SECTION C

THE IGNITION SYSTEM

GENERAL DESCRIPTION.

The coil ignition equipment is provided with an automatic advance mechanism which is housed in the distributor unit. It consists of a centrifugally operated mechanism by means of which the ignition is advanced in proportion to the engine speed.

Like the rest of the electrical equipment, it is wired on the "positive earth" system, which results in longer sparking plug life.

Distributor Type.

The distributor is a Lucas Model DKY4A, Service No. 40162. These identification marks are stamped on the side of the distributor.

Ignition Coil Type.

The coil is a Lucas Model Q12, Service No. 45020. These identification marks are stamped on the base of the ignition coil.

Sparking Plugs.

The standard sparking plugs for the M.G. "TD" Midget are Champion L.10S, 14 mm.

Attention to Sparking Plugs.

To obtain the best engine performance and the most economical running, the sparking plugs must be kept clean and correctly adjusted. They should be removed and cleaned after the first 500 miles of use in a new engine. This is advisable since the slower engine speeds and the conditions of the running-in period have a tendency to cause fouling of the plugs. Plugs should subsequently be removed for inspection cleaning and adjustment after each period of 3,000 miles.

When sparking plugs are removed from the engine their gaskets should be removed with them and replaced on the plugs, which should be placed in a suitable holder. It is advisable to identify each plug with the number of the cylinder from which it was removed so that any faults can be traced back to the cylinder concerned.

When examining plugs place a new plug of the same type beside the others to afford a ready comparison of their relative conditions.

When examining plugs note the condition of their gaskets. A large proportion of the heat from the insulator is dissipated to the cylinder head by means of the copper gasket between the plug and cylinder head. Plugs not screwed down tight become overheated, causing pre-ignition, short plug life and pinking.

Gaskets in different conditions are illustrated in Fig. 17. The upper left-hand gasket was obviously not properly compressed, owing to the plug not being tightened down sufficiently.

On the other hand it is unnecessary and unwise to tighten up the plugs too much. What is required is a reasonably good seal between the plug and the cylinder head.

The lower left-hand gasket clearly indicates that the plug was pulled down too tightly or has been in service too long. Note its distorted condition and the evidence of blow-by, which is a prolific cause of plug overheating.

The right-hand upper gasket is in good condition, providing an adequate seal and a good path for heat dissipation.

For comparison a new gasket is shown in the lower right-hand corner of Fig. 17.

If the gaskets are at all questionable they should be replaced by new ones without hesitation.

Plug inspection.

After removal of the plug the condition of the electrodes and deposits on the insulator and plug body should be examined.

1. If the insulator is brown in colour, the electrodes grey and the plug body dry or covered with a thin layer of soot, the engine condition and mixture strength are satisfactory.
2. A dry, greyish-yellow or brown insulator with a thin layer of light fawn powder deposit indicates the use of a leaded fuel or a rich mixture.
3. When the insulator is dry and fawn or white in colour, and the electrodes are corroded and burnt at the tips, the plug temperature is too high.

   This is caused either through the use of an unsuitable plug; by a weak mixture; or by high combustion temperatures.

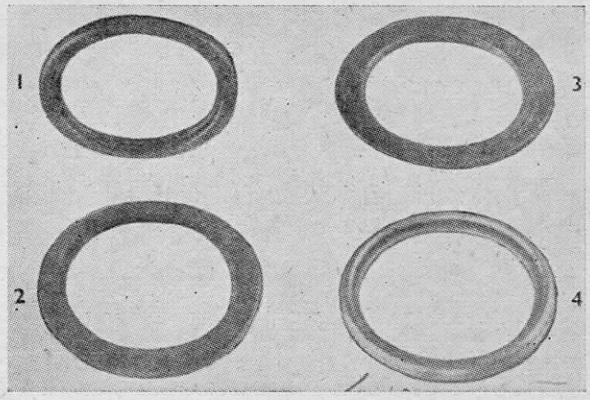

FIG. 17.—This illustration shows plug gaskets in various conditions. (1) Indicating insufficient tightening down on the plug. (2) Over-tightening of the plug. (3) Correct degree of tightening. (4) New gasket before use.

4. Soot deposits, forming a black velvety coating on the insulator and plug body, show that the plug does not reach a self-cleansing temperature. This may be due to a mixture which is too rich, but if the deposit is wet it indicates that oil is also reaching the combustion space in excessive quantities. Correct operation may be restored by adjusting the mixture, but an overhaul of the engine is necessary to reduce the amount of oil passing the piston.
5. After cleaning, examine the plugs for cracked insulators and the lower end for wear produced through previous cleaning.

Whenever possible sparking plugs should be cleaned in a special plug cleaner of the type supplied by the plug manufacturer. Oily plugs should be washed with petrol first. A compressed air jet should then be used to remove any abrasive from the interior of the plug body and the insulator. If a plug cleaner is not available, a wire brush is the best substitute. This should also be used to clean any accumulation of carbon from the threads. The thread portion of the plug body is often neglected when cleaning owing to the fact that it is not generally realised that, like the gaskets, the threads are an important means of heat dissipation and that when they are coated with carbon it retards the flow of heat from the plug and leads to overheating.

Having ensured that the plug is thoroughly clean and still serviceable, the electrodes should be reset. A combination gauge and setting tool produced by the makers of Champion sparking plugs greatly facilitates the correct and easy setting of the sparking plug points, but care should be taken to avoid a false reading through distortion of the points by burning.

When resetting the points, the side electrode only should be adjusted to give the correct clearance. Never bend the centre electrode.

Champion L.10S plugs are fitted as standard, and their correct spark gap should be set between .020 and .022.

Remember that electrode corrosion and the development of oxides at the gap area vitally affects the sparking efficiency. The special plug cleaner can remove oxides and deposits from the insulator, but the cleaner stream does not always reach this area with full effect owing to its location, and cannot necessarily deal with corrosion effectively as this sometimes requires too strong a blast for proper removal.

When plugs appear worthy of further use it is good practice to dress the gap area on both centre and side electrodes with a small file before resetting them to the correct gap. The intense heat, pressures, explosion shock, electrical and chemical action to which the plugs are submitted during miles of service are so intense that the molecular structure of the metal of the points is eventually affected. Plugs then reach a worn out condition where resetting of the points no longer serves a useful purpose and where plug replacement is called for. Every 12,000 miles new plugs should, therefore, be fitted.

Before replacing a used plug in the engine, test it for correct functioning under air pressure in a plug tester, following out the instructions issued by the makers of the tester. Generally speaking a plug may be considered satisfactory for further service if it sparks continuously under a pressure of 100 lb./sq. in. with the gap between the points set at .022 in. It is essential that the plug points then be reset to the smaller gap of .020 in. before the plug is refitted to the engine.

While the plug is under pressure in the tester it should be inspected for leakage by applying oil round the terminal and insulator. Leakage is indicated by the production of air bubbles, the intensity of which give an indication of the degree of leakage. The leaking gases have a "blow-torch" effect when the engine is running which rapidly raises the temperature of the plug to above its heat range, thus producing overheating, pre-ignition, and rapid electrode destruction.

The top half of the insulator is also frequently responsible for poor plug performance due to the following faults: Splashes, accumulation of dirt or dust, cracked insulators, and over-tightness of the terminals. Examine for a cracked insulator at the shoulder and the terminal post and remove any accumulation of dirt and dust.

Since each engine design has its own particular working temperature and pressure inside the cylinder it is essential that only sparking plugs recommended by The M.G. Car Company Ltd. be used. A plug designed for a hot dry engine will not function satisfactorily in relatively cool oily engines, as it will constantly oil up and cause trouble. On the other hand, a plug suitable for the oily engine will not function in the hot type engine as the points will overheat and cause pre-ignition.

The threaded portion or "reach" of the plug is also important since it determines the position of the points in the combustion chamber and may produce pre-ignition if the threads on the plug body protrude beyond the cylinder head.

Contact Breaker Mechanism.

After the first 500 miles and subsequently every 3,000 miles check the contact breaker as follows:—

(a) Turn the engine until the contact breaker points are fully opened, and check the gap with a gauge having a thickness of from .010 to .012. If the gap is correct, the gauge should be a sliding fit. Do not alter the setting unless the gap varies considerably from the gauge thickness.

To adjust the setting keep the engine in the position which gives maximum opening of the contacts and then slacken the two screws securing the fixed contact plate. Adjust the position of the plate until the gap is set to the thickness of the gauge and then tighten the two locking screws.

Remember that the cam only keeps the contact points fully open over 10° and that care must be taken to ensure that the points are in the fully open position.

(b) If the contacts are dirty or pitted they must be cleaned by polishing them with a fine carborundum stone, and afterwards wiping them with a petrol-moistened cloth. The moving contact can be removed from its mounting in order to assist cleaning. Check and adjust the contact breaker setting after cleaning the contacts.

(c) Check that the moving arm moves freely on its pivot. If it is sluggish, polish the pivot pin with a strip of fine emery cloth. Afterwards clean off all trace of emery dust and apply a spot of clean engine oil to the top of the pivot.

The contact breaker spring tension should be between 20 and 24 ozs. measured at the contacts.

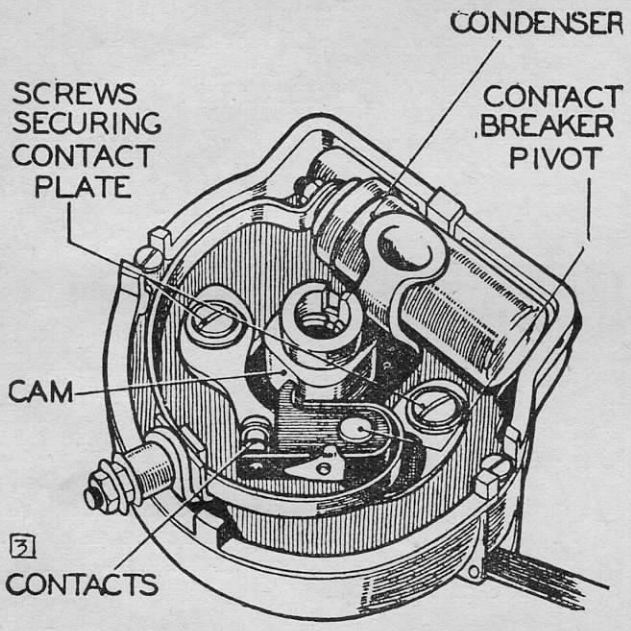

FIG. 18.—The contact breaker, showing the adjusting screws.

Distributor Lubrication.

To be carried out after servicing the distributor and at intervals of about 3,000 miles.

(a) Give the cam a light smear of grease, and apply a slight trace of oil to the top of the contact breaker lever pivot pin.

(b) Lift the rotor arm off the top of the spindle and add a few drops of thin machine oil through the lubricating passage provided in the spindle to lubricate the cam bearing and distributor shaft. (Do not remove the screw in the top of the spindle as an oilway is provided).

(c) Add a few drops of thin machine oil through the hole in the contact breaker base through which the cam passes, in order to lubricate the automatic timing controls. Do not allow any oil to get on or near the contacts.

Removal of the Distributor.

Disconnect the low tension lead from the terminal on the side of the distributor body. Spring back the two retaining clips and lift off the distributor head which can be lodged on the cylinder block. To facilitate replacement turn the engine over until the rotor arm is pointing to the segment in the cover for No. 1 cylinder plug lead.

Remove the locking wire from the dowel bolt holding the clamp plate to the cylinder block and take out the bolt. Disconnect the bonding wire from the cylinder block to the clamp and then the distributor can be lifted straight up.

It should be noted that the drive tongue on the end of the distributor shaft is offset. This is to ensure correct replacement on reassembly and avoid the possibility of the timing being 180° out of phase.

Provided the engine is set as indicated and not disturbed subsequently no difficulty will be encountered in correctly timing the spark when the distributor is replaced.

Ignition Timing Adjustment and Replacement of the Distributor.

When the distributor has been removed, it must be retimed on replacement. It should be set with points just breaking at T.D.C. To do this proceed as follows:—

Set the engine with the Nos. 1 and 4 cylinders on top dead centre.

Examine the valves to see which of the previously mentioned cylinders is starting its firing stroke.

Turn the distributor until the rotor is facing the appropriate segment and insert the distributor in its housing, so that the nearest tooth is engaged. Turn the body about until the locking screw will enter, and lock it.

Set the contact points to .012, and check that the hole in the crankshaft pulley still coincides with the arrow on the timing cover. The contact breaker points should now be commencing to open. Should this not be the case, release the clamping bolt at the base of the distributor, turn the distributor anticlockwise until the points are fully closed, and then turn carefully clockwise until the contact points just commence to open.

Securely tighten the clamp bolt.

Re-check timing to make sure that tightening the clamp bolt has not altered the setting.

NOTE: Before setting the timing, make sure that the automatic advance and retard mechanism is working properly and is in its fully retarded position while the timing is being set.

Important. For an accurate setting an electrical method should be used to determine the actual position at which the points break, one of the following methods can be used:—

(1) With the low tension lead connected to the distributor, turn on the ignition switch and connect a 12-volt lamp in parallel with the contact breaker point (i.e., one lead from the distributor low-tension terminal and the other to earth) and turn the distributor until the lamp lights, which indicates that the points have just opened.

(2) Get a second operator to watch the ammeter and then turn the distributor body, when it will be observed that the small reading recorded on the ammeter when the points are closed "flicks" back to zero immediately the points open.

Dismantling the Distributor.

Before dismantling, carefully note the positions in which the various components are fitted so that they can be replaced correctly, then:—

(a) Spring back the securing clips and remove the moulded cap.

(b) Lift the rotor off the top of the spindle.

(c) Slacken the nut on the terminal post and lift off the end of the contact breaker spring which is slotted to assist removal. Lift the contact breaker lever off its pivot pin and remove the insulating washer. Take out the two screws, complete with spring washers and flat steel washers, from the plate carrying the fixed contact and remove the plate.

(d) Undo the two screws fitted at the edge of the contact breaker base and lift them out together with the spring washers. The contact breaker base can then be removed from the body of the distributor.

(e) Unscrew the condenser terminal nut, lift off the spring washer and remove the connector strip. Soften the solder securing the condenser in its clip, and remove the condenser by applying pressure at one end.

(f) Drive out the parallel driving pin passing through the collar of the driving tongue member at the lower end of the spindle, and with draw the driving tongue from the spindle. Note that the driving tongue itself is offset and that the small offset is towards the front of the engine when the slot for the rotating arm faces the condenser in the distributor body.

(g) Lift the cam, automatic timing control and shaft assembly from the distributor. Take out the screw from inside the top of the cam spindle and lift the cam off. The automatic timing control is then accessible.

The Condenser.

The best method of testing the condenser is by substitution. Disconnect the original condenser and connect a new one between the low-tension terminal of the distributor and earth.

Should a new condenser be necessary, it is advisable to fit a complete condenser and contact breaker plate assembly, but should a condenser only be available, soften the solder securing the defective condenser in the clip and remove the condenser by applying pressure at one end. Care must be taken not to overheat the new condenser when soldering it in position.

The capacity of the condenser is 0.2 microfarads.

Fitting New Distributor Bushes.

In order to ensure easy running of the distributor shaft when the shank has been rebushed, the new bushes must be fitted so that they are in correct alignment. The bushes must be fitted by means of a vertical drilling machine or hand press, using a mandrel and a packing block.

(a) Fit the mandrel in the drilling machine or hand press and place the distributor body in an inverted position on the table below it.

(b) To remove the bushes, a sleeve must be fitted over the mandrel to build it up to the required size. With this sleeve fitted in position, force the old bushes out of the shank by applying a steady pressure. Before new bushes are fitted they should be allowed to soak for twenty-four hours in thin engine oil.

(c) Take the sleeve off the mandrel. Place one of the longer bushes on the mandrel, then the distributor body in an inverted position and finally one of the smaller bushes.

(d) Locate the end of the mandrel through the packing piece and press the mandrel downwards, taking care that both bushes enter the distributor shank squarely. Continue forcing the bushes into the shank until the mandrel reaches the end of its travel.

(e) After fitting, the bushes must not be opened out by reaming or any other means, as this would tend to impair the porosity of the bushes, and so prevent effective lubrication from being obtained.

Reassembling the Distributor.

NOTE: Before assembly, the automatic advance mechanism, distributor shaft, and the portion of the shaft on which the cam fits, must be lubricated with thin engine oil.

(a) Assemble the automatic timing control, taking care that the parts are fitted in their original positions and that the control springs are not stretched. Two holes are provided in each toggle; the springs must be fitted to the inner hole in each case. Place the cam on its spindle and secure by tightening the locking screw.

(b) Fit the shank in its bearings and replace the driving member. Remembering that the small offset of the driving tongue lies towards the front of the engine when the slot for the rotating arm in the cam faces towards the centre of the engine (or towards the condenser in the distributor body), fit the driving pin and burr over the collar each side, to retain it in position, with a suitable punch.

(c) Place the contact breaker base in position on the distributor body and secure it by replacing the two screws. A spring washer must be fitted under each of the screw heads, and the screws must be fully tightened.

(d) Place the end of the connector strip over the condenser terminal post, refit the spring washer and secure it by tightening the terminal nut.

(e) Position the plate carrying the fixed contact on the contact breaker base and secure it by replacing and lightly tightening the two screws, placing a spring washer and flat steel washer under the heads of each of the screws. Place the insulating washer over the contact breaker pivot pin and position the contact breaker lever over the pivot pin. Locate the slotted end of the contact breaker spring under the head of the terminal screw and tighten the nut to lock the spring in position. Adjust the contact breaker setting to give a maximum opening of from .010 to .012.

(f) Place the rotor on the top of the spindle, locating the register correctly, and push it fully home.

(g) Fit the distributor cap.

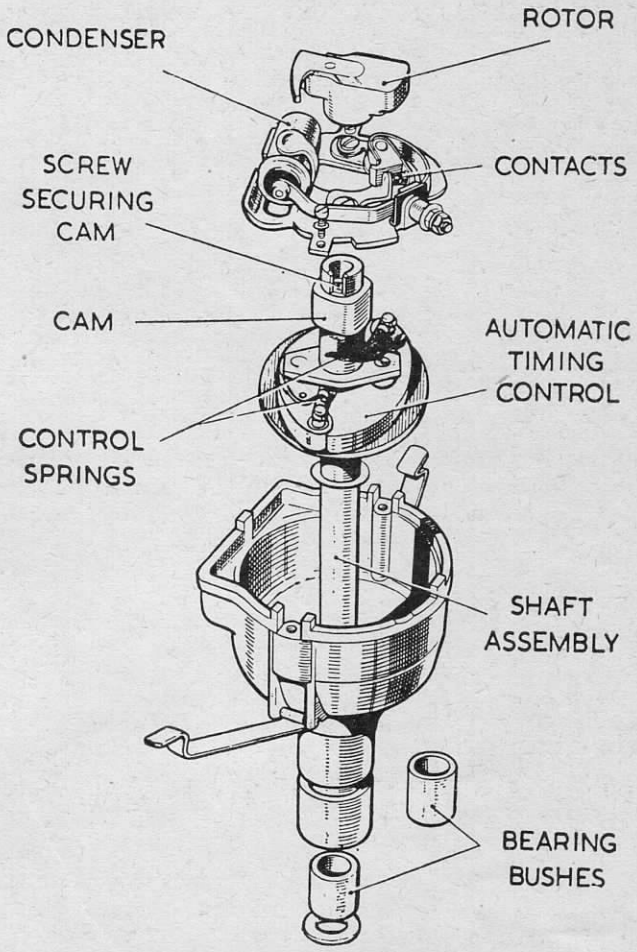

FIG. 19.—The component parts of the distributor.