

INSTRUCTIONS

FOR THE CARE OF
1914 JUNIOR

Delco Systems



THE
Dayton Engineering Laboratories Co.
DAYTON, OHIO

1914 Junior Delco System

What is known as the Delco Junior System is applied to the following cars:

- 1914 Buick Models B-24-25, B-36-37
- " Cartercar Model 7
- " Hudson Model 6-40
- " Keeton Model 4-35
- " Oakland Model 36
- " Oldsmobile Model 42
- " Paterson Models 32-33
- " Westcott Model 0-4

DESCRIPTION

This system includes the following units: A generator with a single armature, having two separate and electrically distinct windings, each with its own commutator, both commutators being mounted on the front end of the armature - a single field coil with two separate windings, one for cranking, the other for generating and provided with a cut-out relay mounted in the rear generator housing - a distributor and timer mounted in the front generator housing, an ignition coil and an ignition relay which are separate in some cases and combined in others-an ignition switch, and a 6-volt storage battery. The negative terminal of the storage battery and the negative side of the system are grounded to the frame of the car.

Figures 1 and 2 are typical wiring and circuit diagrams of one of these systems and show clearly how the various parts are connected together.

OPERATION

The following cycle of operations is performed in getting the engine started: The ignition switch is turned on, so that the ignition coil is supplied with current from the dry cells and through the ignition relay. The path of this current is shown in red in the circuit diagram, Fig. 4. The starting lever or pedal, as the case may be, is pressed down part way; this will cause the brush-shifting rod "A" in the motor generator (see Fig. 6-C) to be drawn back, which mechanically closes the cut-out relay by means of the catch "F." (See Fig. 10). The armature will then revolve due to the current through the

generator windings, the live portion of the circuit being indicated in red in the circuit diagram, Fig. 3. The lever or pedal is then pressed still further down and the starting gears meshed with the flywheel. When the gears are fully in mesh the top motor brush is lowered upon the commutator and just before this time the lower generator brush is raised by means of the catch "L" shown in Fig. 9. Current passing through the motor windings as indicated in red in the circuit diagram, Fig. 4, causes the motor to crank the engine over.

CLUTCHES

When the engine begins to fire the lever or pedal is allowed to slip back to its normal position and the gears are disengaged and the armature is driven by the pump shaft through the driving clutch. It should be noted further that during the cranking operation the armature is running about 20 times the speed of the engine and, therefore, much faster than the pump shaft. While this is occurring the generator clutch at the front of the motor generator is slipping. When the engine begins to fire, however, it begins to run fast enough to drive the armature faster than the pump shaft, but this is prevented by the slipping of the motor clutch, which continues until the gears are out of mesh with the flywheel. This explains the necessity of a starting and driving clutch on a system of this type. When the engine increases its speed to a point where the voltage of the generator is approximately 7 1/2 volts, the cut-out relay closes and the generator begins to charge the storage battery. The charging circuit is shown in red in the circuit diagram, Fig. 3. The circuit for current used in lighting, mag, ignition and by the horn is shown in red in the circuit diagram, Fig. 5.

MOTOR GENERATOR

The motor generators are all essentially of one type, shown in section in Fig. 6-A, 6-B, 6-C. In some the starting clutch is mounted in the rear housing of the motor generator; in others it is mounted on a projection of the flywheel housing. The starting clutch, shown in Fig. 7, is so mounted that when the ring gear is just beginning to mesh with the armature pinion the stub gear is approximately 1/8" away from the flywheel teeth. The driving clutch is held to the front end of the armature shaft by a clamping washer with lugs that fit into slots in the clutch shell and armature shaft. This clamping washer is held to the shaft by a screw and lock washer. By reference to Fig. 8 this construction should be evident. As regards the operation of the motor generator several points should be carefully noted. First, the

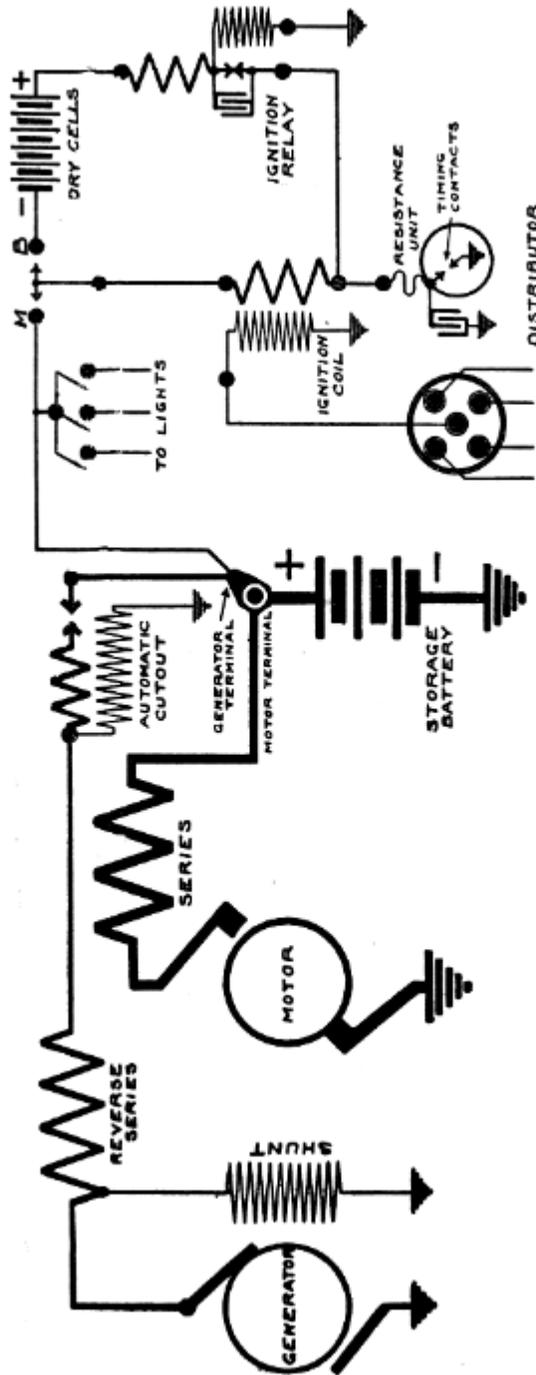


Fig. 2

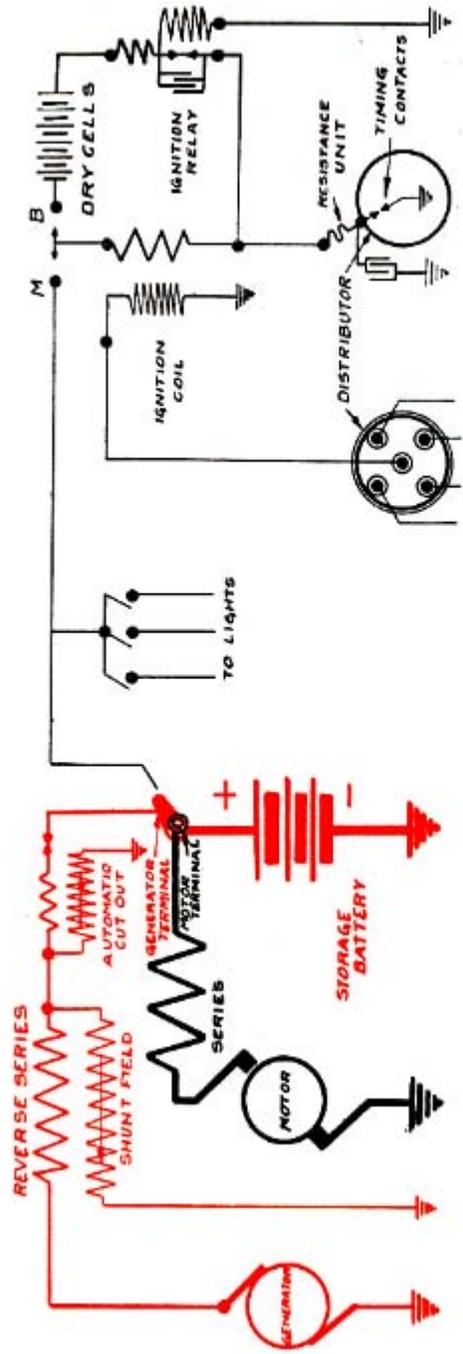


Fig. 3

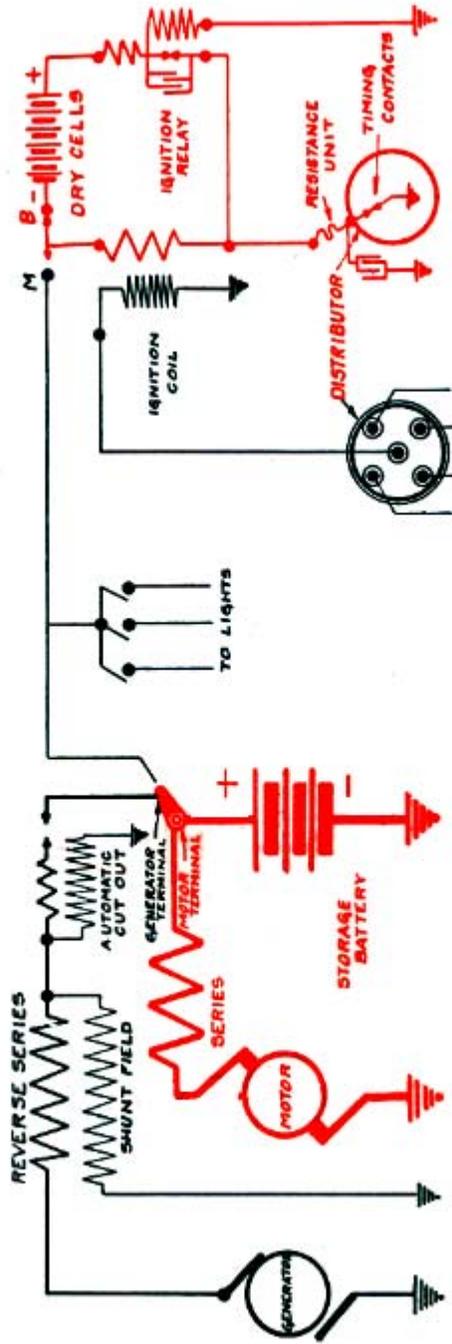


Fig. 4

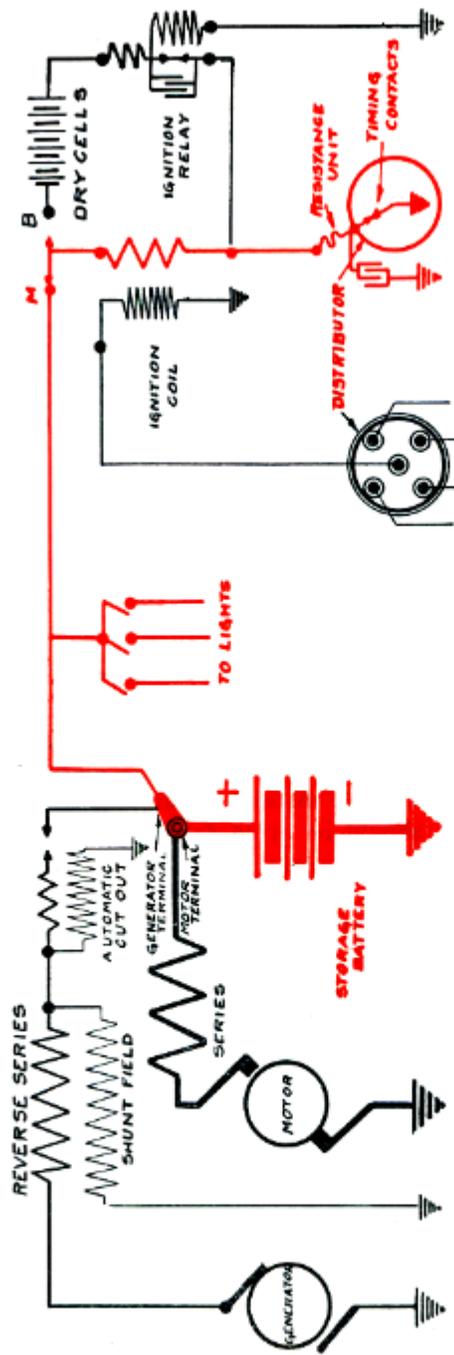


Fig. 5

brush-shifting rod should be so adjusted that the cut-out relay is closed before the teeth in the ring gear of the starting clutch begin to mesh with the teeth on the armature pinion. Also, so that the top motor brush is not permitted to touch the motor commutator until the motor clutch stub gear is fully in mesh with the flywheel teeth. If the little catch "L" shown in Fig 9 is incorrectly assembled, so that it fails, to raise the lower generator brush slightly before the motor brush touches its commutator, the starter will crank at less than 30% of its normal cranking speed. The incorrect assembly is indicated in dotted line in Fig. 9, the correct assembly being indicated in full lines. If this catch has been incorrectly assembled it will be necessary to remove the lower plate that supports the lower brushes, and then while holding this catch in the proper position, slip the brush plate into place and fasten it with its two screws.

CUT-OUT RELAY

The cut-out relay is fastened firmly to the rear housing of the motor generator. A view of this relay as it would appear when seen from the rear is shown in Fig. 10. The catch "F" mechanically closes the relay contacts and permits current from the storage battery to flow through the generator and thus cause the armature to rotate in a clockwise direction when viewed from the front end. The cut-out relay should have the leads to its terminals so fastened that they do not project above the tops of the relay terminals; otherwise they are liable to ground against the metal top cover of the motor generator. Particular attention should be given to this point when taking apart or assembling the motor generator.

THE ADJUSTMENTS, OF THE BRUSH-SHIFTING ROD with respect to the yoke which pulls the starting clutch back, governs the time at which the cut-out relay closes, the lower generator brush is raised from the commutator, and the top motor brush is lowered upon the commutator, relative to the time at which the starting clutch gears mesh with the armature pinion, and the flywheel teeth, respectively. It should be noted that the generators which have the starting clutch mounted in the rear motor generator housing have no adjustment of the rod with relation to the yoke which operates the starting clutch; and that the adjustment is merely to make sure that the starting clutch gears will be fully in mesh with flywheel teeth. On the other hand, on the cars where the starting clutch gears are mounted in the flywheel housing the adjustment provides for a change in the relative time of operation of the brushes and the clutch, and particular care should be taken to make sure

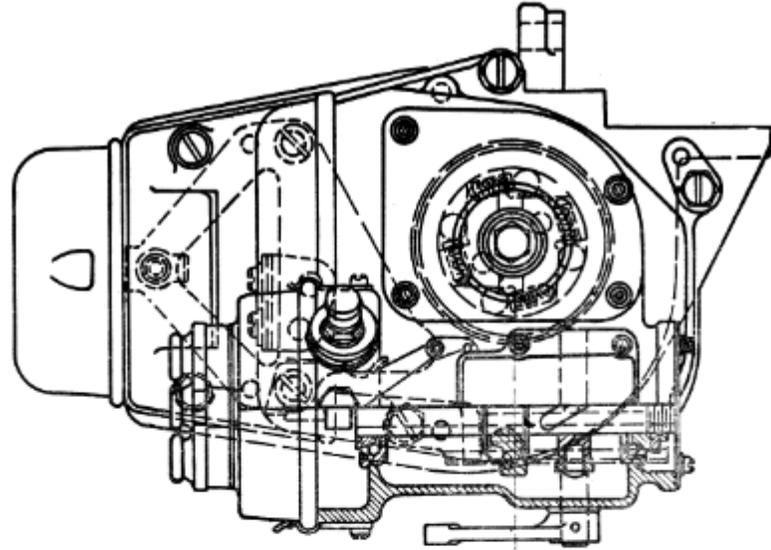


Fig. 6-B

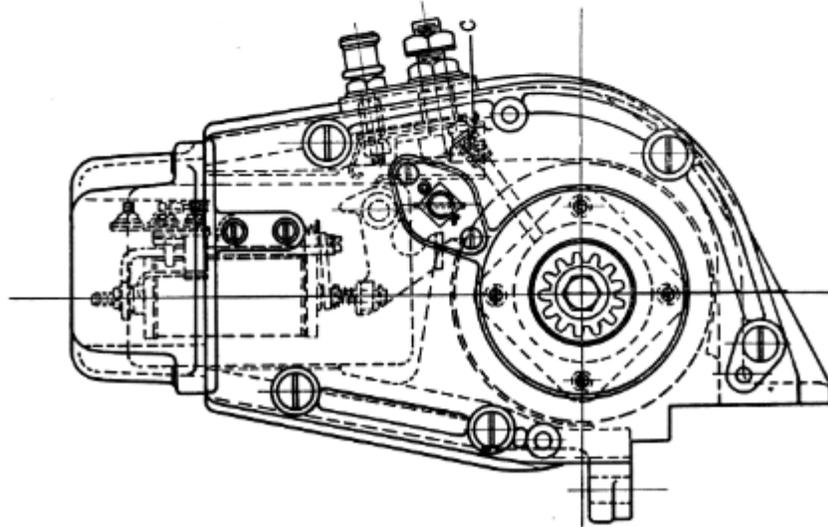


Fig. 6-A

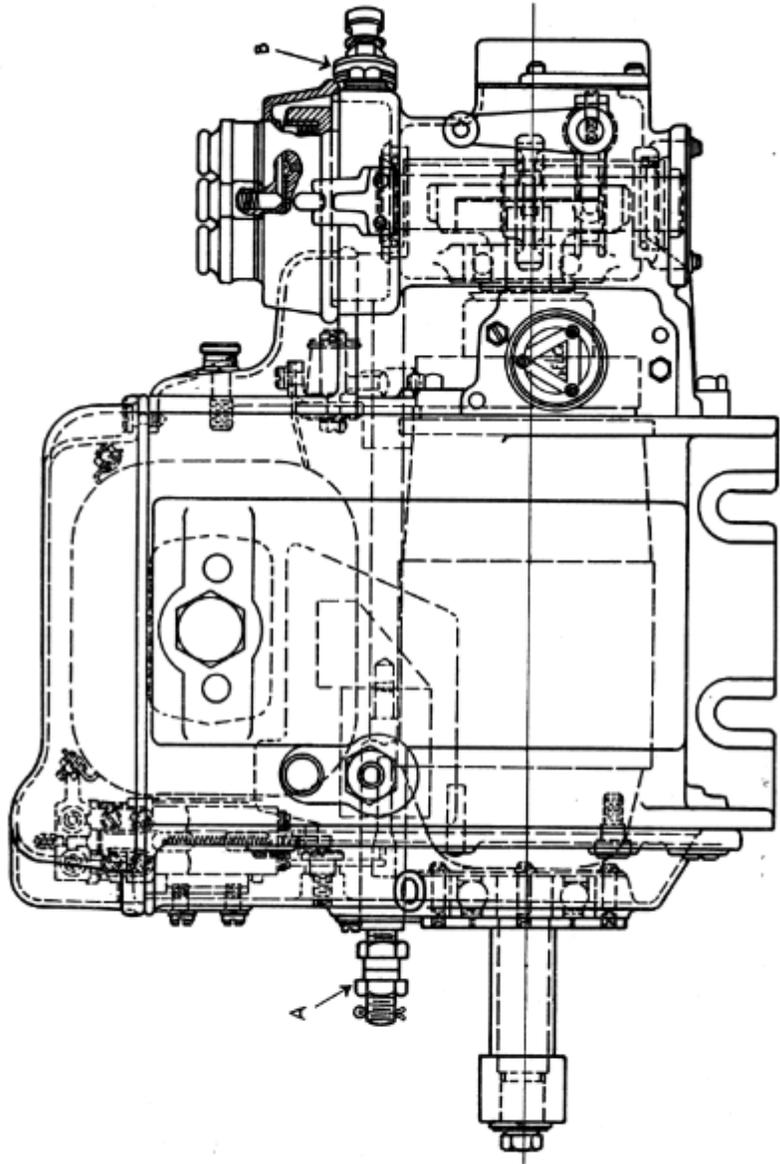


Fig. 6-C

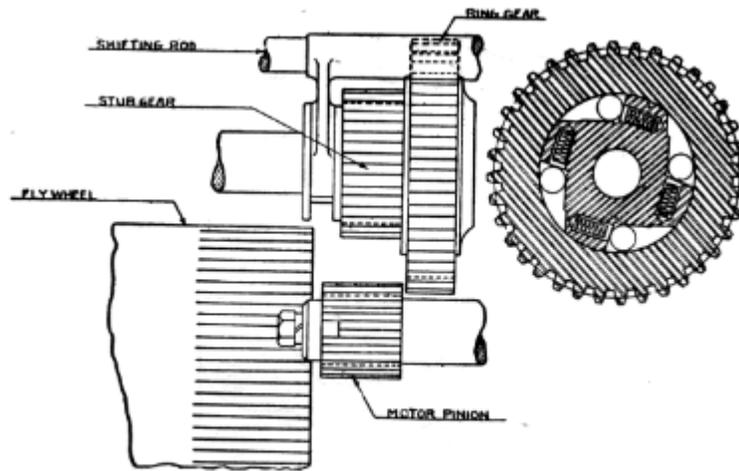


Fig. 7

taken to make sure that these operations are performed in the proper sequence. In both cases the rod should be so adjusted that the starting clutch clears the flywheel teeth when the starting lever or pedal is in the normal position.

DISTRIBUTOR

The distributor is mounted in the front generator housing and is shown in Fig. 6-B and 6-C. This figure will make clear the general features of its assembly. To change the timing loosen the screw in the top of the distributor shaft and turn the assembly around until it is in the proper position, then tighten down the screw again. For information on the timing of any car refer to the manufacturers of that car.

One point regarding this ignition system should be called to attention and that is the effect of a ground on the dry cell circuit, Such a ground will cause the "mag." ignition to stop altogether and yet not affect the dry cell ignition itself. Views of the coil and ignition relay are shown in Fig. 11 and of the coil box in Fig. 12, the latter containing both coil and ignition relay as previously explained.

IGNITION SWITCH

The ignition switches used are of two types, one for ignition only, shown in Fig. 13, and the other for both lights and ignition, shown in Fig. 14. The sectional views will make their construction plain; and a careful examination as to the condition and adjustment of their contacts is about all the attention they will need.

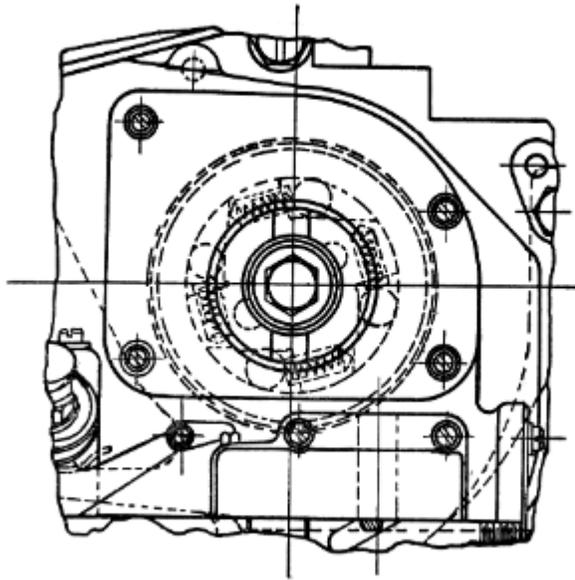


Fig. 8

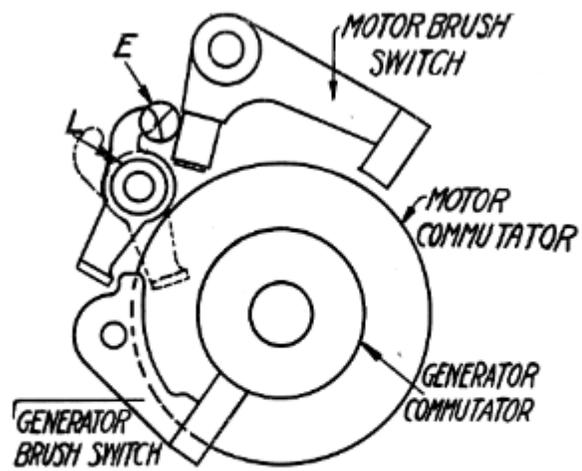


Fig. 9

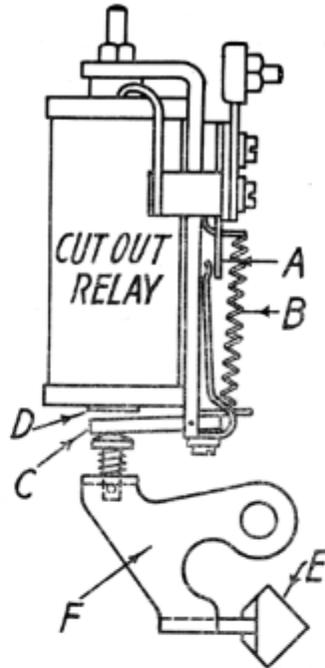


Fig. 10

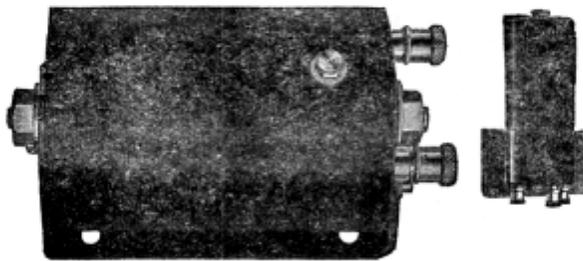


Fig. 11

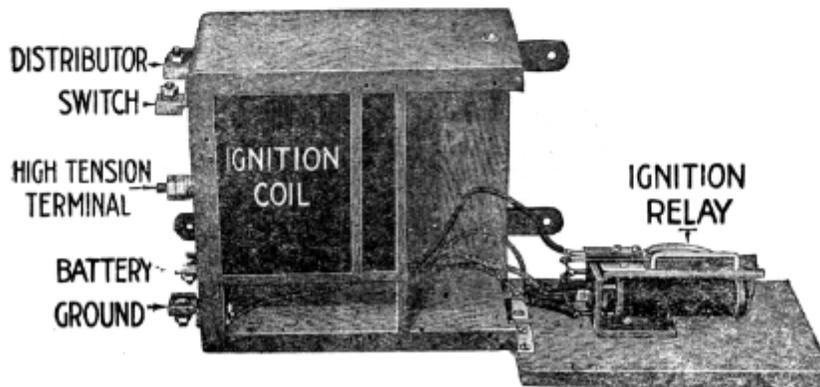


Fig. 12

INSTALLING AMMETER

If it is desired to install an ammeter in connection with this system the following procedure is recommended: Referring to Fig. 15 it will be noted that a brass strap connects the two terminal Nos. 1 and 2. On some of the machines this strap is inside of the frame as indicated by the letter " B " and in others on the outside as in " A. " If this strap is on the inside of the motor generator it will be necessary to remove the motor generator from the car and take it apart to cut the strap. Where the strap is on the outside, as in "A," it can be cut with a hack saw without removing the motor generator from the car. The negative terminal of the storage battery should, however, be disconnected before attempting the cut. After the strap is cut the leads attached to the two ammeter terminals should be connected to the two terminals previously connected by the brass strap. In all cases the leads originally connected to these two terminals must remain undisturbed. The installation of the ammeter requires that the two additional leads must be attached to the

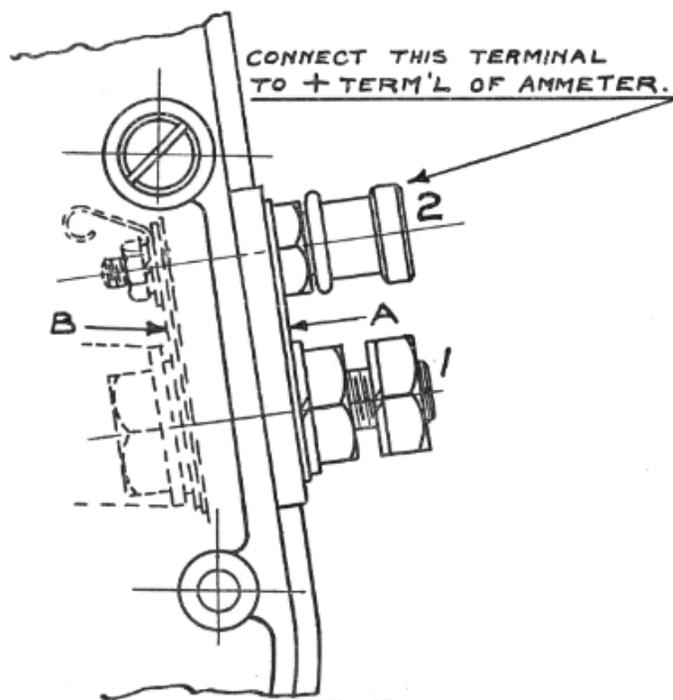


Fig. 15

Motor-generator terminals. Should it be found that the ammeter indicates "discharge" instead of "charge" simply reverse the connections at

the back of the ammeter. For such an installation it is recommended that the meter be of the "deadbeat" type, having a zero center and approximately 30 amperes charge and discharge scale. The meter connected in this way will indicate the net charging current, but will not indicate the discharge current taken by the motor during the cranking operation.

OVERHAULING MOTOR GENERATOR

With regard to overhauling the motor generator it is advisable to have this done about once a year-the various parts taken out, thoroughly cleaned, bearings examined and replaced if unduly worn - the generator clutch taken apart, cleaned out and repacked with grease - the commutators trued up, if they are rough or eccentric. Mica on the generator commutator should be undercut and the brushes replaced and refitted if necessary. Details are given in another article for the work of undercutting the mica and refitting the brushes. If it is suspected that any portions of the system are grounded, the system can be tested out by the use of a drop light; and complete information regarding the method to be used on this subject is given in another article.

TESTING CHARGING RATE

To test the charging rate disconnect the lead from the field to the top carbon brush and then connect the two meter terminals respectively to this lead and to the brush to which it was formerly connected. The meter used for this purpose should preferably have a zero center and a range of 30 amperes charge and discharge. When the meter is connected into the circuit and in the manner described above, it will indicate the gross charging rate produced by the generator. The charging rate of the generators of the type used on these systems has a maximum of from 14 to 20 amperes-these figures being approximately correct for the generator when hot.

TIMING IGNITION

The ignition system of these cars call for little special attention. The connections should be gone over occasionally to make sure that they are clean and tight. The resistance unit "B" on these systems is shown in Fig. 6. The timing of these systems is accomplished, by setting the timing cam adjustment assembly in the proper position so that when the rotor contact is approximately under the No. 1 terminal of the distributor head the "mag." contacts are just beginning to break when the flywheel has gone about one or two

inches past top dead center with the No. 1 cylinder in firing position, (This with the spark lever set at full retard). These instructions are only intended to be approximate, and details for any car can be obtained upon application of the manufacturer of that car. After the timing cam adjustment assembly has been properly set, it is fastened in position by tightening down the center screw firmly. For further information regarding the ignition systems and the best methods of adjusting the same, refer to another article on Delco Ignition. Systems.

LUBRICATION

As regards the lubrication of these systems, the following points should be observed: By removing the distributor head and rotor it will be possible to drop a few drops of good light cylinder oil in the top bearing. Reference to Fig. 6 will make the location of this bearing plain.. The lower distributor bearing is lubricated by grease in the generator housing; and no particular attention need be paid to it excepting to see that the front distributor housing is kept supplied with a reasonable amount of grease. The grease in the front generator housing also lubricates the generator clutches and excepting that it will be necessary to repack the clutches about once a year, the only attention necessary to the clutches will be to keep a good supply of grease in the front generator housing. Care should be taken not to put in too much grease, as if this is done, an excessive quantity will be forced through the front armature bearing and gum up on the generator commutator and thus reduce the charging rate. The front generator bearing is oiled through a hole in the front generator housing. This hole will be exposed if the front cover of the generator be removed. The rear armature bearing is lubricated through an oiler "C" screwed into the rear housing of the motor generator-this location will be plain on referring to Fig. 6. The starting clutch and shaft on which it slides are both lubricated by a grease cup which forces, grease through the hollow shaft. It will be necessary to repack the starting clutch from time to time, once a year being the correct period in most cases. The grease used for lubrication should be the best grade of cup grease. All these parts mentioned should be kept properly lubricated in order to insure long life.

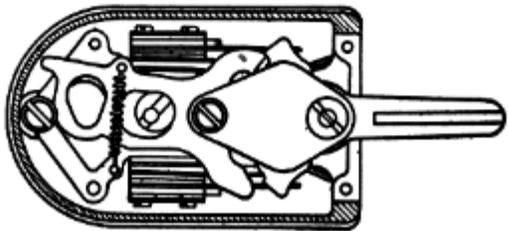
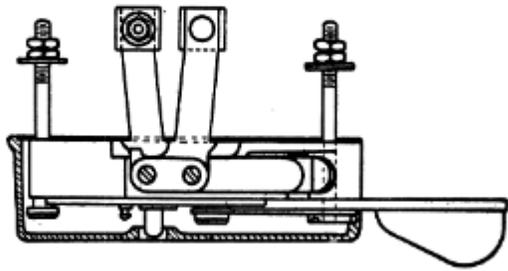
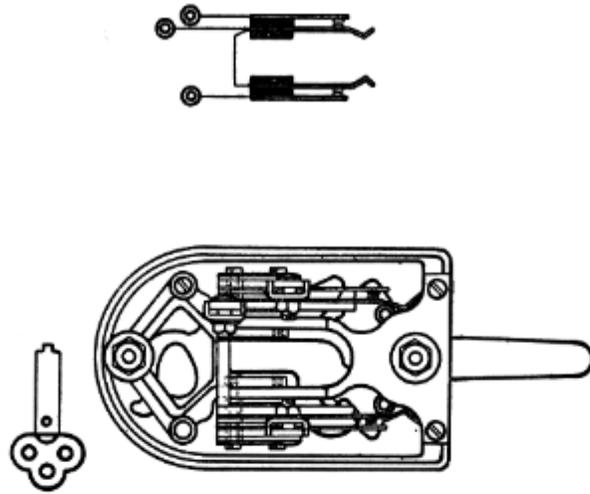


Fig. 13

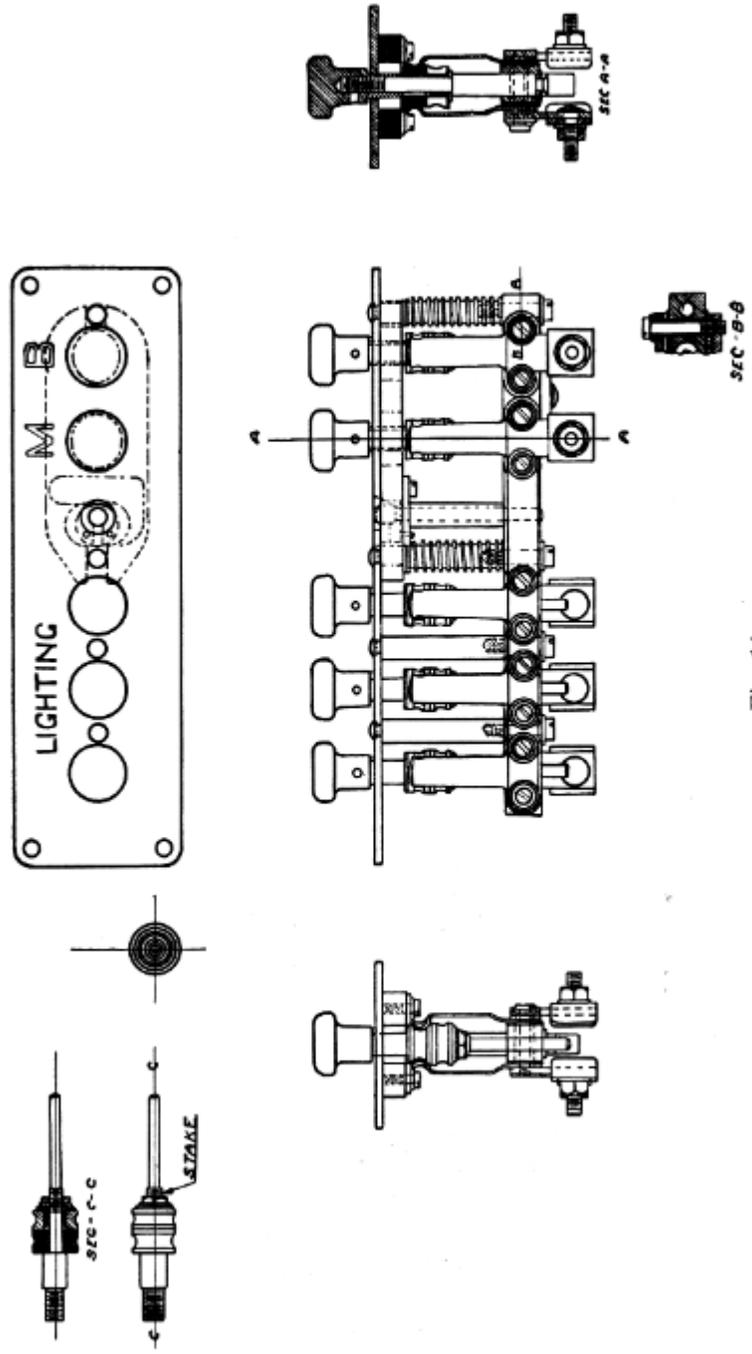


Fig. 14

