

# RUNNING INSTRUCTIONS FOR COIL IGNITION EQUIPMENT

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A coil ignition set consists essentially of a coil, and a combined distributor and contact breaker.

The distributor is driven from the engine, generally by some form of skew gearing, or is sometimes driven from the dynamo shaft. The coil and distributor are sometimes mounted as one unit, conforming with magneto standards so that it is interchangeable with a magneto.

The ignition switch and an ignition warning lamp are usually incorporated in the switch box or instrument panel.

Some sets are provided with an automatic timing control which relieves the driver of constant adjustment of the hand ignition control.

To enable the owner to understand the functioning of the system, we give a brief description of the equipment and how it works.

The coil consists of an iron core around which are wound the primary, or low tension, and the secondary, or high tension windings. The duty of the coil is to convert the battery voltage of 6 or 12 to something in the order of 6,000 volts which is required to form a spark across the plug points. When the ignition switch is "on," current flows from the battery through the primary winding. This current is interrupted by means of the contact breaker, causing a high voltage to be induced in the secondary winding. The distributor moulding is provided on the inside with metal inserts, which are in contact with the high tension cables connected to the sparking plugs. The centre terminal of the distributor moulding is connected,

on the outside, to the high tension terminal of the coil and on the inside, it is connected by means of a carbon brush contact to a rotating distributor arm. This arm is provided at its outer tip with a metal electrode, which, when the arm rotates, passes very close to the metal inserts.

The cycle of events in the operation of the set is as follows:—When the starting switch is depressed, the distributor shaft rotates, causing the contact breaker points to make and break alternately. This will give rise, every time the points open, to the high secondary voltage, which will be passed from the coil to the rotating distributor arm. From here, it jumps the gap to one of the metal inserts in the distributor moulding, which, in turn, is connected by cable to one of the sparking plugs. Immediately after the spark occurs, the contact breaker points will close and the cycle of operations will be repeated for the spark to occur in the cylinder next in firing order.

## **AUTOMATIC ADVANCE MECHANISM.**

Some coil ignition equipments are provided with an automatic advance mechanism, which relieves the driver of the necessity of constant adjustment of the hand ignition control. Its advantages are particularly evident when accelerating, and during hill climbing, the danger of pre-ignition knocking or "pinking" being very much reduced.

Usually a small range hand ignition control is also provided so that the experienced driver can alter the firing position for special conditions of load and throttle if he desires.

The device consists of a centrifugally-operated governor mechanism in which moving weights cause angular motion between the cam and the driving shaft.

The action of the mechanism is briefly as follows:—As the engine speed increases, the weights, acted upon by centrifugal forces, move outwards, causing the cam to move in the direction of the drive, thus advancing the timing.

As motion only takes place dependent on engine acceleration and deceleration, and not on velocity, wear is negligible, and as the control is carefully adjusted and greased during assembly, it requires no attention whatever.

## IGNITION SWITCH AND WARNING LAMP.

Besides forming a means of stopping the engine, the ignition switch is provided for the purpose of preventing the battery being discharged by the current flowing through the coil windings when the engine is stopped. A warning lamp is usually provided in the instrument panel, which gives a red light when the ignition is "on" and the car is running very slowly or is stationary, thus reminding the driver to switch off.

After long service, the warning lamp bulb may burn out. However, this will not affect the ignition, but it should be replaced as soon as possible so as to act as a safeguard to the battery. Care must be taken that replacement bulbs are of the same size and type as those originally fitted. The voltage and current consumption will be found stamped on the cap of the bulb.

## USE OF IGNITION CONTROL.

When an automatic timing mechanism is not fitted with the equipment, the ignition control should be retarded for starting but advanced as soon as the engine is running at speed. The ignition should be retarded when the engine is pulling slowly on full throttle, *e.g.*, when hill climbing. When starting, always retard the ignition control, otherwise there is a danger of backfiring.

When the equipment is fitted with an automatic timing control, there is no need under normal running conditions to make use of the manual control usually fitted. This is provided for use under special conditions, *e.g.*, when the engine is in need of decarbonising, the experienced driver may find that the engine is assisted by retarding with the manual control. One of the advantages of automatic timing control is that the ignition will always be retarded when starting, consequently there is no need to use the manual control for this purpose.

## MAINTENANCE.

Very little attention is needed to keep the ignition equipment in first class condition. We advise that it is inspected occasionally, and the following instructions on

lubrication, cleaning and adjustment should be carried out. As the set also depends on the battery and dynamo, brief maintenance hints are given for these units on page 9. (For further instructions, see booklet for lighting and starting equipment).

## LUBRICATION.

(1) **Distributor Shaft.** The greaser on distributor shaft should be given one turn about every 500 miles.

Repack the greaser with a good quality high melting point grease when necessary.

On some type distributors, an oiler is provided instead of a greaser. Add one or two drops of oil about every 1,000 miles.

(2) **Cam.** About every 3,000 miles, give the cam the slightest smear of vaseline.

(3) **Distributors with Automatic Timing Control.** About every 3,000 miles withdraw the rotating arm "G" (Fig. 2) or "H" (Fig. 3) from the top of the spindle by lifting it off, and add a few drops of thin machine oil. Do not remove the screw exposed to view, as there is a clearance between the screw and the inner face of the spindle through which the oil passes to lubricate the automatic timing control.

(4) **Contact Breaker Pivot ("DJ" Type Distributors only).** Every 5,000 miles, place a single drop of oil on the pivot "J" (Figs. 1 and 2), on which the contact breaker works.

(5) **Distributor Gears.** When distributors are mounted on the dynamo and are driven from the dynamo shaft, the gears are packed with grease during assembly and should not need attention for a considerable time. When the car is undergoing a general overhaul, move aside the flap on the gear housing and if the gears are dry, add a little high melting point grease. Care must be taken not to add excess of grease, otherwise it may work its way into the dynamo or distributor.

In warm and tropical climates, the lubrication of the moving parts will need more frequent attention.

## CLEANING AND ADJUSTMENT.

### Single Lever Type Distributors and Contact Breakers.

These distributors have one contact breaker lever. The distributor shaft carries a 2, 4 or 6 lobe cam according to the number of cylinders of the engine, and is driven at half engine speed so that the contacts open once, twice or three times each revolution of the engine. Occasionally remove the distributor moulding by pushing aside its two securing springs. See that the electrodes are clean and free from deposit. If necessary, wipe out the distributor with a dry duster and clean the electrodes with a cloth moistened with petrol. With "DJ" type distributors, see that the carbon brush "A" (Fig. 1), is clean and moves freely in its holder. Clean the outside of the moulding, particularly the spaces between the terminals. Next examine the contact breaker; it is important that the contacts "C" are kept free from any grease or oil. If they are burned or blackened, they may be cleaned with very fine emery cloth and afterwards with a cloth moistened with petrol. Care must be taken that all particles of dirt and metal dust are wiped away. Misfiring may be caused if the contacts are not kept clean.

The contact breaker gap is carefully set before leaving the Works, and a gauge is provided on the spanner dispatched with each distributor. Provided that the cam is kept clean and that the instructions on cam lubrication given on page 4 are carried out, the wear on the fibre heel is negligible, and consequently the contact breaker gap will only need adjustment at very long intervals. If the cam is dirty, it may be cleaned with a cloth moistened with petrol, and afterwards given the slightest smear of vaseline. To test the contact breaker gap, slowly turn the engine over by hand until the contacts are seen to be fully opened. Now insert the gauge on the spanner in the gap; if it is correct the gauge should be a sliding fit. It is not advisable to alter the setting unless the gap varies considerably from the gauge. If adjustment is necessary, proceed as follows:— When the contacts are fully opened, slacken the locking nut "D" on the stationary contact screw, and rotate it by its hexagon head until the gap is set to the thickness of the

gauge. After making the adjustment, care must be taken to tighten the locking nut.

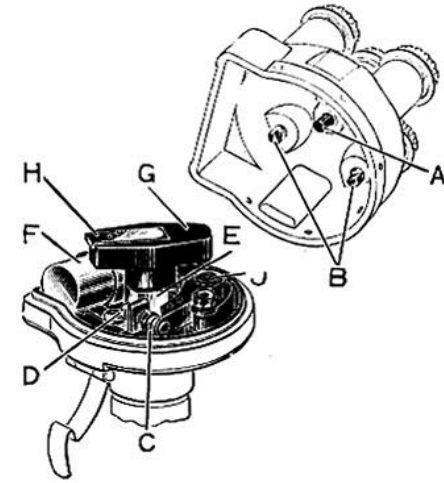


FIG. 1. DISTRIBUTOR AND CONTACT BREAKER TYPE DJ4.

- |                 |                             |
|-----------------|-----------------------------|
| A—Carbon brush. | F—Condenser.                |
| B—Electrodes.   | G—Rotating distributor arm. |
| C—Contacts      | H—Metal electrode.          |
| D—Locking nut.  | J—Contact breaker pivot.    |
| E—Rotating cam. |                             |

**Double Lever Type Distributors and Contact Breakers.** Some distributors for 6 cylinder engines, and all those for 8 cylinder engines, are of the double lever type. Each lever operates for half the number of cylinders, a three or four lobe cam being fitted.

The distributor should be inspected and the two pairs of contacts "A" (Fig. 4) should be cleaned and the gaps between them checked as described on page 5.

It is important that both gaps are maintained to the gauge, as the two contact breaker levers are synchronized at the Works with the gaps accurately set. If the contact gaps are not correct, there will be a tendency for the

timing of half the cylinders to be slightly different from the rest.

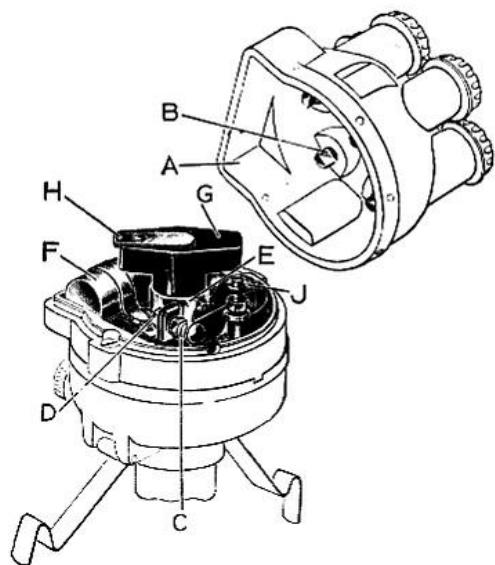


FIG. 2. DISTRIBUTOR AND CONTACT BREAKER TYPE DJ6A.

- |                         |                             |
|-------------------------|-----------------------------|
| A—Distributor moulding. | F—Condenser.                |
| B—Electrode.            | G—Rotating distributor arm. |
| C—Contacts.             | H—Metal electrode.          |
| D—Lock nut.             | J—Contact breaker pivot.    |
| E—Rotating cam.         |                             |

To adjust the gaps, proceed as follows:—Slowly turn the engine until one pair of contacts are seen to be fully opened. Then slacken the locking screw “B” and adjust the gap to the gauge by turning the adjusting screw “C.” After the adjustment, do not forget to tighten the locking screw. Adjust the other gap in the same way.

The owner is cautioned that it is extremely inadvisable to make any adjustment to the other screws in the contact

breaker, which are locked. These are provided for synchronizing the two contact breaker levers.

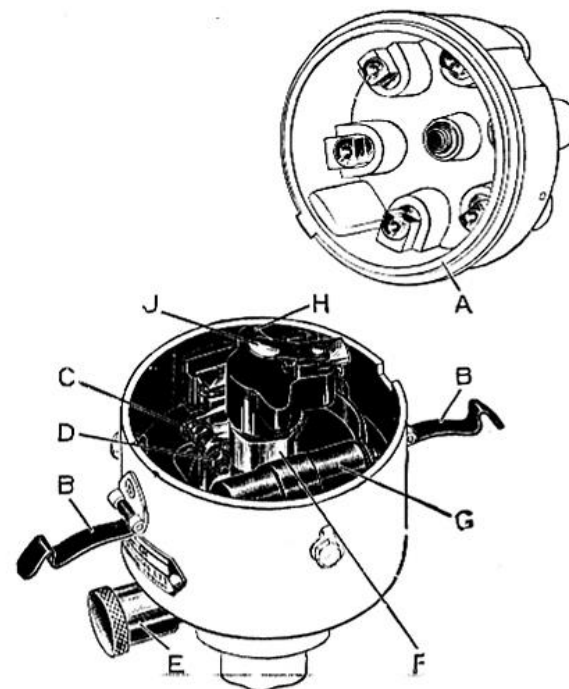


FIG. 3. DISTRIBUTOR and CONTACT BREAKER TYPE DF6A.

- |                                  |                             |
|----------------------------------|-----------------------------|
| A—Distributor moulding.          | E—Greaser.                  |
| B—Securing springs for moulding. | F—Rotating cam.             |
| C—Contacts.                      | G—Condenser.                |
| D—Locking nut.                   | H—Rotating distributor arm. |
|                                  | J—Spring contact.           |

### ADJUSTMENT OF SPARKING PLUGS.

The plug electrodes burn away slightly with service, and thus, in time, the gap length increases. Occasionally examine and clean them, adjusting them if necessary to the right setting (about 20 thousandths of an inch). It is advisable to follow the engine manufacturer's recommendations for the exact setting, as the gap depends somewhat on the type of plug fitted and the characteristics of the engine.

## COIL.

The coil unit is not adjustable in any way, and requires no attention beyond seeing that the terminal connections are kept tight, and the moulded coil top is kept clean.

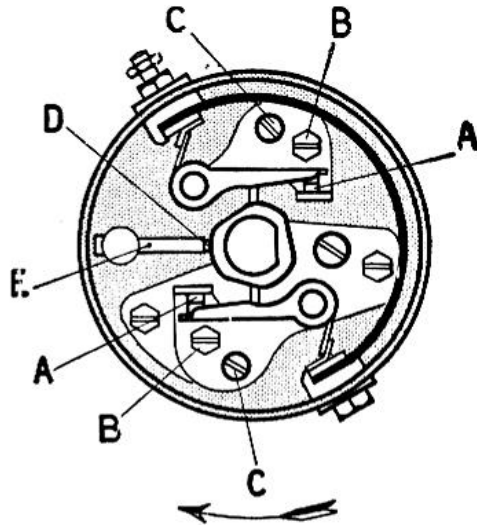


FIG. 4. PLAN VIEW OF DOUBLE LEVER TYPE DISTRIBUTOR.

- |                                      |                         |
|--------------------------------------|-------------------------|
| A—Contacts.                          | C—Adjustment screw.     |
| B—Locking screw.                     | D—Wick lubricating cam. |
| E—Oil hole for cam lubricating wick. |                         |

## MAINTENANCE OF THE BATTERY AND DYNAMO.

As the ignition coil depends on the battery and dynamo for its supply of current, it is important that these units are kept in good condition by carrying out the following brief instructions :—

At least once a month remove the vent plugs and examine the acid level. If necessary, add distilled water to bring the level  $\frac{3}{4}$  in. above the top of the plates.

Do not add acid solution unless some has been spilled, when it should be replaced with dilute sulphuric acid of the correct specific gravity (indicated on the side or cover of the battery).