

SECTION C-9  
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# LUCAS

*Quality*

## EQUIPMENT

VOLUME 2

### WORKSHOP INSTRUCTIONS DISTRIBUTORS

MODELS DM4, DMBZ4, DM6,  
DMX6, DMZ6, DMB6 and DMBZ6



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# LUCAS WORKSHOP INSTRUCTIONS

## DISTRIBUTORS

MODELS DM4, DMBZ4, DM6, DMX6, DMZ6, DMB6 and DMBZ6.

### 1. GENERAL

Mounted on the distributor driving shaft, immediately beneath the contact breaker, is a centrifugally operated timing control mechanism. It consists of a pair of spring-loaded governor weights, linked by lever action to the contact breaker cam. Under the centrifugal force imparted by increasing engine speed, the governor weights swing out against the spring pressure to advance the contact breaker cam, and thereby the spark, to suit engine conditions at the greater speed.

A built-in vacuum-operated timing control is also included, designed to give additional advance under part-throttle conditions. One side of a spring-loaded diaphragm is subjected to pressure variations in the induction pipe. This diaphragm acts through a lever mechanism to rotate the heel of the contact breaker about the cam, thus advancing the spark for part-throttle operating conditions. There is also a micro-meter adjustment by means of which fine alterations in timing can be made to allow for changes in running conditions, e.g., state of carbonisation, change of fuel, etc.

A completely sealed metallised paper capacitor is utilised. This has the property of being self-sealing; should the capacitor break down, the metallic film around the point of rupture is vaporised away by the heat of the spark, so preventing a permanent short circuit.

The HT pickup brush is of composite construction, the centre portion consisting of a resistive compound and the two end portions of softer carbon. The resistive portion of this carbon brush which is in circuit between the coil and the distributor gives a measure of radio interference suppression. Under no circumstances must a short non-resistive brush be used as a replacement for one of these longer resistive brushes.

Models DM and DMB differ from each other in the arrangement of the distributor shaft bearings. In model DM distributors a hardened shaft runs in cast iron bearings, a greaser being provided for the upper bearing. Model DMB has a ball bearing at the upper end of the shaft and a porous bronze bush at the lower end.

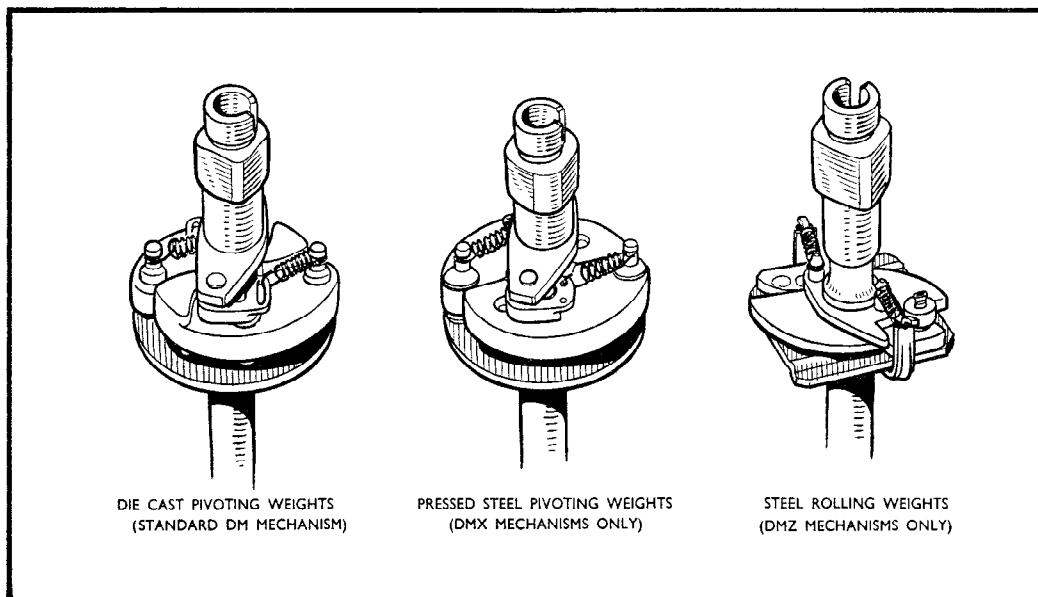


Fig. 1.

Three centrifugal advance control mechanisms arranged to show differences in design



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Three alternative types of centrifugal advance mechanism are used. Models DM and DMB have diecast governor weights which rotate on pivots situated on opposite sides of the base plate. Model DMX mechanisms differ only in that the governor weights are made of pressed steel, case hardened, instead of being diecast. Model DMZ distributors employ a different design called the rolling weight mechanism. Lighter weights are used in this type of control and they move freely around action cams on the control base plate.

## 2. ROUTINE MAINTENANCE

In general, lubrication and cleaning constitute normal maintenance procedure.

### (a) LUBRICATION

Take great care to prevent oil or grease from getting on or near the contacts.

#### **Every 1,000 miles** (*Plain bearing models only*)

Give the lubricator on the side of the distributor body **one full turn** clockwise to lubricate the distributor shaft.

When necessary, refill with Acheson's graphited grease, grade GC, or any equivalent grease.

#### **Every 6,000 miles**

Add a few drops of thin engine oil (S.A.E. 30) through the aperture at the edge of the contact breaker base plate to lubricate the centrifugal advance mechanism.

Lightly smear the cam with Mobilgrease No. 2.

Lift off the rotor arm and apply to the spindle a few drops of thin machine oil to lubricate the cam bearing. It is not necessary to remove the exposed screw, since it affords a clearance to permit the passage of oil.

Refit the rotor arm, carefully locating its moulded projection in the keyway in the spindle and pushing it on as far as it will go.

### (b) CLEANING

#### **Every 6,000 miles**

Thoroughly clean the moulded distributor cover, inside and out, with a soft dry cloth, paying particular attention to the spaces between the metal electrodes. Ensure that the carbon brush moves freely in its holder.

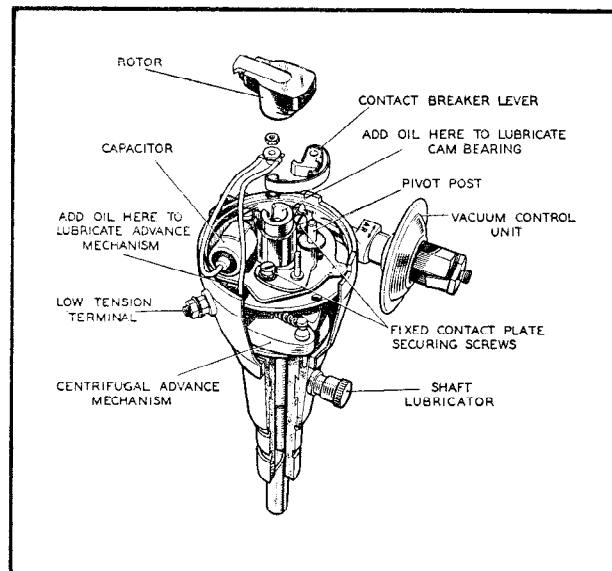


Fig. 2.

Sectioned view of distributor with contact breaker dismantled for cleaning

Examine the contact breaker. The contacts must be quite free from grease or oil. If they are burned or blackened, clean them with very fine carborundum stone or emery cloth, then wipe with a petrol-moistened cloth. Cleaning is facilitated by removing the contact breaker lever. To do this, remove the nut, insulating piece and connections from the post to which the end of the contact breaker spring is anchored, or, with earlier types, slacken the screw securing the slotted end of the contact breaker spring. The contact breaker lever may now be removed from its pivot.

Before refitting the contact breaker, smear the pivot post with Ragosine Molybdenised non-creep oil or Mobilgrease No. 2.

After cleaning, check the contact breaker setting. Turn the engine by hand until the contacts show the maximum opening. This should measure 0.014" to 0.016". If the measurement is incorrect, keep the engine in a position giving maximum opening, and slacken the two screws securing the fixed contact plate. A slotted adjuster is fitted in this plate by means of which the contact breaker can be opened or closed, as required. Tighten the screws. Recheck the setting for other positions of the engine giving maximum contact opening.



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## 3. DESIGN DATA

(a)	Open Period	Closed Period	Firing Angles
4-cyl. models	$30^{\circ} \pm 3^{\circ}$	$60^{\circ} \pm 3^{\circ}$	$0^{\circ}, 90^{\circ}, 180^{\circ}, 270^{\circ}, \pm 1^{\circ}$
6-cyl. models	$25^{\circ} \pm 2^{\circ}$	$35^{\circ} \pm 2^{\circ}$	$0^{\circ}, 60^{\circ}, 120^{\circ}, \text{etc.}, \pm 1^{\circ}$

- (b) Contact breaker gap: 0.014" to 0.016".
- (c) Contact breaker spring tension, measured at contacts: 18-24 oz.
- (d) Capacitor: 0.18-0.24 microfarad.
- (e) Centrifugal and vacuum-operated timing control: the operating range of the mechanism varies with each car model, and is given in Test Data published by the Lucas Service Bulletin Department. The performance of the control may be checked against these figures if the requisite equipment is available.
- (f) For current consumption, etc., of ignition coils, see Section C-8.

## 4. SERVICING

Before starting to test, make sure that the battery is in good condition.

### (a) TESTING IN POSITION TO LOCATE CAUSE OF UNEVEN FIRING

Run the engine at a fairly fast idling speed.

If possible, short circuit each plug in turn with the blade of an insulated screwdriver or hammer head placed across the terminal to contact the cylinder head. Short circuiting the plug in the defective cylinder will cause no noticeable change in the running note. With the others, however, there will be a pronounced increase in roughness.

If short-circuiting the sparking plugs is not possible, due to their being fitted with shrouded cable connectors, remove each plug connector in turn. Again, removal of the connection to the defective cylinder will cause no noticeable change in the running note, but there will be a definite increase in roughness when the other plugs are disconnected. Having thus located the defective cylinder, stop the engine and remove the cable from the sparking plug terminal.

Restart the engine and hold the cable end about  $\frac{3}{16}$ " from the cylinder head. If sparking is strong and regular, the fault lies with the sparking plug, and it should be removed, cleaned and adjusted, or a replacement fitted. If, however, there is no spark, or only weak irregular

sparking, examine the cable from the plug to the distributor moulded cover for deterioration of the insulation, renewing the cable if the insulation is cracked or perished. Clean and examine the moulded cover for free movement of the carbon brush. If a replacement brush is necessary, it is important that the correct type is used. If tracking has occurred, indicated by a thin black line between two or more electrodes or between one of the electrodes and the body, a replacement distributor cover must be fitted.

### (b) TESTING IN POSITION TO LOCATE CAUSE OF IGNITION FAILURE

Spring back the clips on the distributor head and remove the moulded cover. Lift off the rotor, carefully levering with a screwdriver if necessary.

Switch on the ignition and whilst the engine is slowly cranked, observe the reading on the vehicle ammeter, or on an ammeter connected in series with the battery supply cable. The reading should rise and fall with the closing and opening of the contacts if the low tension wiring is in order. When a reading is given which does not fluctuate, a short circuit, or contacts remaining closed, is indicated. No reading indicates an open circuit in the low tension circuit or badly adjusted or dirty contacts.

Check the contacts for cleanliness and correct gap setting as described in Para. 2(b). Ensure that the moving arm moves freely on the pivot. If sluggish, remove the arm and polish the pivot post with a strip of fine emery cloth. Smear the post with Ragosine Molybdenised non-creep oil or Mobilgrease No. 2. Replace the arm.

If the fault persists, proceed as follows:

### (c) LOW TENSION CIRCUIT—FAULT LOCATION

#### (i.) No reading in ammeter test

Refer to wiring diagram and check circuit for broken or loose connections, including ignition switch.

Check the ignition coil by substitution.

#### (ii.) Steady reading in ammeter test

Refer to wiring diagram and check wiring for indications of a short circuit. Check capacitor (either by substitution or on a suitable tester). Check ignition coil by substitution.

Examine insulation of contact breaker.

### (d) HIGH TENSION CIRCUIT

If the low tension circuit is in order, remove the high tension cable from the centre terminal of the distributor cover. Switch on the ignition and turn the engine until the contacts close. Flick open the contact breaker lever whilst the high tension cable from the coil is held about  $\frac{3}{16}$ " from the cylinder block. If the ignition equipment is in good order, a strong spark will be obtained. If no spark occurs, a fault in the circuit of the secondary



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winding of the coil is indicated and the coil must be replaced. Carefully examine the high tension cables and replace if the insulation is cracked or perished, using 7 mm. (p.v.c. or neoprene-covered) rubber-insulated ignition cable.

To fit cables to ignition coils or to distributor covers with vertical outlets, pass the cable through the knurled

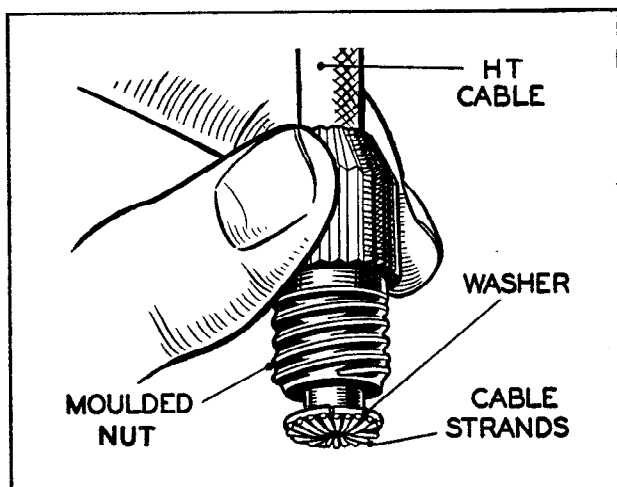


Fig. 3.  
Fitting moulded terminal to high tension cable (ignition coil, or distributor cover with vertical outlets)

moulded terminal, bare about  $\frac{1}{4}$ " of the end of the cable, thread the wire through the brass washer (removed from the original cable) and bend back the strands. Finally screw the moulded terminal into the coil moulding or distributor cover.

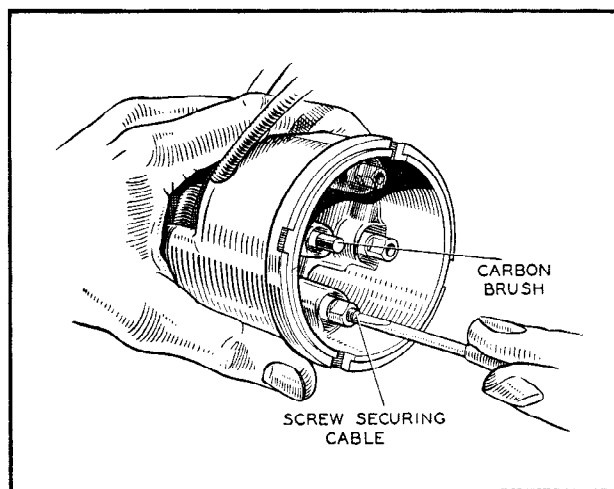


Fig. 4.  
Making connections to distributors with horizontal high tension cable outlets

To make connections to the terminals in distributor covers having horizontal outlets, remove the cover and slacken the screws on the inside of the moulding. Cut the cables to the length required and push firmly home in the holes in the moulding. Tighten the screws, which will pierce the rubber insulation to make good contact with the cable core. The connection to the centre terminal is made accessible by removing the small carbon brush.

The cables from the distributor to the sparking plugs must be connected in the correct firing order.

## (e) DISMANTLING

When dismantling, carefully note the positions in which the various components are fitted, in order to ensure their correct replacement on reassembly. If the driving dog or gear is offset, or marked in some way for convenience in timing, note the relation between it and the rotor electrode and maintain this relation when re-assembling the distributor. The amount of dismantling necessary will naturally depend on the repair required.

Spring back the securing clips and remove the moulded cover. Lift the rotor arm off the spindle, carefully levering with a screwdriver if it is tight.

Next take out the split pin securing the vacuum unit link to the rotating contact breaker plate, and remove the two screws at the edge of the contact breaker base. Slacken the two nuts on the low tension terminal and pull the connection from the contact breaker away from the terminal block. The contact breaker assembly, can now be lifted off (see (i) below). Remove the circlip on the end of the micrometer timing screw, and turn the micrometer nut until the screw and the vacuum unit assembly are freed. Take care not to lose the ratchet and coil springs located under the micrometer nut.

Before attempting to remove the shaft and action plate assembly from plain bearing models, first unscrew the complete lubricator from the distributor body and remove the spring and pad.

The complete shaft assembly can now be removed from the distributor body (see (ii) below).

## (i) Contact Breaker

To dismantle the assembly further, remove the nut, insulating piece and connections from the pillar on which the contact breaker spring is anchored.

Lift off the contact breaker lever and the insulating washer beneath it. Remove the two screws securing the fixed contact plate, together with the spring and plain steel washers, and take off the plate. Withdraw the single screw securing the capacitor and contact breaker earthing lead. The contact breaker base assembly can be dismantled by removing the jump ring and star washer located under the lower plate.



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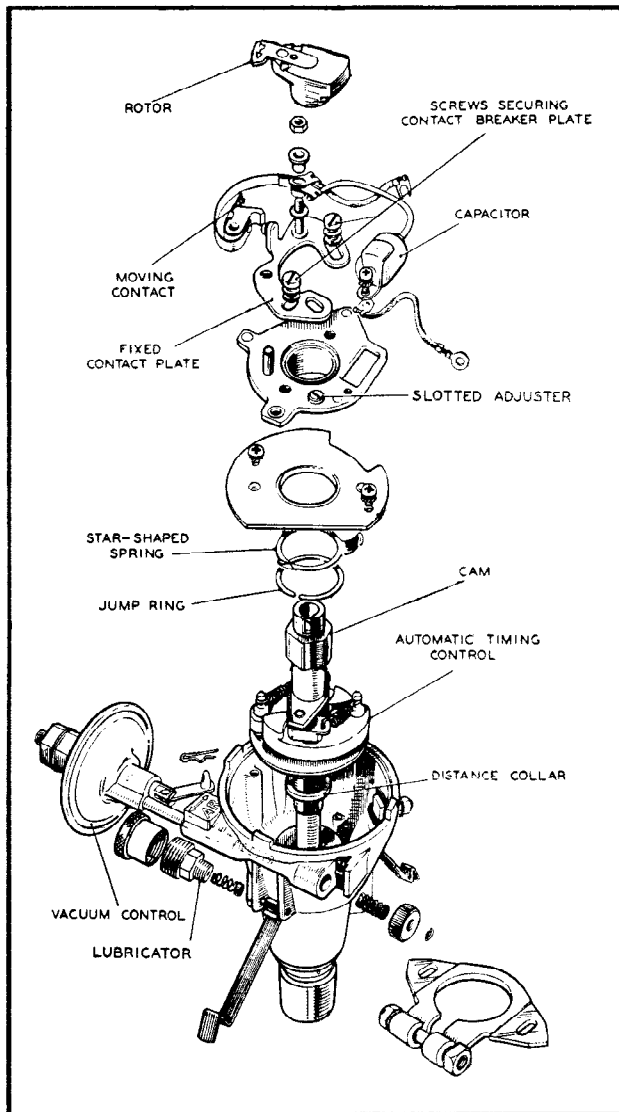


Fig. 5.

Model DM6, dismantled

## (ii) Shaft and action plate

To dismantle the assembly further, take out the screw inside the cam and remove the cam and cam foot. The weights, springs and toggles of the automatic timing control can now be lifted off the action plate. Note that a distance collar is fitted on the shaft underneath the action plate.

## (f) BEARING REPLACEMENT

Model DM distributors have bearings forming an integral part of the cast iron shank, and no appreciable wear should occur during the normal service life of the distributor provided lubrication is carried out as specified.

The bearing bush at the bottom of the shank of model DMB distributors can be driven out with a suitable punch. The ball bearing at the top of the shaft can be removed by means of a shouldered mandrel locating on the inner journal of the bearing.

Fit the new ball bearing into its housing at the top of the shank, using a shouldered mandrel that locates on both inner and outer bearing journals.

Prepare the new bush for fitting by allowing it to stand completely immersed in medium viscosity (S.A.E. 30-40) engine oil for at least 24 hours. In cases of extreme urgency, this period of soaking may be shortened by heating the oil to 100°C. for 2 hours, then **allowing the oil to cool before removing the bush**. Using a shouldered mandrel, press the bearing into the shank. The mandrel should be hardened and polished, and approximately 0.0005" greater in diameter than the distributor shaft. To prevent subsequent withdrawal of the bush with the mandrel, a stripping washer should be fitted between the shoulder of the mandrel and the bush.

**Under no circumstances should the bush be over-bored by reamering or any other means, since this will impair the porosity and thereby the effective lubricating quality of the bush.**

## (g) REASSEMBLY

The following instructions assume that **complete** dismantling has been undertaken.

(i) Reassemble the automatic timing control. See that the springs are not stretched or damaged. Place the cam and cam foot assembly over the shaft, engaging the projections on the cam foot with the toggles (or weights) and fit the securing screw.

(ii.) Place the distance collar over the shaft. Smear the shaft with Ragosine Molybdenised non-creep oil or clean engine oil and fit it into its bearing.

(iii.) Refit the vacuum unit into its housing and replace the springs, milled adjusting nut and securing circlip.

(iv.) Refit the shaft lubricator to models having plain bearings.

(v.) Replace the connection to the low tension terminal on the inner side of the distributor body and tighten the nuts on the terminal post.

(vi.) Before reassembling the contact breaker base assembly, lightly smear the base plate with Ragosine Molybdenised non-creep oil, or clean engine oil. On earlier distributors, the felt pad under the rotating contact breaker plate should be moistened with a few drops of thin machine oil. Fit the moving con-



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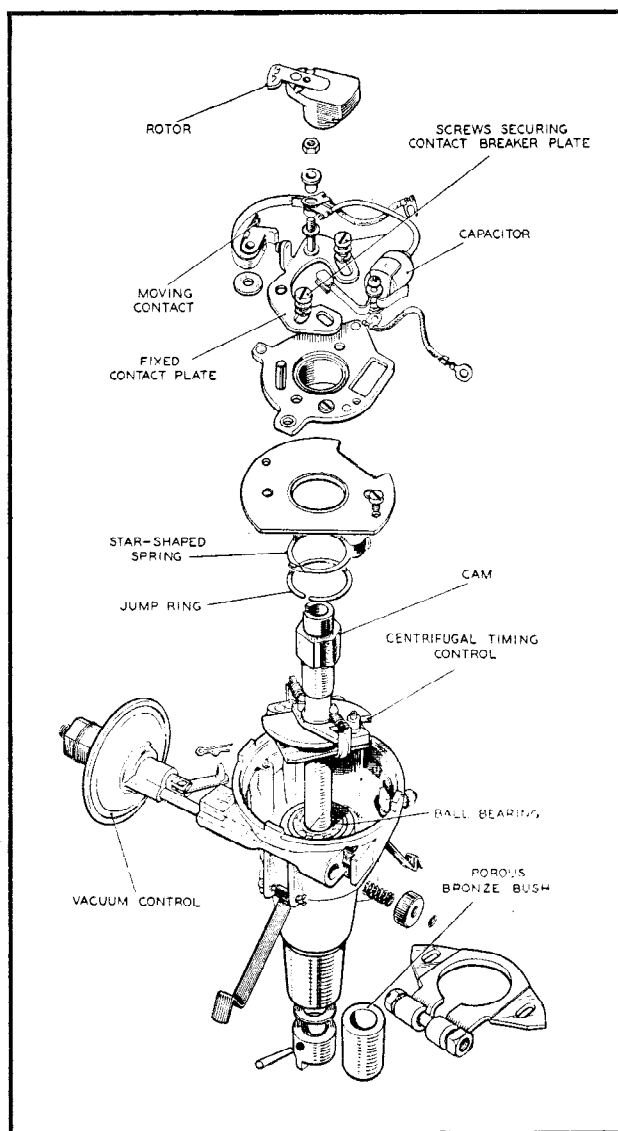


Fig. 6.  
Model DMBZ4, dismantled

tact breaker plate to the base plate and secure with the star washer and jump ring. Refit the contact breaker base into the distributor body. Engage the link from the vacuum unit with the bearing bush in the rotating plate, and secure with the split pin. Insert the two base plate securing screws, one of which also secures one end of the earthing cable.

(vii.) Fit the capacitor into position. The eyelet on the end of the contact breaker earthing cable is held under the capacitor fixing screw. Place the fixed contact plate in position and secure lightly with two securing screws. Fit one plain and one spring washer under each of these screws.

(viii.) Place the insulating washer on the contact breaker pivot post and on the pillar on which the end of the contact breaker spring locates. Refit the contact breaker lever and spring.

(ix.) Thread the low tension connector and capacitor eyelets on to the insulating piece, and place these on the pillar which secures the end of the contact breaker spring. Refit the washer and securing nut.

(x.) Set the contact gap to 0.014" to 0.016" and tighten the securing screws of the fixed contact plate.

(xi.) Refit the rotor arm, locating the moulded projection in the rotor arm with the keyway in the shaft and pushing fully home. Refit the moulded cover.

(xii.) Before refitting the distributor to the vehicle fill the lubricator cap on plain bearing models with Acheson's graphited grease grade GC, or an equivalent grease such as Shell Retinax A.

## (h) REPLACEMENT CONTACTS

If the contacts are so badly worn that replacement is necessary, they must be renewed as a pair and not individually. Set the contact gap to 0.014" to 0.016"; after the first 500 miles' running with new contacts fitted, check the setting and reset the gap to 0.014" to 0.016". This procedure allows for the initial "bedding-in" of the heel.

