How To Service and Repair The Lucas Distributor

Of the many makes of distributor found on classic cars today, the Lucas is among the most common. They are found principally on Leyland cars, there were two main series: the 22, 23 and 25 series; and the later 43, 44 and 45 series. Each type occurs in both 4 and 6 cylinder versions, indicated by the suffix D4 or D6. Within each series the 23 and 43 models differ most in that they are not fitted with vacuum advance systems. Distributor maintenance involves checking the contact breaker gap, making sure that the contacts (points) are clean and not badly pitted and lubricating the unit. A complete dismantle and service is possible and may be worthwhile if the unit has been in service for a long time.

The Work Of The Distributor

For a car engine to run correctly, ignition of the fuel/air mixture must take place in each cylinder at the right time. Two jobs are carried out by the distributor. It both initiates the production of this spark, and passes it to the correct spark plug at the right time in relation to engine speed and load. An overhaul will aid efficiency. The distributor is basically a rotating shaft geared to the camshaft. As this shaft rotates, a cam on it operates a moveable contact which makes and breaks the coil primary circuit. This breaking of the primary low voltage (low tension) circuit has the effect of generating a high voltage (high tension) surge which then passes from the coil to the cap of the distributor. There the rotor arm at the top of the shaft distributes it to the spark plugs via contacts in the cap.

The moment at which the spark should occur in the cylinder is not always the same, but varies with engine load and speed. To accommodate these variations there are two further refinements on the distributor which advance or retard the timing of the spark as necessary. They are the mechanical advance system and the vacuum-operated system mounted on the distributor body. The mechanical system comprises two weights attached by springs to the part of the distributor shaft which carries the contact breaker cam. They are pivoted at their other ends on a circular drive plate which moves with the distributor main shaft. As the speed of the shaft increases, the weights move outwards. This results in pressure being applied to the contact breaker cam through the springs so that the cam is turned in relation to the main-shaft. The contacts open earlier, thereby advancing the timing.

All distributors have the mechanical advance system and generally it functions quite efficiently. However, a vacuum advance system is often incorporated to increase the accuracy of the ignition timing. The vacuum advance consists of a diaphragm which is linked mechanically to the contact breaker plate and by a tube to the carburettor. High engine speed increases the suction within the carburettor bore to a point where

the diaphragm in the vacuum advance is pulled forwards, moving the contact breaker plate and advancing the timing of the spark. Clearly, the distributor is a critical component in the operation of any engine and correct maintenance of this part will help ensure that your engine both starts well and performs to its full potential.

Servicing The Contact Breaker Assembly

Basically contact breaker servicing simply involves adjusting the size of the gap between the points when the contacts are open using a clean feeler gauge. First remove the distributor cap, which is held in place by spring clips, then lift off the rotor arm. The contact breaker and the cam which operates it will now be visible. Now turn the engine over while watching the cam. When the heel of the contact breaker is exactly on one of the lobes of the cam and the points are therefore fully opened, measure the gap between the points with a feeler gauge. A 0.38 mm (0.015ins) feeler should just be a sliding fit. If the gap is obviously larger or smaller than this it should be re-set. To do this first slacken off the screw which secures the fixed contact plate. Then, by inserting the screwdriver in the recess at the end of the fixed contact plate, lever the plate until the gap is correct. Re-tighten the screw, taking care not to disturb the setting. As a final check turn the engine over and check the gap on each lobe of the cam.

As there is almost continual sparking between the two contacts the points eventually become dirty and pitted. This affects both the size of the gap and the general efficiency of operation. Therefore it is a good idea to remove the contact breaker assembly periodically and give it a thorough clean or replace it with a new set. This operation is slightly different for the two series of Lucas distributors. On the older series (22, 23, 25) you must first unscrew the terminal nut and remove it with its washer. Next pull off the nylon bush, condenser lead and the low tension lead. Then remove the contact breaker arm and the fibre washer beneath it. The plate can then be removed by undoing the retaining screw.

On the newer series of Lucas distributors, with the cap and rotor removed the first step is to remove the contacts securing screw with its spring and washers. Once you have done this press the moveable contact breaker arm towards the cam and release it from the terminal. With the points free, examine them for pitting. If they are not too bad you should be able to clean them up with emery cloth or fine grade wet-and-dry paper. One of the contacts will probably have signs of pitting while the other one

will have deposits on it. When cleaning them you should try to reface the contacts so that they are parallel to each other. Obviously if they are badly worn then they will need replacing. Re-fitting a new set of points for either the new or old series is simply a reversal of the removal procedure. But before you fit new points give the faces of the contacts a good clean with methylated spirits.

Lubrication of the Distributor

The distributor, like all other moving parts in an engine, requires periodic lubrication, roughly every 10,000 km (6,000 miles). Lubrication is slightly different for the two Lucas series distributors. On the older series, the cam should be lubricated with Retinax 'A' or an equivalent grease. You should then inject a couple of drops of clean engine oil (SAE 30) through the aperture in the contact breaker base plate. This will lubricate the automatic advance mechanism. Next lift off the rotor arm and apply a few drops of engine oil to the top of the shaft to lubricate the cam bearing.

Certain distributors in the earlier series have two-piece contact breaker sets. On these you should apply one drop of engine oil to the pivot post on the contact breaker base plate. If your distributor has one-piece contact breakers, simply smear a little grease on the outside of the hollow pivot post. Do not use too much. On 43, 44, and 45 series distributors, first lubricate the contact breaker pivot post and the face of the cam with Retinax 'A' or equivalent grease. Next, apply a few drops of engine oil to the felt pad at the top of the cam to lubricate the spindle, then lubricate the vacuum advance, where fitted, through the two small apertures in the contact breaker base plate.

Checking The Condenser

A certain amount of sparking and resultant wear between the contacts is unavoidable, but to minimize this a condenser (capacitor) is fitted. As the condenser is wired in parallel with the contact breaker points, failure of the component will interrupt the low tension circuit and inevitably cause ignition failure. Fortunately, condensers give ample warning that they are about to fail; the car will be hard to start, the engine will miss, and the points will show signs of serious burning. If your car shows any of these symptoms and investigation leads you to suspect the condition of the condenser, simply purchase and fit a new one.

To remove the condenser on the older series distributors, unscrew the terminal nut, and take off the nut, washer and nylon bush. This will release the condenser. On the

newer distributors it is held in place by a single screw. When re-fitting a new condenser be sure that its leads are in good condition and do not short circuit against any part of the contact breaker base plate.

Distributor Removal, Dismantling and Overhaul

The extent to which you can overhaul a distributor which has been in service for a long time is limited by the availability of spare parts. So before you start to dismantle your distributor, check with your local main dealer to find out what replacement parts you will be able to buy. If none are available then you will simply have to exchange your unit for a new or factory-reconditioned replacement. Whether you are going to service your distributor or simply replace it the next step will be the same. Start by detaching the high tension leads from the spark plugs. Then remove the low tension lead from the side of the distributor. The pipe to the vacuum advance should then be disconnected. Undo the distributor clamp plate bolt and withdraw the whole unit. As long as you do not disturb the driveshaft or turn the engine over, the timing will not be altered and the new or serviced distributor can simply be slotted back into place.

With the distributor on the bench start dismantling it by removing the cap and rotor. Clean the cover and inspect it closely for cracks and any signs of charring caused by short-circuiting (tracking) of the high tension spark. If either are present then the cap should be replaced. Also inspect the brush for wear. It should be approximately 4 mm (0.156ins) long and its end should be bevelled. Also check that it moves freely. Slight burning of the contacts in the cap is quite acceptable and you should not try to clean them. If you do so, you will increase the gap between them and the rotor, and this will lead to excessive burning of both the rotor and the contacts and it could also overload and seriously damage the coil.

Check the rotor for wear but note that some burning of its edge is normal. Do not clean the rotor with anything abrasive; if it becomes scored it will simply wear away the contacts more quickly. If there are any signs of tracking, however, the rotor should be replaced. The procedure for further dismantling of the distributor is slightly different for the two series of Lucas distributors, so separate instructions are given for each series. On the older series, start by removing the contact breaker and condenser as described above. Next free the vacuum advance spring (where fitted) from the pin on the contact plate and lift out the contact plate. The base plate can be removed by undoing the two securing screws and lifting off the earth lead.

Before going further make a note of the position of the slot in the rotor drive in

relation to the offset drive dog at the other end of the distributor. These two parts must be kept in the same relation to each other, or the timing may be thrown out by 180°. Next, unscrew the cam spindle retaining screw and lift off the cam spindle. The weights of the mechanical advance can then be removed, examined for wear and replaced as necessary. To remove the vacuum advance, start by taking off the circlip and the adjustment nut. With this free, take off the spring and ratchet. The vacuum unit may then be removed.

In order to remove the driveshaft you will require a small parallel drift to drive out the locking pin from the driving dog. This shaft and its thrust washers can then be removed. The unit is now completely dismantled. To dismantle one of the newer types of distributor, start by removing the two screws which retain the vacuum unit. Then, by tilting the distributor downwards, disengage the vacuum unit actuating lever from the tapered peg on the contact breaker base plate. The vacuum unit can now be withdrawn from the distributor body. Next push the low tension lead into the interior of the distributor and, after removing the base-plate screws, lift this plate away.

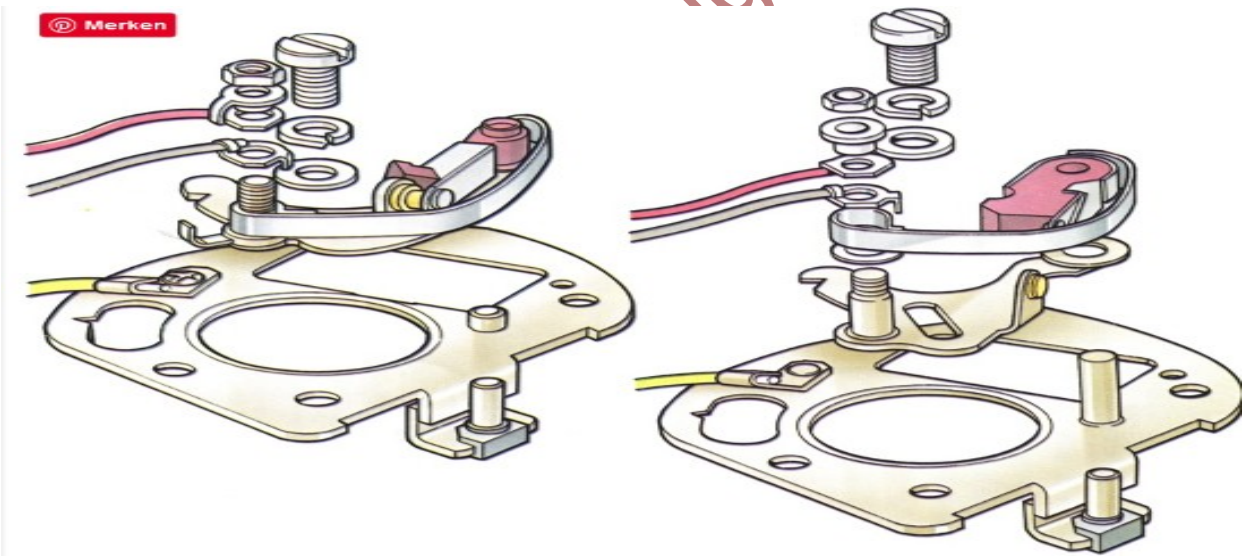
After first noting the relative position of the drive dog to the rotor drive, drift out the locking pin and remove the dog and thrust washer. The whole shaft assembly can then be lifted out. You will now be able to remove the contact breaker and condenser, leaving the mechanical advance mechanism exposed. The distributor is now fully dismantled. Once dismantled, clean all the components in paraffin and dry them thoroughly. How far it is possible to service the unit will again depend on the availability of spares and this will differ between the new and old series distributors. In the older series you will be able to replace the breaker plate and breaker arm pivot, if either is loose or worn. The mechanical advance weights and their pivot pins can also be renewed, as can the cam assembly if it shows any signs of wear on the shaft. If the drive shaft is loose in its bushes then a new shaft and bushes should be fitted.

The bushes are simply pushed out, but note that new bushes should be soaked in engine oil for 24 hours before they are fitted. Drive shafts are sold undrilled so you will have to drill a new one using a 5 mm (3 16ins) drill to provide for the locking pin. Use the hole in the dog as a guide and drill while compressing the shaft and dog together. Once you have inserted the pin, the dog should be tapped a few times with a mallet to flatten the pips on the new thrust washer and provide the correct amount of end-float. Less work is possible on the newer distributors, partly because they are simpler. The springs on the weights can be renewed, but if the weights themselves are at all worn the complete shaft assembly will need replacing. Any wear on the bearings, evident by looseness, will require replacement of the whole distributor.

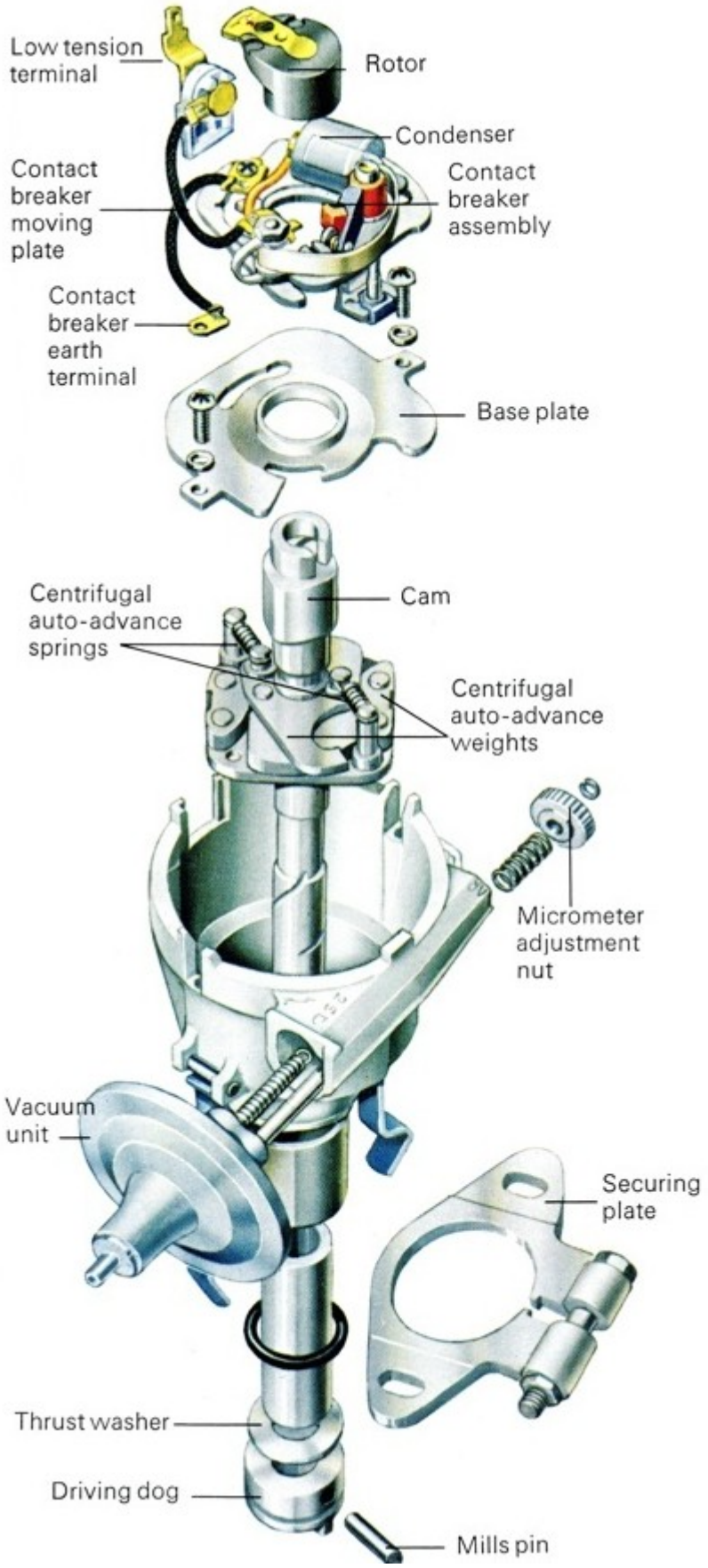
Replacement of either type of distributor is basically the reverse of the dismantling procedure. But do not forget to lightly lubricate all the moving parts. Also make sure that the dog is re-fitted in the correct position relative to the rotor. On those distributors which have micrometer-adjusted vacuum advances, the screw on the unit should be set halfway along the timing scale. With the unit replaced on the engine, re-set the contact gap and the job is basically complete, although you may have to check the timing.

Checking Your Lucas Distributor When The Engine Is Running Rough

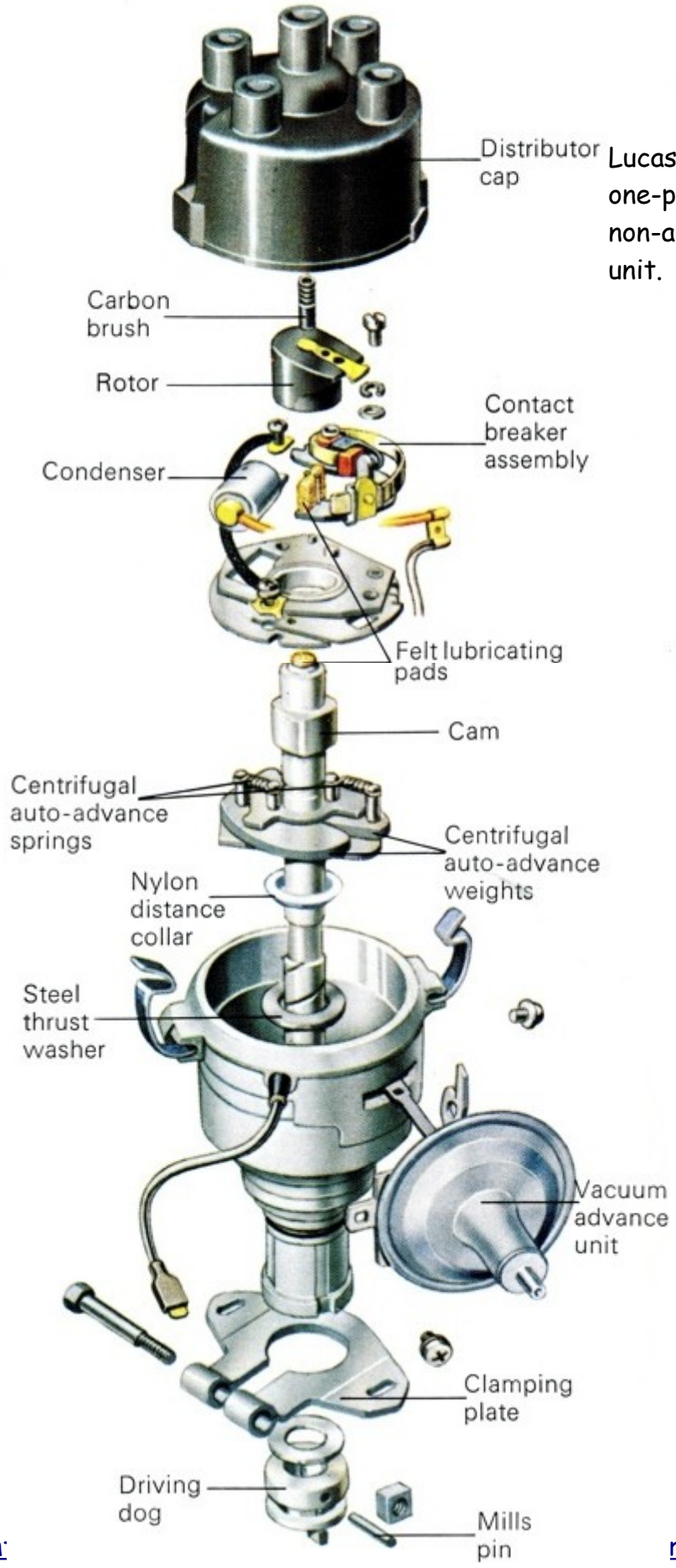
The vacuum advance units on Lucas distributors are not fixed to the distributor in the usual way, but are held by one long bolt. On the other side of the distributor there is a knurled adjusting nut. First prise out the small wire circlip which is on the same thread and put it to one side. Then loosen the knurled nut carefully. As you undo it count the number of times the nut turns. In this case the connecting arm is a long, slender spring. Disconnect this from the base-plate and withdraw the vacuum advance, bolt and spring as one unit. Slide the replacement into position. Reconnect the spring and turn the knurled nut back on to the thread for exactly the same number of turns as was needed to remove it. Replace the circlip in the thread.



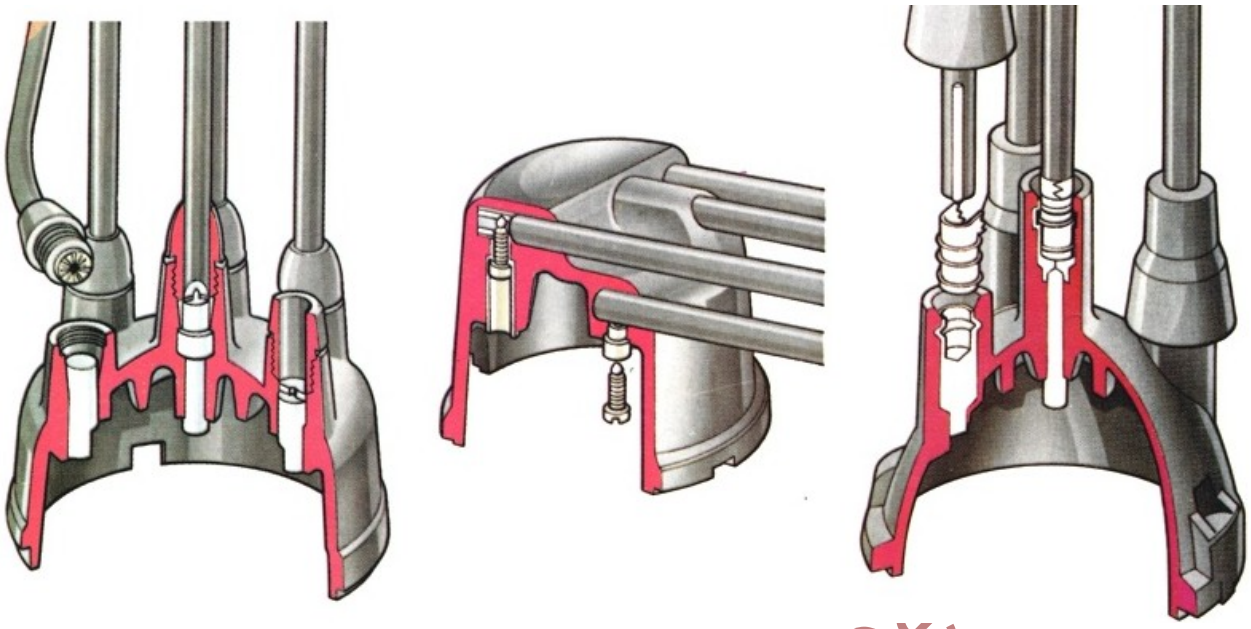
Lucas distributor one-piece contact set
(the older type had a two-piece assembly).



The older style Lucas 25D distributor with vacuum advance.



Lucas 45D distributor with one-piece contact breaker and non-adjustable vacuum advance unit.



The different distributor cap styles as used on Lucas distributors.