SECTION B27

RENEWING THE SMALL END BUSHES

The small end bush wear, which normally is very slight, can be estimated when sliding the gudgeon pin through the bush. If it is in good condition the pin will be a sliding fit in the bush, with no play being in evidence.

Renewal of the small end bushes can be easily achieved by using the new bush to press out the old one. For this purpose a threaded bolt, about 4 in. long and a $1\frac{1}{4}$ in. long piece of tube with an inside diameter of $\frac{7}{8}$ in. will be required.

Place a suitable washer and the new bush onto the bolt, then offer it into the old bush. Place the piece of tube and a suitable washer over the bolt and screw the nut on finger-tight. Centralise the bush and tube and align the oilway in the new bush with that in the connecting rod. When the nut is tightened the new bush will extract the old one.

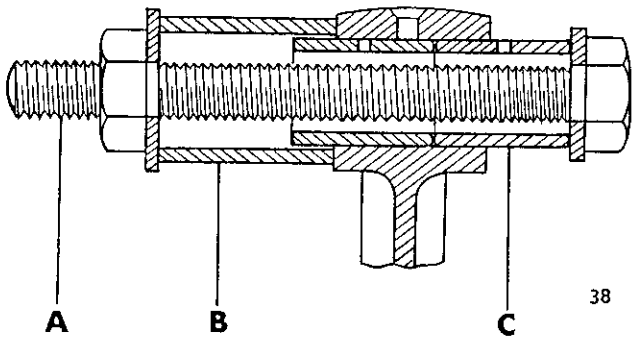

Fig. B22. Extracting a small end bush

Finally, ream the bore of the bush to the size given in "General Data", taking care not to allow any metallic particles to enter the crankcase. When reamering the bush, ensure that its bore is parallel with the big-end bore.

SECTION B28

REMOVING AND REPLACING THE CONTACT BREAKER

The contact breaker mechanism is housed in the timing cover on the right of the engine and is driven by the exhaust camshaft. It consists of two sets of points (one per cylinder), two auxilliary backplates with cam adjustment and a fully automatic centrifugal type advance and retard mechanism. The working parts are protected by a circular cover and gasket. The engine oil is prevented from entering the contact breaker cavity by means of an oil seal fitted to the inner wall of the timing cover. The complete contact breaker unit can be removed from the timing cover with the aid of service tool D782.

First, disconnect the leads from the battery terminals or remove the fuse from the holder adjacent to the battery, then remove the two screws and withdraw the outer cover and gasket. Remove the centre bolt and screw in service tool D782 until the cam unit is released from it's locking taper in the camshaft. Unscrew the tool and remove the cam unit.

To completely detach the contact breaker unit it will be necessary to disconnect the two leads from the ignition coils and remove the appropriate frame clips so that the leads can be withdrawn through the holes in the crankcase and timing cover.

It is advisable to make a note of the degree figure which is stamped on the back of the cam unit, as this indicates the advance range, which it is necessary to know for accurate static timing purposes.

Prior to replacing the cam unit it is advisable to add a small drop of lubricating oil to the pivot pins only, not the cam pivot. The cam unit slot should be located on the peg in the camshaft and the centre bolt screwed in and tightened.

IMPORTANT NOTE: "Run out" on the contact breaker cam or misalignment of the secondary backplate centre hole can result in contact between the cam and backplate. This can result in the auto advance remaining retarded or the spark retarding. To check for "run-out" check the point gap with the contact nylon heel aligned with the cam scribe mark for each set of points. Should there be a discrepancy greater then

0·003 in. tap the outer edge of the cam with a brass drift with the cam securing bolt tight. in cases of misalignment of the secondary backplate hole, check the cam clearance in different positions and elongate the hole only where the backplate rubs the cam.

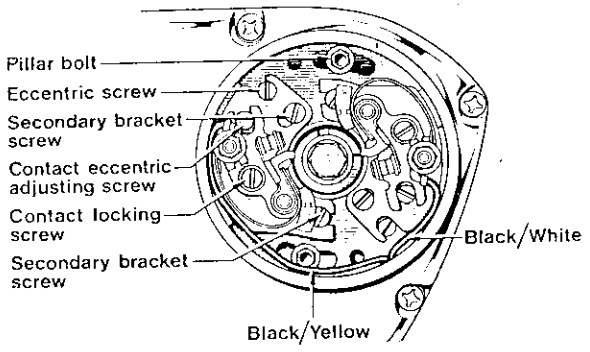

Fig. B23. Contact breaker 6CA

To adjust the contact breaker gaps, turn the motor with the starter pedal until the scribe mark on the cam aligns with the nylon heel of one set of points. Measure the point gap using a 0·015 in. feeler gauge. If outside the limits, slacken the contact adjusting screw, adjust the gap by turning the eccentric screw, and re-tighten the adjusting screw.

Revolve the motor until the second set of points is lined up with the scribe line, and adjust as before.

NOTE: Setting the ignition timing is fully described in Sections B29 to B31.

SECTION B29

IGNITION TIMING —INITIAL PROCEDURE

Initial assembly of the contact breaker mechanism and auto advance unit prior to final timing of the engine:—

(1) Remove both sparking plugs and all four rocker box caps. Set the engine at T.D.C. with both valves closed in the right hand cylinder.

(2) Assemble the auto advance unit into the exhaust camshaft, locating on the camshaft peg where it is fitted.

(3) Assemble the C.B. plate taking care not to trap the C.B. leads, assembling the plate so that one set of C.B. points is located at 7 o'clock. Loosely assemble the hexagonal pillar bolts and flat washers.

(4) Lock the auto advance cam into the taper using the central fixing bolt. For static timing remove the bolt again, taking care not to release the taper of the cam. Temporarily fit another washer with a centre hole just large enough to fit over the cam bearing, thus allowing the washer to bear hard on the end of the cam. Rotate the cam carefully to its limit against the auto advance springs, holding in this position whilst the centre bolt is re-fitted and nipped up. The fully advanced position has then been located.

SECTION B30

STATIC TIMING WHERE NO STROBOSCOPE IS AVAILABLE

Rotate the engine until the nylon heel of the C.B. points aligns with the scribe marking on the cam. At this stage set both points gaps to 0·015 in.

Locate the crankshaft at 38° B.T.D.C. using the timing body and plunger D2195 and D572 as shown below.

It will be found easiest to start with the pistons at T.D.C. (checked through the sparking plug hole) and then, with both sparking plugs removed and second gear engaged, rotate the rear wheel backwards. As the crank is turned by this means, pressure on the timing plunger will locate it at 38° B.T.D.C. Remove the rocker caps to establish which cylinder is on the compression stroke (i.e. which cylinder has both valves closed). Note that the timing side cylinder is operated by the contact points with the black/yellow lead and the drive side with the black/white lead.

When it has been decided which cylinder is being timed, rotate the main contact breaker backplate on its slots until the particular contact points just open. This can be checked using a battery and light or by an 0·0015 in. feeler gauge between the points. Alternatively unless the battery has been removed or disconnected, turn the ignition switch "on" and the position where the points open can be identified by the ammeter needle giving a "flick" back to zero.

Attention should now be turned to the other cylinder. Remove the timing plunger, turn the engine forwards through 360° (1 revolution) and relocate the timing plunger. The second set of points should now be adjusted as above but the main backplate must not be disturbed. Adjust only on the secondary backplate. Finally secure all screws, lubricate both sides of the cam with Shell Retinax A grease, replace the cover plate and the sparking plugs, finally engaging neutral gear.

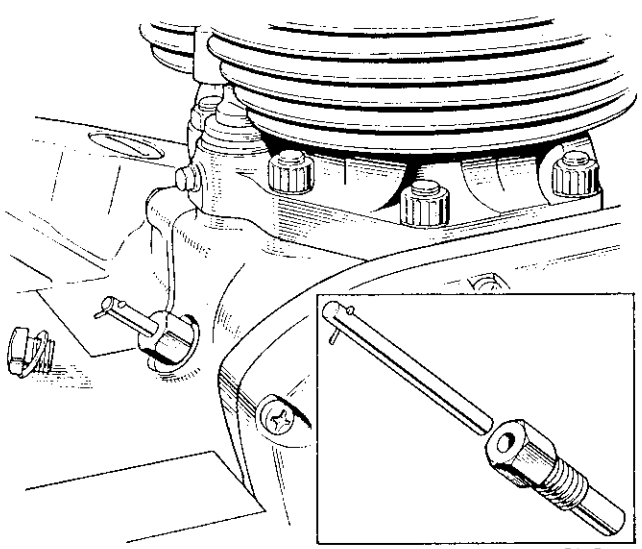

Fig. B24. Showing T.D.C. body and plunger in situ

SECTION B32

IGNITION TIMING BY STROBOSCOPE AFTER ENGINE NUMBER DU.66245

Undertake the initial procedure as in Section B32.

Remove the inspection plate secured by three screws) from the primary chaincase. As seen in Fig. B29 there is a marking on the outer face of the rotor which is to coincide with an ignition pointer on the primary chaincase to achieve the correct 38° ignition timing position.

On machines with the inspection plate on the primary cover but no provision for the timing pointer, a special timing plate D2014 is available and this is shown in Fig. B30. Note that D2014 has two markings, the one 'B' only being used on 650 c.c. applications.

NOTE: When using a stroboscope powered by a 12 volt battery as on external power source, do not use the machines own battery equipment. (A.C. pulses in the low tension machine wiring can trigger the stroboscope and give false readings).

(1) Connect the stroboscope to the right hand spark plug lead and start the engine. Read the strobo-light on the rotor marking in relation to the timing pointer or timing plate marking with the engine running at 2,000 R.P.M. or more. Adjust the main backplate on its slots until the marks align whereupon the timing on the one cylinder is correct.

(2) Repeat for the L.H. plug and adjust the timing by slackening off the clamping screw on the auxilliary backplate and turning the eccentric screw (see Fig. B25) until again the markings align. Timing is then correct. Refit the primary chaincase inspection plate.

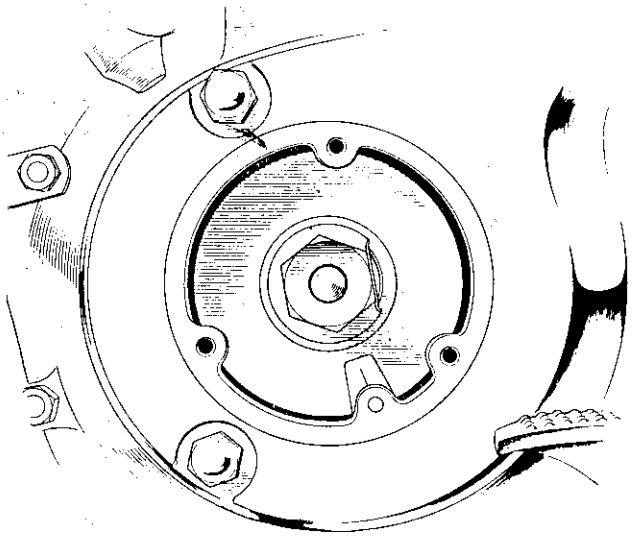

Fig. B29. Rotor marking

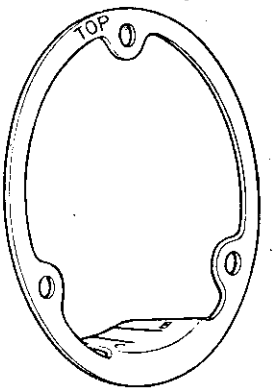

Fig. B30. Timing plate D2014

There are three different conditions of flywheel and crankcase locating holes as shown in Fig. B28 below. Identify the condition relating to the particular machine being timed. It will be found easiest to start with the pistons at T.D.C. (checked through the sparking plug hole) and then, with both sparking plugs removed and second gear engaged, rotate the rear wheel backwards. As the crank is turned by this means, pressure on the timing plunger will locate it at 38° B.T.D.C. Remove the rocker caps to establish which cylinder is on the compression stroke (i.e. which cylinder has both valves closed). Note that the timing side cylinder is operated by the contact points with the black/yellow lead and the drive side with the black/white lead.

When it has been decided which cylinder is being timed, rotate the main contact breaker backplate on its slots until the particular contact points just open. This can be checked using a battery and light or by an 0·0015 in. feeler gauge between the points. Alternatively unless the battery has been removed or disconnected, turn the ignition switch "on" and the position where the points open can be identified by the ammeter needle giving a "flick" back to zero.

Attention should now be turned to the other cylinder. Remove the timing plunger, turn the engine forwards through 360° (1 revolution) and relocate the timing plunger. The second set of points should now be adjusted as above but the main backplate must not be disturbed. Adjust only on the secondary backplate. Finally secure all screws, lubricate both sides of the cam with Shell Retinax A grease, replace the cover plate and the sparking plugs, finally engaging neutral gear.

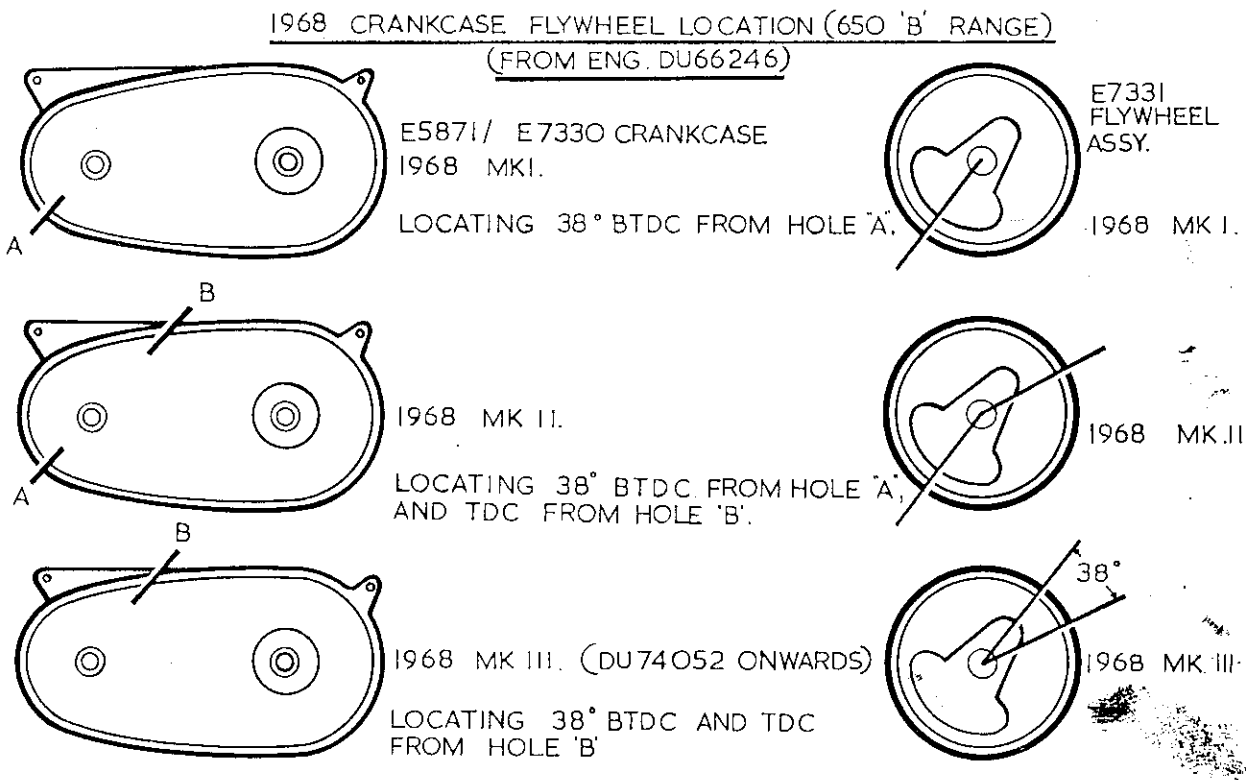

Fig. B28. Crankcase flywheel location

(5) Rotate the C.B. back plate on its slots until a position is reached where the points just open (check using a battery and light, or an 0·0015 in. feeler gauge. Alternatively, if a battery is fitted to the machine and the ignition switch turned to "IGN", the position where the points open can be identified by the ammeter needle giving a "flick" back to zero).

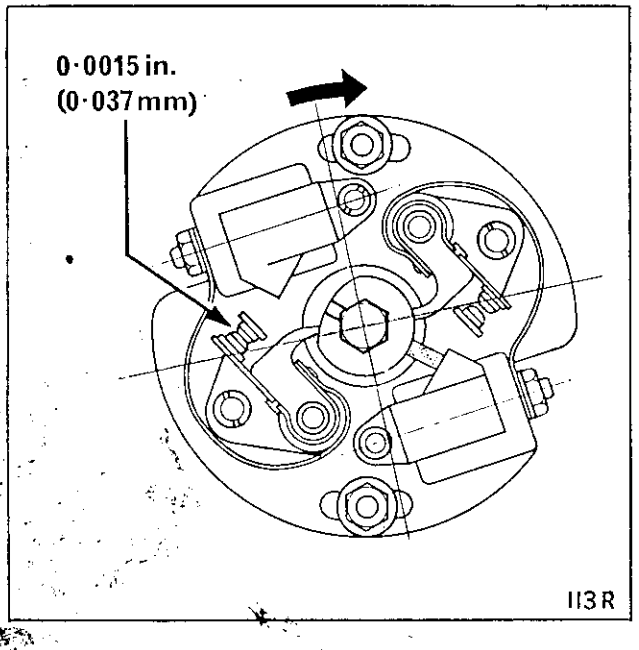

Fig. B34(a). Contact breaker points just opening on the right cylinder. With the engine set at the correct STATIC SETTING, the C.B. back plate assembly should be adjusted in the slots, to a position where the C.B. points just commence to open.

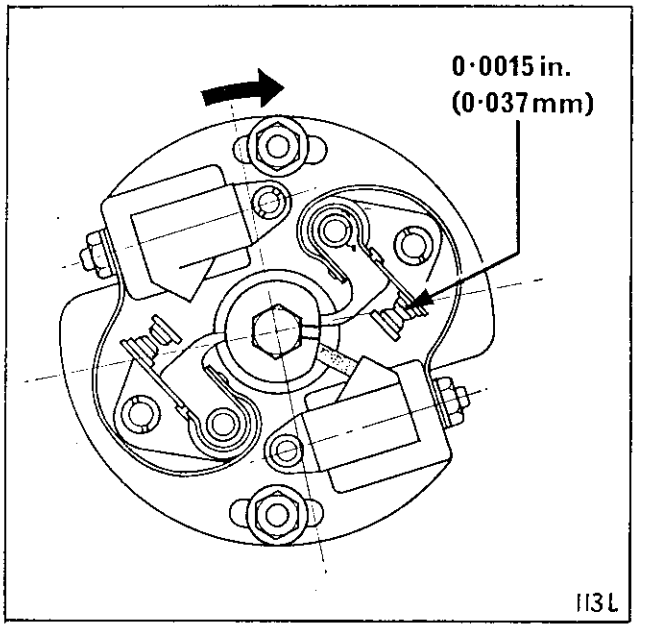

Fig. B34(b). Contact breaker points just opening on the left cylinder

Rotate the engine through 360° and repeat (4) above. The other set of C.B. points should just have opened. If not, the accuracy of spark on the second set of C.B. points can be corrected by adjusting the points gap.

NOTE: To advance the spark, open the points, approximately 0·001 in. for each engine degree required, and to retard, close the points setting similarly. Minor adjustments to left cylinder C.B. points setting to ensure accurate ignition timing are permissible.

SECTION B35

STATIC IGNITION TIMING

(TO BE USED ONLY WHERE A STROBOSCOPE IS NOT AVAILABLE)

BEFORE DU.66246

(1) Rotate the engine so that the fibre heel of the C.B. points have just passed beyond the ramp of the auto advance cam, and just reached the full open position. Set the point gap 0·015 in.

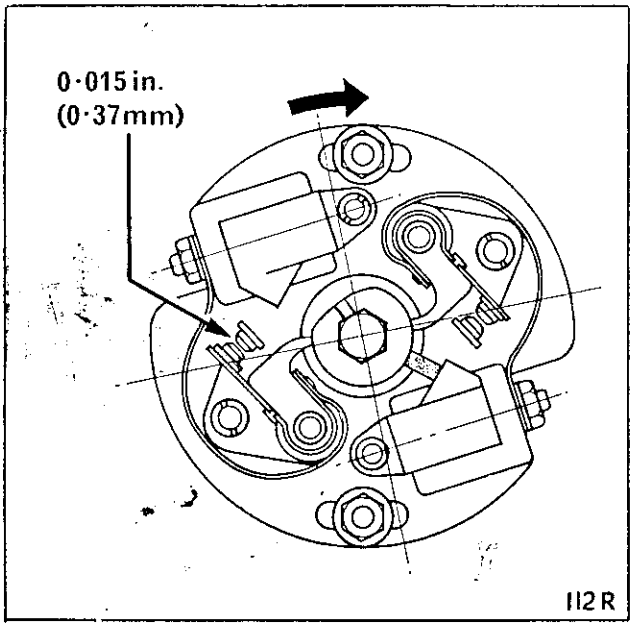

Fig. B33(a). Setting the contact breaker point gap for the right cylinder (black/yellow) lead, illustrating position of the cam where points are just fully open

(2) Rotate the engine "forwards" through 360° and set the second set of points in the corresponding position on the cam. Set these points at a gap of 0·015 in.

(3) ROTATE ENGINE AND ESTABLISH ACCURATE T.D.C. (See Section B34 prior to engine number DU.13375 and Section B33 after this number and prior to DU.66246.

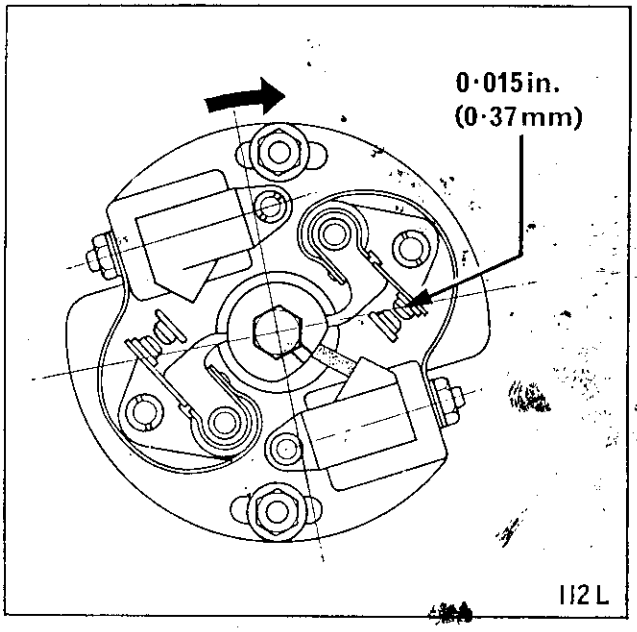

Fig. B33(b). Setting contact breaker point gap for the left cylinder (black/white) lead, illustrating the second position of the cam, where the points have just achieved the fully open position

If the machine is put in top gear, small increments in crank rotation and piston movement can be achieved by rotating the rear wheel slowly, and accurate piston T.D.C. established by "swinging" the engine either side of T.D.C. Mark the timing stick at T.D.C. Mark a second position on the timing stick ABOVE the T.D.C. mark appropriate to the specified timing for the machine, i.e. "piston movement before T.D.C.".

(4) Rotate the engine "backwards" beyond this mark and then slowly reverse the rotation "forwards" until the timing mark is set in line with the top of the cylinder head fins. If a timing disc is employed, rotate the engine forwards until the correct "static setting" is achieved in crankshaft degrees.