



## THE IGNITION SYSTEM.

### THE DISTRIBUTOR.

A diagram of the ignition circuit is shown in Fig.22. The distributor, which is accessibly mounted on the near side of the engine, is of the three lobe cam and twin contact breaker arm type. An automatic centrifugal advance mechanism is housed in the base of the distributor head. No hand control for varying the ignition timing being fitted.

To expose the contact breakers and cam, spring back the securing clips and remove the moulded distributor cover.

The only adjustments required in service are maintenance of the correct gaps, and in certain circumstances, the synchronisation of the contact breaker arms.

The firing order is 1,4,2,6,3,5, this is embossed on the distributor cover, No.1 being the front cylinder. The direction of rotation of the distributor is clockwise when viewed from the top.

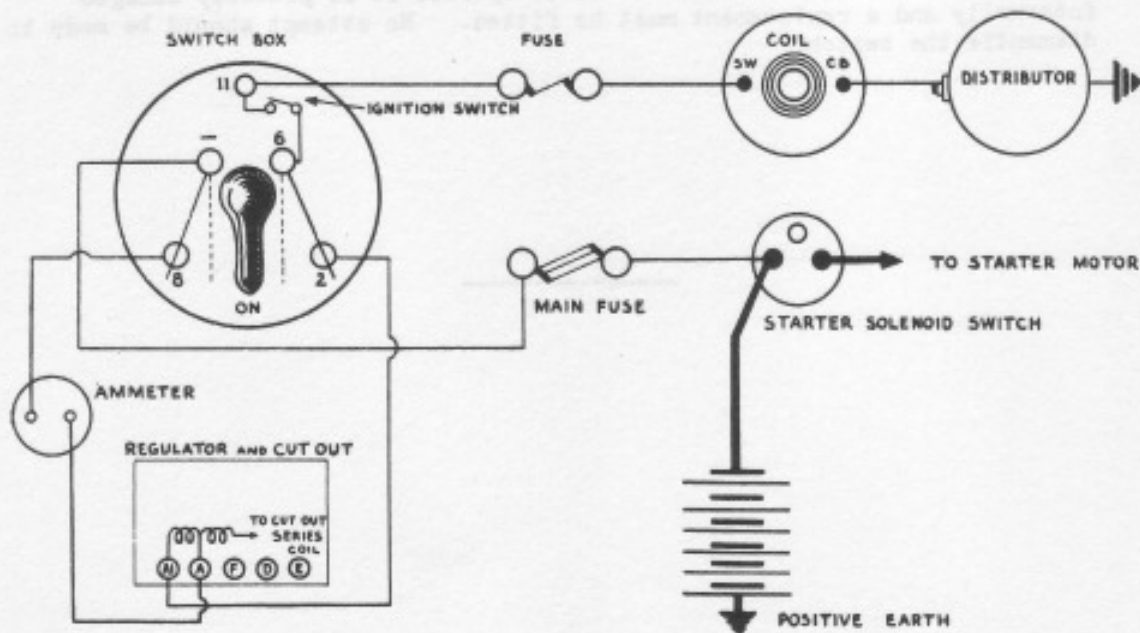


FIG. 22. IGNITION CIRCUIT.



### CLEANING THE CONTACTS.

Every 5000 miles the contact surfaces should be examined. If they have a clean greyish frosted appearance and are not badly pitted, then do not try to improve them by trimming.

If, however, they appear burnt and badly pitted, they should be removed from the distributor for trimming as follows:-

Lift the Rotor Arm off the top of the spindle. Remove the small screws which attach the springs to their anchorage. Remove the two Contact Plate Locking Screws B and E (see Fig.23), then remove the contact plates complete with breaker arms. Screws G, H and J MUST NOT be disturbed.

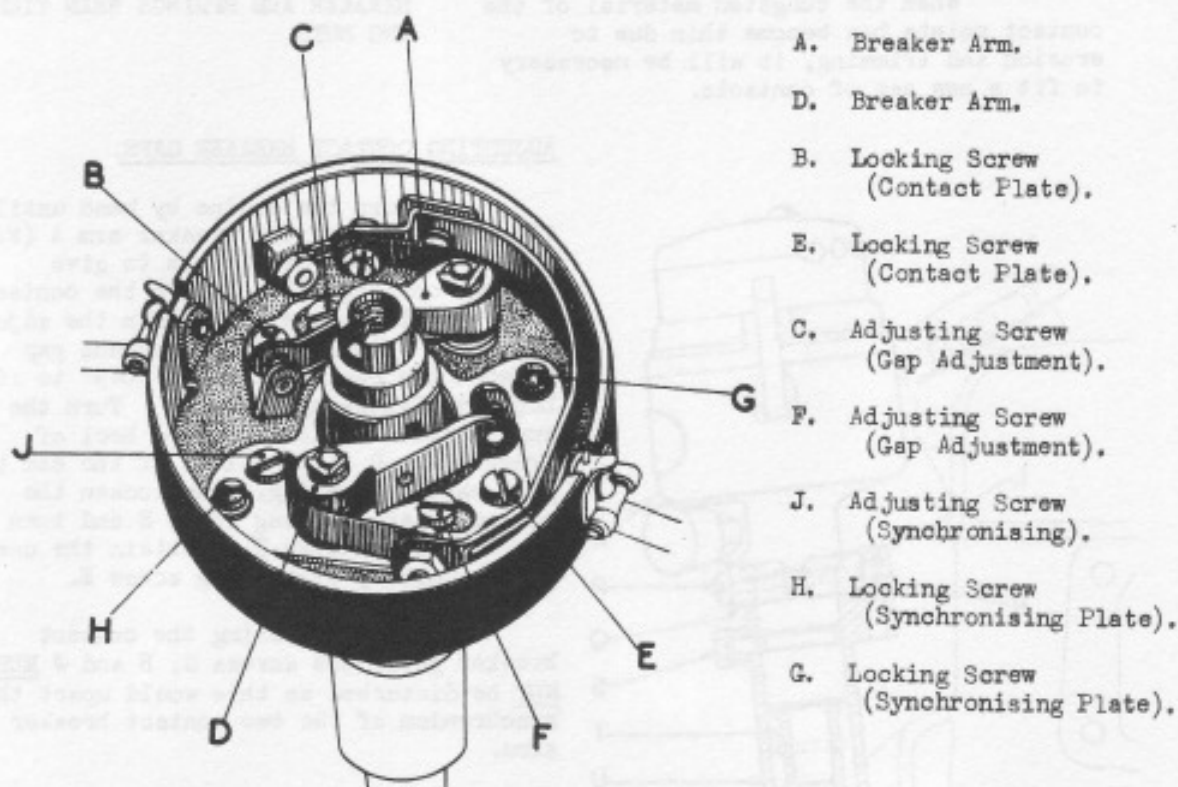


FIG. 23. LOW TENSION CONTACT BREAKERS.

Trimming is best done with an India stone. It is advisable to leave the breaker arms in position on the pivots during this operation, to prevent loss of the small spring retaining clips and fibre washers, and to allow the contacts to be swung together to check for trueness of the surfaces, which should close flush with each other. All raised portions of the contact surfaces should be removed, but it is not necessary to remove the pit mark. Finish by wiping with a petrol moistened cloth to remove all traces of grease or dirt.



When replacing the contacts, they must be refitted in the correct position; i.e. the breaker arm D and its contact plate must be fitted over the synchronising plate, otherwise the springs will not line up with the anchorage nor will the fibre heels bear centrally on the cam. When attaching the springs to their anchorage, tighten the nuts as shown in Fig. 24, to avoid twisting the springs, and so cause the breaker arms to bind on their pivots.

Finally, lubricate where necessary and adjust the gaps.

When the tungsten material of the contact points has become thin due to erosion and trimming, it will be necessary to fit a new set of contacts.

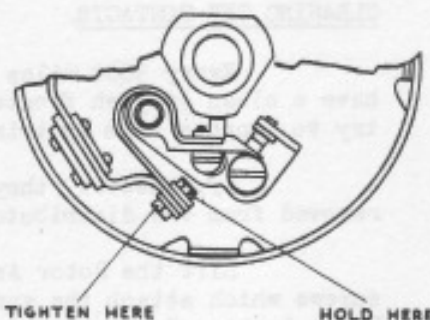


FIG. 24. TO AVOID TWISTING BREAKER ARM SPRINGS WHEN TIGHTENING NUTS.

#### ADJUSTING CONTACT BREAKER GAPS.

Turn the engine by hand until the fibre heel of the breaker arm A (Fig. 23) is on a lobe of the cam to give maximum opening, then loosen the contact plate locking screw B and turn the adjusting screw C to obtain the correct gap between the contacts, i.e., .019" to .021". Lock by tightening screw B. Turn the engine again until the fibre heel of breaker arm D is on a lobe of the cam to give maximum opening, then loosen the contact plate locking screw E and turn the adjusting screw F to obtain the correct gap. Lock by tightening screw E.

When adjusting the contact breaker gaps, the screws G, H and J MUST NOT be disturbed as this would upset the synchronism of the two contact breaker arms.

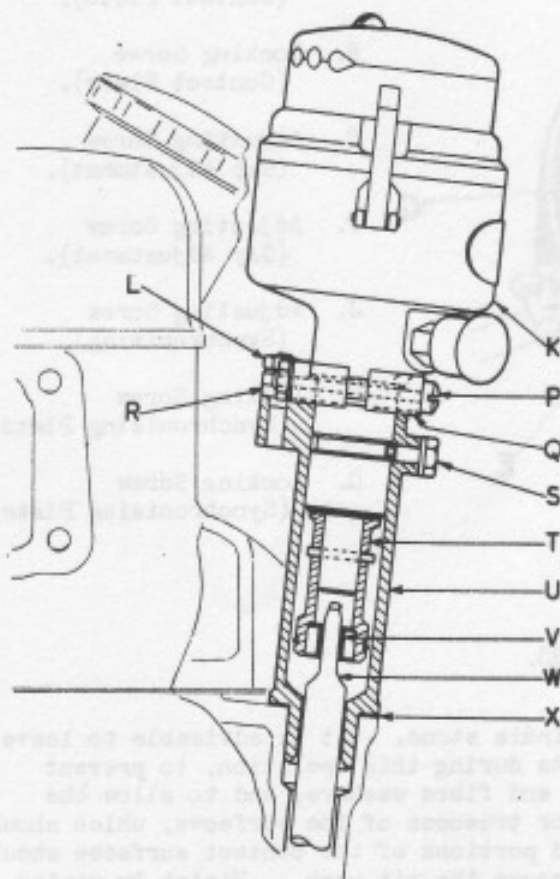


FIG. 25. DISTRIBUTOR AND HOUSING IN POSITION.

- K. Distributor.
- L. Nut - Clamping Plate to Housing.
- P. Screw - Clamping Plate.
- Q. Clamping Plate.
- R. Packing Washer.
- S. Setscrew.
- T. Driven Sleeve.
- U. Distributor Housing.
- V. Driven Plates.
- W. Driving Shaft.
- X. Vellumoid Joint.



### WHEN TO CHECK SYNCHRONISM OF BREAKER ARMS.

The contact breaker arms are accurately synchronised by the makers, and normally no further adjustment will be required; it will be necessary, however, to check them for synchronism and re-adjust in the following circumstances:-

- If the screws G, H and J (Fig.23) have been accidentally disturbed.
- If for any reason (such as a broken C.B. spring or fibre heel) only one new pair of contacts is fitted to the distributor and the other pair have been in use for some time.
- If two new pairs of contacts are fitted to replace one new and one old pair as in (b) above.

Synchronising is carried out after removing the distributor from the cylinder block.

### REMOVING THE DISTRIBUTOR.

Remove the distributor complete with the housing U (Fig.25) as follows:-

Remove the distributor cover. Turn the engine until the distributor rotor arm is in line with No.1 cylinder firing position as indicated on the moulded cover.



FIG. 26. SYNCHRONISING TOOL.

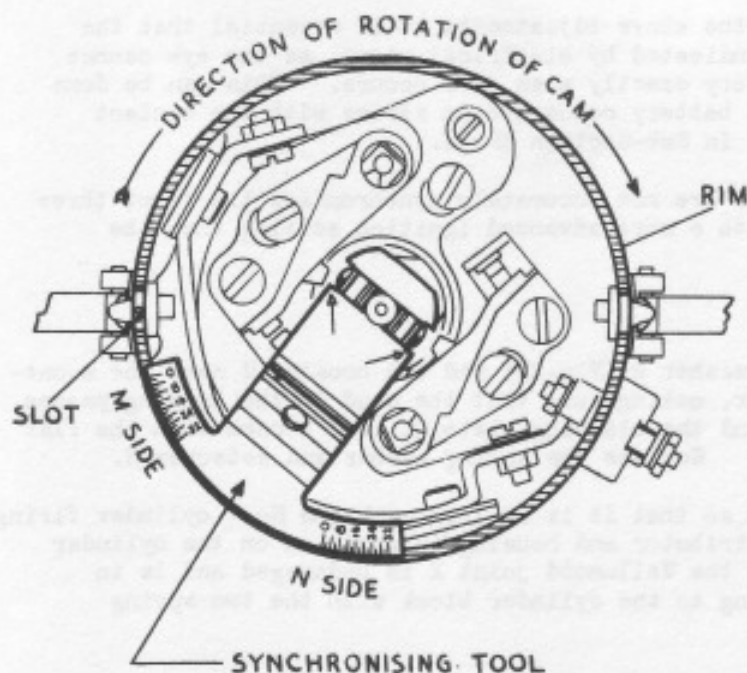


FIG. 27. SYNCHRONISING TOOL IN POSITION.

Remove the two nuts and flat spring washers which secure the distributor housing to the cylinder block and then remove the housing and distributor assembly from the block. Take care not to damage the Vellumoid joint X as fitted to the lower end of the housing.

**NOTE:** DO NOT slacken the clamping plate screw P, as the clamping plate should be left in position; i.e. clamped to the distributor so as not to disturb the timing.

Remove the nut L and flat spring washer which secures the clamping plate to the housing U. Remove the setscrew S which retains the distributor to the housing.





Withdraw the distributor from the housing thereby exposing the driven sleeve T.

#### SYNCHRONISING CONTACT BREAKER ARMS.

Using the special tool illustrated in Fig.26, proceed as follows:-

Adjust the gaps of both pairs of contacts as previously described.

Place the synchronising tool on the cam with the M side of the spring in the slot in the cam, then turn the cam in a clockwise direction until the graduations on the M side of the tool are near the slot in the rim of the distributor base (see Fig.27). Continue to turn the cam slowly until the breaker arm A just breaks contact. Note the graduation on the tool that aligns with the edge of the slot, in the exact position in which the points broke contact. Again turn the cam until the corresponding graduation on the N side aligns with the same edge. Loosen screws G and H and turn the adjusting screw J until the breaker arm D just breaks contact.

Check this by turning the cam again. Tighten screws G and H. Re-check contact opening of arm D and if it is not still within the limits of .019" to .021" re-adjust to obtain this figure, and re-synchronise the breaker arms. Finally, re-check the contact opening of arm D.

The graduations on the tool represent engine degrees and the markings on the M side are just 60 distributor degrees or 120 engine degrees from corresponding markings on the N side. The breaker arms must not be out of synchronism more than 2 engine degrees.

When carrying out the above adjustments it is essential that the opening of the contacts is indicated by electrical means, as the eye cannot detect with sufficient accuracy exactly when this occurs. This can be done by means of a small bulb and battery connected in series with the contact breaker points, as described in Sub-Section BP.6A.

If the breaker arms are not accurately synchronised the front three cylinders will be running with a more advanced ignition setting than the other three, or vice versa.

#### REFITTING DISTRIBUTOR.

Slide the packing washer R (Fig.25) and the housing U over the mounting spigot of the distributor, making sure that the stud in the housing passes through the packing washer and the clamping plate Q, then secure with the flat spring washer and the nut L. Replace the spring washer and setscrew S.

Turn the rotor arm so that it is in line with the No.1 cylinder firing position, then place the distributor and housing in position on the cylinder block after making sure that the Vellumoid joint X is undamaged and is in position. Secure the housing to the cylinder block with the two spring washers and nuts.

**NOTE:** The distributor and housing can only be re-assembled to the block as described above if the tongue on the driving shaft W is in line with the driving plates V of the distributor assembly, therefore the engine should not have been turned since the distributor



was removed. However, if the engine has been turned, it will be necessary to re-set the engine position so that No.1 piston is at the top of its firing stroke. This can be done by removing the small inspection plate from the clutch housing just above the starter motor, and turning the engine until the IGN/TDC mark on the flywheel lines up with the pointer with both valves of No.1 cylinder closed.

#### DISTRIBUTOR COVER.

The moulded distributor cover which is of the side outlet type, requires no attention other than cleaning. This should be done by wiping the inside and outside with a clean dry cloth.

If cleaning of the distributor cover is neglected it is possible that "tracking" may occur, in which case a new cover must be fitted.

#### LUBRICATION.

The distributor grease cup should be given a turn or two about every 1000 miles, to lubricate the spindle bearing.

In replenishing the grease in the cup, Shell Mex V.W. or a similar type, should be used.

Every 5000 miles the rotor arm should be removed and a few drops of engine oil applied to the felt pad in the top of the spindle, this lubricates the automatic advance mechanism. At the same time, one drop of engine oil should be applied to each contact breaker arm pivot and the cam should be lightly greased with Mobilgrease No.2 to reduce wear of the breaker arm fibre heel.



### CHECKING AND ADJUSTING THE IGNITION TIMING.

In the fully retarded position the spark for No.1 cylinder should occur when the IGN/TDC marking on the flywheel is in line with the timing pointer and both valves of that cylinder are closed, i.e. No.1 piston at the top of its firing stroke.

The timing pointer and flywheel markings can be seen by removing the small inspection hole cover from the near-side front face of the clutch casing just above the starter motor.

Owing to the fact that a friction damped spring drive is used for driving the valve gear and distributor and as the starting handle operates to turn the crankshaft through the medium of the spring drive, the starting handle must not be used to turn the engine for timing purposes, nor must the starting handle have been used since the engine was last running. It is equally important that when the engine is turned from the rear as described later, it should be turned in the normal direction of rotation only.

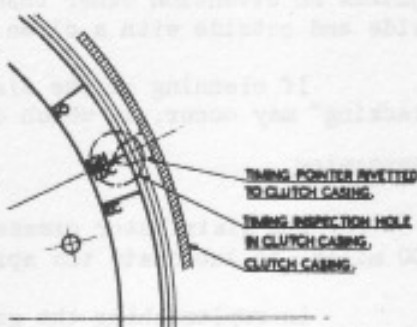


FIG. 28. TIMING MARKS ON FLYWHEEL.

If the engine has been turned in the opposite direction of rotation or if the starting handle has been used, the timing should be checked and re-adjusted if necessary after the engine has been running again.

To turn the engine for timing purposes, remove the sparking plugs, jack up one rear wheel, engage top gear, release the handbrake and turn the wheel in the normal direction of rotation.

To check the timing, turn the engine by the above method until the distributor rotor arm approaches the No.1 cylinder firing position, then continue to turn very slowly until the points just break contact. The moment the points "break" contact, prevent any further movement of the flywheel and observe the position of the flywheel marking through the inspection hole. The IGN/TDC marking should be in line with the timing pointer. If this is not so, turn the engine until the marking does line up with the pointer (not forgetting that the engine must be turned in its correct direction of rotation only) and then slacken the distributor head clamping screw (P, Fig.25) and rotate the distributor body in an anti-clockwise direction until the points of breaker arm (A, Fig.23) just break contact. Tighten the clamping screw (P) and check the timing again. If necessary re-adjust and then re-check.

On early chassis a hexagon nut was fitted to the clamping screw (P). On later chassis this has been changed to a knurled nut in order to eliminate the possibility of spannering the nut with consequent overtightening of the clamping plate (Q) causing the bearing of the distributor to be nipped. The clamping screw (P) should be tightened as follows:-

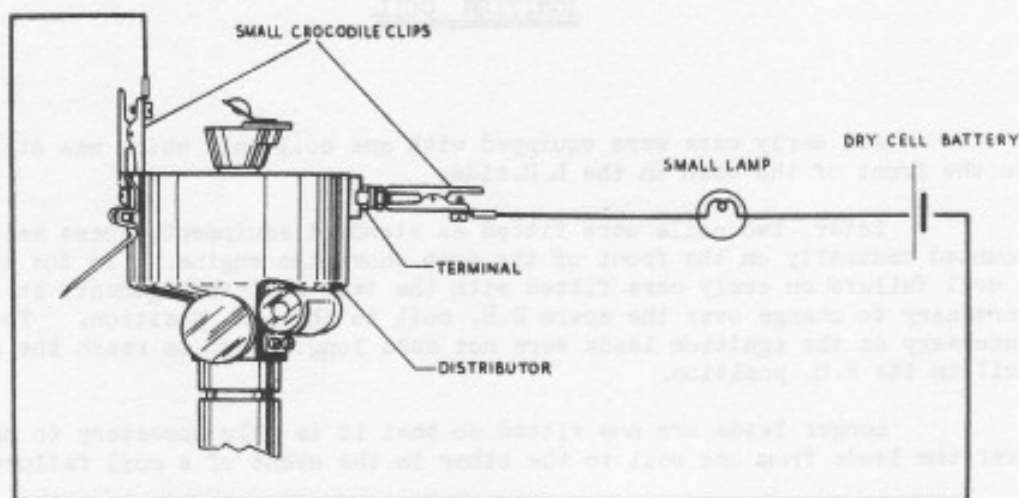


FIG. 29. BULB AND BATTERY CONNECTED IN SERIES WITH BREAKER POINTS.

- (a) If the screw (P) is fitted with a hexagon nut, the nut should be held by a spanner and the screw tightened by means of a screwdriver.
- (b) If the screw (P) is fitted with a knurled nut, the knurled nut should be held by hand and the screw also tightened by means of a screwdriver.

To advance the ignition timing, turn the distributor body in an anti-clockwise direction.

**NOTE:** When checking or adjusting the ignition timing, the distributor rotor arm must be kept fully retarded; i.e. in its fully anti-clockwise position.

#### TO DETERMINE WHEN THE POINTS BREAK CONTACT.

Either of the following methods of determining precisely when the contact points separate, may be used:

- (a) With the ignition switched off, and a small bulb and battery connected in series with the contact breaker points, as shown in Fig. 29. In this case the bulb will go out as the contact points "break" and will light as the points "make".
- (b) With the ignition switched on, and by observation of the ammeter. When the points are in contact a discharge of approximately 2 amperes will be shown on the ammeter, and when the contact points "break" the ammeter needle will return to zero.