Instructions

FOR THE CARE OF

1916

Standard Delco Systems

Having Third Brush Regulations

The

Dayton Engineering Laboratories Co.

Dayton, Ohio, U. S. A.

Instructions for the care of 1916

STANDARD DELCO SYSTEMS

These systems are used on the following cars:

1916	Auburn, Model 4-60 A.
1916 & 1917	Buick and McLaughlin, Models D-44, 45, 46 & 47.
1916	Buick and McLaughlin, Models D-54 & 55.
1916	Buick Model D-4 Truck.
1916, 1917 & 1918	Cadillac, Models 53, 55 & 57.
1916	Davis, Models C-38, 6-E & 6-G.
1916, 1917 & 1918	Hudson, Super-Six.
1916	Moon, Models 6-40 & 6-30.
1916	Oakland ' Model 38.
1916	Oldsmobile, Model 43.
1916	Sayers-Scoville Six Cylinder.
1916	Westcott, Models 41 & 51.

Description

The system includes the following units: A two pole motor-generator having a single field coil with two separate windings; one for cranking and the other for generating. The Hudson Super-Six generator differs from the above in that it is supplied with two field coils; one above and one below the armature. The single armature has two separate and electrically distinct windings; one commutator being on each end of the armature, except in the generator on the Buick Models D-44 and 45, which is designed with both commutators on the forward end of the armature. The distributor is built in the forward end of the motor generator on all models except the Hudson Super-Six and the Cadillac Models 53, 55 and 57, the latter models being supplied with a separate timer and distributor unit. An ignition coil, combination lighting and ignition switch and motor assembly complete the Delco system proper. The system does not include the storage battery, lamps, born or spark plugs, although these connect with and depend directly upon the Delco system.

The negative terminal of the storage battery and the negative side of the system are grounded to the frame of the car, except Cadillac Models 53, 55 and 57.

Operation

Figures 1 to 6 show typical wiring and circuit diagrams of these systems and clearly indicates how the various parts are electrically connected. The path taken by the current from the generator through the ignition switch, ignition circuit and ammeter to the storage battery is shown in red in Figure 2.

The cycle of operation in getting the gasoline motor started is as follows: The ignition button on the combination lighting and ignition switch (Figure 6) is pulled out. This completes the circuit from the storage battery through the ammeter, causing it to show a discharge. The current discharging during this operation is the amount required to slowly revolve the armature, and for the ignition. The circuits are shown in red, Figure 2.

Part of this current flows through both the shunt field and the brushes and armature windings of the generator and causes the armature to slowly revolve. This motoring of the generator is necessary in order that the starting gears may be brought into mesh. Should trouble be experienced in meshing these gears, do not try to force them, but simply allow the starting pedal to come back, giving the gears time to change their relative position.

the clicking sound heard during the motoring of the generator is caused by the overrunning of the generator clutch in the forward end of the generator, as shown in Figure 7. (See also Figure 12).

The motoring of the generator is one of the most important operations for the mechanic to familiarize himself with, as the same wiring and parts of the generator are used during this operation as when generating. Therefore, if the apparatus will perform this operation properly, it is sure to generate when driven by the engine.

The cranking operation takes place when the starting pedal is fully depressed. The starting pedal brings the motor clutch gears into mesh with both the small gear on the end the armature shaft and the teeth on the flywheel of the engine, and also withdraws the pin "P," (Figures 7 and 8) allowing the motor brush to make contact on the motor commutator. At the same time the generator switch (Figure 8) breaks contact, thus cutting out the generator element during the cranking operation. Cranking speed is materially reduced if the generator switch does not break contact. As soon as the motor brush makes contact on the commutator, a heavy current from the storage battery flows through the series field winding and the motor winding of the armature. This rotates the armature and performs the cranking operation. The cranking circuit is shown in the heavy lines on the circuit diagram (Figure 1.) Figures 10 and 13 show the method of operating the upper generator and motor brushes by means of the rod operated by the starting pedal of Models D-44 and 45 Buick cars. (Circuit diagram Figure 3.)

In the motor generators used on the Cadillac, Models 53, 55 and 57 (Circuit Diagram Figure 4) and Hudson Super-Six (Circuit diagram Figure 5), both motor brushes are held from the motor commutator except during the cranking operation.

As the cranking operation requires a heavy current from the storage battery, if the lights are on during the cranking operation the heavy discharge from the battery causes the voltage of the battery to decrease enough to cause the lights to grow slightly dim. This is noticed especially when the battery is nearly discharged, when the motor is stiff, and when a loose or poor connection exists in the battery circuit. PAY PARTICULAR ATTENTION TO KEEPING THE BATTERY TERMINALS CLEAN AND TIGHT.

Nine-tenths of all cranking failures are caused by loose or corroded connections in the cranking circuit.

NEVER RUN THE ENGINE WITH THE STORAGE BATTERY DISCONNECTED OR WHILE IT IS OFF THE CAR. VERY SERIOUS DAMAGE TO THE MOTOR GENERATOR MAY RESULT FROM SUCH ACTION.

When the engine fires, the starting pedal should be immediately released, as the overrunning clutch is operated continuously from the time the engine fires until the starting gears are out of mesh. Since they operate at a very high speed, if they are held in mesh for any length of time, the friction in the clutch is sufficient to cause it to heat and burn out the lubricant, and will result in serious damage being done to the armature winding.

Explanation of Regulation

The regulation of this type generator is effected by what is known as the third brush regulation. In order to maintain a nearly constant voltage with variable speed, it becomes necessary to decrease the magnetic field as the speed increases.

Since the magnetic field of the generator is produced by the current in the shunt field winding, it is evident that should the shunt field current decrease as the speed of the engine increases, the regulation would be affected. In order to fully understand this explanation it must be borne in mind that a current of electricity always has a magnetic effect, whether this is desirable or not. Referring to Figure 19 the theory of this regulation is as follows: The full voltage of the generator is obtained from the large brushes marked "C" and "D." When the magnetic field from the pole pieces North and South is not disturbed by any other influence, each coil is generating uniformly as it passes under the pole pieces. The voltage from one commutator bar to the next one is practically uniform around the commutator. Therefore, the voltage from brush C to brush E is about 5 volts when the total voltage from brush C to D is 6½ or 7 volts. The 5 volts is applied to the shunt field winding and forces approximately 1¼, amperes through the field winding.

As the speed of the generator increases the voltage is also increased causing the current to charge the storage battery at a higher rate.

This increase in the charging current flows through the armature winding, producing a stronger magnetic effect in the direction of the arrow "B," and acts upon the main magnetic field which is in the direction of the arrow "A," with the result that the magnetic field set up by the shunt field is twisted out of its original position in very much the same manner as two streams of water coming together are each deflected from their original directions. This deflection causes -the magnetic field to be strong at the receding pole tips marked "G" and "F" and weaker at the approaching or opposite pole tips, with the result that the coils generate a very low voltage while passing from the brush "C" to the brush "E" (the coils at this time are under the pole tips having a weak field) and generates a greater part of their voltage while passing from the brush "E" to "D." The amount of this variation depends upon the amount of current generated, and has a direct relation to the speed that the generator is driven, with the result that the shunt field current decreases as the speed increases.

By this form of regulation it is possible to get a high charging rate between the speeds of 12 and 25 miles per hour, and it is with drivers whose average driving speed comes between these limits that more trouble is experienced in keeping the battery charged. At the higher speeds the charging current is decreased.

Adjustment of the Charging Rate

A considerable variation in the charging rate is made permissible by the adjustment of the third brush. This is done in order that the charging rate may be adjusted to suit the different driving conditions of the various cars. The range of adjustment usually varies from 12 to 20 amperes at the maximum output. The charging rate should be taken when the lights are off. The adjustment can be made by observing the following:

To increase the charging rate, the third brush must always be moved in the direction that the armature rotates; and of course, moving the brush in the opposite direction decreases the output.

In Figure 9 it will be noted that the third brush arm is in two parts, and by loosening the two screws the brush can be shifted in either direction for changing the charging rate.

In Figure 13 the third brush is mounted on a plate which has the screw holes at either end slotted to permit the third brush position being changed for different charging rates.

When the third brush is moved in either direction, it is important and usually necessary to reflt the brush to the commutator. If this is not done, the third brush will not make proper contact on the commutator, and the output of the generator is somewhat less than when the third brush is properly fitted.

To fit the third brush to the commutator, a strip of very fine sand paper should be inserted between the brush and commutator, and around at least half the commutator, with the sand side next to the brush and drawn back and forth a few times to form the brush so that it will fit the curvature of the commutator.

In a great many instances the charging rate is too high, yet the owner or driver of the car does not make any complaint in regard to the charging rate, his complaint being more often in regard to the short life of his lamps, and the necessity of frequent additions of distilled water to the storage battery.

By studying the driving conditions of the individual cars, it is usually possible to adjust to a charging rate that will give very satisfactory service for all driving conditions.

Clutches

The purpose of the generator clutch, (Figures 7, 10 & 12) is to connect the pump shaft to the armature to allow the armature to revolve at a higher rate of speed than the pump shaft during the cranking operation. A spiral gear is cut on the outer face of this clutch for driving the distributor, except on the Cadillac and Hudson models. This portion of the clutch is connected by an Oldham coupling to the pump shaft. Therefore, its relation to the pump shaft is always the same and does not throw the ignition out of time during the cranking operation.

Two views of the generator clutch are shown in Figure 12. This clutch is removed from the armature and end frame assembly by loosening the screw in the end of the armature shaft. and removing the lock and clamp washers. Then place the armature and end frame assembly in an arbor press or by cutting a hole in a work bench about one-half an inch larger in diameter than the amature and inserting the armature through the hole, let the armature and end frame drop about two inches, being careful to have the end frame strike the bench squarely. The weight of the armature will pull it from the clutch and end frame, but do not allow the armature to strike the floor. The clutch is held together by a retaining spring wire which when removed allows the clutch to be disassembled for inspection and lubrication.

The motor clutch (Figures 6, 7 & 10) operates between the armature pinion and the fly wheel for the purpose of obtaining a suitable gear reduction between the motor generator and the fly wheel. It also prevents the armature from being driven at an excessively high speed during the short time the gears are meshed after the engine is running on its own power.

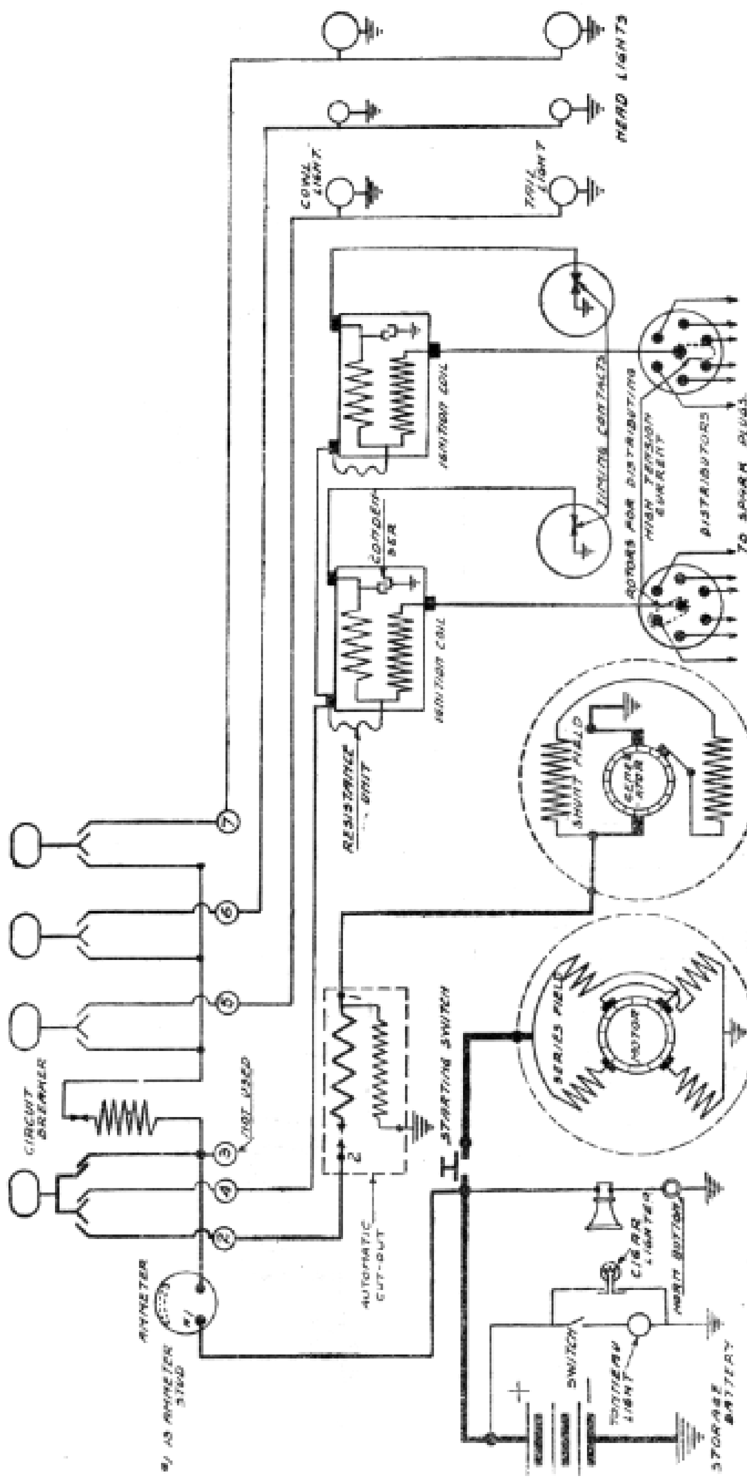

CIRCUIT BREAKER
AMMETER
NOT USED
AUTOMATIC CUT-OUT
STARTING SWITCH
SERIES FIELD
MOTOR
SHUNT FIELD
RESISTANCE UNIT
IGNITION COIL
CONDENSER
TIMING CONTACTS
ROTORS FOR DISTRIBUTING HIGH TENSION CURRENT
DISTRIBUTORS
TO SPARK PLUGS
COWL LIGHT
TAIL LIGHT
HEAD LIGHTS
SWITCH
CIGAR LIGHTER
HORN BUTTON
STORAGE BATTERY

Fig. 1

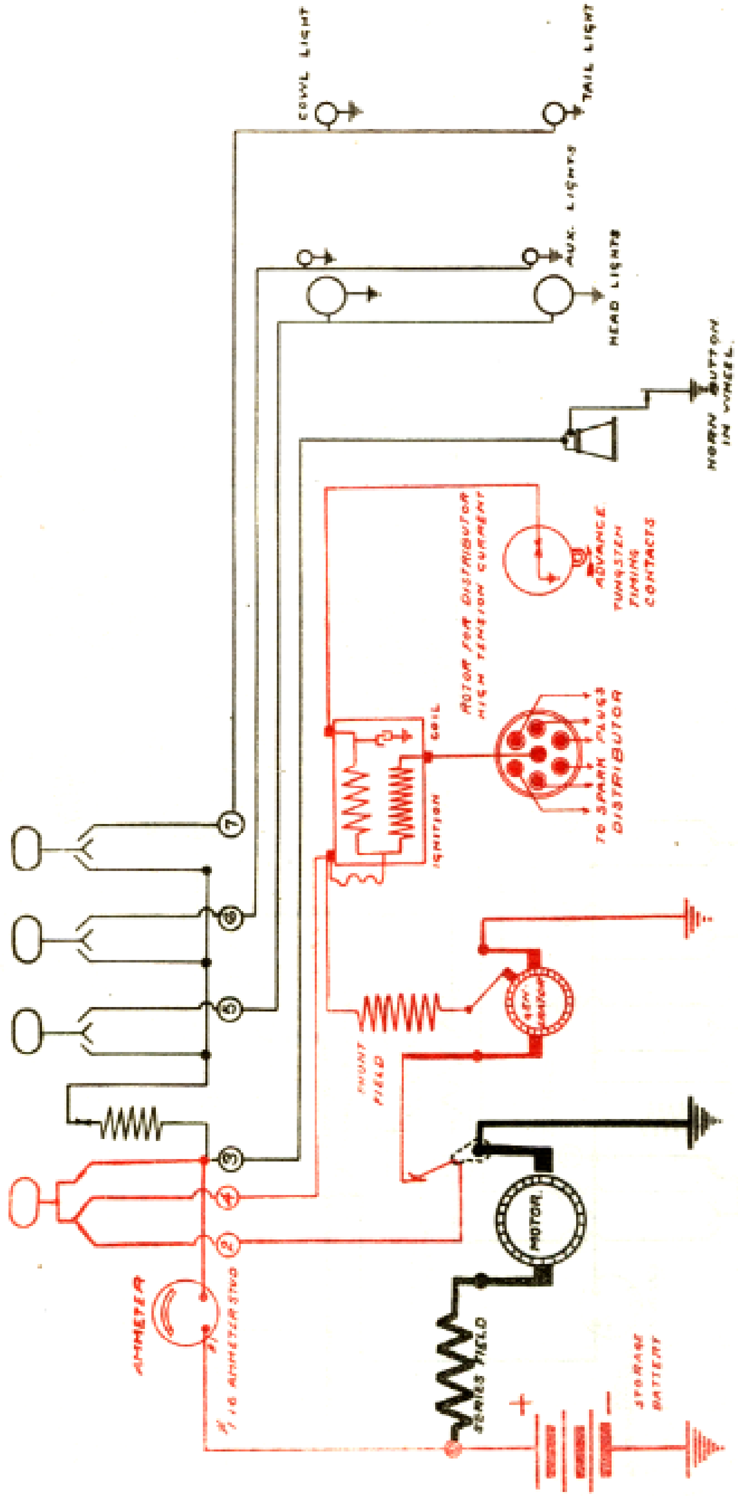

COWL LIGHT
TAIL LIGHT
AUX. LIGHTS
HEAD LIGHTS
HORN BUTTON IN WHEEL
ROTOR FOR DISTRIBUTOR HIGH TENSION CURRENT
ADVANCE
TUNGSTEN TIMING CONTACTS
COIL
IGNITION
TO SPARK PLUGS
DISTRIBUTOR
SHUNT FIELD
MOTOR
SERIES FIELD
STORAGE BATTERY
AMMETER
AMMETER STUD

Fig. 2

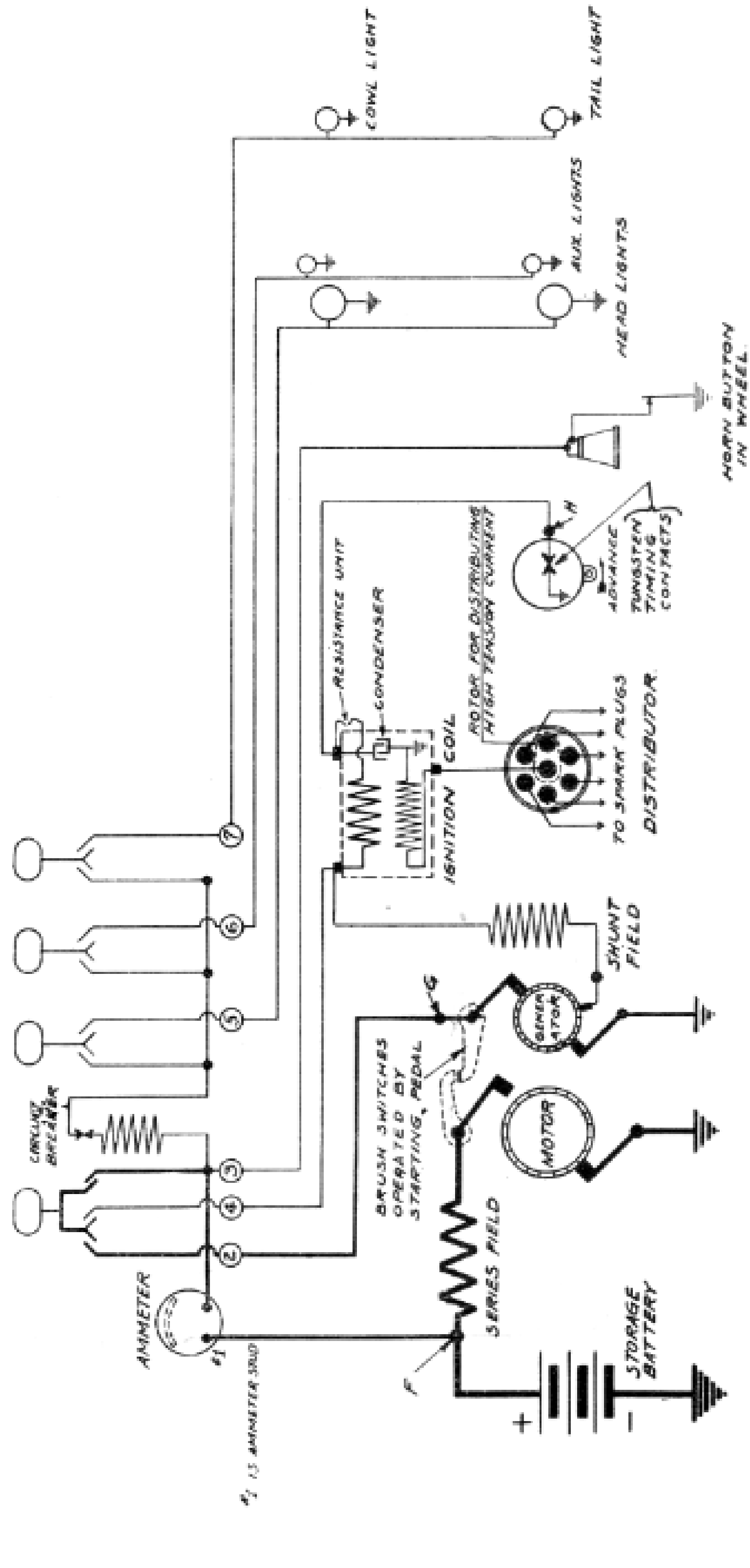

COWL LIGHT
TAIL LIGHT
AUX. LIGHTS
HEAD LIGHTS
HORN BUTTON IN WHEEL
RESISTANCE UNIT
CONDENSER
COIL
IGNITION
ROTOR FOR DISTRIBUTING HIGH TENSION CURRENT
ADVANCE
TUNGSTEN TIMING CONTACTS
TO SPARK PLUGS
DISTRIBUTOR
SHUNT FIELD
GENERATOR
MOTOR
BRUSH SWITCHES OPERATED BY STARTING PEDAL
SERIES FIELD
STORAGE BATTERY
AMMETER
#1 IS AMMETER STUD
CIRCUIT BREAKER

Fig. 3

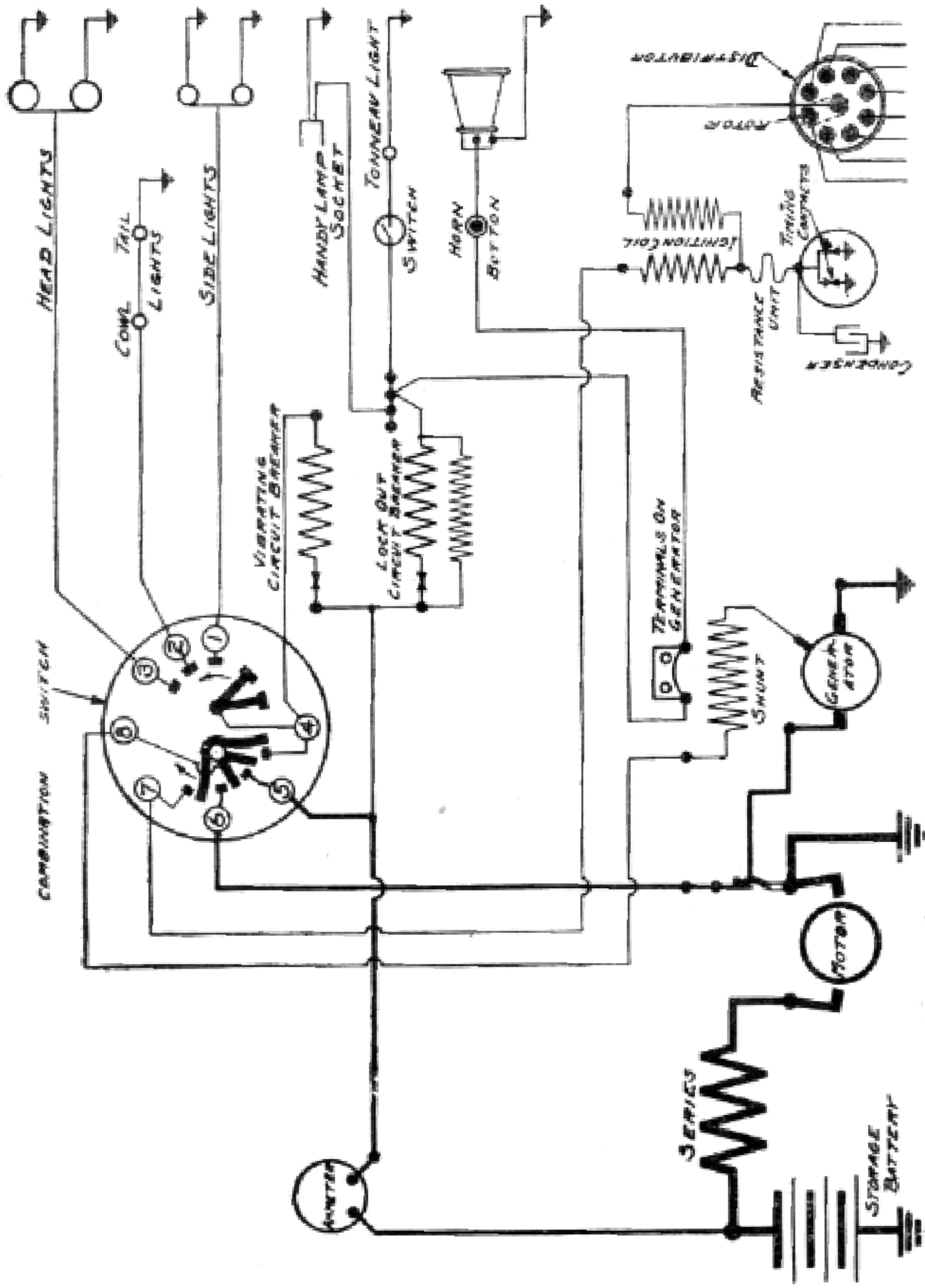

HEAD LIGHTS
COWL
TAIL
LIGHTS
SIDE LIGHTS
HANDY LAMP SOCKET
TONNEAU LIGHT
SWITCH
HORN BUTTON
DISTRIBUTOR
ROTOR
IGNITION COIL
TIMING CONTACTS
RESISTANCE UNIT
CONDENSER
COMBINATION SWITCH
VIBRATING CIRCUIT BREAKER
LOCK OUT CIRCUIT BREAKER
TERMINALS ON GENERATOR
SHUNT
GENER-ATOR
MOTOR
SERIES
STORAGE BATTERY

Fig. 4

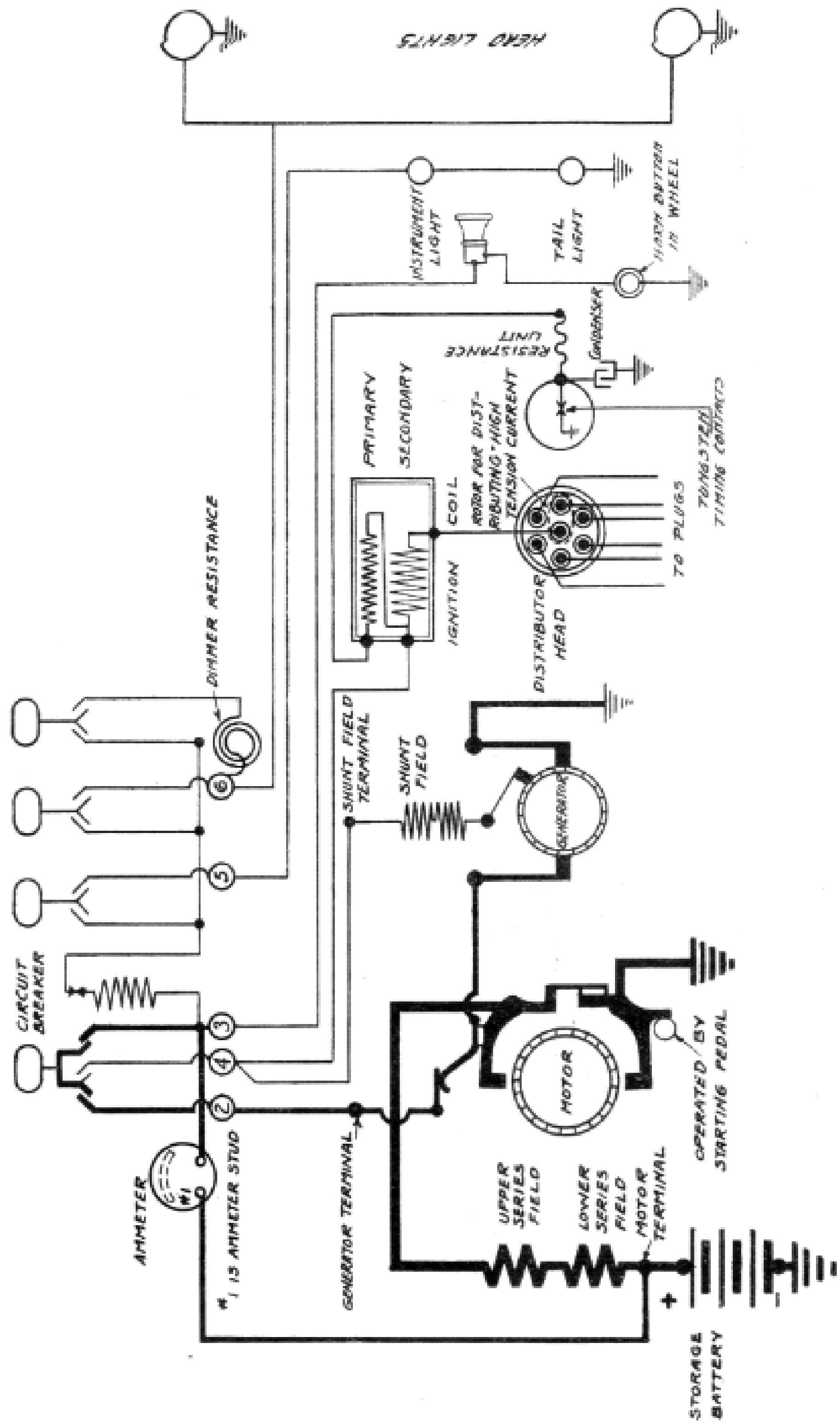

HEAD LIGHTS
INSTRUMENT LIGHT
TAIL LIGHT
HORN BUTTON IN WHEEL
CONDENSER
RESISTANCE UNIT
PRIMARY
SECONDARY
COIL
IGNITION
ROTOR FOR DISTRIBUTING HIGH TENSION CURRENT
DISTRIBUTOR HEAD
TO PLUGS
TUNGSTEN TIMING CONTACTS
DIMMER RESISTANCE
CIRCUIT BREAKER
SHUNT FIELD TERMINAL
SHUNT FIELD
GENERATOR
MOTOR
OPERATED BY STARTING PEDAL
AMMETER
#1
#1 IS AMMETER STUD
GENERATOR TERMINAL
UPPER SERIES FIELD
LOWER SERIES FIELD
MOTOR TERMINAL
STORAGE BATTERY
+
-

Fig. 5

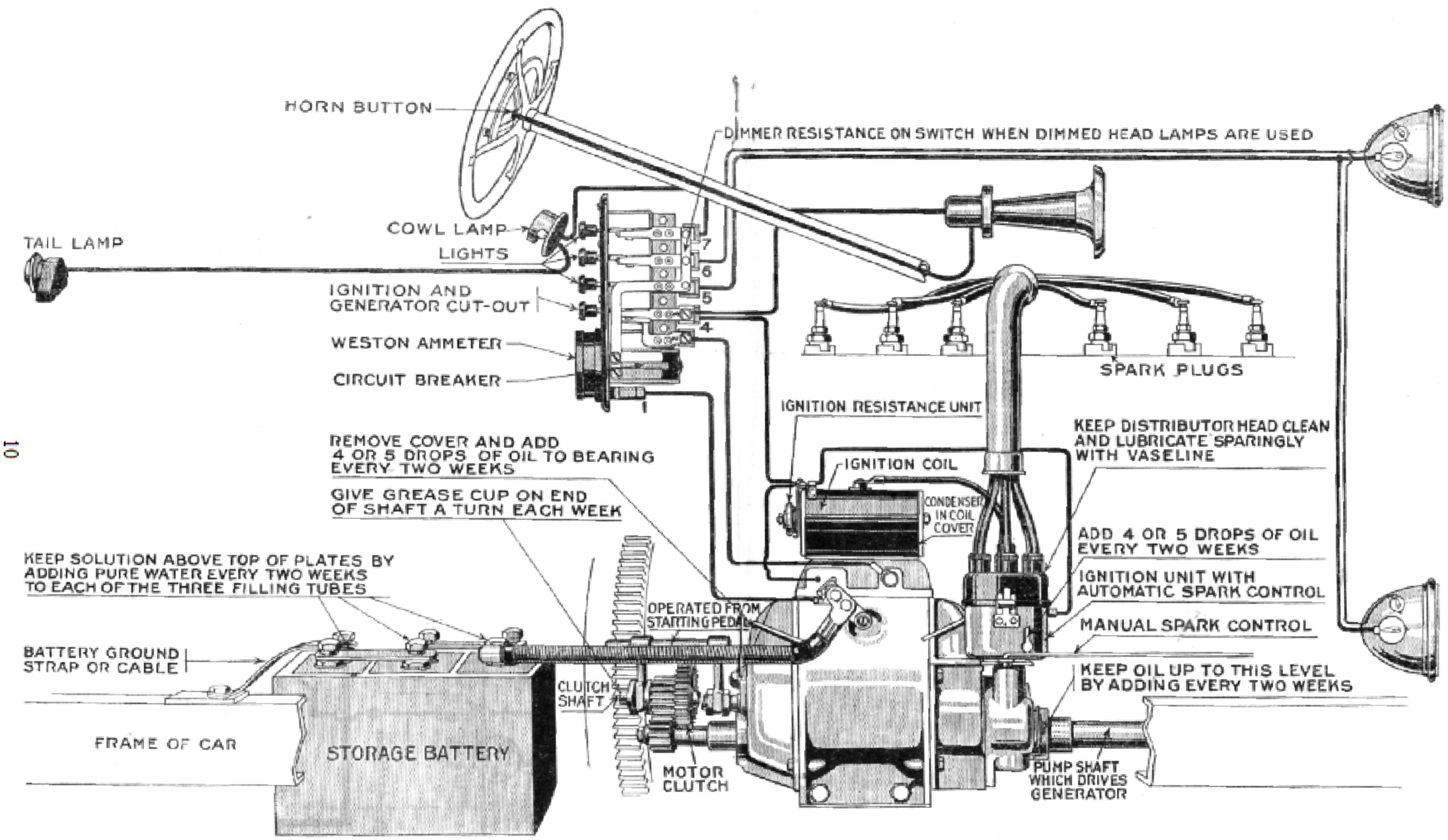
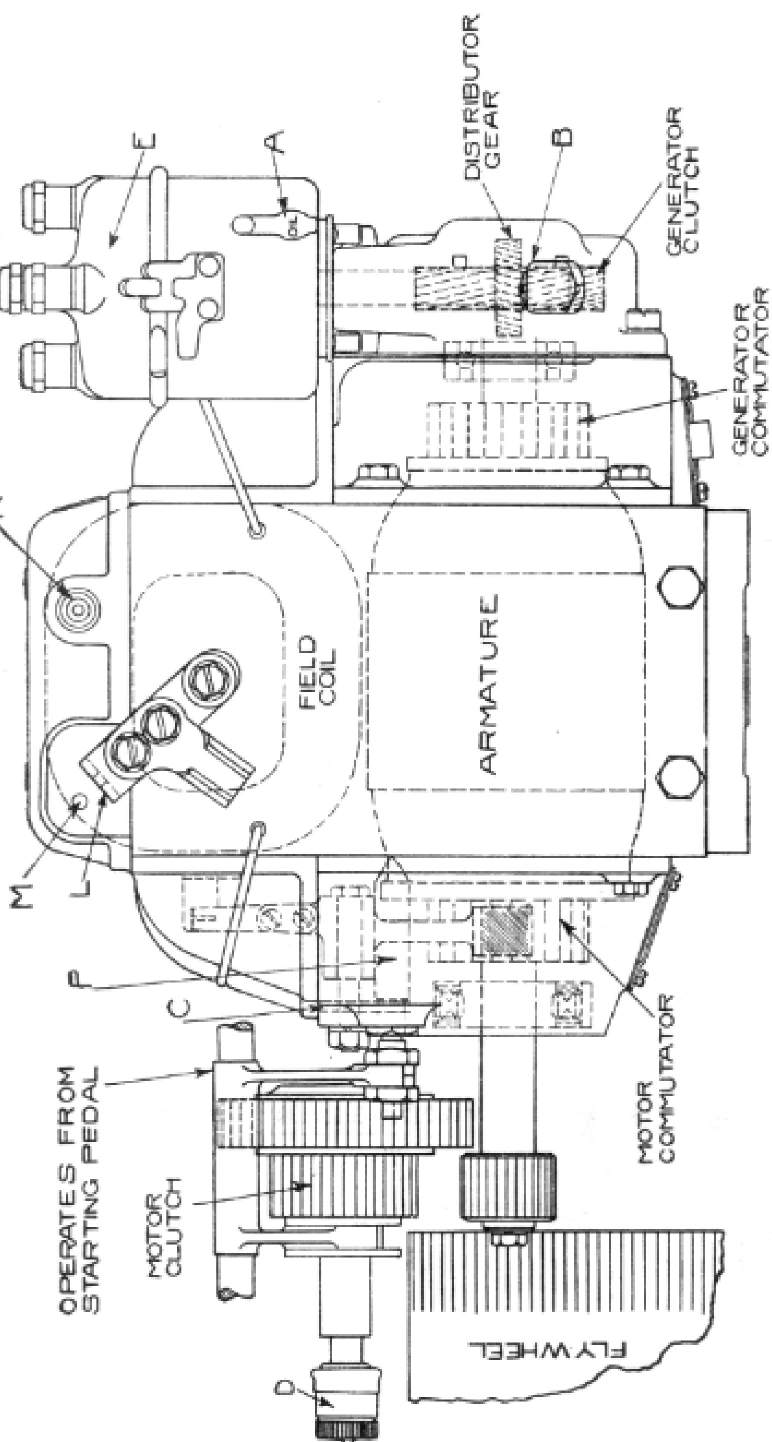

HORN BUTTON
DIMMER RESISTANCE ON SWITCH WHEN DIMMED HEAD LAMPS ARE USED
COWL LAMP
TAIL LAMP
LIGHTS
IGNITION AND
GENERATOR CUT-OUT
WESTON AMMETER
CIRCUIT BREAKER
7
6
5
4
1
SPARK PLUGS
IGNITION RESISTANCE UNIT
REMOVE COVER AND ADD
4 OR 5 DROPS OF OIL TO BEARING
EVERY TWO WEEKS
IGNITION COIL
KEEP DISTRIBUTOR HEAD CLEAN
AND LUBRICATE SPARINGLY
WITH VASELINE
GIVE GREASE CUP ON END
OF SHAFT A TURN EACH WEEK
CONDENSER IN COIL COVER
ADD 4 OR 5 DROPS OF OIL
EVERY TWO WEEKS
KEEP SOLUTION ABOVE TOP OF PLATES BY
ADDING PURE WATER EVERY TWO WEEKS
TO EACH OF THE THREE FILLING TUBES
IGNITION UNIT WITH
AUTOMATIC SPARK CONTROL
OPERATED FROM
STARTING PEDAL
MANUAL SPARK CONTROL
BATTERY GROUND
STRAP OR CABLE
KEEP OIL UP TO THIS LEVEL
BY ADDING EVERY TWO WEEKS
CLUTCH
SHAFT
FRAME OF CAR
STORAGE BATTERY
MOTOR
CLUTCH
PUMP SHAFT
WHICH DRIVES
GENERATOR

Fig. 6



E
A
K
M
L
F
C
D
DISTRIBUTOR GEAR
B
GENERATOR CLUTCH
GENERATOR COMMUTATOR
FIELD COIL
ARMATURE
MOTOR COMMUTATOR
OPERATES FROM STARTING PEDAL
MOTOR CLUTCH
FLY WHEEL

Fig. 7

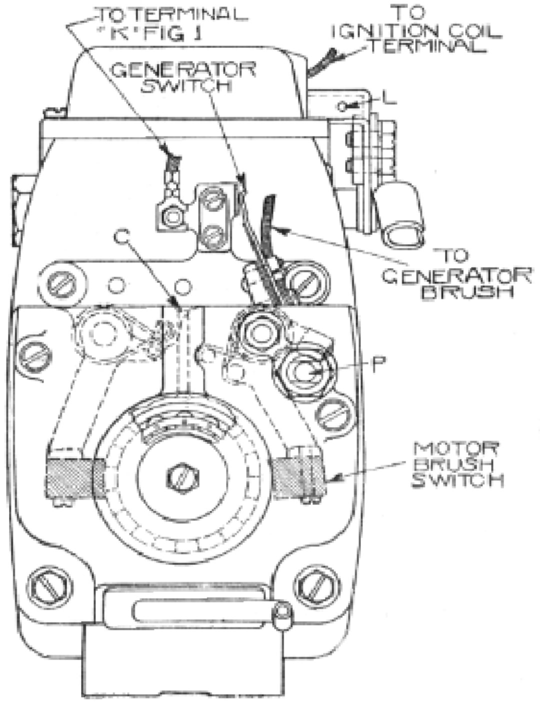


Fig. 8

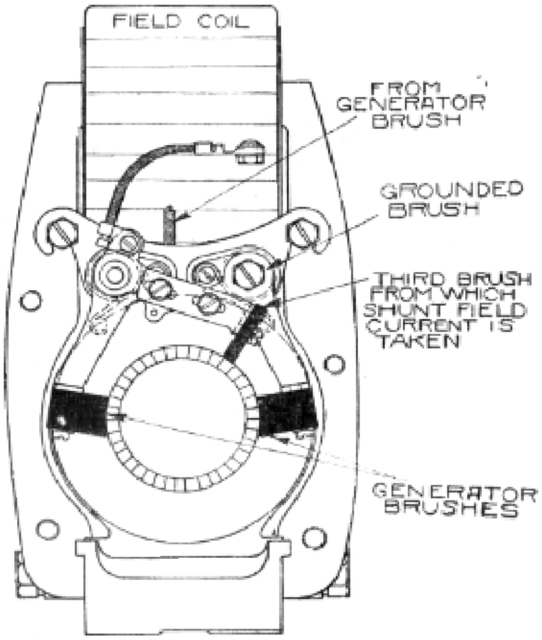


Fig. 9

Combination Switch

The button next to the ammeter (Figures 6 & 11) controls both the ignition and the circuit between the generator and the storage battery; the circuits being shown in red on the circuit diagram (Figure 2). The remaining three buttons control the lighting circuits.

Do not leave the ignition switched on when the generator is not running, as it serves as the generator cut out.

Ammeter

The ammeter indicates the current that is going to or coming from the storage battery with the exception of the cranking current. When the engine is not running and the current is being used for light, the ammeter shows the amount of current that is being used and the ammeter hands points to the discharge side, as the current is being discharged from the battery.

When the engine is running above generating speeds, or about seven or eight miles per hour, and no current is being used for lights or horn, the ammeter will show charge. This is the amount of current that is being charged into the battery. If the current is being used for light, ignition and horn in excess of the amount that is being generated at this speed, the ammeter will show a discharge, as the excess current must be discharged from the battery, but at all ordinary speeds the ammeter will read charge.

If the ammeter hand remains on the discharge side of the scale at all times and vibrates violently at each revolution of the armature during the motoring of the generator and when the engine is running at low speed, this is quite conclusive evidence that the armature has either a ground, open coil, short circuit, or is connected to the motor winding.

Ignition Coil

The round type ignition coil is used on the Cadillac Models 53, 55 and 57 and the Hudson Super-Six and in both cases the coil is mounted on the dash. All other systems described herein use the D-type coil, which is mounted on the top of the motor generator. The circuit and arrangement of the different parts are shown in Figure 14. The primary winding is wound up on and insulated from a round core of small iron wires. The secondary winding consists of several thousand turns of very fine copper wire, the different layers of which are well insulated from each other and from the primary winding, one end of which terminates at the high tension terminal about midway and on top of the coil. From this terminal the high

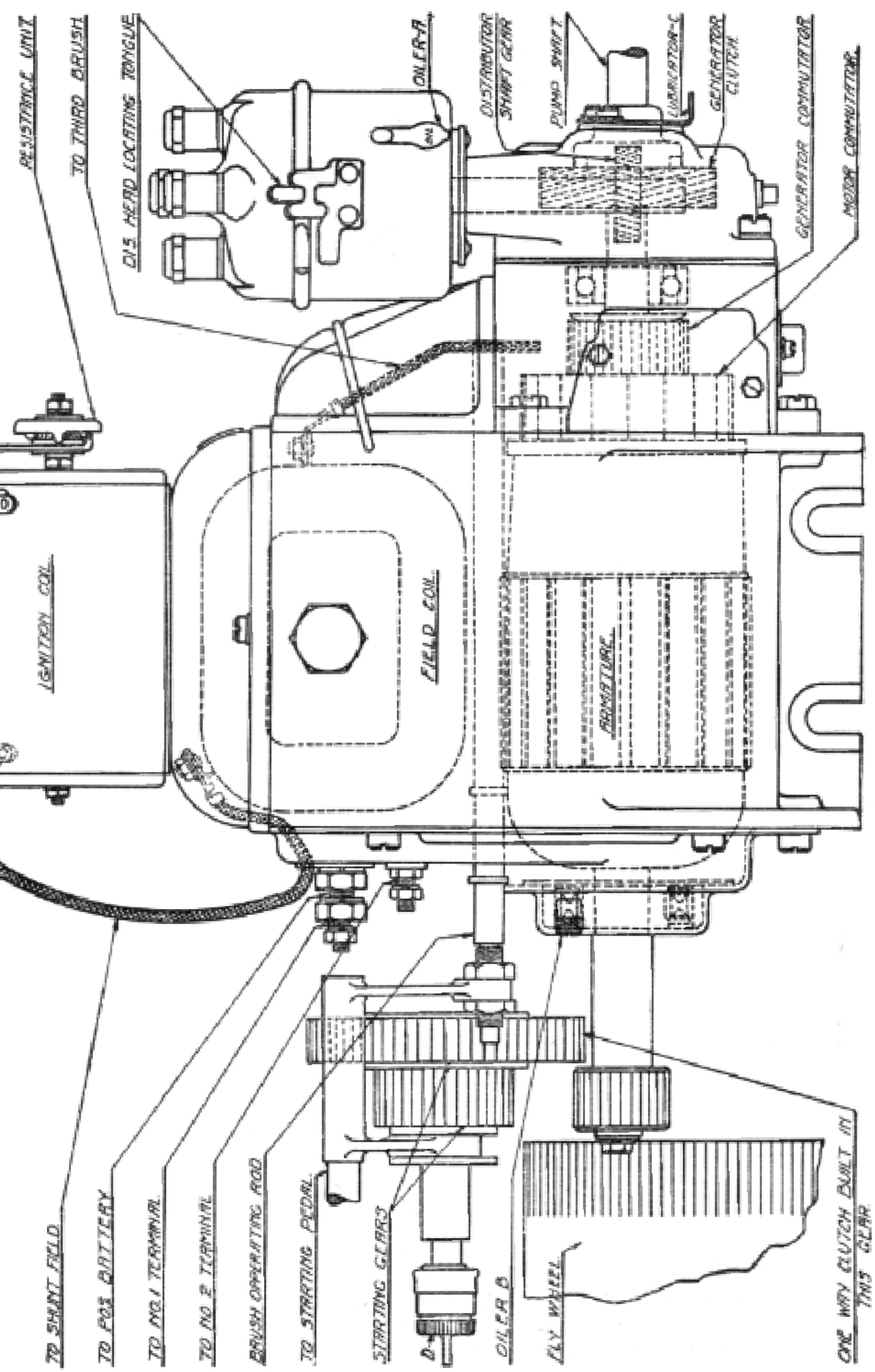

RESISTANCE UNIT
TO THIRD BRUSH
DIS. HEAD LOCATING TONGUE
OILER-A
DISTRIBUTOR SHAFT GEAR
PUMP SHAFT
LUBRICATOR-C
GENERATOR CLUTCH
GENERATOR COMMUTATOR
MOTOR COMMUTATOR
IGNITION COIL
FIELD COIL
ARMATURE
TO SHUNT FIELD
TO POS. BATTERY
TO NO.1 TERMINAL
TO NO 2 TERMINAL
BRUSH OPERATING ROD
TO STARTING PEDAL
STARTING GEARS
D
OILER B
FLY WHEEL
ONE WAY CLUTCH BUILT IN THIS GEAR

Fig. 10

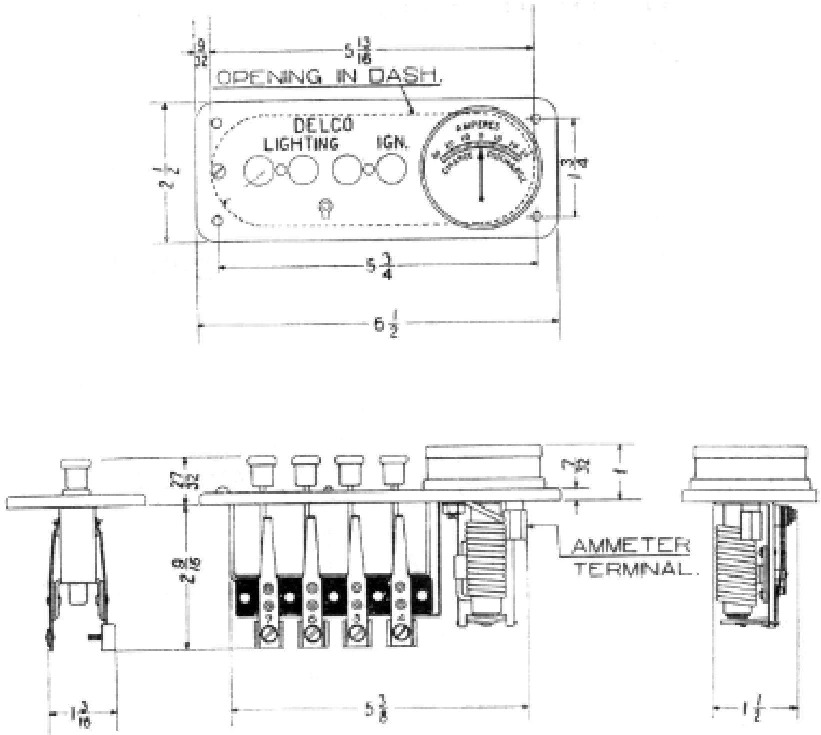

OPENING IN DASH.
DELCO
LIGHTING
IGN.
AMMETER
TERMINAL.

Fig. 11

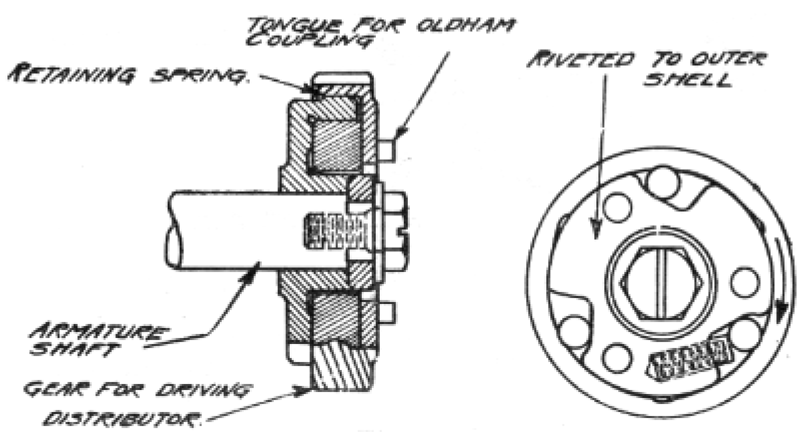

TONGUE FOR OLDHAM COUPLING
RETAINING SPRING.
RIVETED TO OUTER SHELL
ARMATURE SHAFT
GEAR FOR DRIVING DISTRIBUTOR.

Fig. 12

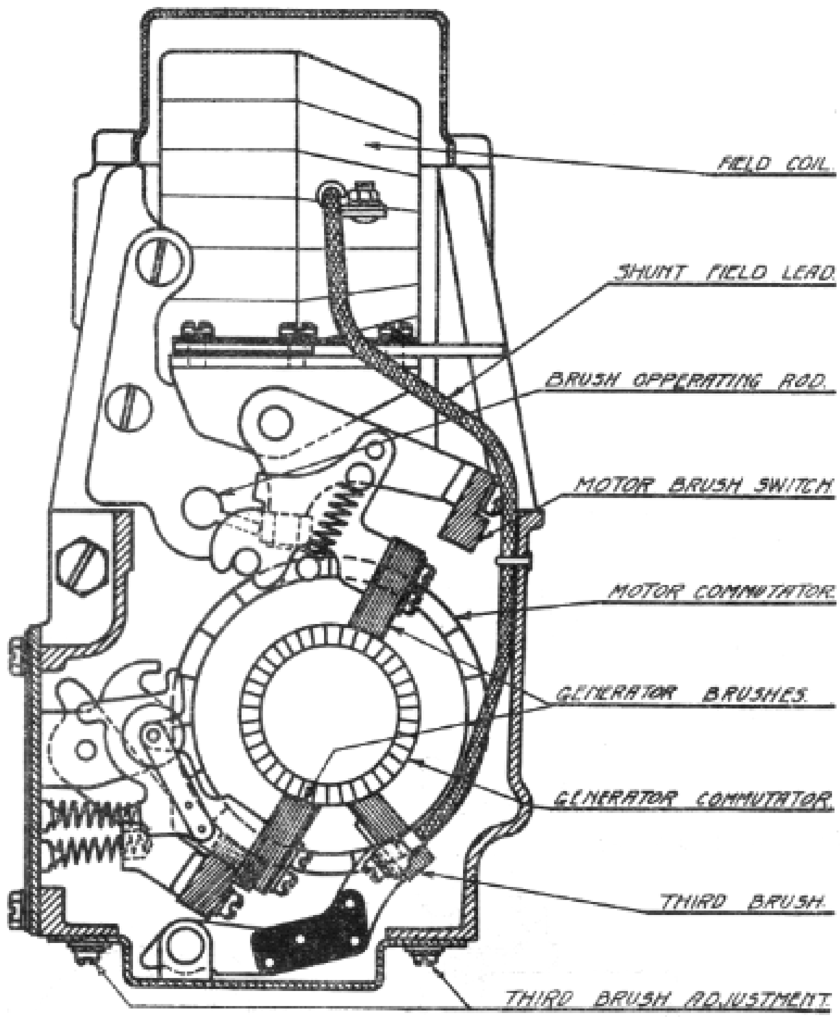

FIELD COIL.
SHUNT FIELD LEAD.
BRUSH OPPERATING ROD.
MOTOR BRUSH SWITCH.
MOTOR COMMUTATOR.
GENERATOR BRUSHES.
GENERATOR COMMUTATOR.
THIRD BRUSH.
THIRD BRUSH ADJUSTMENT.

Fig. 13

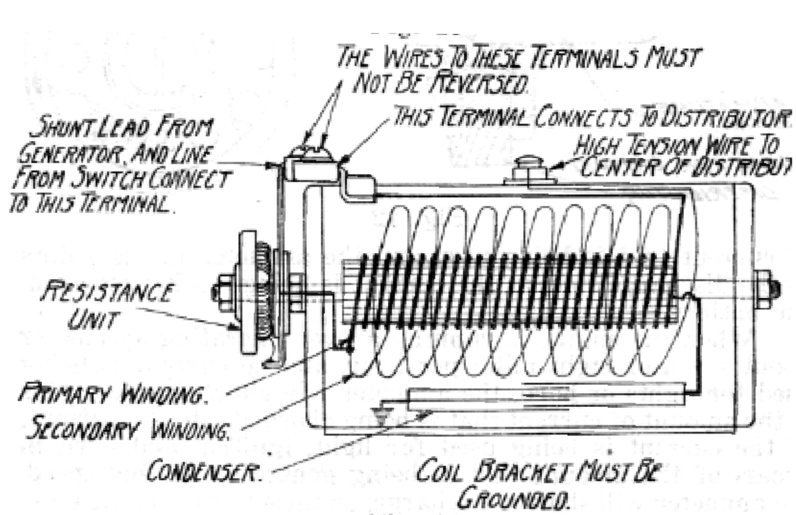

THE WIRES TO THESE TERMINALS MUST NOT BE REVERSED.
THIS TERMINAL CONNECTS TO DISTRIBUTOR.
SHUNT LEAD FROM GENERATOR, AND LINE FROM SWITCH CONNECT TO THIS TERMINAL.
HIGH TENSION WIRE TO CENTER OF DISTRIBUT
RESISTANCE UNIT
PRIMARY WINDING.
SECONDARY WINDING.
CONDENSER.
COIL BRACKET MUST BE GROUNDED.

Fig. 14

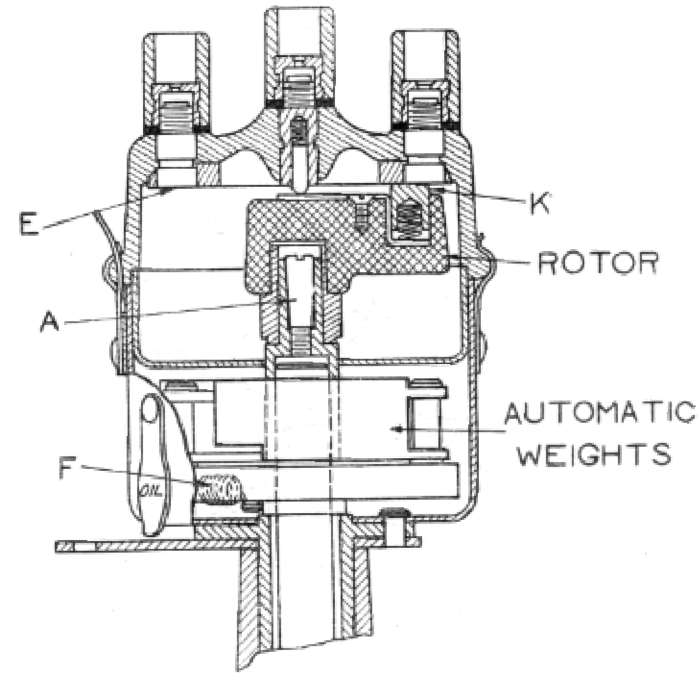

E
K
ROTOR
A
AUTOMATIC
WEIGHTS
F
OIL

Fig. 15

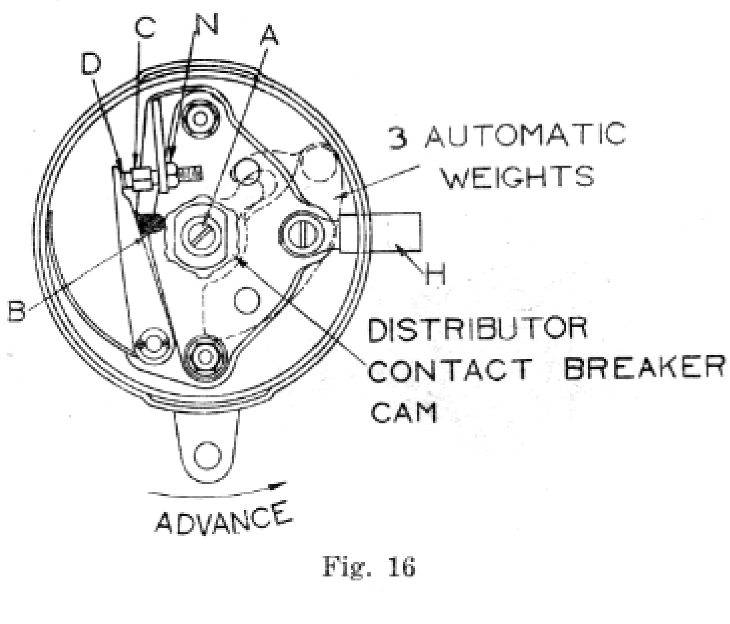

D
C
N
A
3 AUTOMATIC
WEIGHTS
H
B
DISTRIBUTOR
CONTACT BREAKER
CAM
ADVANCE

Fig. 16

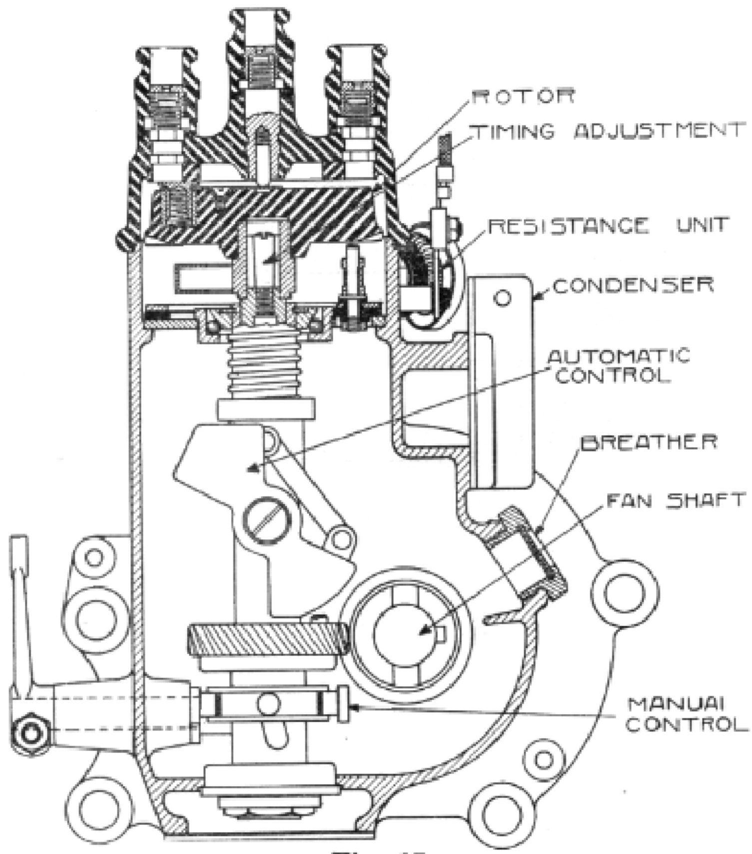

ROTOR
TIMING ADJUSTMENT
RESISTANCE UNIT
CONDENSER
AUTOMATIC CONTROL
BREATHER
FAN SHAFT
MANUAl CONTROL

Fig. 17

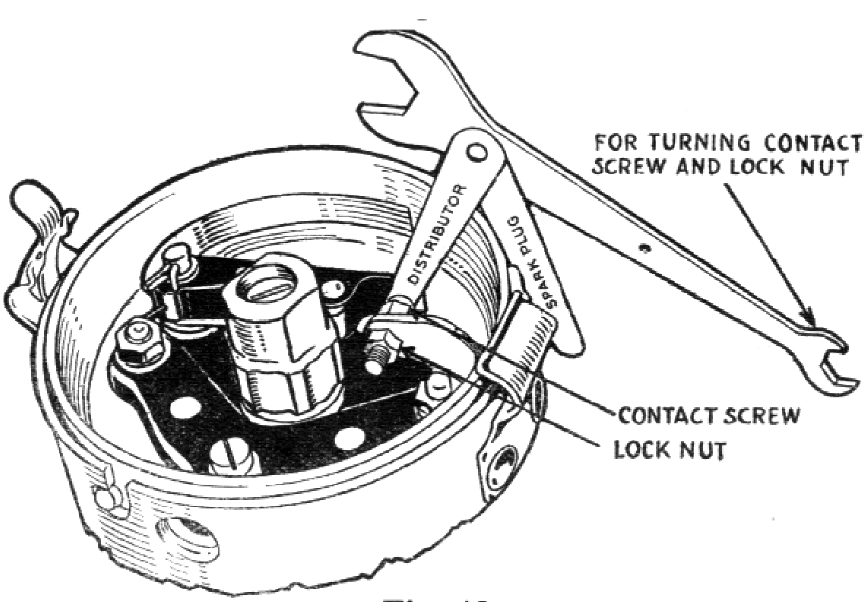

FOR TURNING CONTACT SCREW AND LOCK NUT
DISTRIBUTOR
SPARK PLUG
CONTACT SCREW
LOCK NUT

Fig. 18

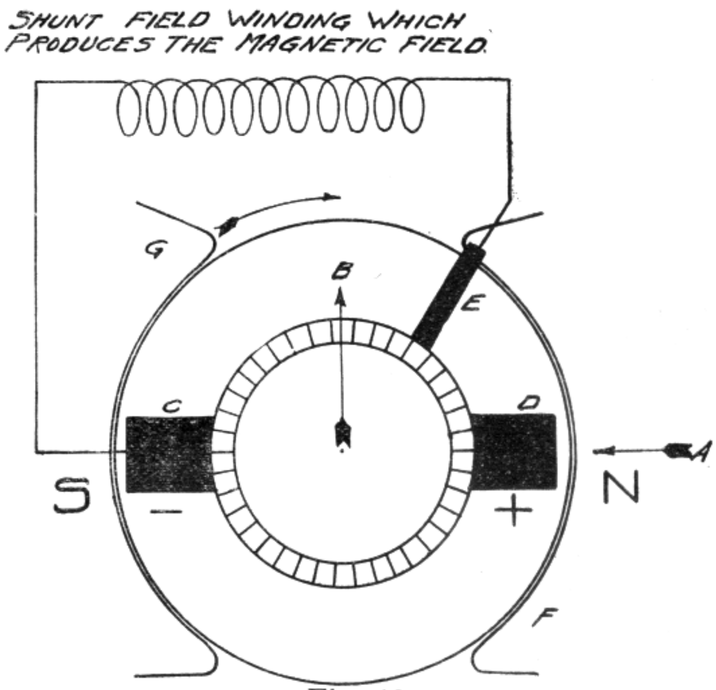


Fig. 19

tension current is conducted to the distributor where it is distributed to the proper cylinders by the rotor shown in Figure 15.

The primary ignition current flows through the primary ignition circuit as shown in red (Figure 2.) It is the interrupting of this primary current by the contact points together with the action of the condenser, that causes the rapid demagnetization of the iron core of the coil and induces the high tension current in the secondary windings of the coil.

The ignition coil is readily tested with a set of test points. The primary circuit is tested between the terminals on the top of the coil at the ends. The secondary winding can be tested for open circuits by testing from the high tension terminal to either of the other terminals. Because of the high resistance of the secondary winding, the test lamps will not burn when making this test, but a spark can be obtained when the test point is removed from the terminal. No spark will be obtained if the winding is open.

A short in the secondary winding causes the spark obtained from a wire removed at the plug to be much weaker and will cause missing when the engine is pulling, especially at low speeds.

Condenser

When the condensor discharges itself through the primary winding of the coil, in the reverse direction from which the ignition current was flowing, it causes the iron core of the coil to be quickly demagnetized and remagnetized in the reverse direction, resulting in a very rapid change of magnetism within the secondary windings, inducing a high voltage in the secondary winding, which is necessary for ignition purposes. Therefore, when the condenser is weak, a very weak spark results, and the timer contacts burn readily.

Resistance Unit

The resistance unit is mounted on one end of the ignition coil as shown in Figure 14. This consists of a special resistance wire wound on a porcelain spool and connected as shown on circuit diagram Figure 2. It is for the purpose of preventing an excessive discharging from the storage battery when the engine is not running, should the ignition switch be left on. Never leave the ignition switch on when the engine is not running. It also causes the spark obtained from the ignition coil to be more uniform at the different engine speeds.

Distributor Contact Points

Their arrangement is clearly shown in Figure 16 and the proper method of adjustment in Figure 18. The correct distance between the contacts when held apart by the breaker cam is eighteen thousandths of an inch (.018). The gauge on the distributor wrench marked "For steel cam distributor" gives this adjustment. During the first few hundred miles driving, the wear of the fibre block on the breaker arm is much greater than after this block has worn to a seat. After the first one or two adjustments, it will be found that the points require practically no attention. If the contacts become rough or burned, due to excessive voltage such as is obtained when the storage battery is removed, a loose connection, or the resistance unit on the ignition coil shorted out, they should be removed and smoothed by the use of an oil stone or very fine emery cloth, and when assembled, they should be adjusted to meet squarely.

Two sets of contact points are provided in the Cadillac distributor. The object is to distribute over two sets of points the current which would otherwise pass through one. Both sets of points should be adjusted exactly alike and to operate at the same instant.

Spark Advance

The mechanism for operating the automatic advance on these systems is shown in Figures 15 and 16, except on the Cadillac models. The weights which are mounted on the disc move outward as the speed increases, overcoming the resistance of the springs "F". This has the effect of automatically advancing the spark to the correct position in proportion to the engine speed.

In the Cadillac distributor, Figure 17, the weight on the distributor shaft approaches a horizontal position as the speed increases, the position of the weight being, at all speeds, controlled by a spring just above the weight, and the outward movement of the weight automatically advances the spark in proportion to the engine speed.

The quality of the mixture and the amount of the compression are also factors in the time required for the timing to be complete. Thus a rich mixture burns quicker than a lean one. For this reason, the engine will stand more advance with a half open throttle than with a wide open throttle, and in order to secure the-proper timing of the ignition due to these variations, and to retard the spark for starting, idling and carburetor adjusting, the Delco distributor also has manual control, linked up with the spark advance lever on the steering wheel sector.

Timing

The center of the distributor shaft is provided with an adjustment screw "A" (Figure 16), the loosening of which allows the cam to be turned in either direction to receive the proper timing; turning in a clockwise direction to advance and counter clockwise to retard.

The manufacturer of the car should be consulted for exact directions for timing the engine.

Circuit Breaker

The circuit breaker is a protective device and takes the place of fuses. It is mounted on the back of the ignition switch as shown in Figures 6 & 11. It prevents the discharging of the battery or damage to the switch and wiring to the lamps, should any of these become grounded. A normal amount of current flowing to the lighting circuits does not affect the circuit breaker, but in case of a ground, the abnormally heavy discharge of current through the circuit breaker windings produces a strong magnetic field around the core, which attracts the armature and opens the contacts. This cuts off the flow of current which allows the contacts to close again and the operation is repeated, producing a clicking sound, as long as the switch is left in the "On" position and the ground exists. As soon as the ground is removed and the contacts remain closed and the circuit is immediately restored, there being nothing to replace as is the case with fuses.

It requires approximately 25 amperes to start the circuit breaker vibrating, but once vibrating, a current of three to 5 amperes will cause it to continue vibrating.

Spark Plug Adjustment

The electrodes of the spark plugs should be adjusted to about twenty-eight thousandths of an inch (.028). On some engines a slightly wider adjustment is permissible.

Lubrication

Attention should be given to the lubrication of the following:

No. 1 - The grease cup for lubricating the motor clutch D, Figures 7 and 10, should be filled once a month.

No. 2- Oiler for lubricating the generator clutch and forward armature bearing B, Figures 7 and 10. This compartment should be kept filled with a good grade of light cup grease.

No. 3 - The oil hole C, (Figures 7 and 10) for lubricating the bearings on the rear of the armature shaft. This is exposed when the rear end cover is removed. This should receive four or five drops of oil once every 500 miles.

No. 4 - The oil hole in the distributor A, (Figures 7 and 10), for lubricating the top bearing of the distributor shaft. This should receive four or five drops of oil once every 500 miles.

No. 5 - A very small amount of vaseline should be applied to the distributor head track in order to secure a bunished track for the rotor button in the distributor head. When this condition is attained it is only necessary to keep the distributor head wiped clean, and free from dust and dirt.

No. 6 - By removing the distributor head and rotor from the Hudson Super-Six distributor units, a few drops of oil may be applied directly on the upper ball bearing of the distributor shaft. The Cadillac distributor has an oiler to oil the top ball bearing. Pack cup grease every 1,000 miles round the gears within the distributor housing. This also lubricates the lower bearing of the distributor shaft.

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