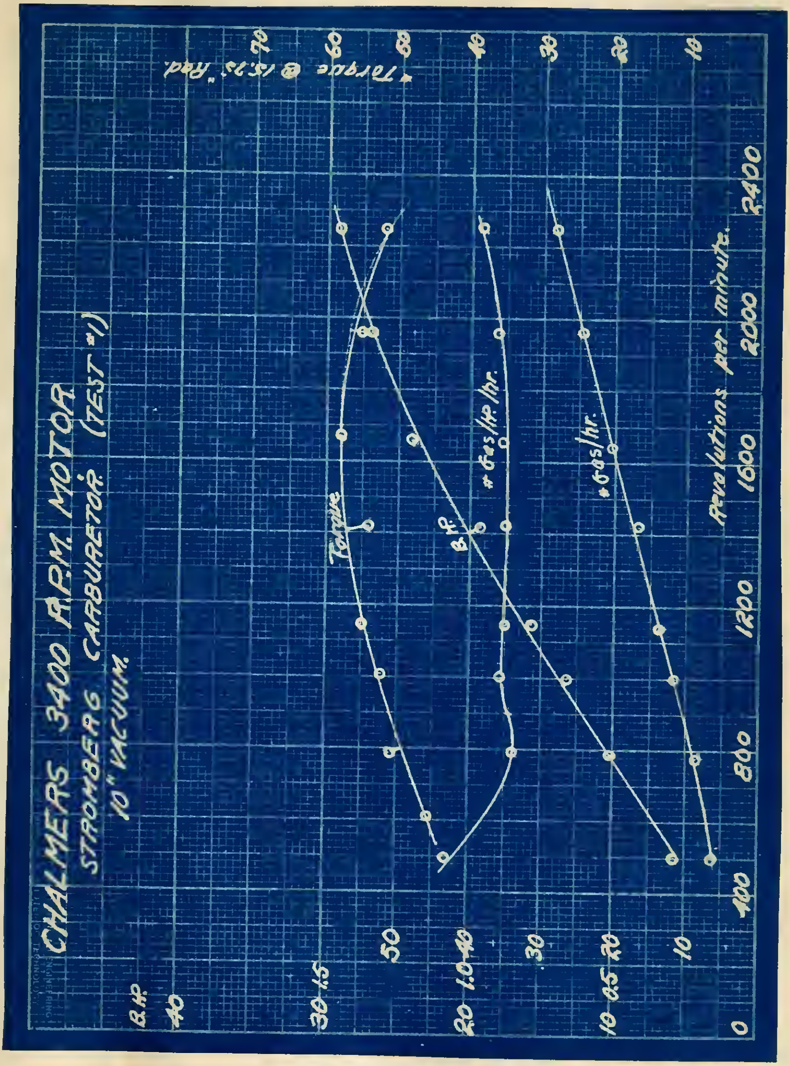

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
10" VACUUM.
Torque
B.H.P.
Gas/HP/hr.
Gas/hr.
Revolutions per minute.
B.H.P.

Fig. 11

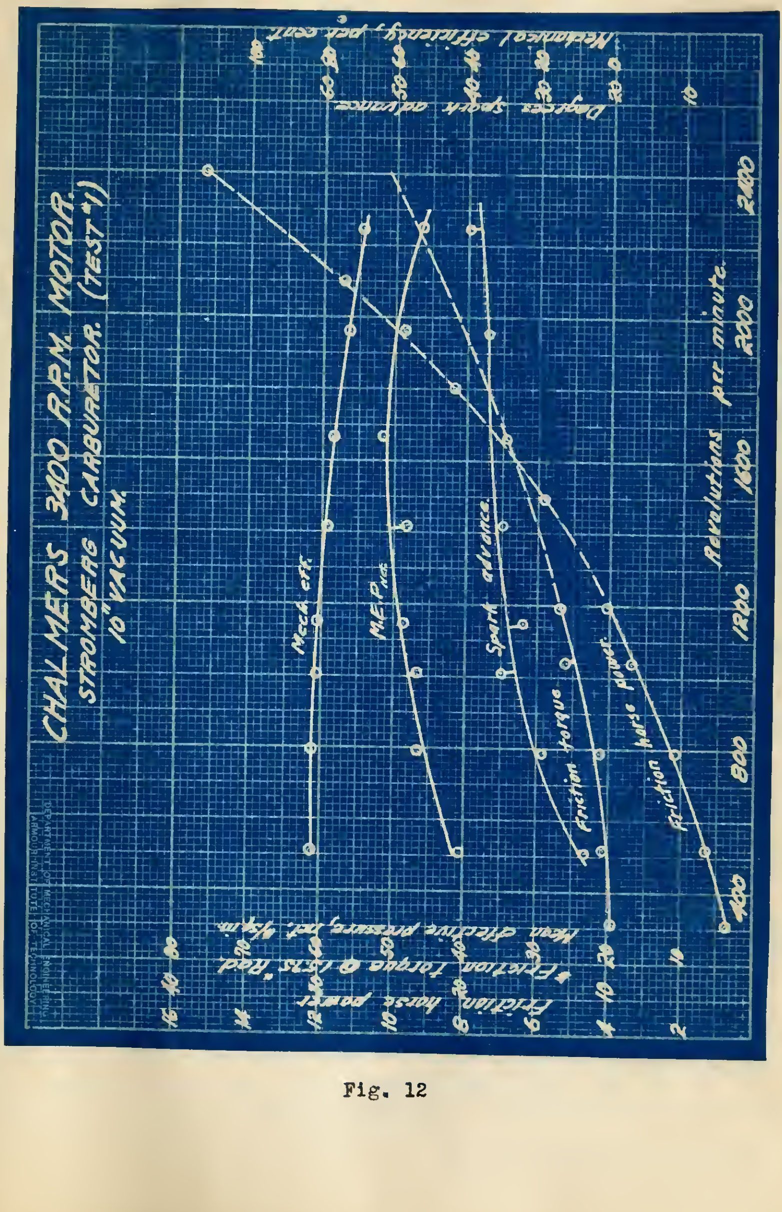

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR. (TEST #1)
10" VACUUM.
Mech. eff.
Spark advance
Friction torque
Friction horse power
Revolutions per minute
Mechanical efficiency, per cent
Degrees spark advance
Mean effective pressure, lbs. sq. in.
Friction horse power
DEPARTMENT OF MECHANICAL ENGINEERING
ARMOUR INSTITUTE OF TECHNOLOGY

Fig. 12

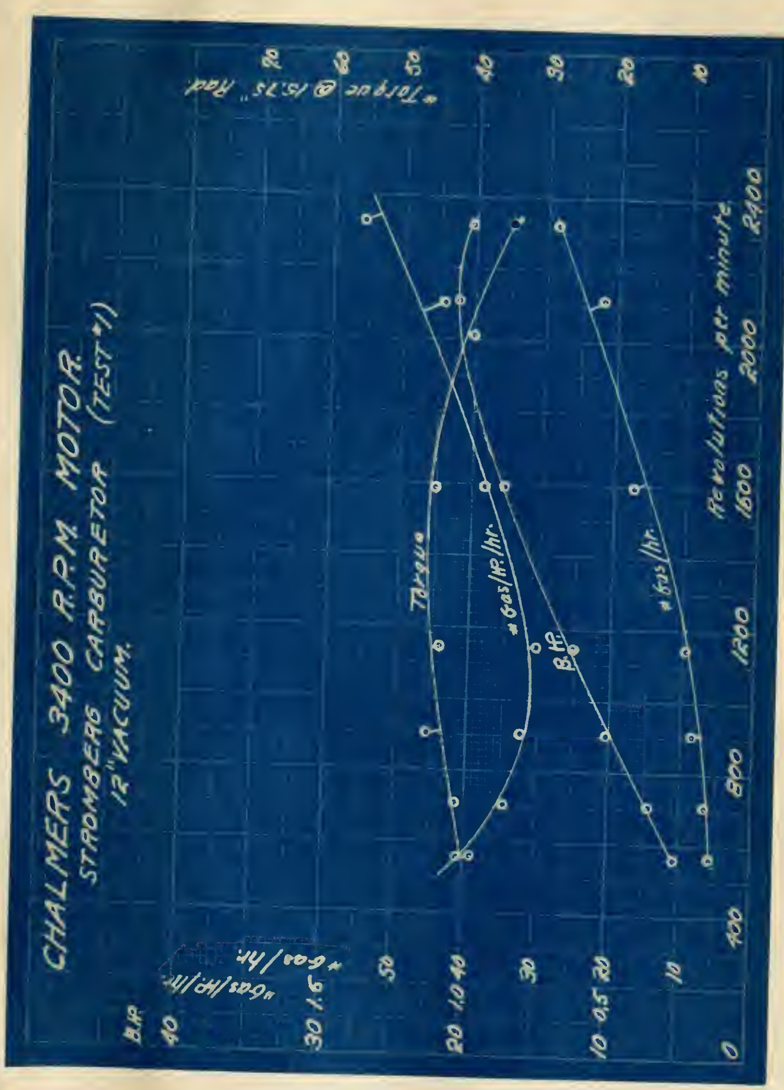

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
12" VACUUM.
Torque
B.H.
#Gas/HP./hr.
#Gas/hr.
Revolutions per minute

Fig. 13

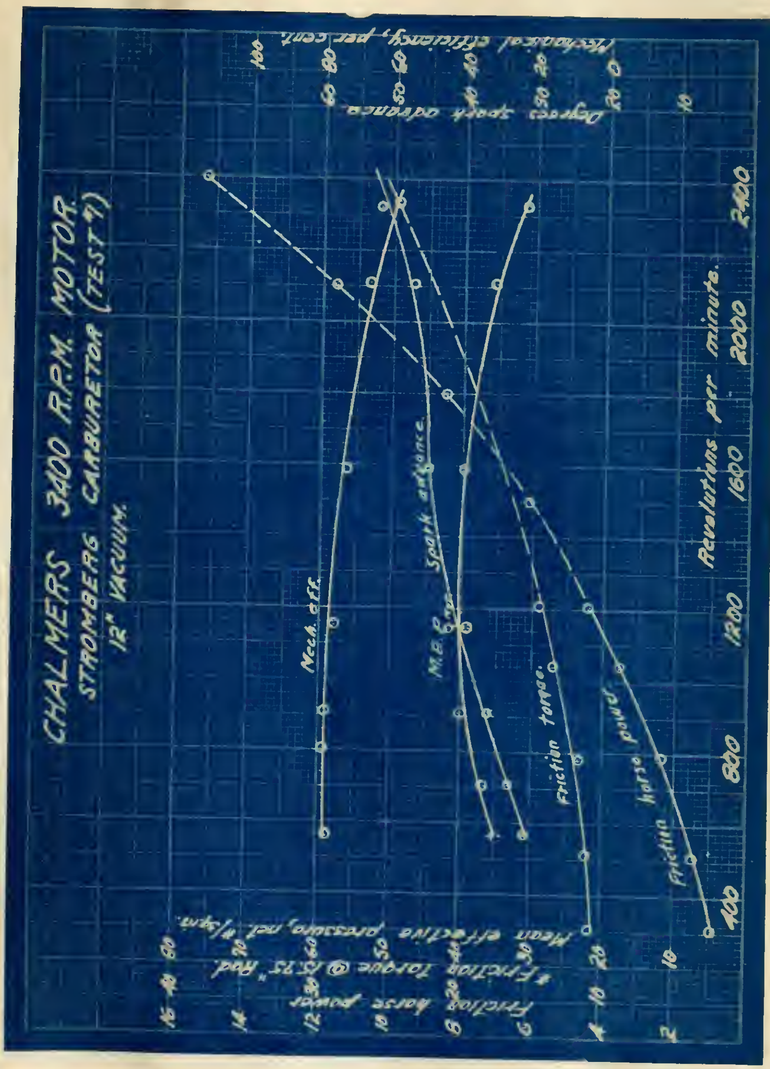

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST 9)
12" VACUUM.
Mech. eff.
Spark advance.
M.E.P.
Friction torque.
Friction horse power
Revolutions per minute.
Mechanical efficiency, per cent.
Degrees spark advance.
Mean effective pressure, net #/sq.in.
Friction horse power

Fig. 14

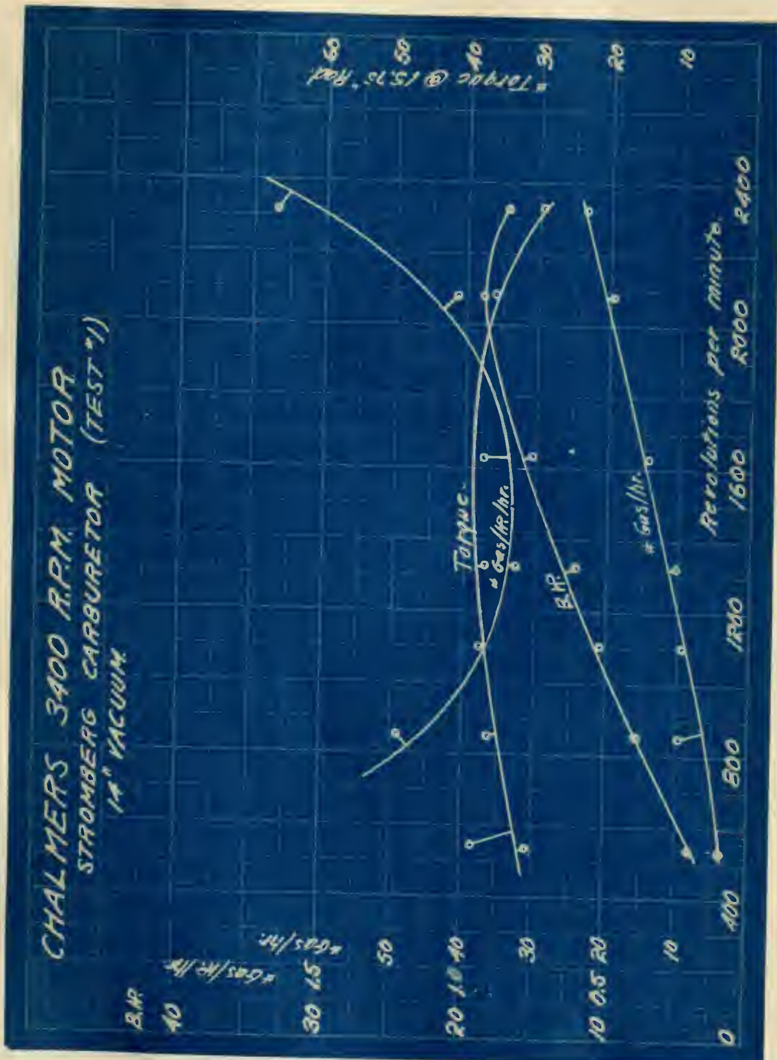

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
14" VACUUM
Torque
B.H.P.
Gas/hr.
Revolutions per minute

Fig. 15

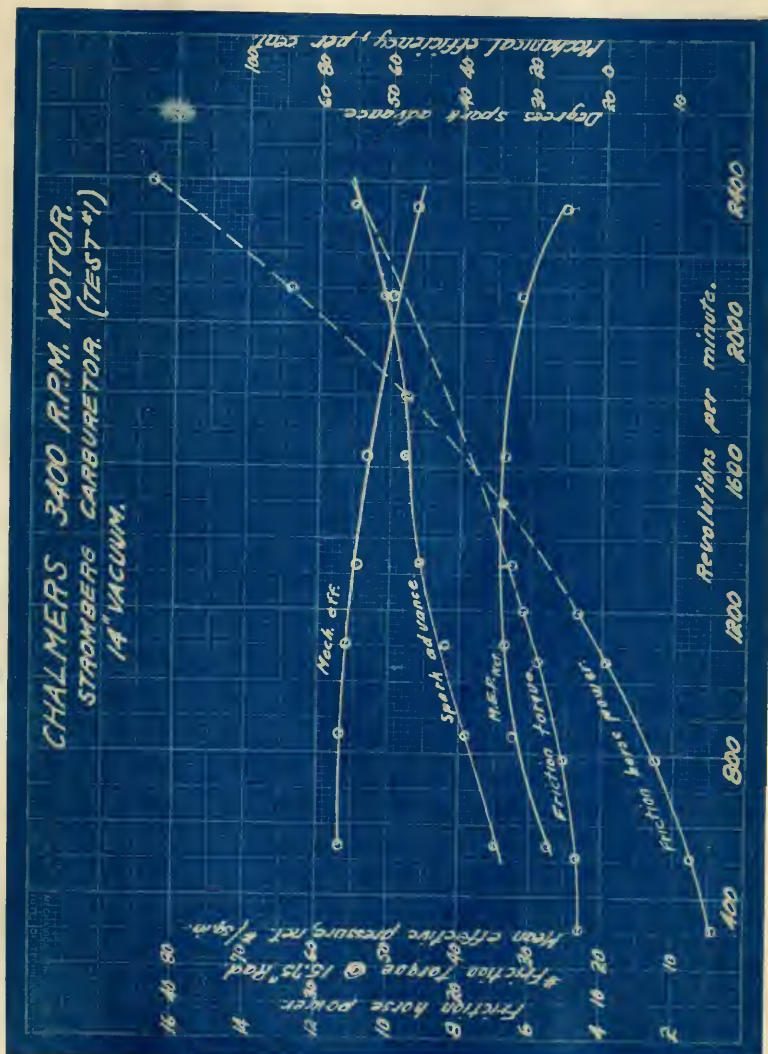

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR. (TEST #1)
14" VACUUM.
Mechanical efficiency, per cent
Degrees spark advance
Mech. eff.
Spark advance
M.E.P. net
Friction torque
Friction horse power
Mean effective pressure net #/sq.in.
#Friction Torque @ 15.75" Rad.
Friction horse power
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 16

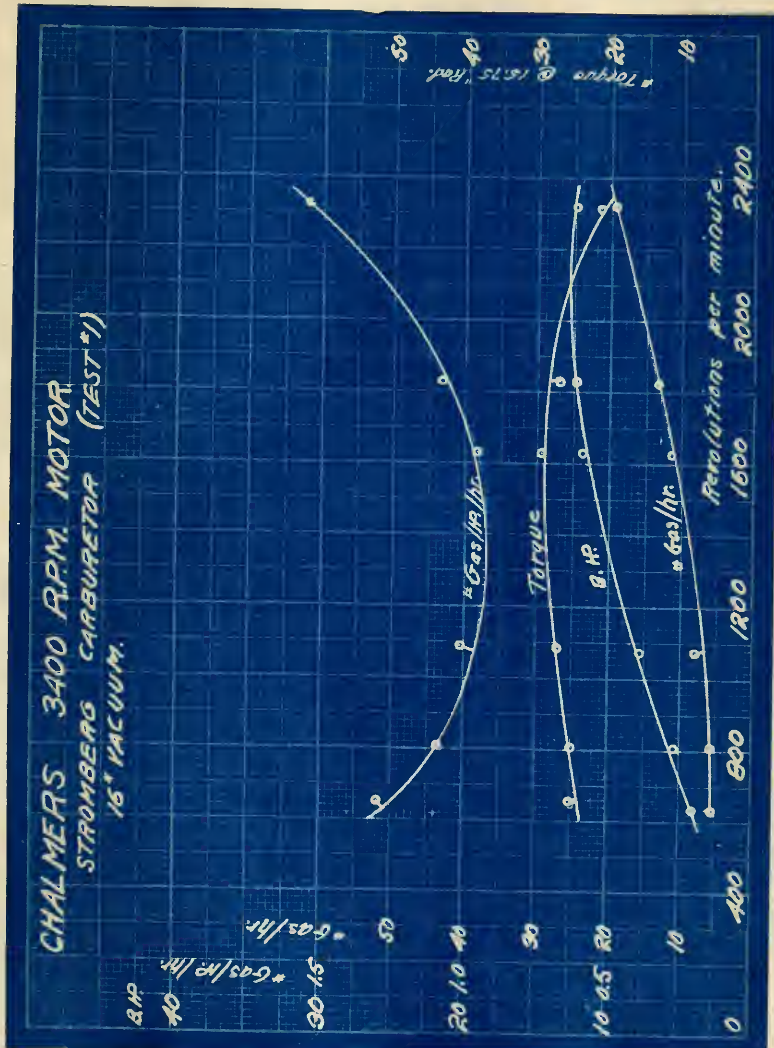

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
16" VACUUM.
Gas/H.P./hr.
Torque
B.H.P.
Gas/hr.
Revolutions per minute
Torque @ 18.75" Rad.

Fig. 17

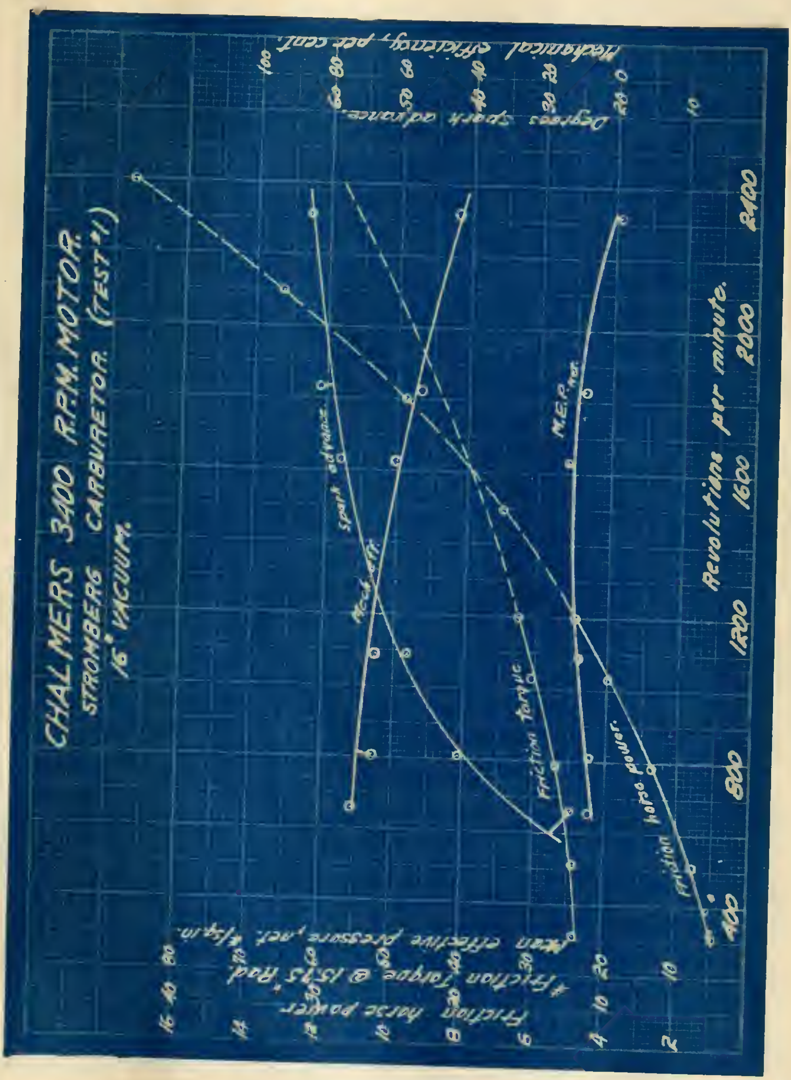

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR. (TEST #1)
16" VACUUM.
Revolutions per minute.
Mechanical efficiency, per cent.
Degrees spark advance.
Spark advance
M.E.P. net.
Friction torque
Friction horse power.
Mean effective pressure, net. #/sq.in.
Friction horse power

Fig. 18

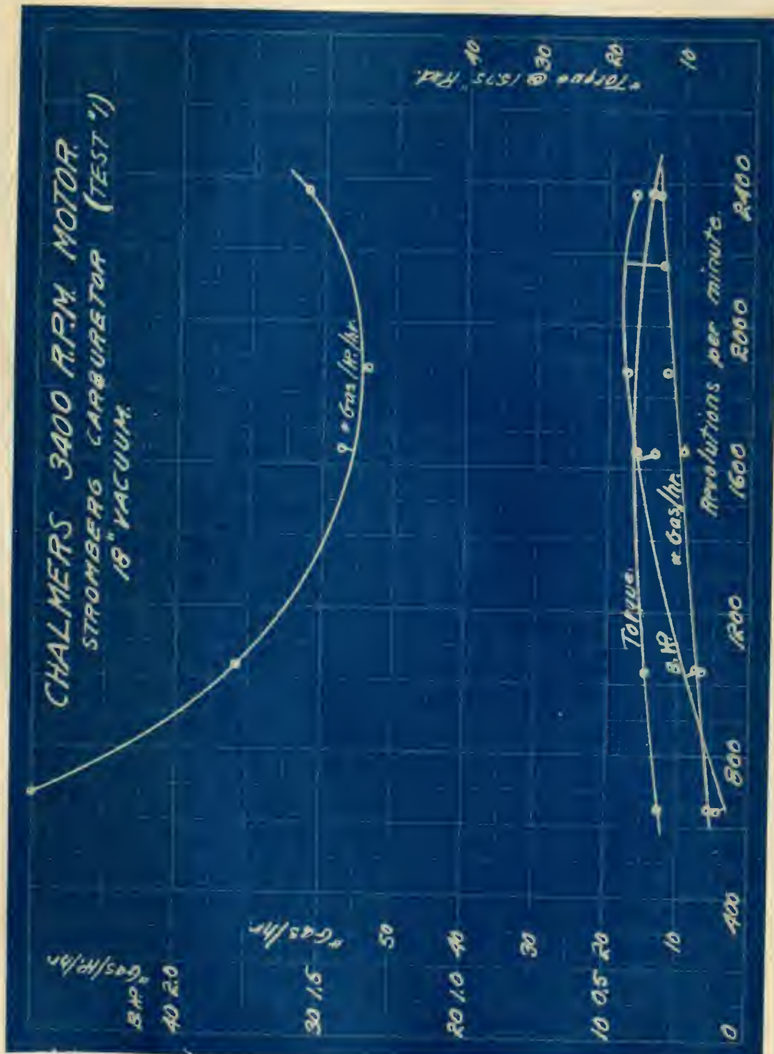
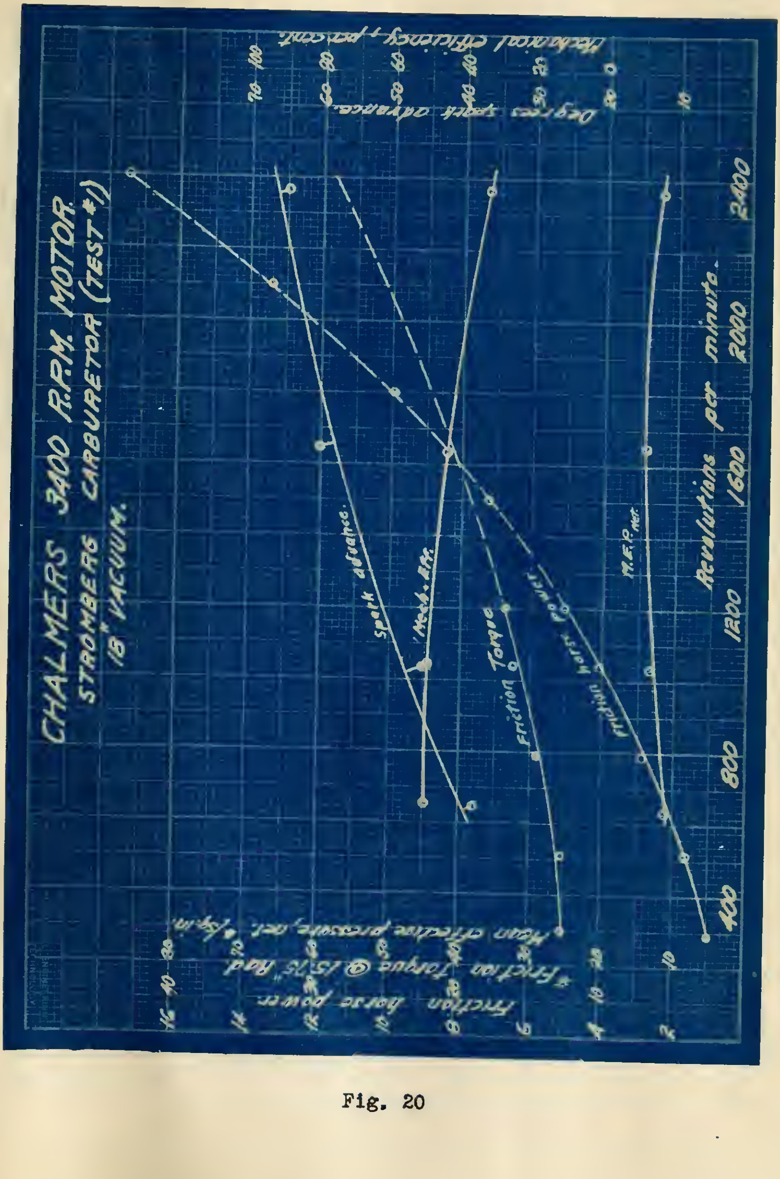

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
18" VACUUM.
Torque
B.H.P.
#Gas/hr.
#Gas/Hr./hr.
Revolutions per minute

Fig. 19



CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
18" VACUUM.
Mechanical efficiency, per cent.
Degrees spark advance.
Spark advance.
Mech. Eff.
Torque
Friction
Friction horse power
M.E.P. net
Revolutions per minute.
400
800
1200
1600
2000
2400
Friction horse power.
Friction Torque @ 15.75" Rad
Mean effective pressure, net. #/sq.in.

Fig. 20

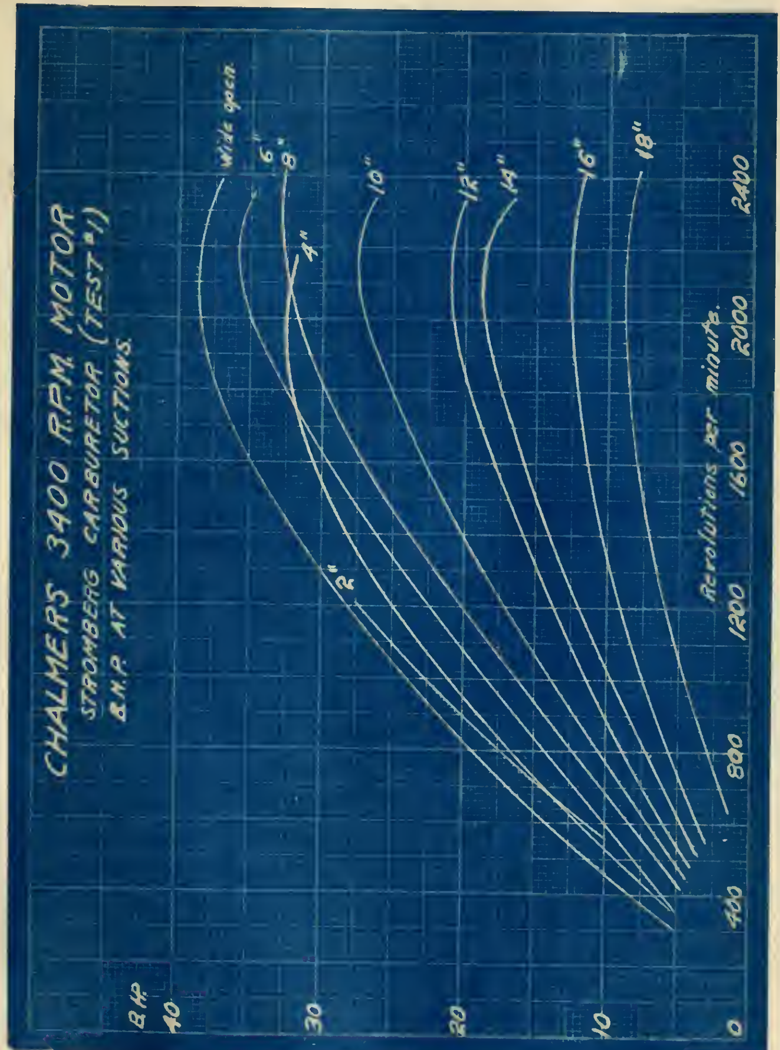

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
B.H.P. AT VARIOUS SUCTIONS
Wide open
6"
8"
4"
10"
12"
14"
16"
18"
2"
B.H.P.
40
30
20
10
0
400
800
1200
1600
2000
2400
Revolutions per minute.

Fig. 21

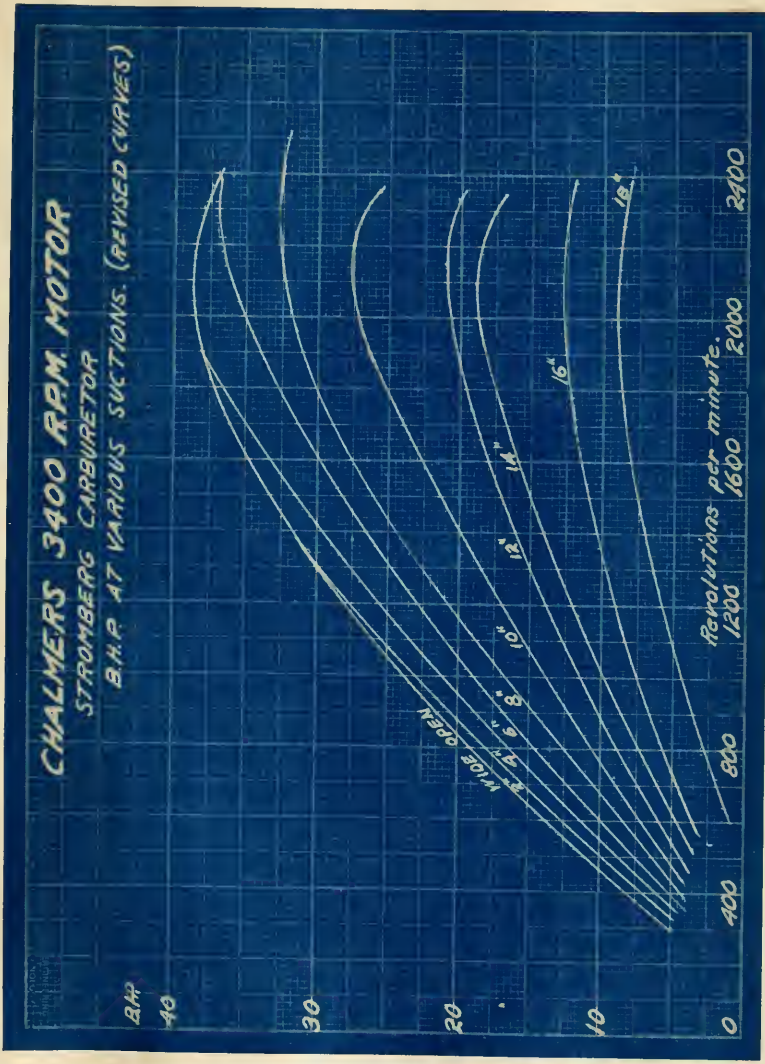

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
B.H.P. AT VARIOUS SUCTIONS. (REVISED CURVES)
WIDE OPEN
2"
4"
6"
8"
10"
12"
14"
16"
18"
B.H.P.
40
30
20
10
0
400
800
1200
1600
2000
2400
Revolutions per minute.

Fig. 22

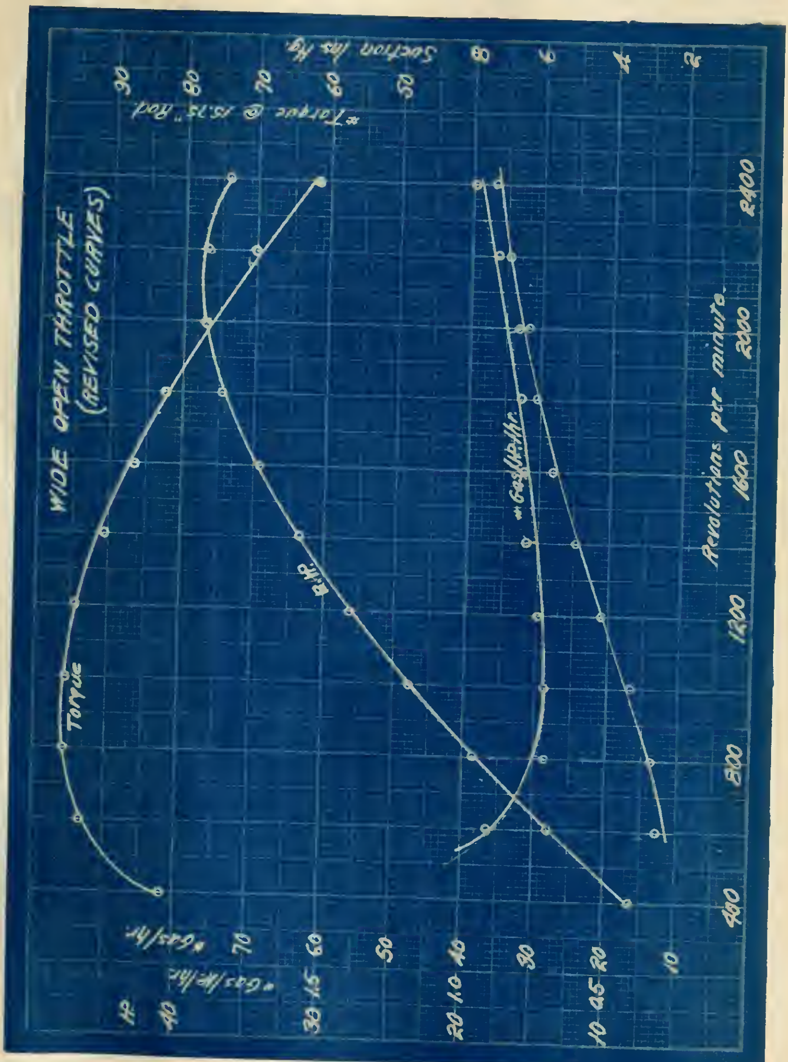

WIDE OPEN THROTTLE
(REVISED CURVES)
Torque
B.H.P.
Revolutions per minute
Suction Ins. Hg.

Fig. 23

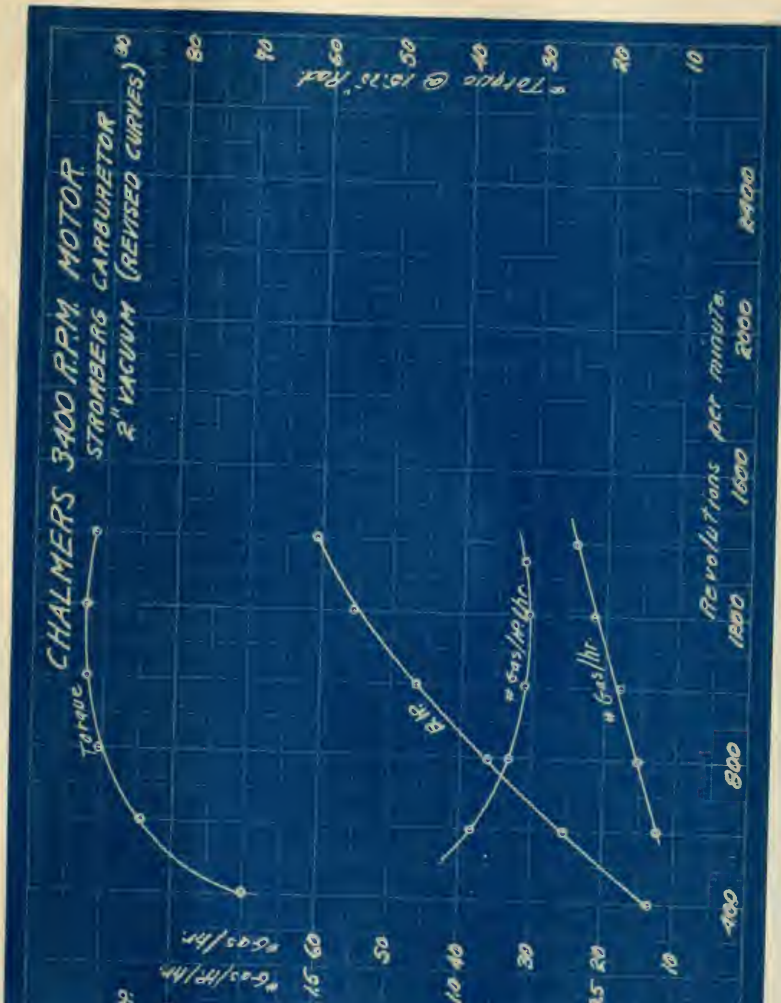
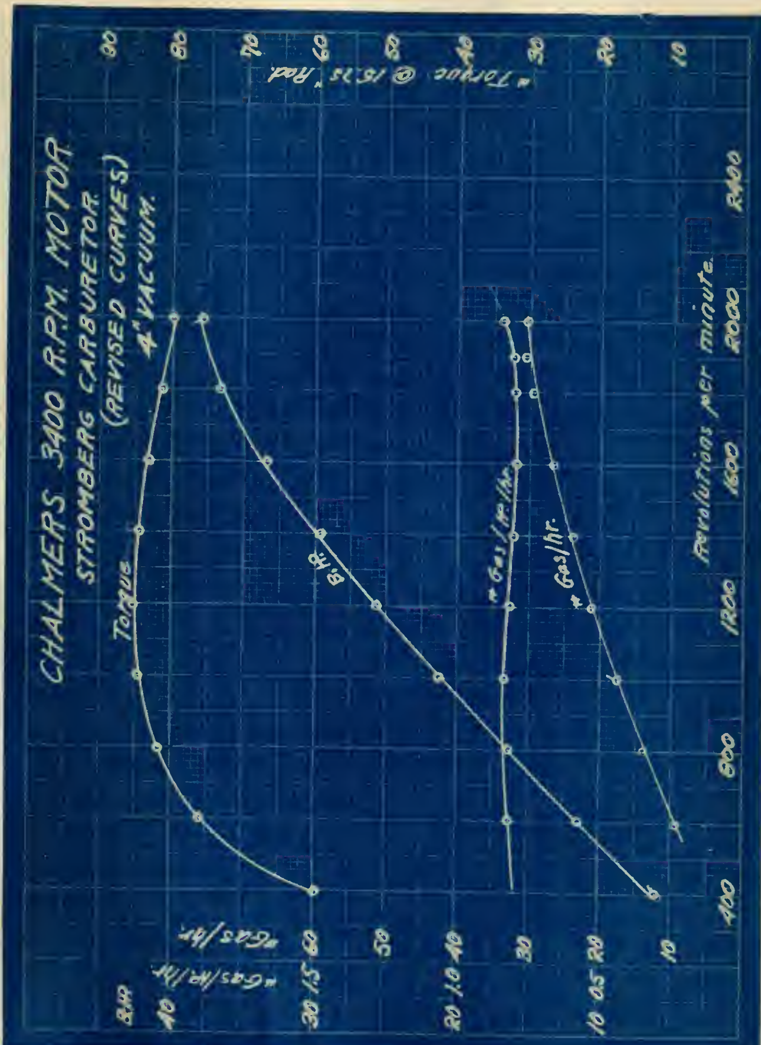

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
2" VACUUM (REVISED CURVES)
Torque
B.H.P.
Gas/H.P./hr.
Gas/hr.
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 24



CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR.
(REVISED CURVES)
4" VACUUM.
Torque
B.H.P.
Gas/hp./hr.
Gas/hr.
Revolutions per minute.

Fig. 25

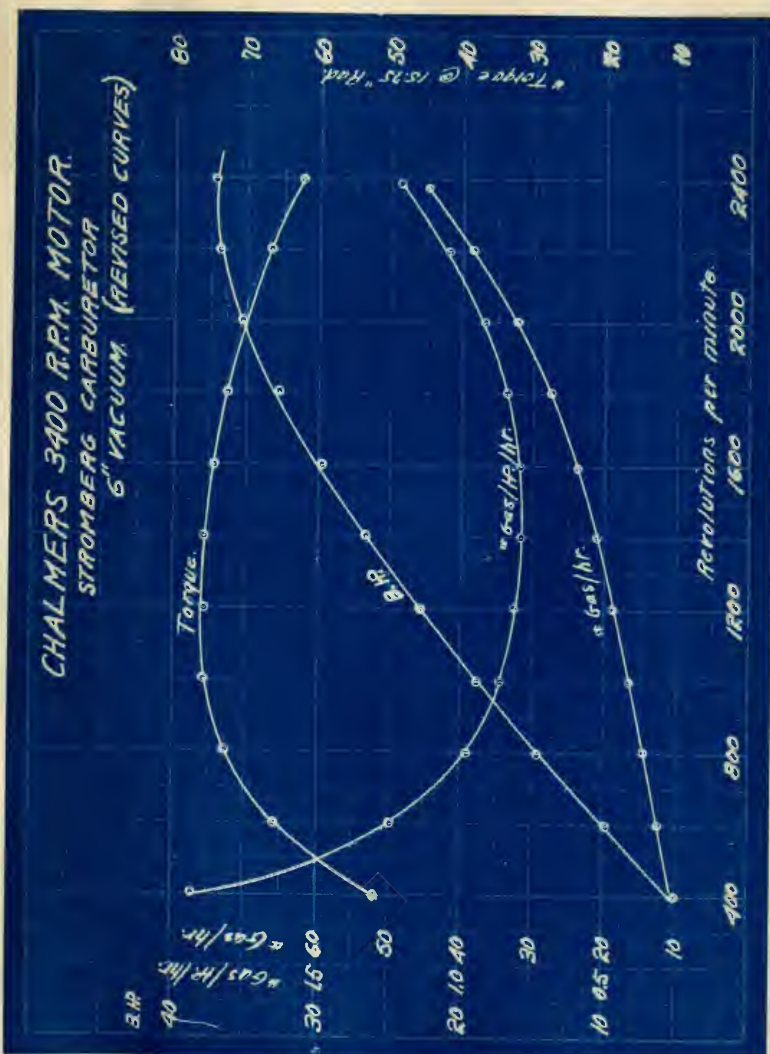

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR
6" VACUUM (REVISED CURVES)
Torque.
B.H.
Gas/HP/hr.
Gas/hr.
Revolutions per minute
400
800
1200
1600
2000
2400

Fig. 26

[illegible]

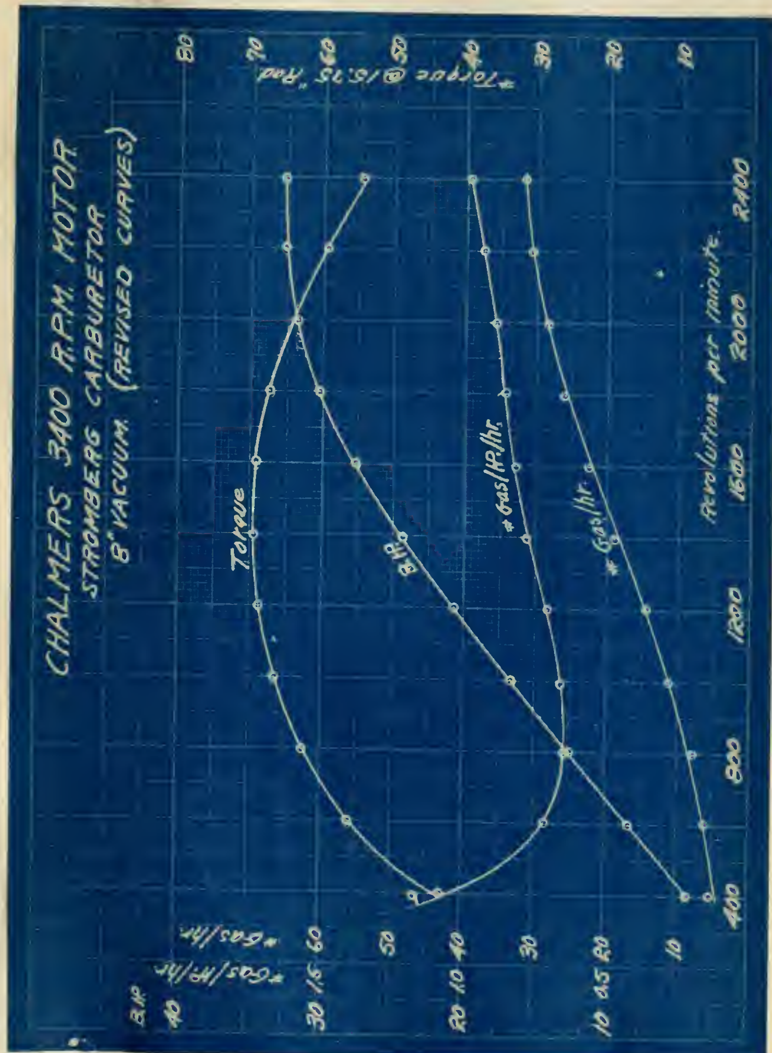

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
8" VACUUM (REVISED CURVES)
Torque
B.H.P.
Gas/H.P./hr.
Gas/hr.
Revolutions per minute
Torque @ 15.75" Rad.
B.H.P.
Gas/H.P./hr.
Gas/hr.

Fig. 27

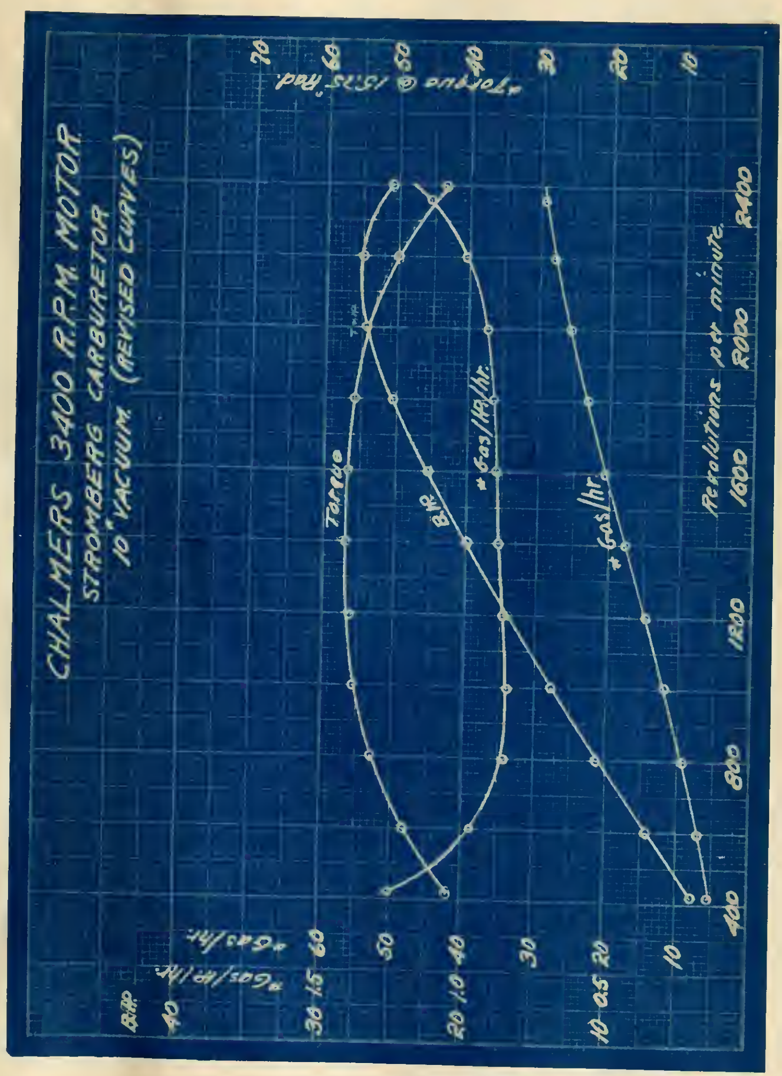

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
10" VACUUM (REVISED CURVES)
Torque
B.H.P.
* Gas/HP/hr.
* Gas/hr.
Revolutions per minute
*Torque @ 13.75" Rad.
B.H.P.
*Gas/HP/hr.
*Gas/hr.

Fig. 28

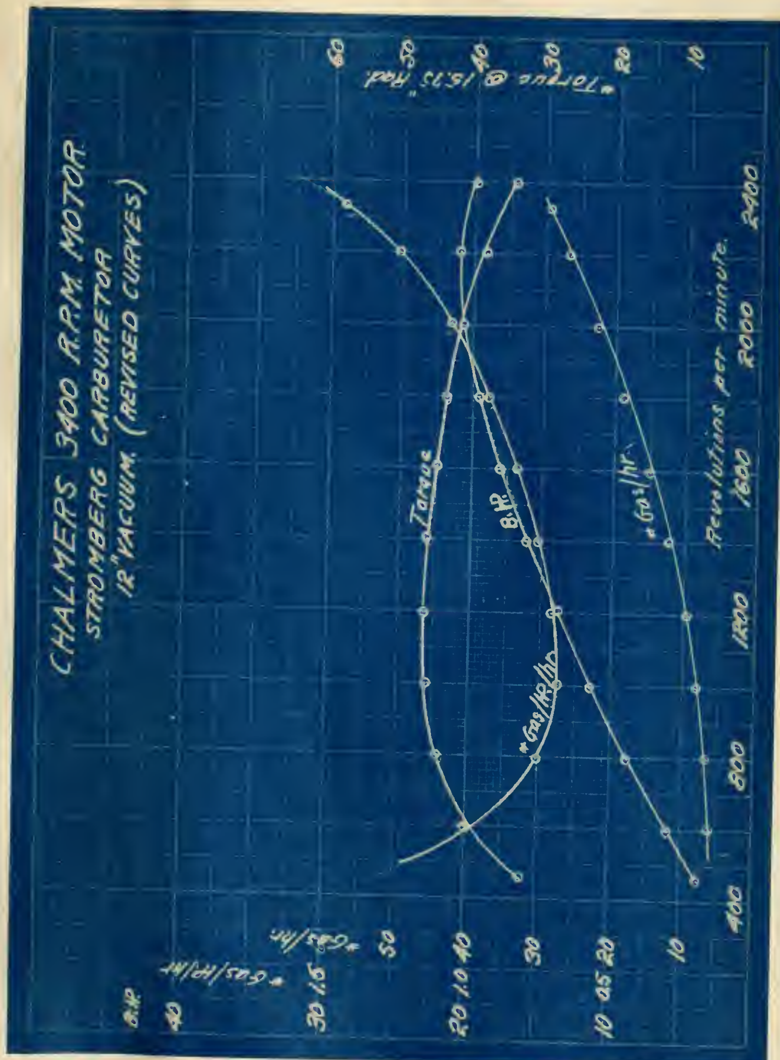

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
12" VACUUM. (REVISED CURVES)
Torque @ 15.75" Rad.
Torque
B.H.P.
Gas/hr.
Gas/HP/hr.
Revolutions per minute.
400
800
1200
1600
2000
2400
B.H.P.
Gas/HP/hr.
Gas/hr.

Fig. 29

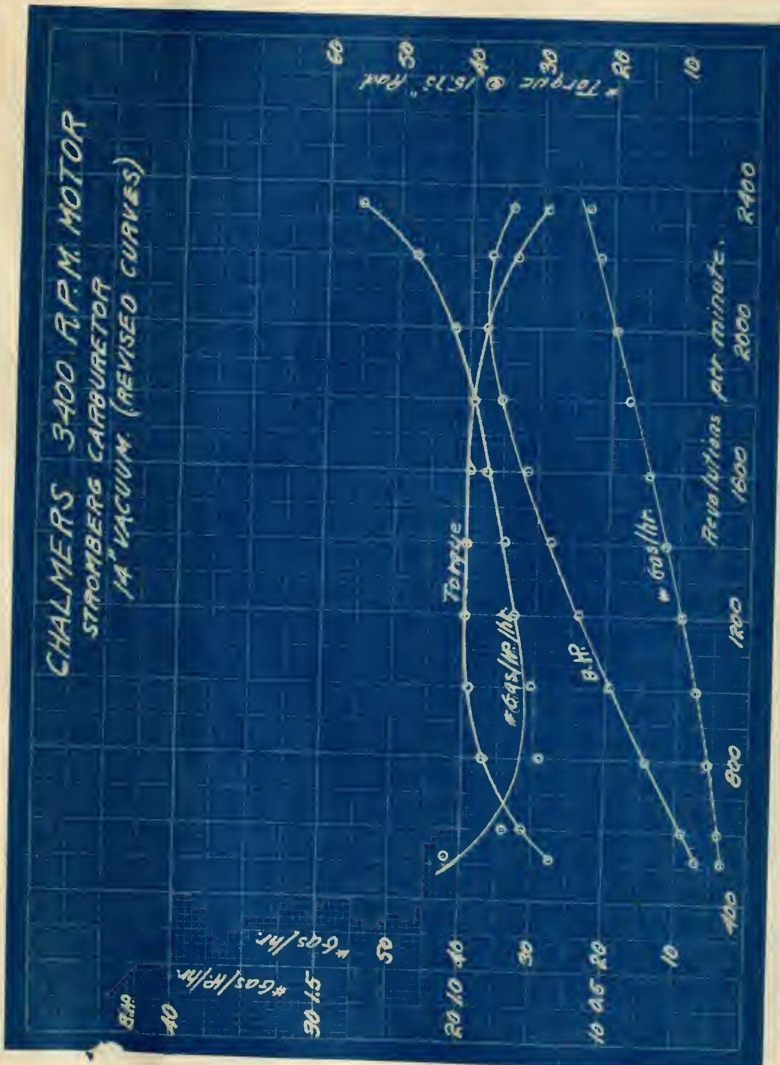

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
14" VACUUM (REVISED CURVES)
Torque @ 15.15" Rad
Torque
Gas/Hp.-hr.
B.HP.
Gas/hr.
Revolutions per minute
400
800
1200
1600
2000
2400
10
20
30
40
50
60

Fig. 30

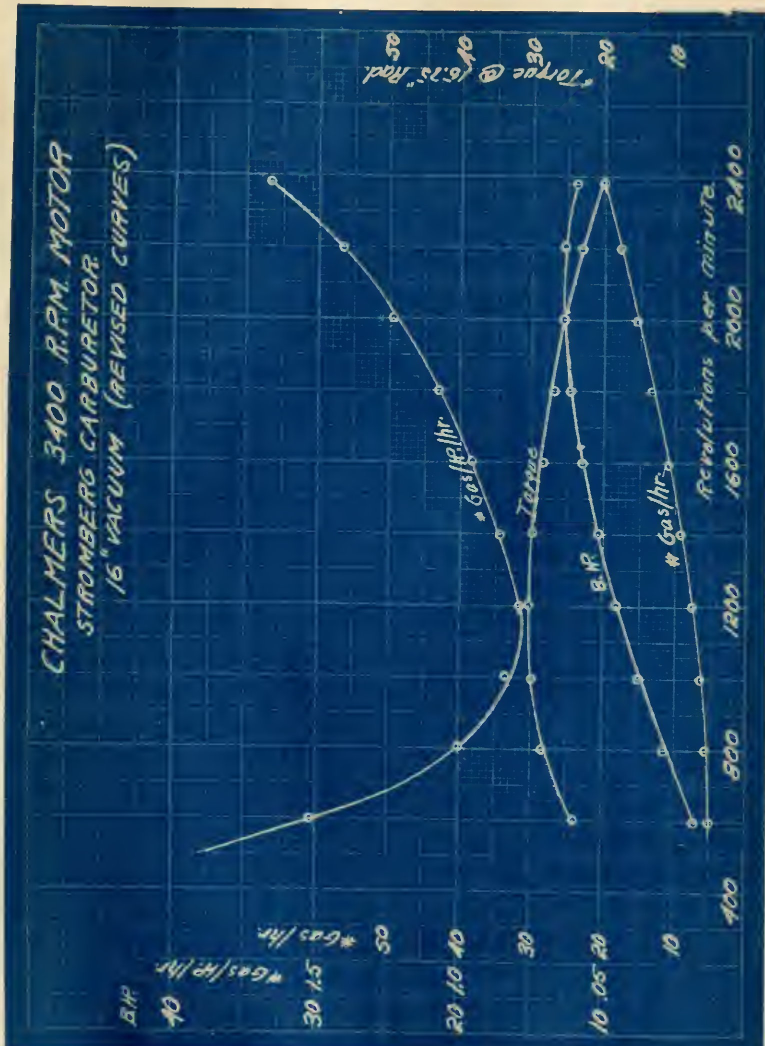

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
16" VACUUM (REVISED CURVES)
#Gas/hr.
Torque
B.H.P.
Gas/hr.
Revolutions per minute
B.H.P.
#Gas/HP/hr
#Gas/hr
Torque @ 16.75" Rad.

Fig. 31

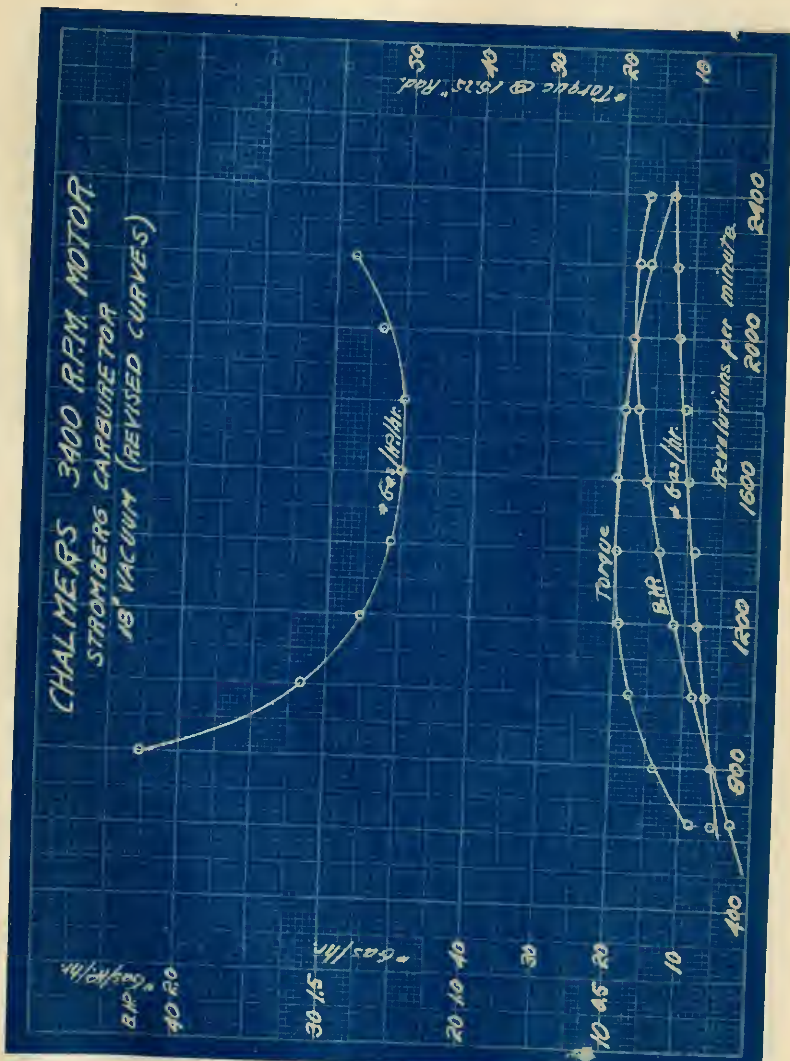

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR
18" VACUUM (REVISED CURVES)
Torque
B.H.P.
Revolutions per minute
400
800
1200
1600
2000
2400

Fig. 32

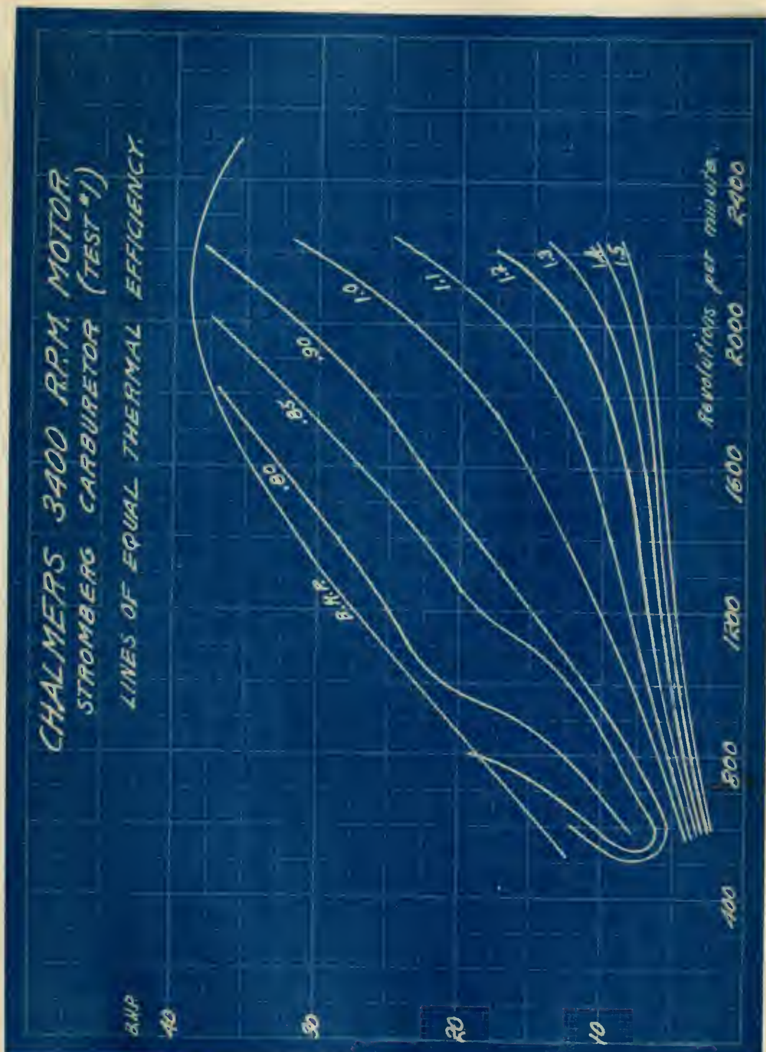
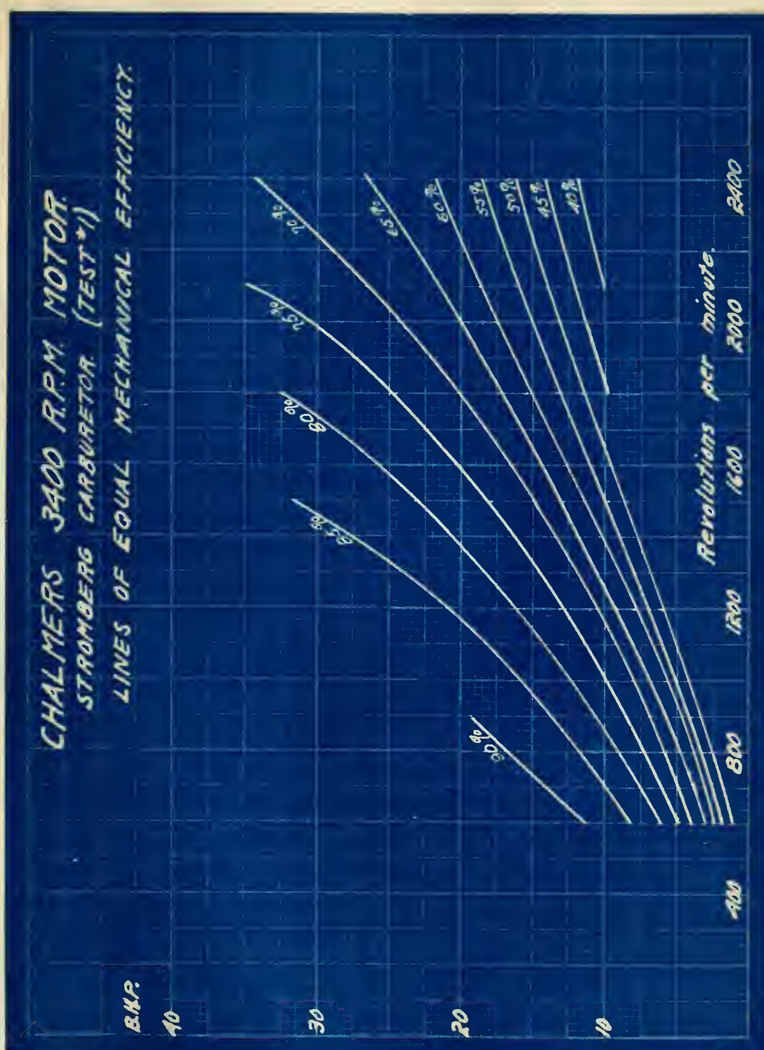

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
LINES OF EQUAL THERMAL EFFICIENCY.
B.H.P.
40
30
20
10
400
800
1200
1600
2000
2400
Revolutions per minute.
B.H.P.
.80
.85
.90
1.0
1.1
1.2
1.3
1.4
1.5

Fig. 33



CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR. (TEST *1)
LINES OF EQUAL MECHANICAL EFFICIENCY
B.H.P.
40
30
20
10
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
400
800
1200
1600
2000
2400
Revolutions per minute

Fig. 34

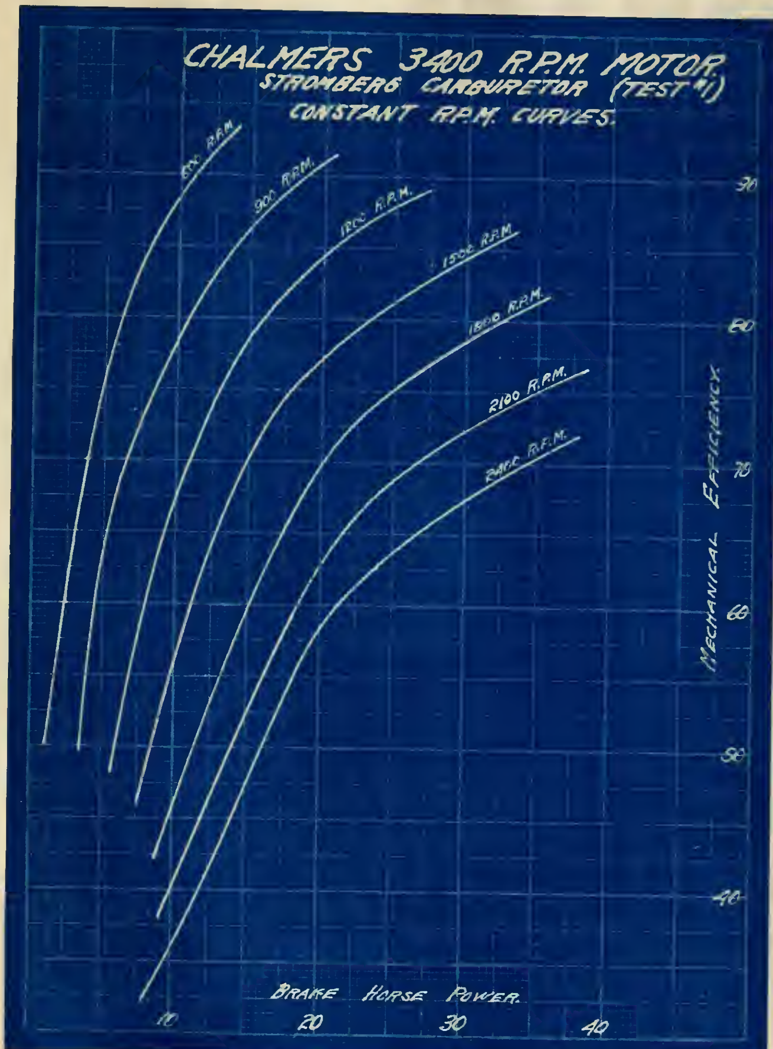

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #1)
CONSTANT R.P.M. CURVES.
600 R.P.M.
900 R.P.M.
1200 R.P.M.
1500 R.P.M.
1800 R.P.M.
2100 R.P.M.
2400 R.P.M.
MECHANICAL EFFICIENCY
90
80
70
60
50
40
BRAKE HORSE POWER.
10
20
30
40

Fig. 35

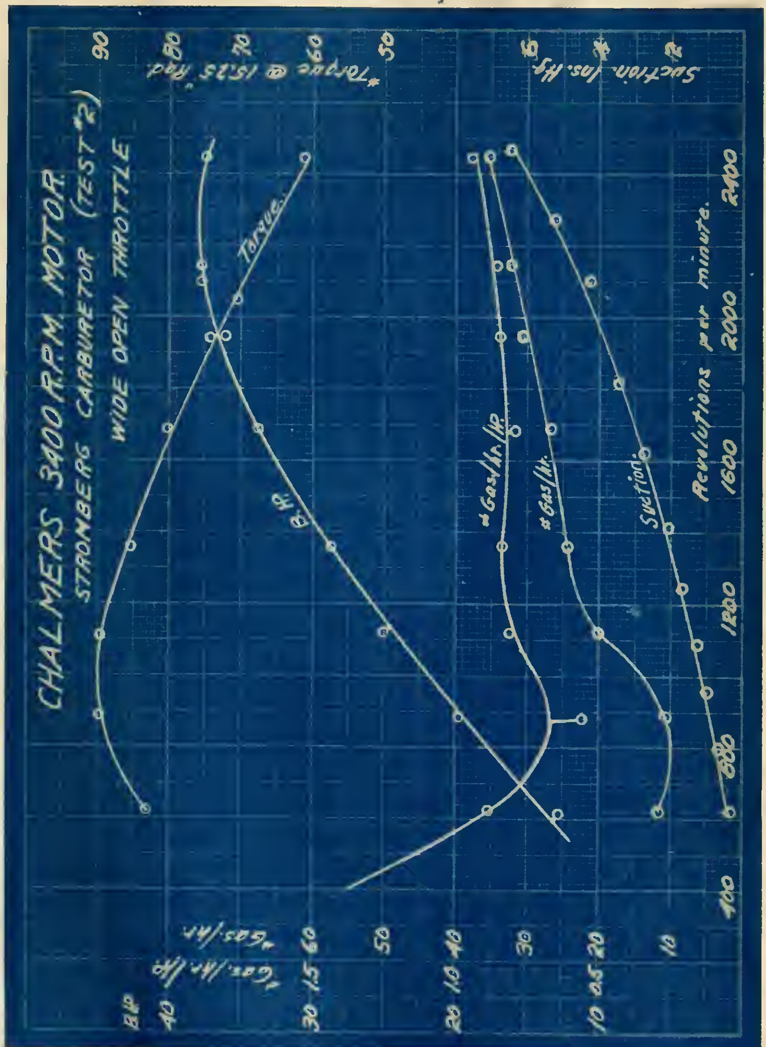

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
WIDE OPEN THROTTLE
*Torque @ 15.25" Rad.
Suction. Ins. Hg.
Torque
B.HP.
#Gas/Hr./HP.
#Gas/Hr.
Suction
Revolutions per minute
B.HP.
#Gas./Hr./HP.
#Gas./Hr.

Fig. 36

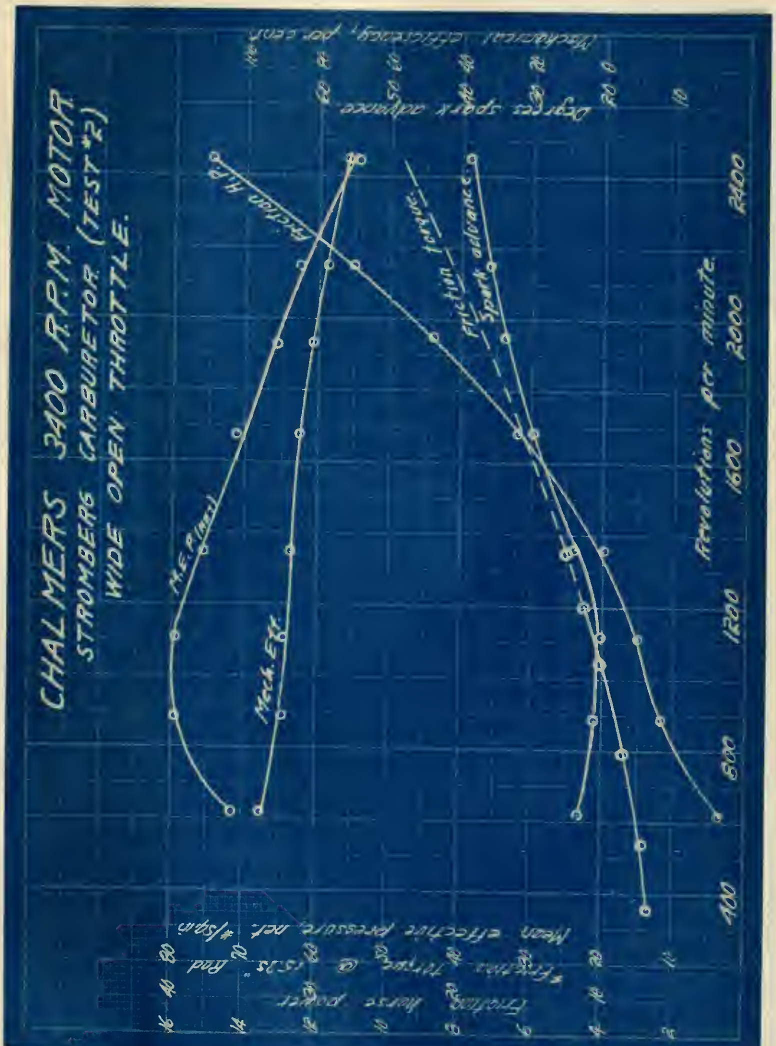

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
WIDE OPEN THROTTLE.
M.E.P.(net)
Mech. Eff.
Friction H.P.
Friction torque
Spark advance
Revolutions per minute
400
800
1200
1600
2000
2400
Mechanical efficiency, per cent
Degrees spark advance
Mean effective pressure, net, #/sq.in.
Friction horse power

Fig. 37

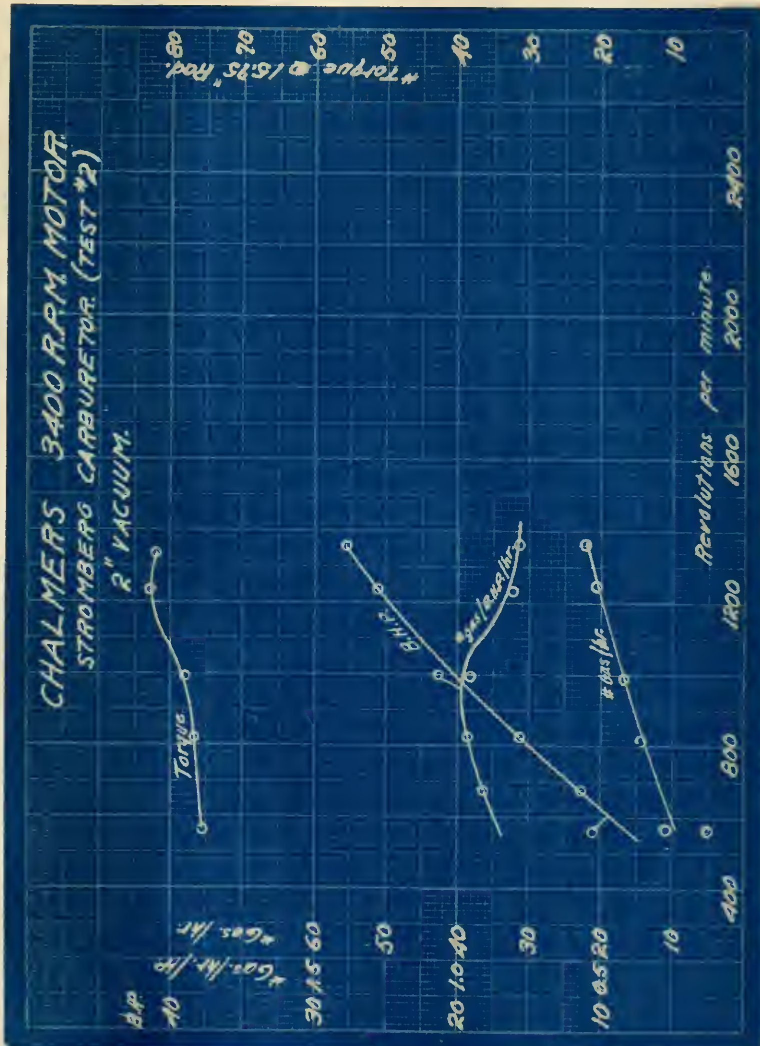

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
2" VACUUM.
#Torque @ 15.75" Rad.
Torque
B.H.P.
#gas/b.h.p./hr.
#Gas/hr.
Revolutions per minute
400
800
1200
1600
2000
2400

Fig. 38

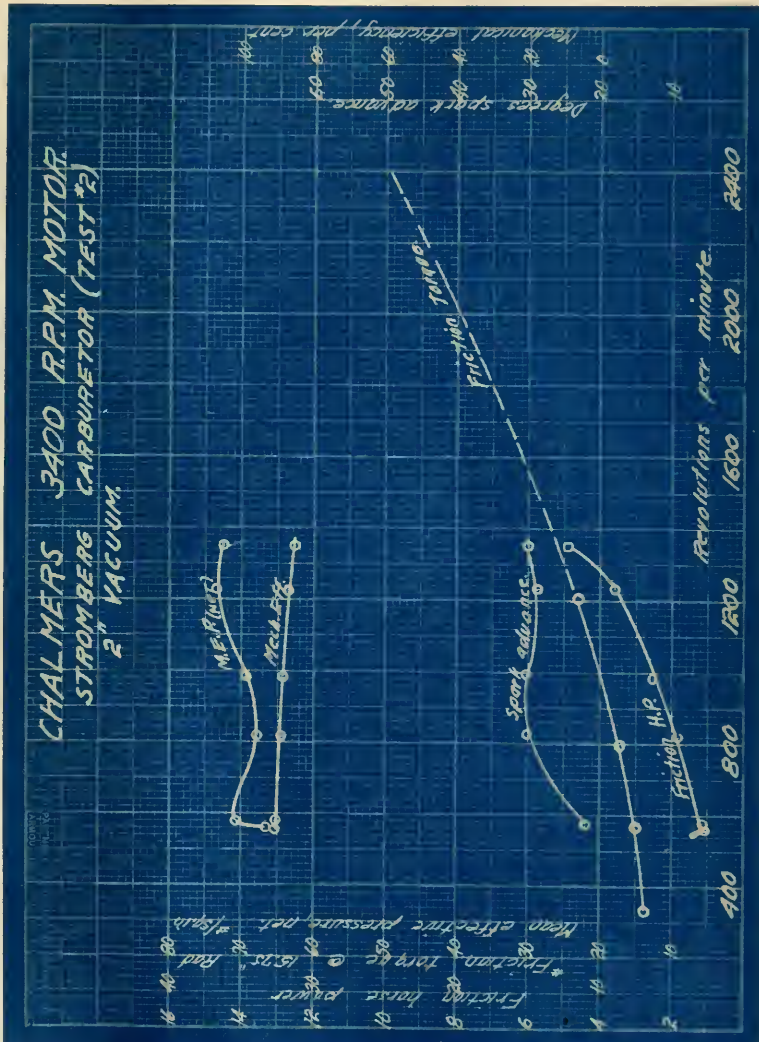

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
2" VACUUM.
M.E.P.(net)
Mech.Eff.
Spark advance
Friction torque
Friction H.P.
Revolutions per minute
400
800
1200
1600
2000
2400
Mechanical efficiency, per cent
Degrees spark advance
Mean effective pressure net #/sq.in.
Friction torque @ 15.75" Rad
Friction horse power

Fig. 39

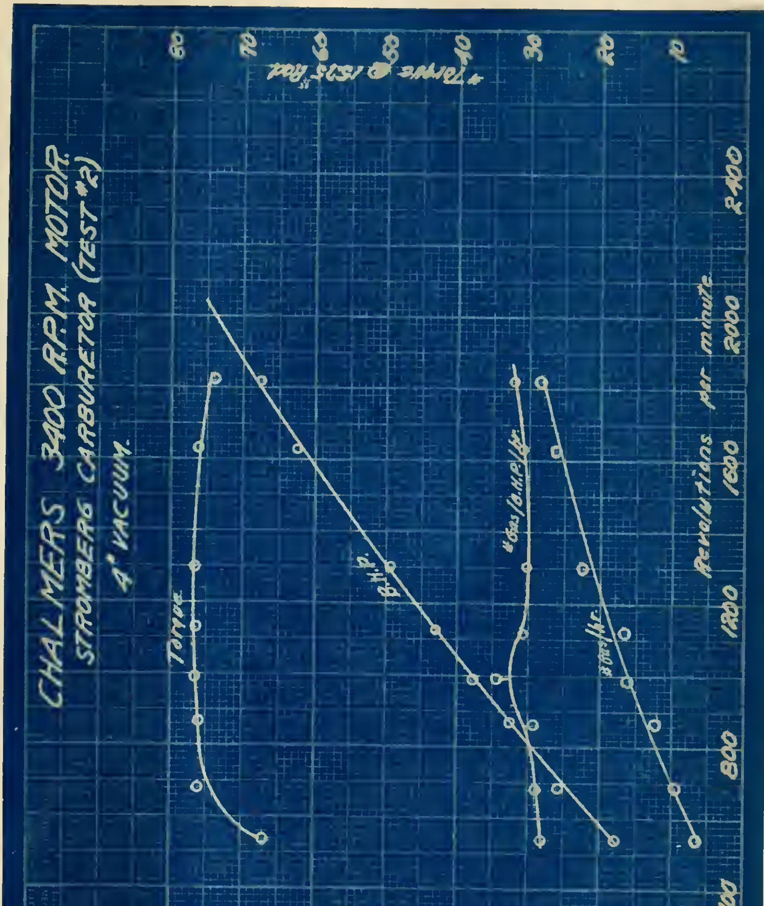

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
4" VACUUM.
Tempe.
B.H.P.
Revolutions per minute
400
800
1200
1600
2000
2400

Fig. 40

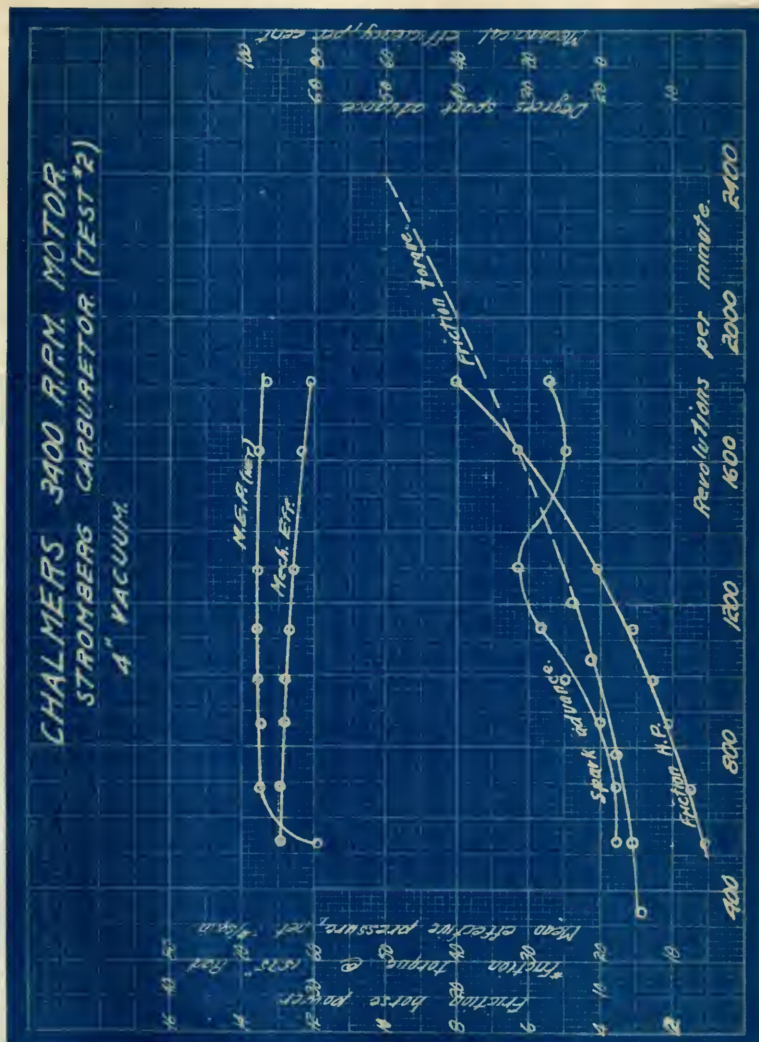

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
4" VACUUM.
M.E.P. (net)
Mech. Eff.
Friction torque
Spark advance
Friction H.P.
Revolutions per minute.
Mechanical efficiency per cent
Degrees spark advance
Mean effective pressure, per sq. in.
Friction horse power

Fig. 41

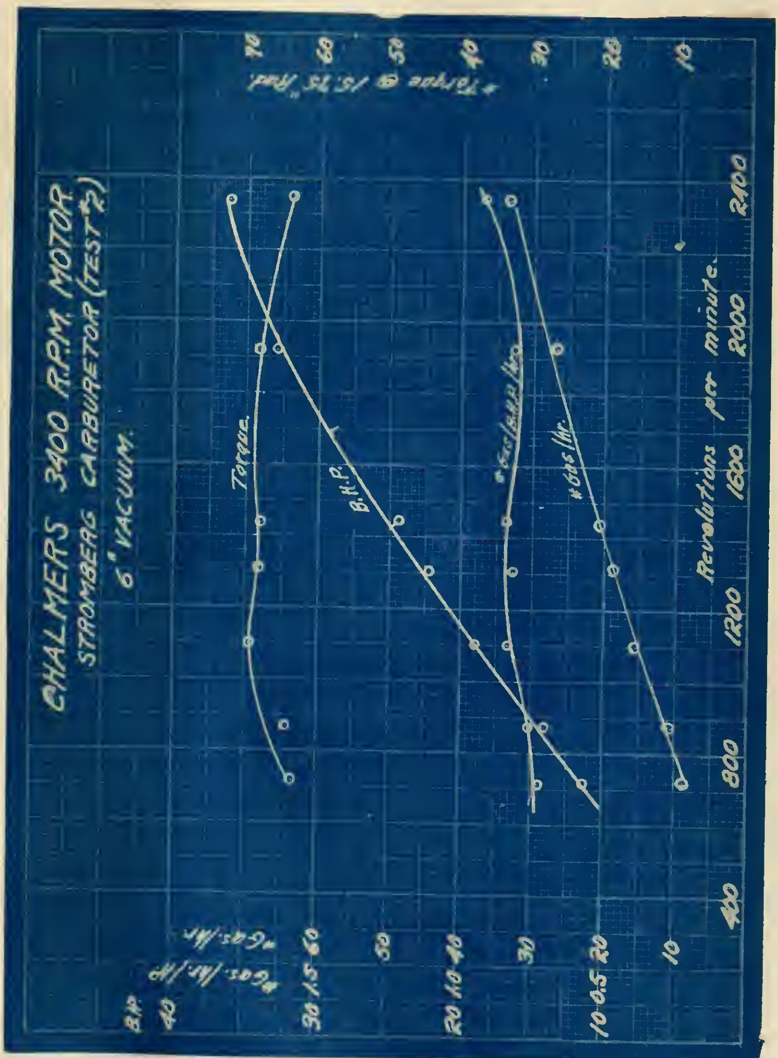

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
6" VACUUM.
Torque.
B.H.P.
Revolutions per minute.
800
1200
1600
2000
2400

Fig. 42

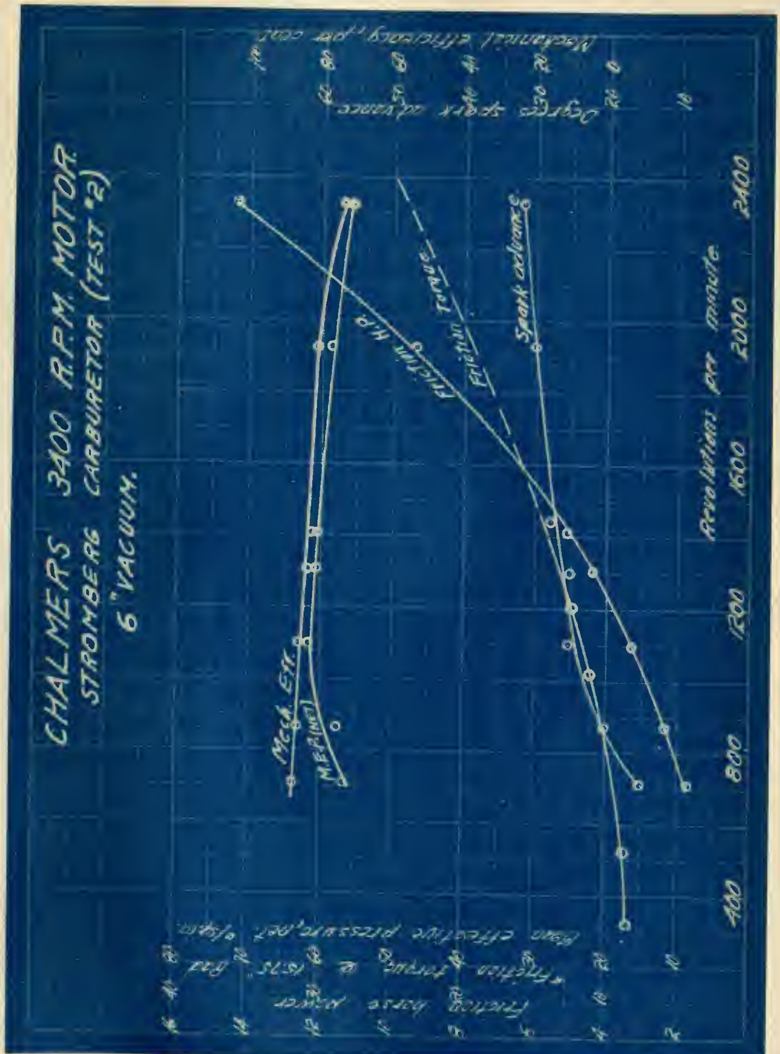

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
6" VACUUM.
Mech. Eff.
M.E.P.(NET)
Friction H.P.
Friction Torque
Spark advance
Revolutions per minute
400
800
1200
1600
2000
2400
Mechanical efficiency, per cent
Degree spark advance

Fig. 43

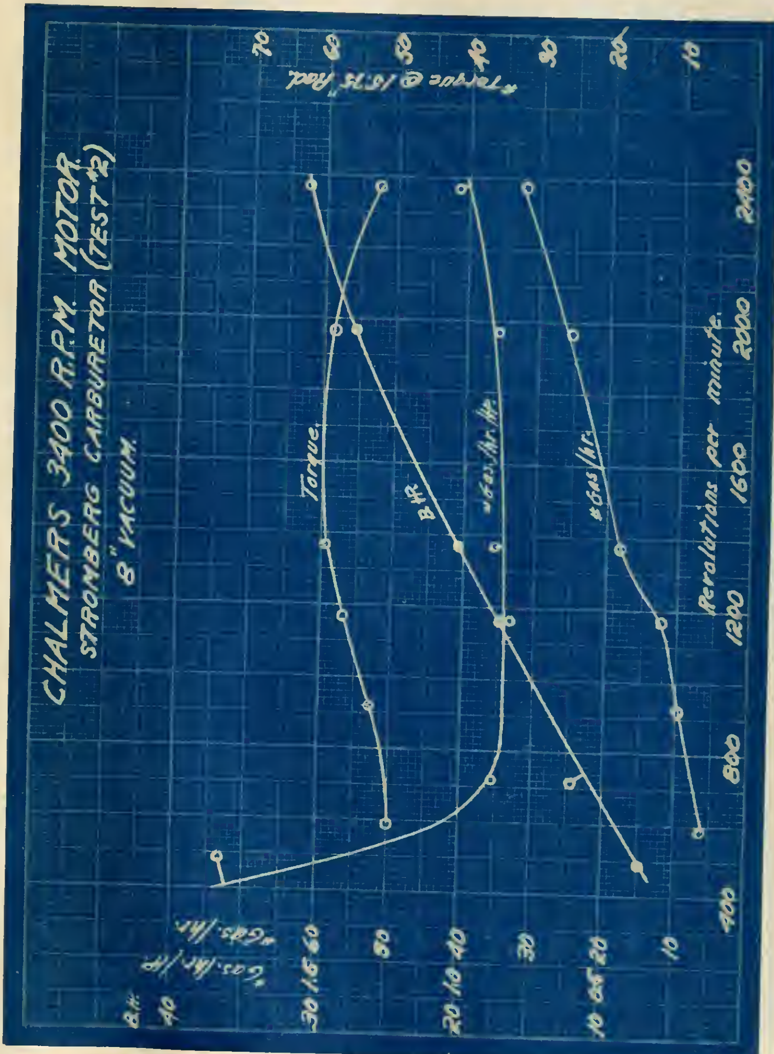

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
8" VACUUM.
Torque.
B.H.P.
#Gas/hr.
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 44

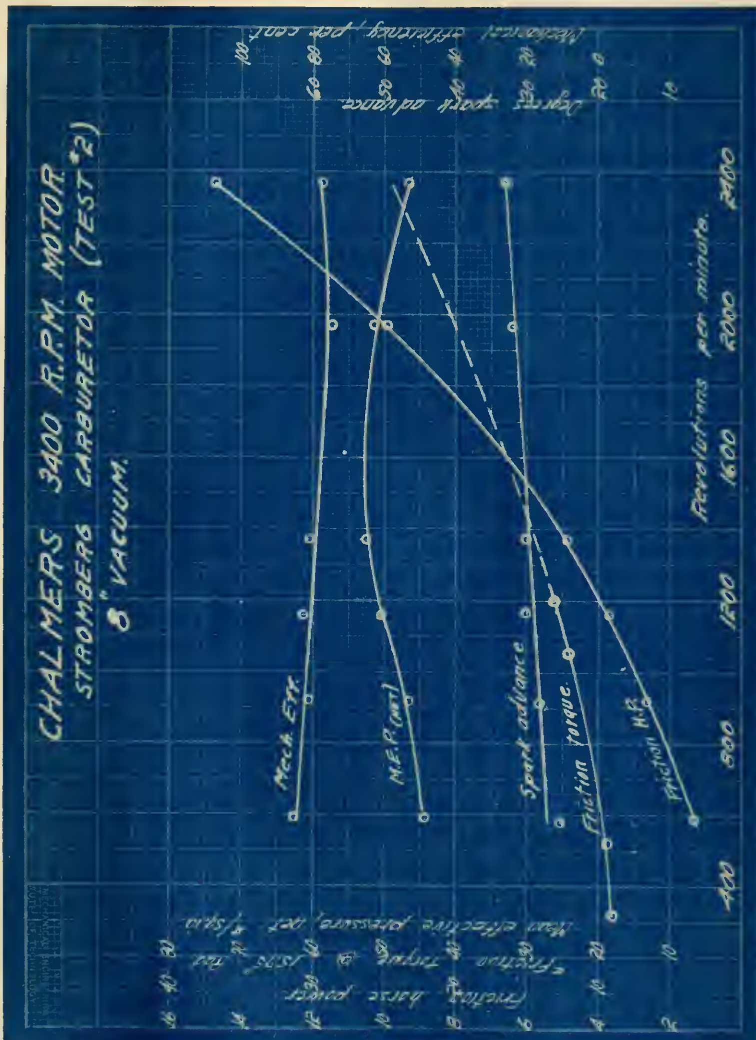

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
8" VACUUM.
Mech. Eff.
M.E.P. (net)
Spark advance
Friction torque
Friction H.P.
Revolutions per minute.
Mechanical efficiency per cent
Degrees spark advance
Mean effective pressure, per #/sq.in.
Friction horse power

Fig. 45

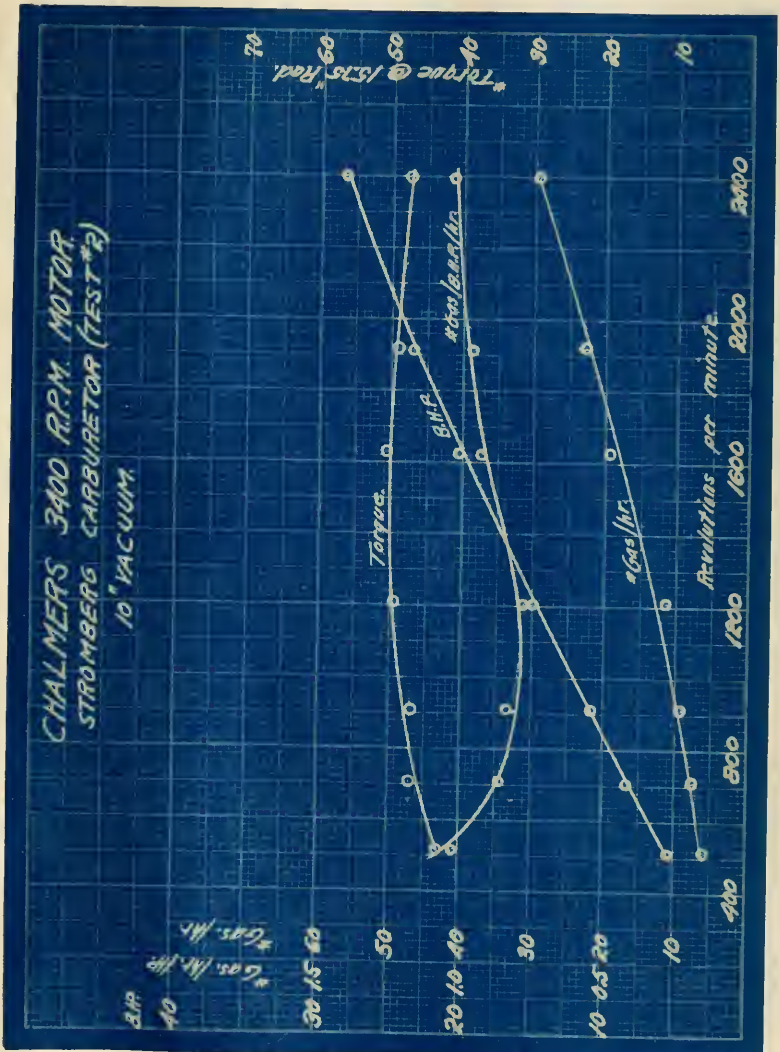

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
10" VACUUM
Torque.
B.H.P.
#Gas/B.H.P./hr
#Gas/hr.
Revolutions per minute
B.H.P.
#Gas/hr.

Fig. 46

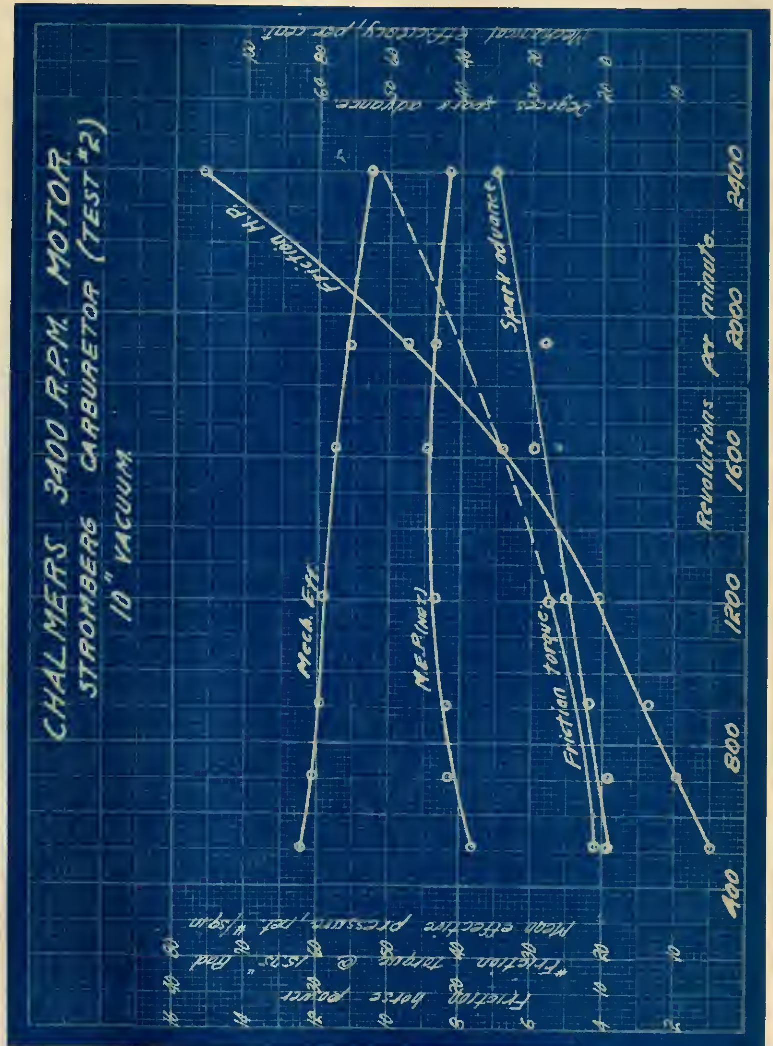

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
10" VACUUM
Friction H.P.
Spark advance
Mech. Eff.
M.E.P.(net)
Friction torque
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 47

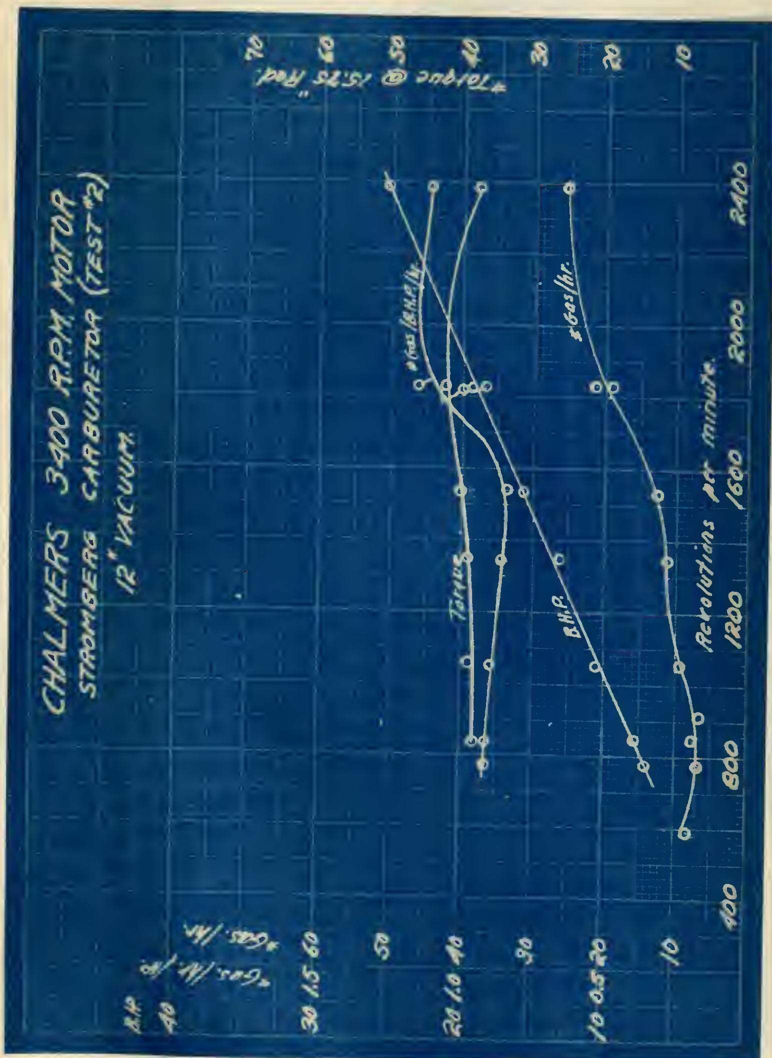

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
12" VACUUM.
#Torque @ 15.75" Rad.
#Gas/B.H.P./hr.
#Gas/hr.
Torque
B.H.P.
Revolutions per minute
400
800
1200
1600
2000
2400
B.H.P.
#Gas./hr./hp.
#Gas./hr.
70
60
50
40
30
20
10

Fig. 48

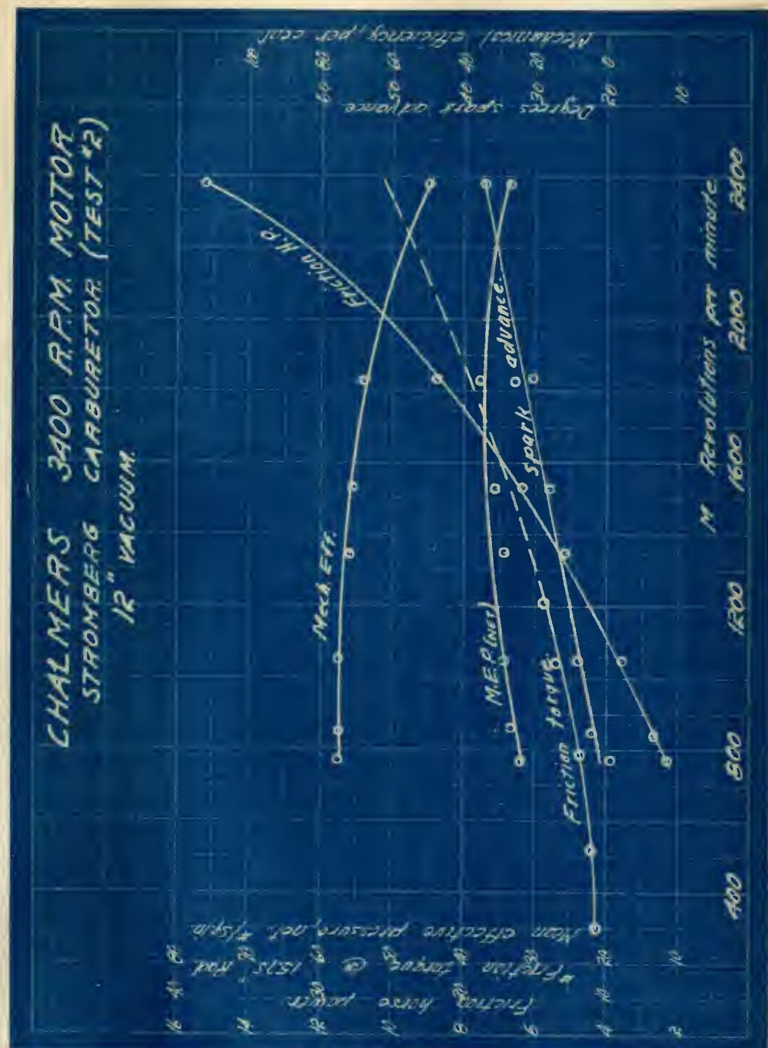

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
12" VACUUM
Friction H.P.
Mech. Eff.
M.E.P. (net)
Friction torque
Spark advance
Revolutions per minute
Mechanical efficiency, per cent
Degrees spark advance
Friction horse power
Mean effective pressure, net, #/sq.in.

Fig. 49

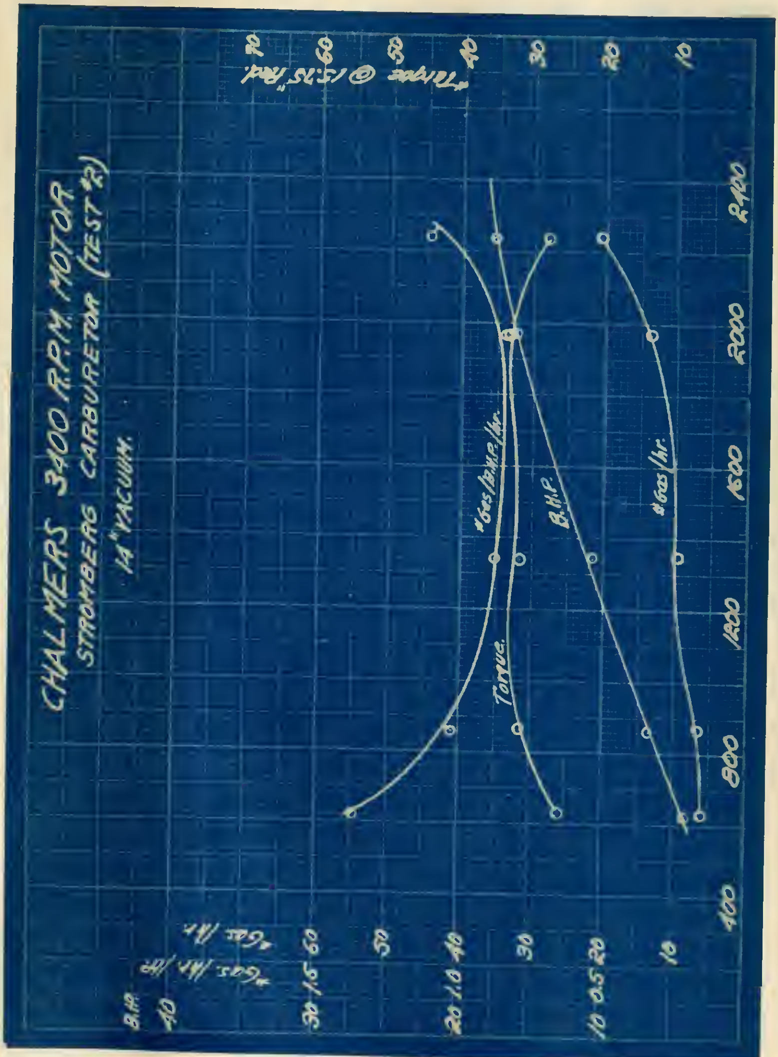

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
14" VACUUM.
Torque @ 1.575' Rad.
#Gas/B.H.P./hr.
B.H.P.
#Gas/hr.
Torque.
B.H.P.
#Gas/Hr/HP.
#Gas/Hr.
400
800
1200
1600
2000
2400

Fig. 50

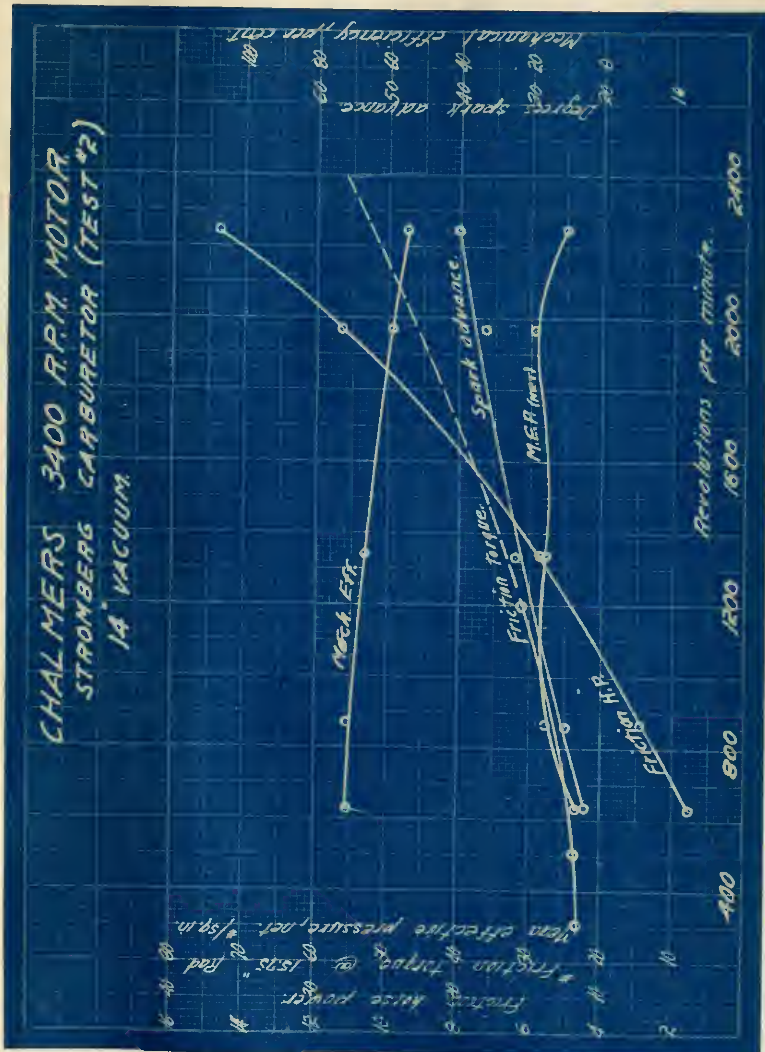

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
14" VACUUM
Mech. Eff.
Spark advance
Friction torque
M.E.P. (net)
Friction H.P.
Revolutions per minute
400
800
1200
1600
2000
2400
Mechanical efficiency, per cent
Degrees spark advance
Mean effective pressure, net, #/sq.in.
Friction torque, @ 15.75" Rad
Friction horse power

Fig. 51

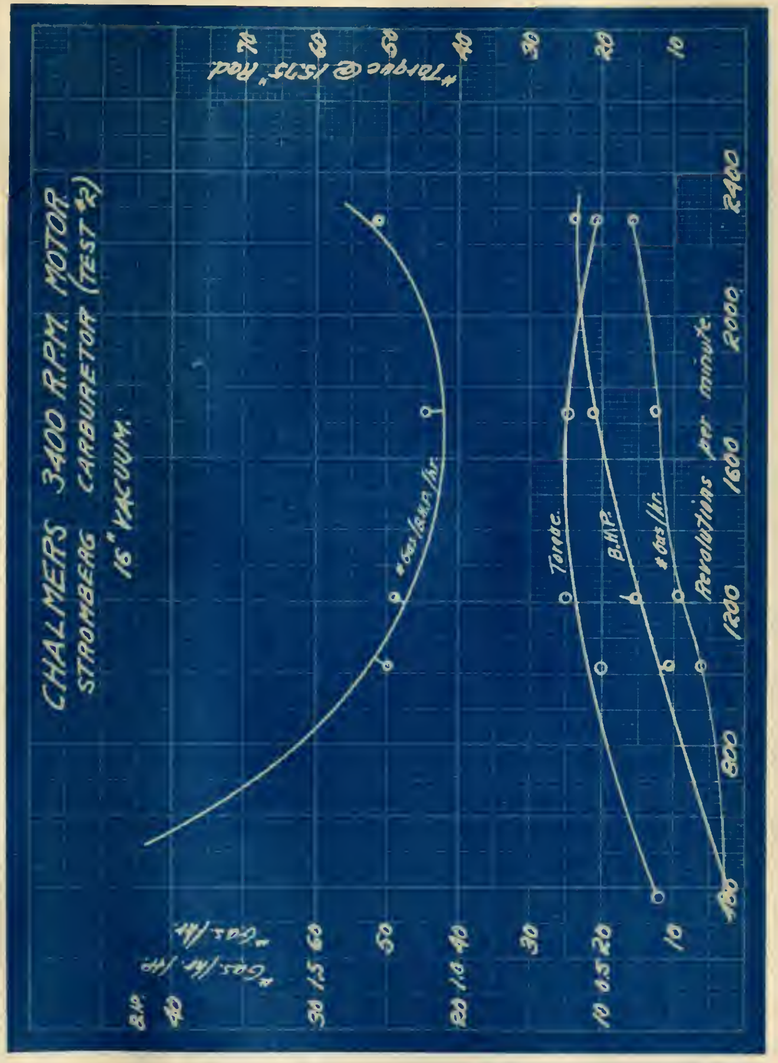

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
16" VACUUM
#Torque @ 1.575' Rod
Torque.
B.H.P.
#Gas/hr.
#Gas/B.H.P./hr.
Revolutions per minute

Fig. 52

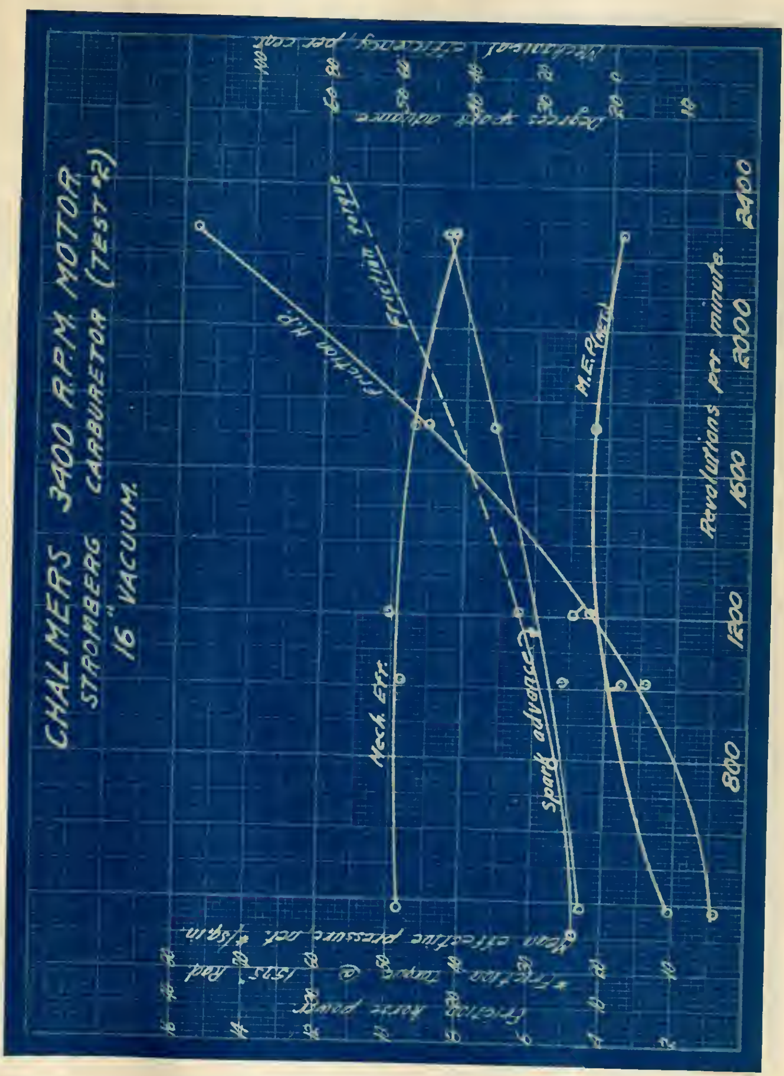

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
16" VACUUM.
Mech. Eff.
Spark advance
M.E.P.
Friction H.P.
Friction torque
Revolutions per minute.
800
1200
1600
2000
2400
Mechanical efficiency, per cent
Degrees spark advance
Mean effective pressure

Fig. 53

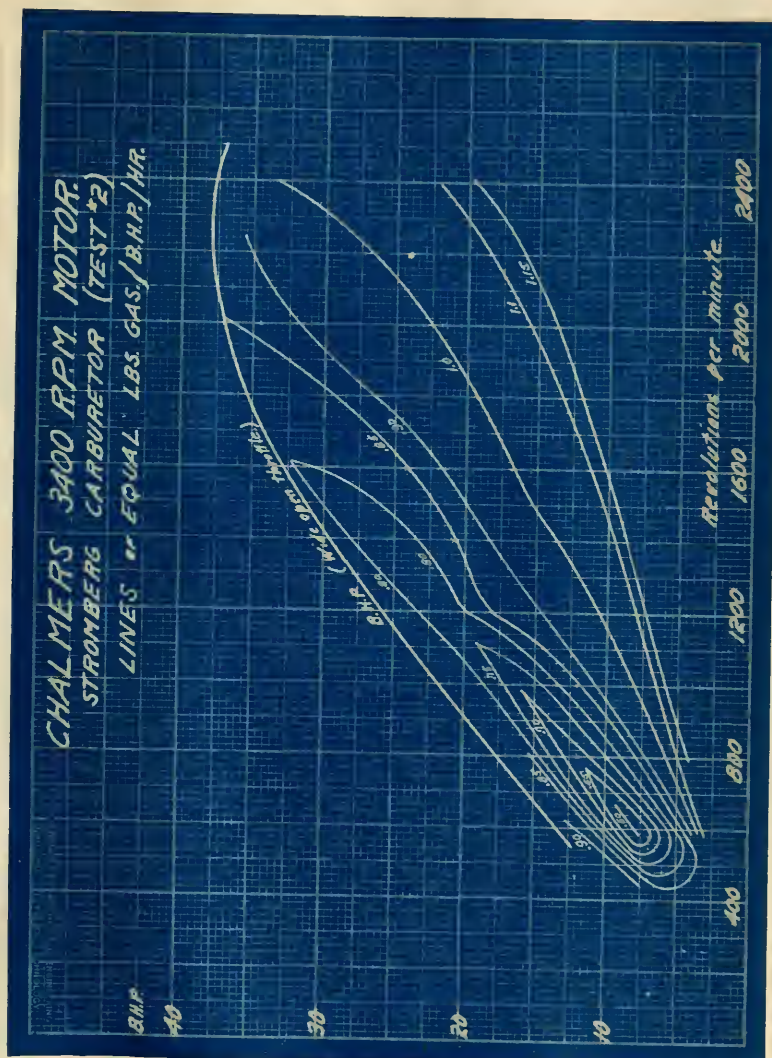

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
LINES OF EQUAL LBS. GAS./B.H.P./HR.
B.H.P. (Wide open throttle)
Revolutions per minute
400
800
1200
1600
2000
2400
B.H.P.
10
20
30
40

Fig. 54

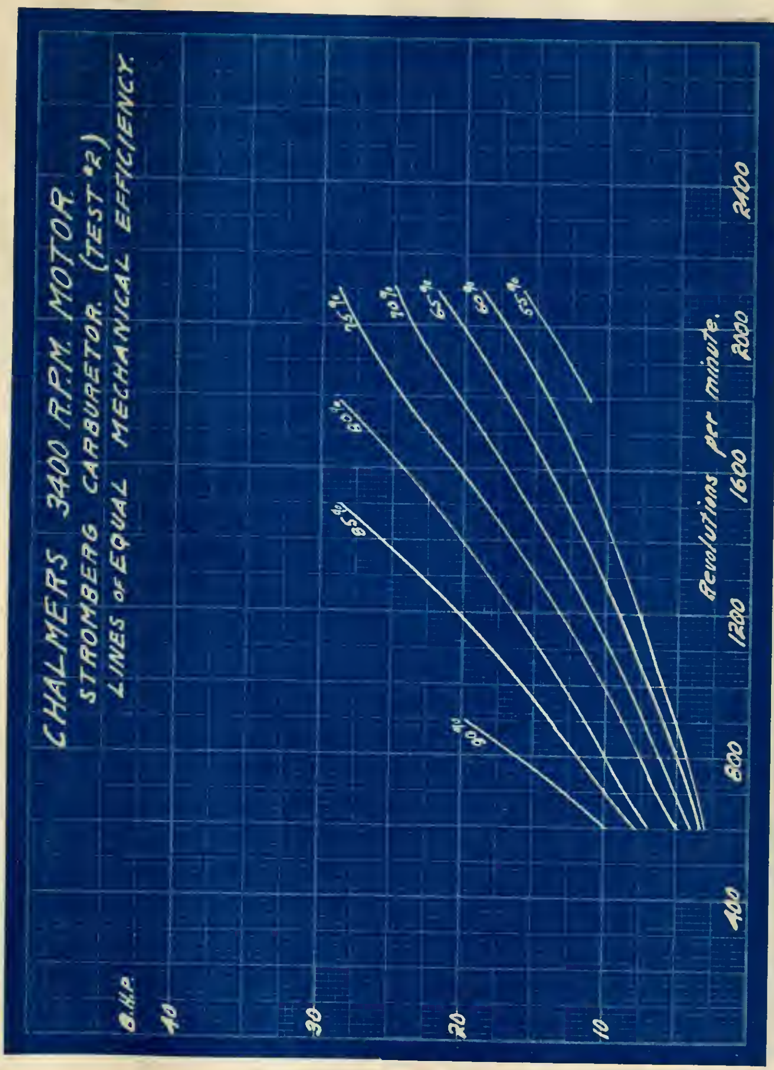

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR. (TEST #2)
LINES OF EQUAL MECHANICAL EFFICIENCY.
B.H.P
40
30
20
10
75%
70%
65%
60%
55%
80%
85%
90%
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 55

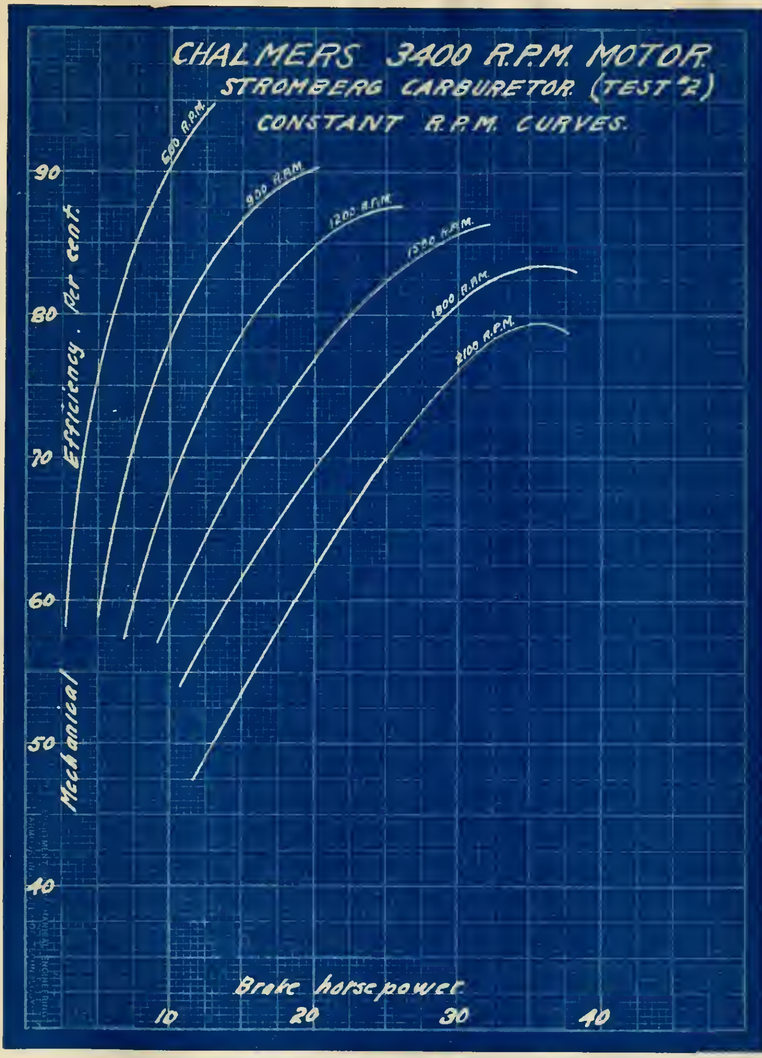

CHALMERS 3400 R.P.M. MOTOR.
STROMBERG CARBURETOR (TEST #2)
CONSTANT R.P.M. CURVES.
500 R.P.M.
900 R.P.M.
1200 R.P.M.
1500 R.P.M.
1800 R.P.M.
2100 R.P.M.
Mechanical Efficiency. Per cent.
90
80
70
60
50
40
Brake horsepower
10
20
30
40

Fig. 56

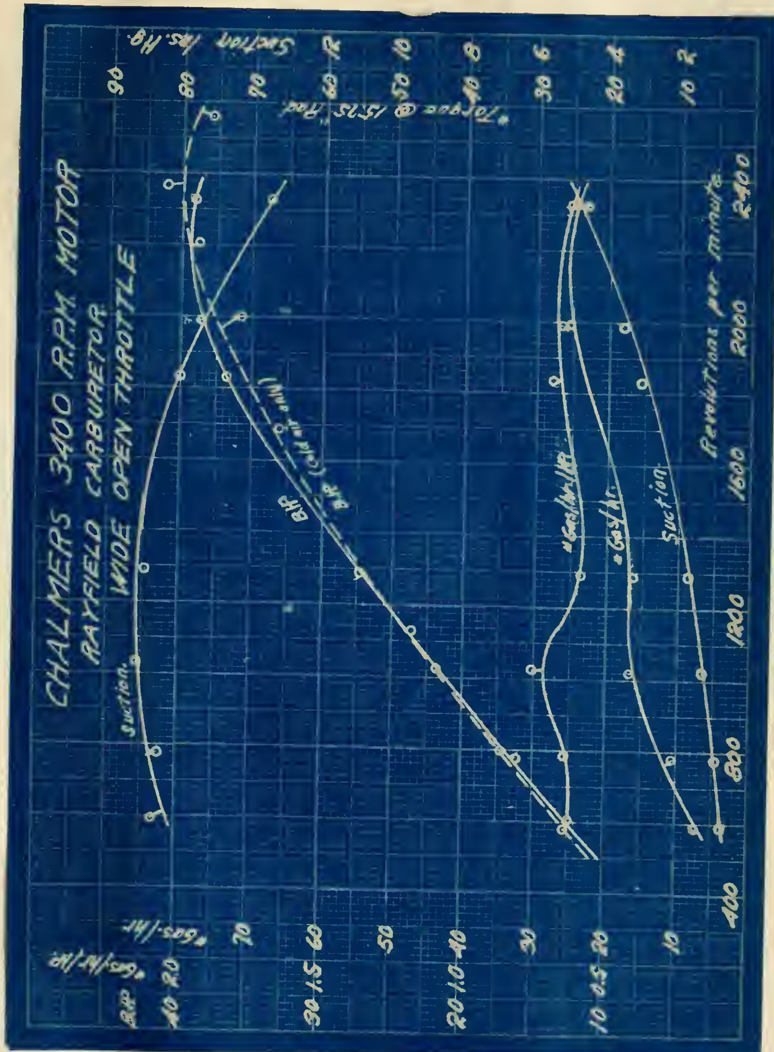

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
WIDE OPEN THROTTLE

Fig. 57

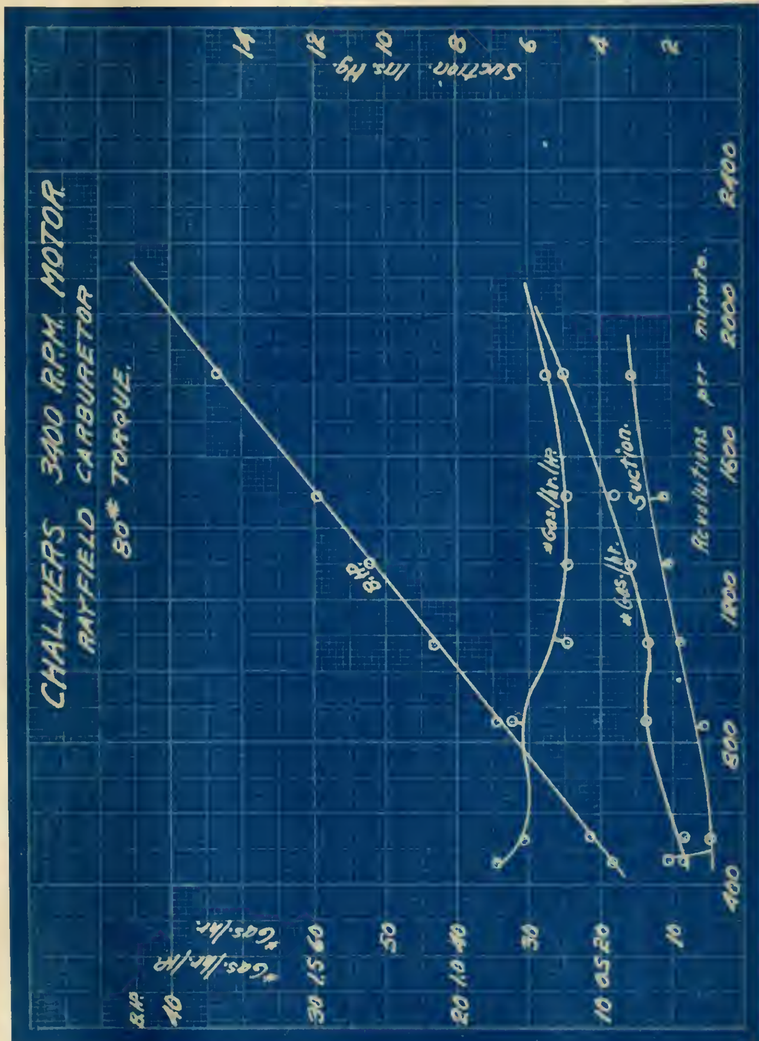

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
80# TORQUE.
Suction. Ins. Hg.
B.H.P.
#Gas./hr./H.P.
#Gas./hr.
Suction.
Revolutions per minute.
400
800
1200
1600
2000
2400

Fig. 58

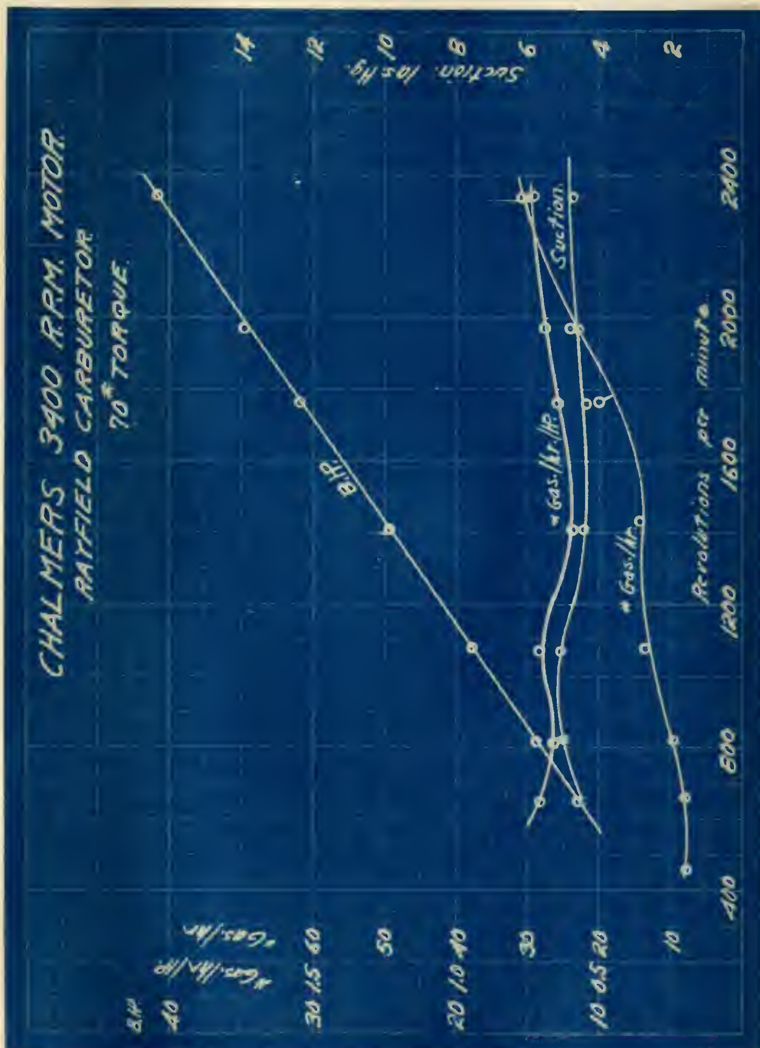

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
70# TORQUE
B.H.P.
Gas./hr./HP.
Gas./hr.
Suction.
Suction. lbs Hg.
Revolutions per minute
400
800
1200
1600
2000
2400
B.H.P.
Gas./hr./HP.
Gas./hr.
2
4
6
8
10
12
14

Fig. 59

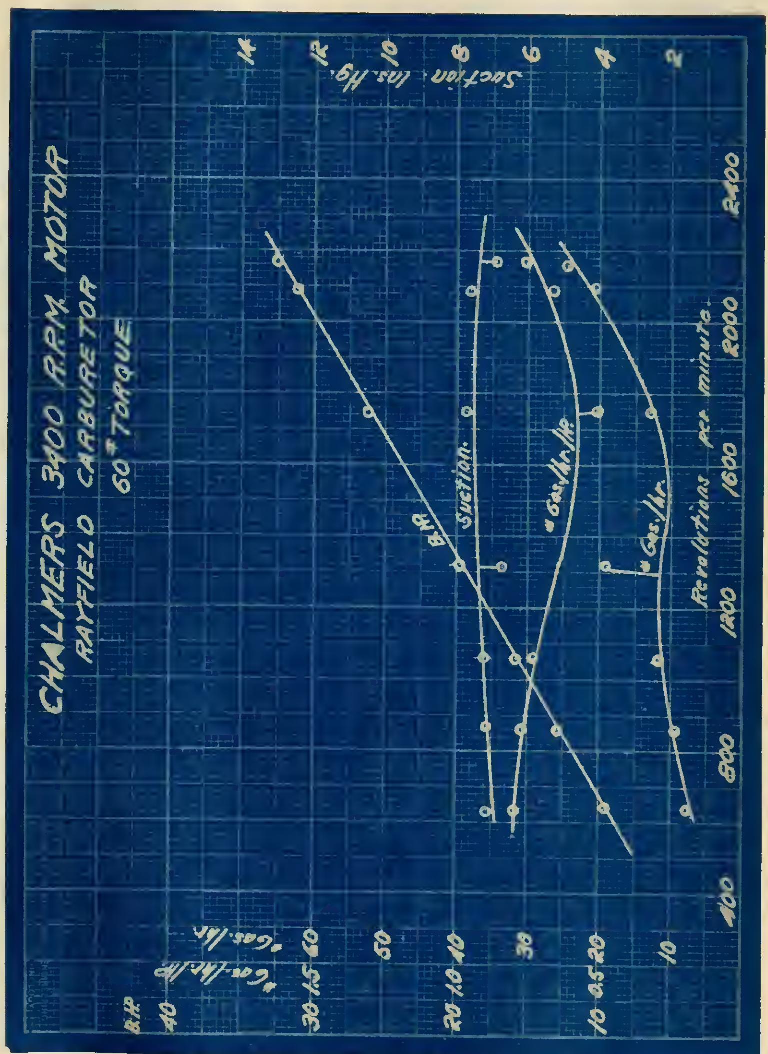

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
60# TORQUE
Suction ins. Hg.
B.H.P.
Suction
#Gas/hr./hp.
#Gas/hr.
Revolutions per minute
400
800
1200
1600
2000
2400
14
12
10
8
6
4
2
B.H.P.
40
30
20
10
#Gas/hr./hp.
1.5
1.0
0.5
#Gas/hr.
60
50
40
30
20
10

Fig. 60

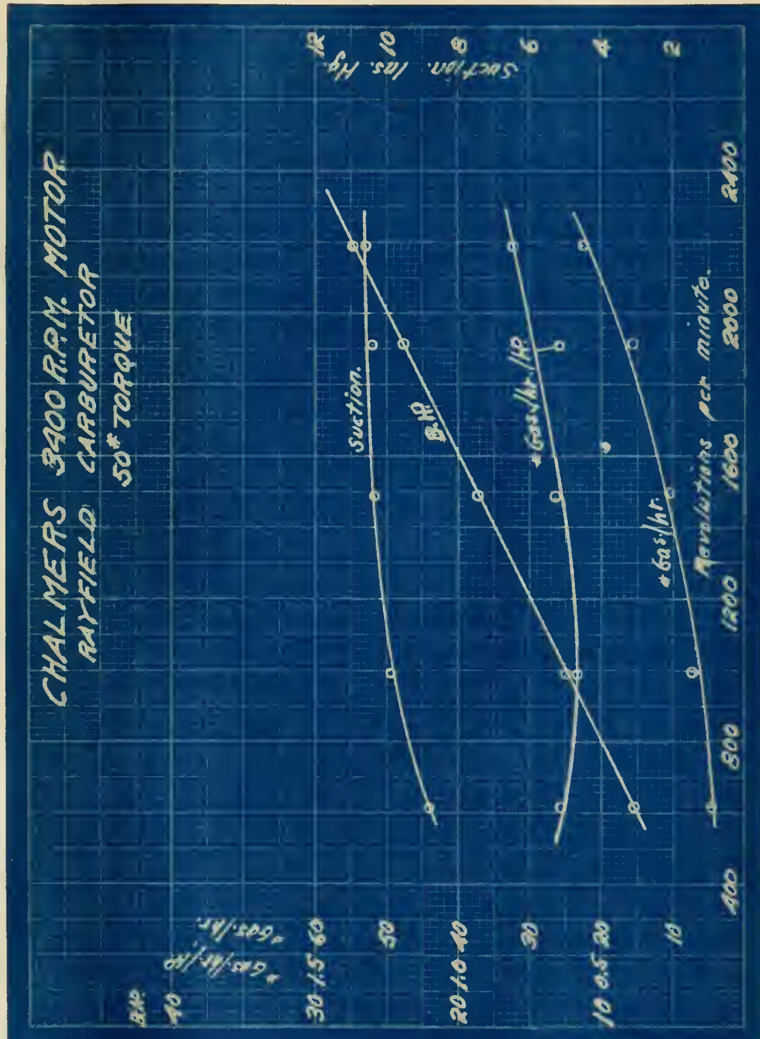

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
50# TORQUE
Suction.
B.H.P.
*Gas/hr./HP
*Gas/hr.
Revolutions per minute.
400 800 1200 1600 2000 2400
Suction. ins. Hg.
2 4 6 8 10 12
B.H.P.
10 20 30 40
*Gas/hr./HP
0.5 1.0 1.5
*Gas/hr.
10 20 30 40 50 60

Fig. 61

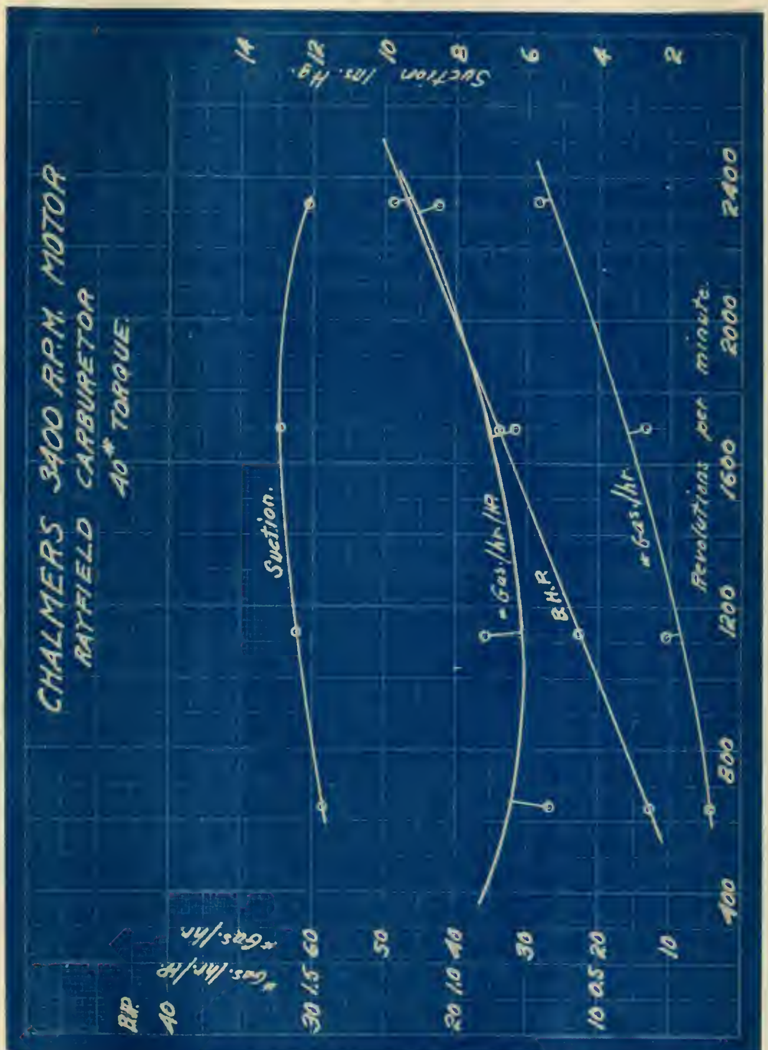

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
40# TORQUE
Suction ins. Hg.
Suction.
#Gas/hr/HP
B.H.P.
#Gas/hr.
Revolutions per minute
400
800
1200
1600
2000
2400
14
12
10
8
6
4
2
B.P.
40
30
20
10
1.5
1.0
0.5
60
50
40
30
20
10

Fig. 62

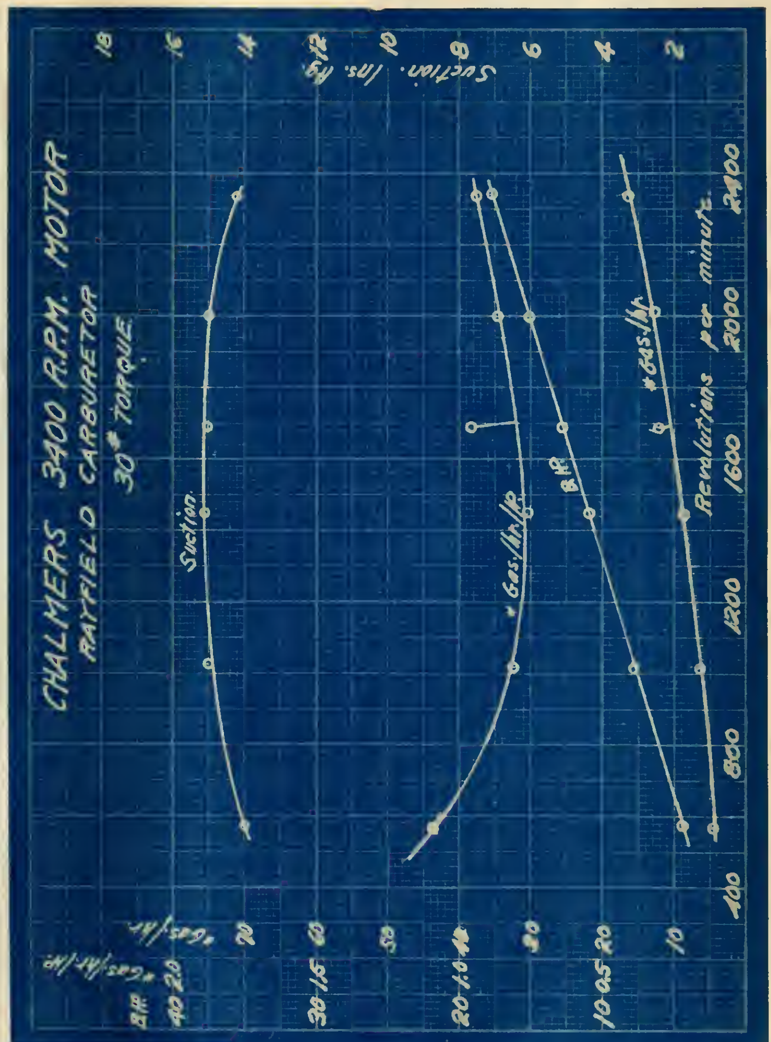

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
30# TORQUE
Suction
Suction. Ins. Hg.
Gas./hr./hp.
B.HP.
Gas./hr.
Revolutions per minute
B.HP.
Gas./hr./HP.
Gas./hr.

Fig. 63

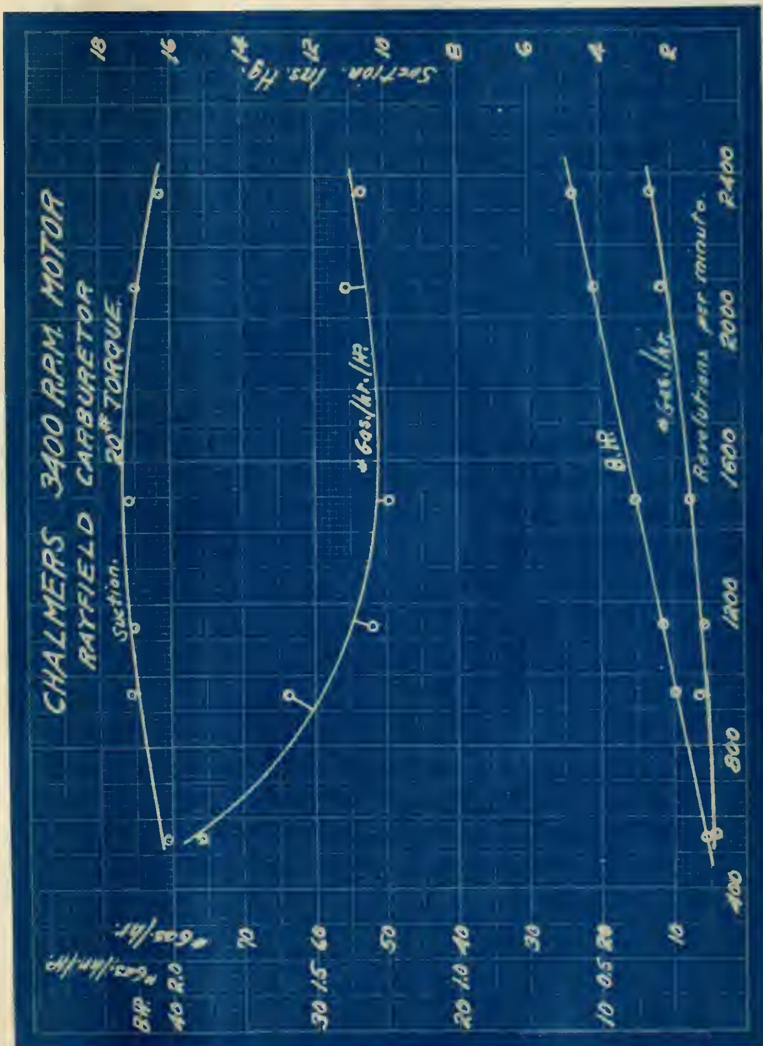

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
20# TORQUE
Suction.
Suction. Ins. Hg.
Gas./hr./HP.
B.HP.
Gas./hr.
Revolutions per minute.

Fig. 64

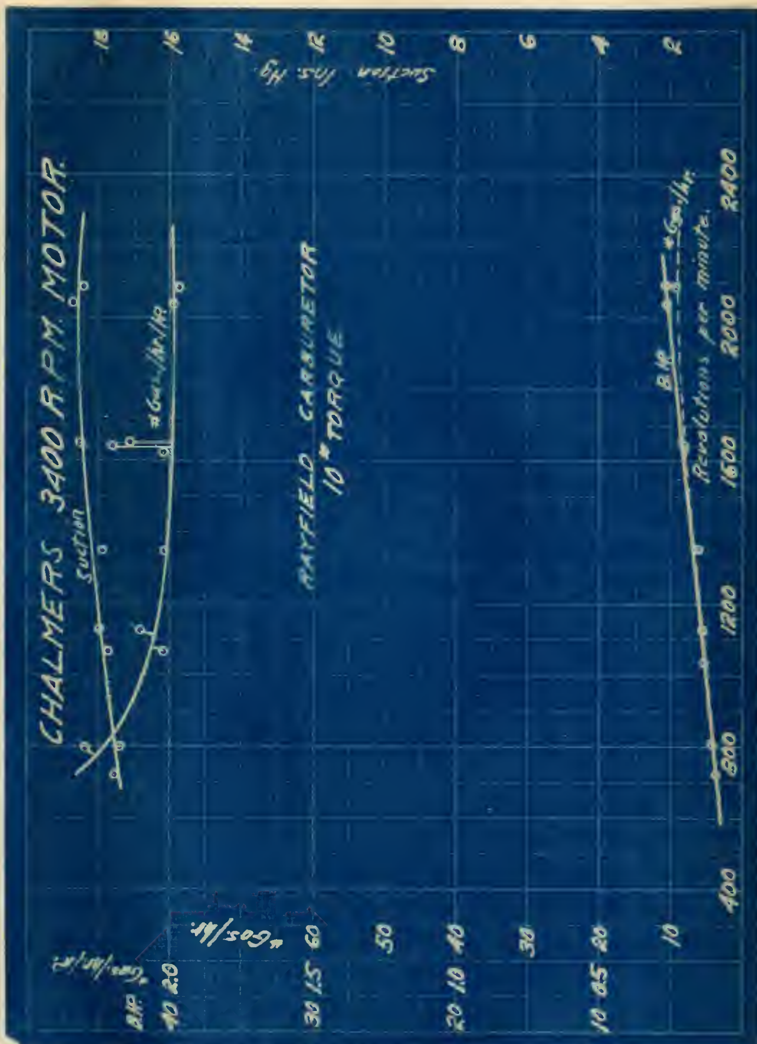

CHALMERS 3400 R.P.M. MOTOR.
MAYFIELD CARBURETOR
10# TORQUE
Suction
Suction Ins. Hg
Revolutions per minute.
B.H.P.

Fig. 65

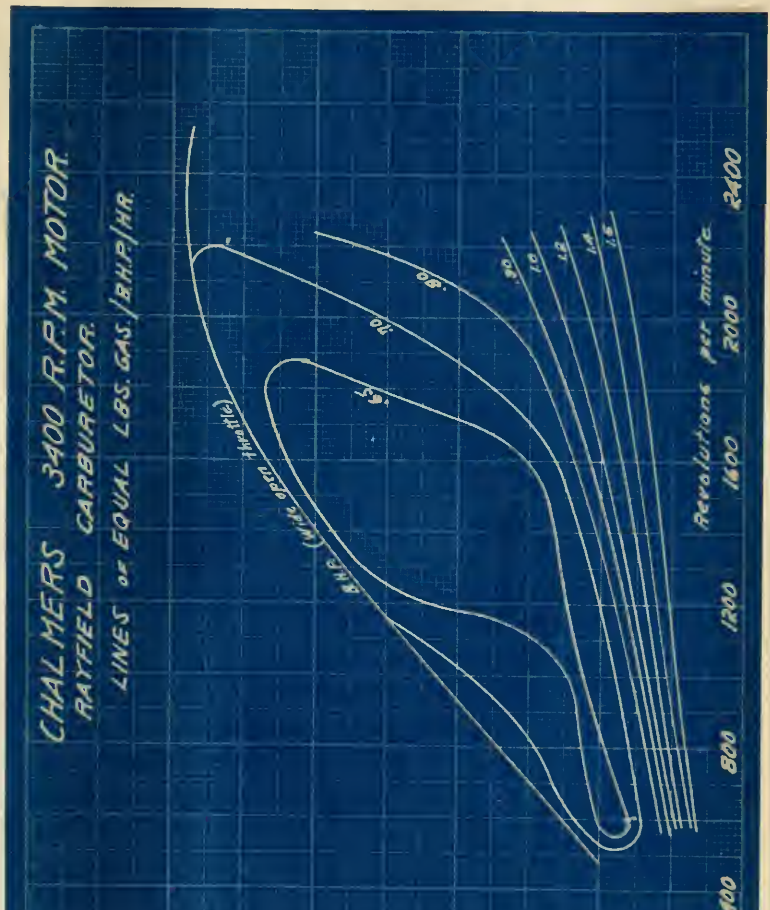
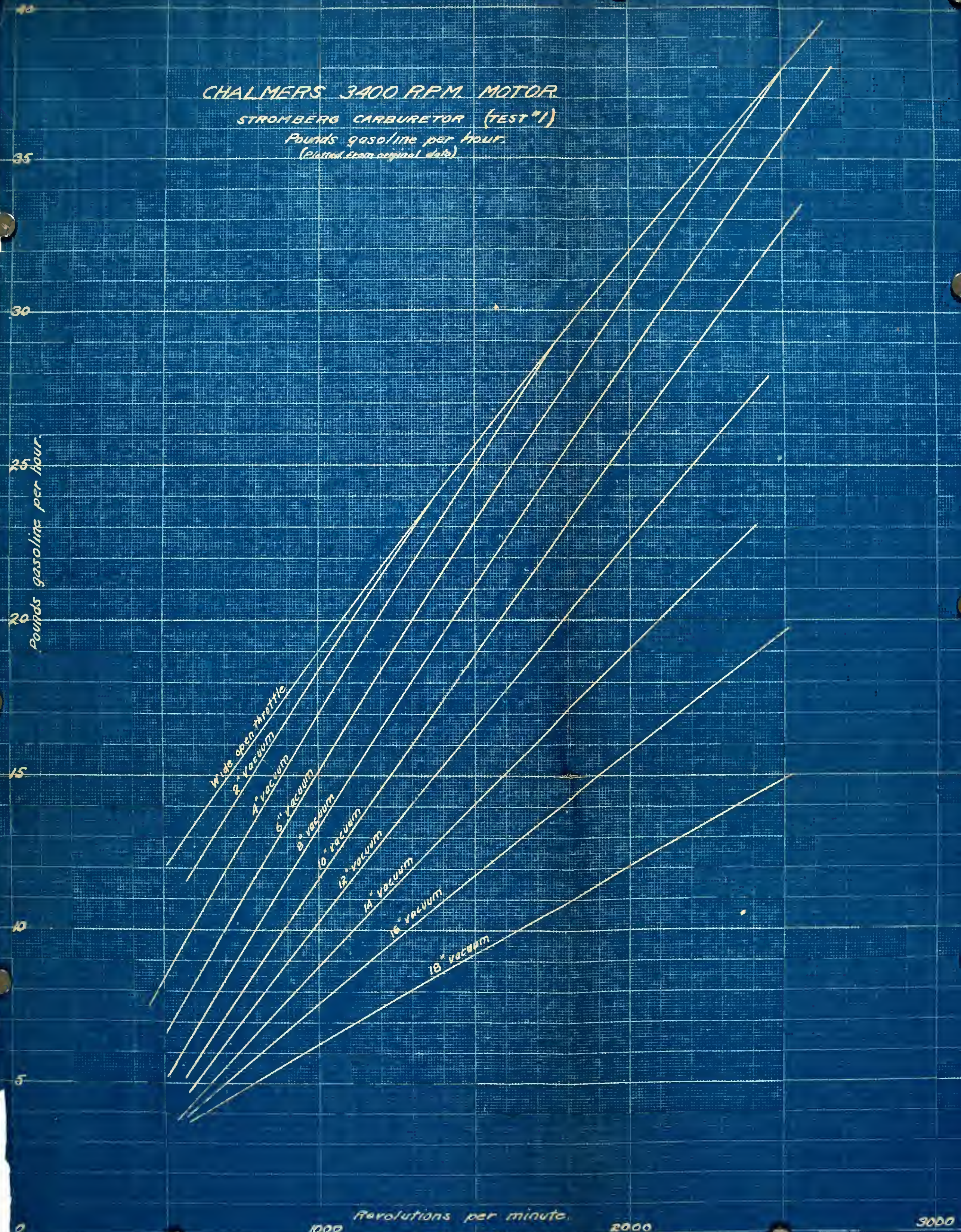

CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR.
LINES OF EQUAL LBS. GAS./B.H.P./HR.
B.H.P.
40
30
20
10
B.H.P. (Wide open throttle)
.65
.70
.80
.90
1.0
1.2
1.4
1.6
Revolutions per minute
400
800
1200
1600
2000
2400

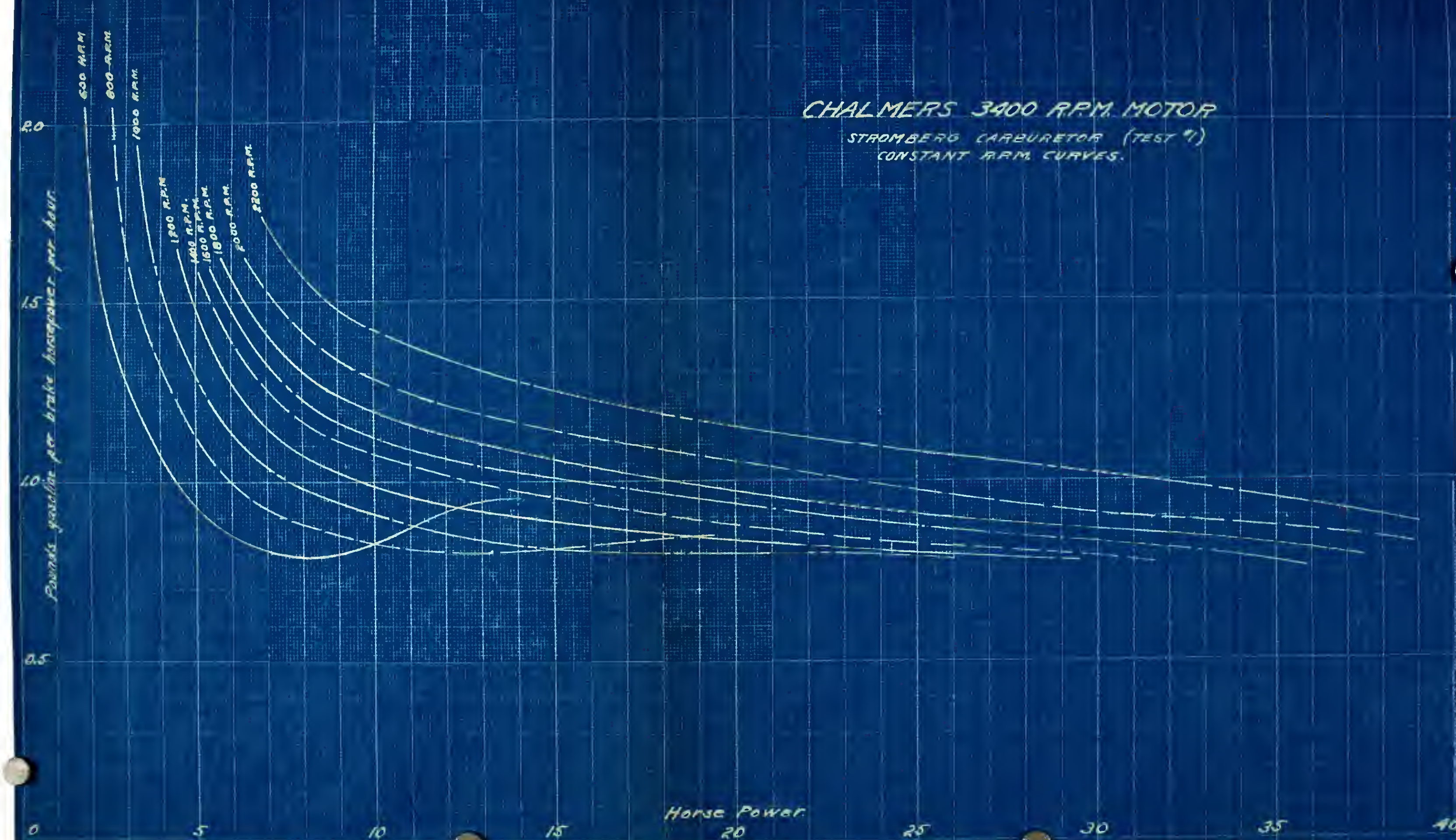
Fig. 66



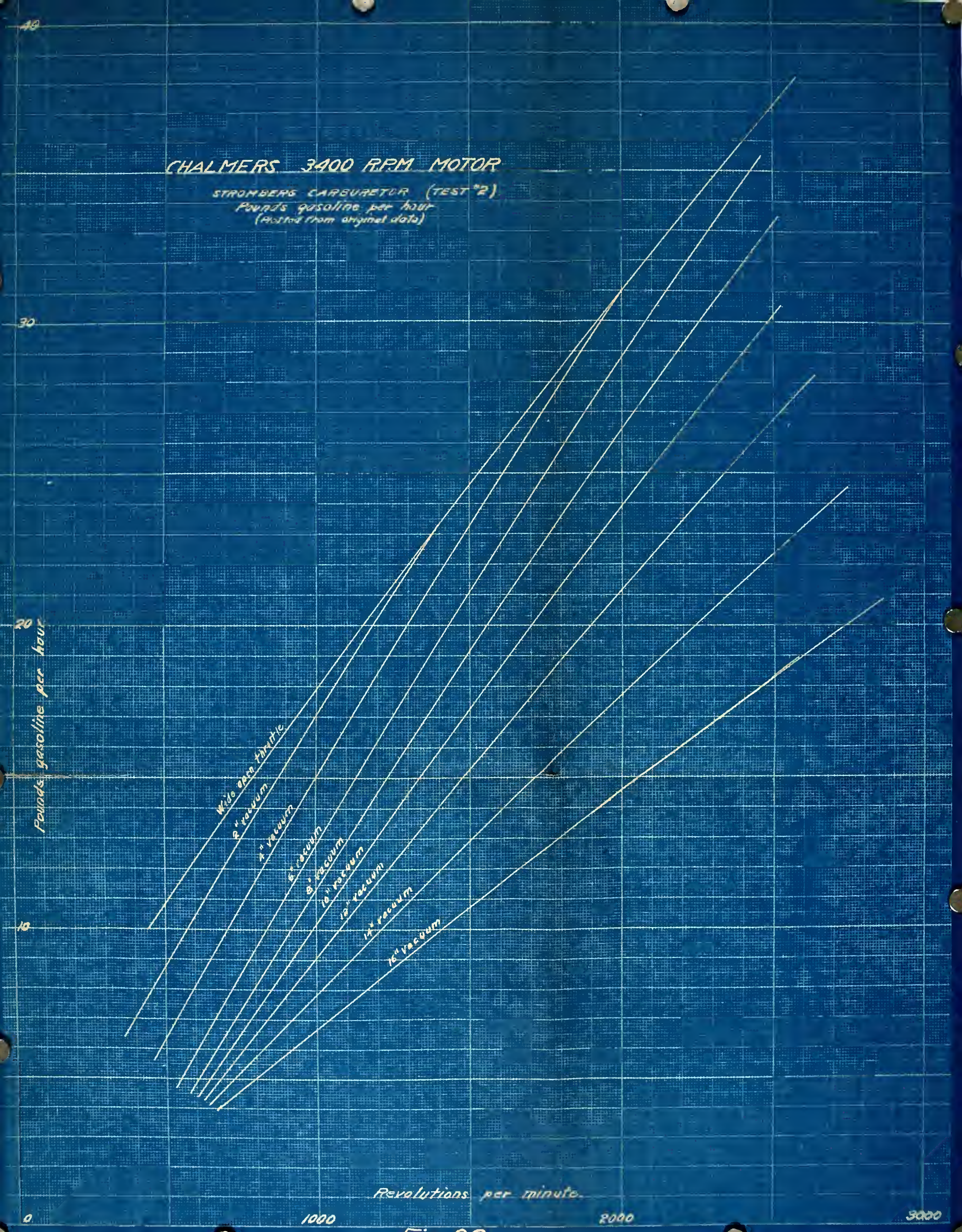
CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
Pounds gasoline per hour.
(Plotted from original data)
Wide open throttle
2" vacuum
4" vacuum
6" vacuum
8" vacuum
10" vacuum
12" vacuum
14" vacuum
16" vacuum
18" vacuum
Pounds gasoline per hour.
40
35
30
25
20
15
10
5
0
1000
2000
3000
Revolutions per minute.

Fig. 67

Fig. 68.



CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #1)
CONSTANT R.P.M. CURVES.
600 R.P.M.
800 R.P.M.
1000 R.P.M.
1200 R.P.M.
1400 R.P.M.
1600 R.P.M.
1800 R.P.M.
2000 R.P.M.
2200 R.P.M.
Pounds gasoline per brake horsepower per hour.
2.0
1.5
1.0
0.5
Horse Power
0
5
10
15
20
25
30
35
40



CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
Pounds gasoline per hour
(Plotted from original data)
Wide open throttle
2" vacuum
4" vacuum
6" vacuum
8" vacuum
10" vacuum
12" vacuum
14" vacuum
16" vacuum
Pounds gasoline per hour
Revolutions per minute.
0
10
20
30
40
1000
2000
3000

Fig. 69.

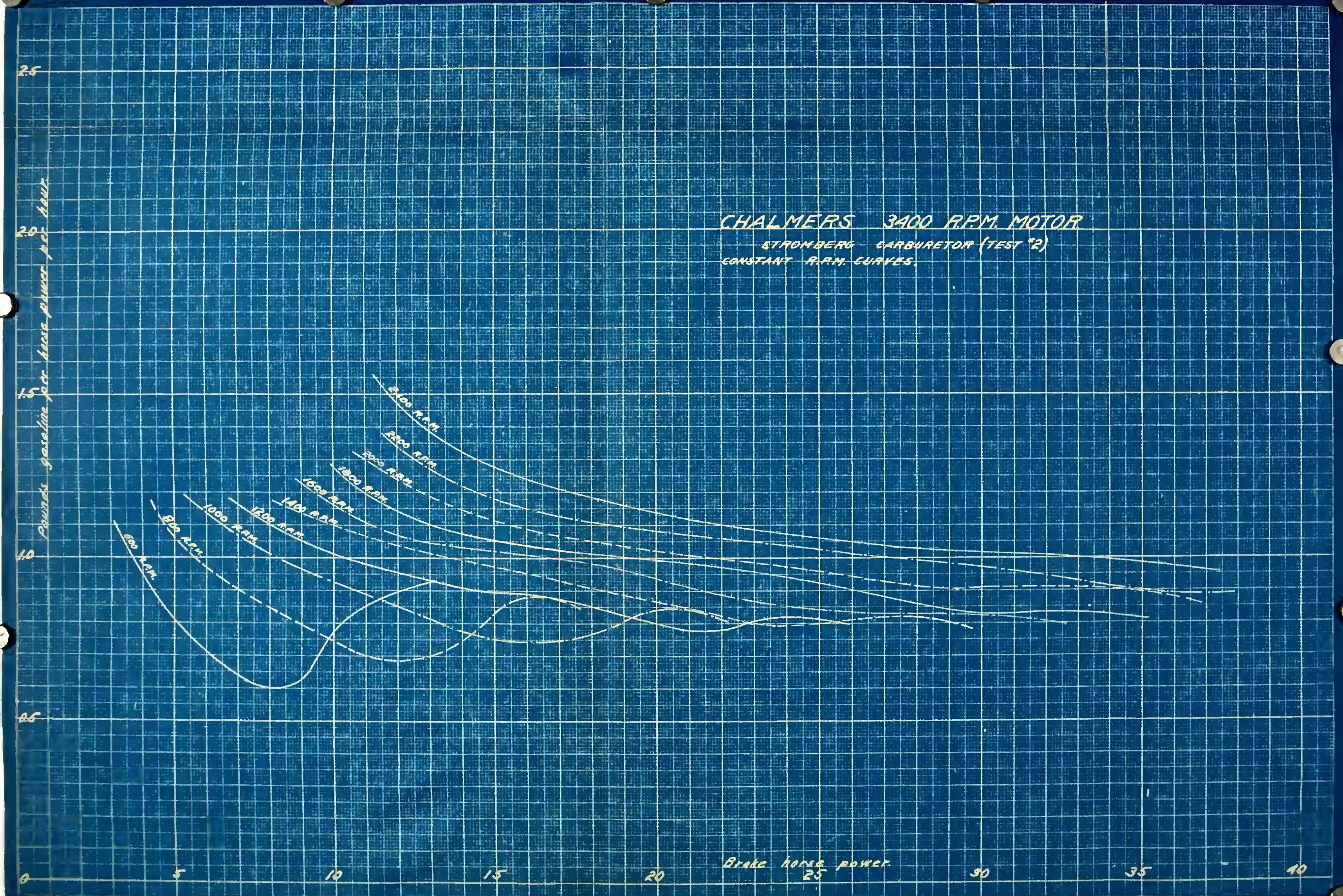
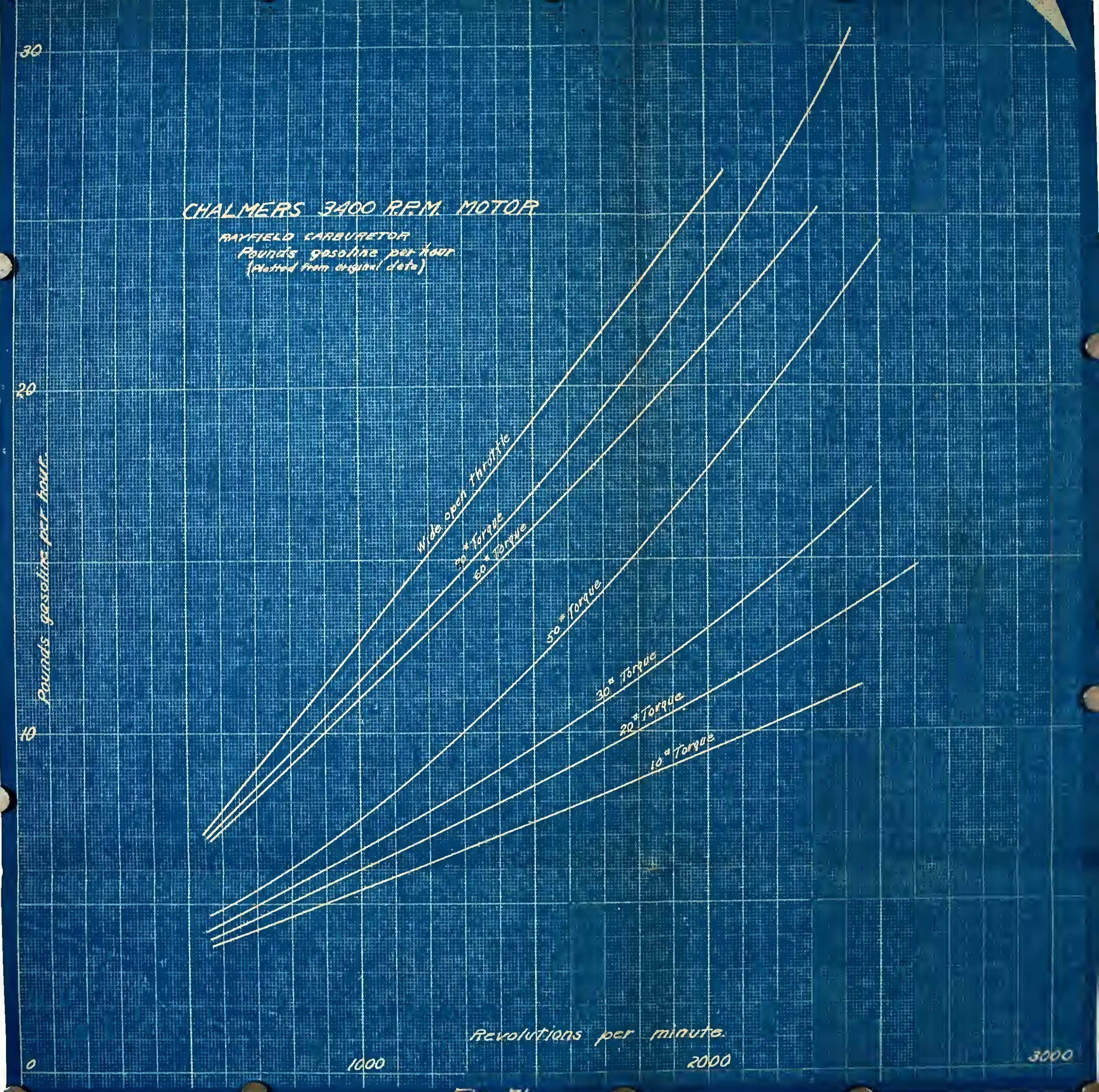

CHALMERS 3400 R.P.M. MOTOR
STROMBERG CARBURETOR (TEST #2)
CONSTANT R.P.M. CURVES.
Pounds gasoline per horse power per hour
Brake horse power
2.5
2.0
1.5
1.0
0.5
0
5
10
15
20
25
30
35
40
2400 R.P.M.
2200 R.P.M.
2000 R.P.M.
1800 R.P.M.
1600 R.P.M.
1400 R.P.M.
1200 R.P.M.
1000 R.P.M.
800 R.P.M.
600 R.P.M.

Fig. 70.



CHALMERS 3400 R.P.M. MOTOR
RAYFIELD CARBURETOR
Pounds gasoline per hour
(Plotted from original data)
Wide open throttle
70# Torque
60# Torque
50# Torque
30# Torque
20# Torque
10# Torque
Pounds gasoline per hour.
Revolutions per minute.
30
20
10
0
1000
2000
3000

Fig. 71.

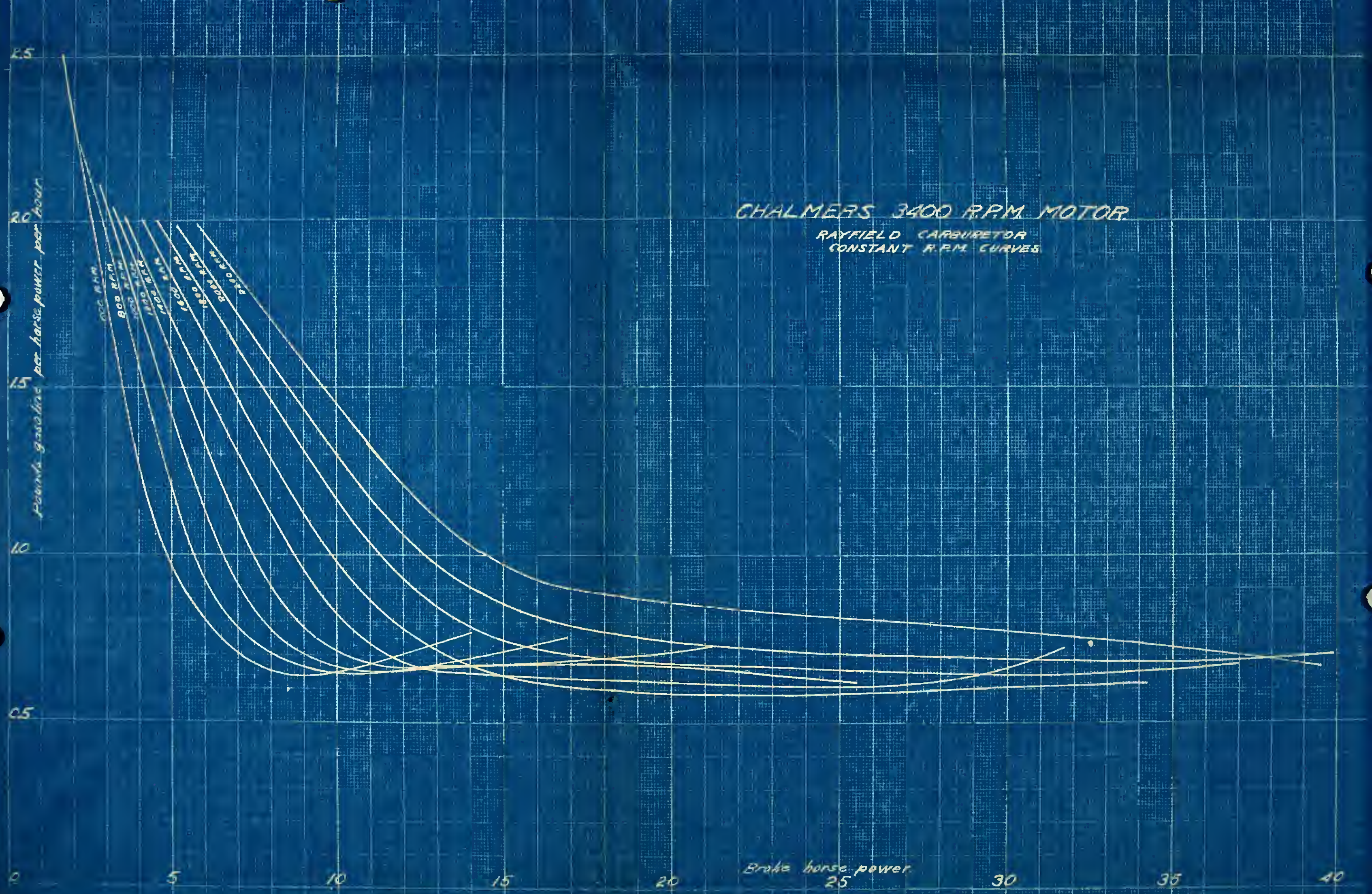

CHALMERS 3400 R.P.M. MOTOR.
RAYFIELD CARBURETOR
CONSTANT R.P.M. CURVES
Pounds gasoline per horse power per hour
Brake horse power
800 R.P.M.
1600 R.P.M.
1800 R.P.M.
2000 R.P.M.
2.5
2.0
1.5
1.0
0.5
0
5
10
15
20
25
30
35
40

Fig. 72