BSA SERVICE SHEET No. 506

Revised June 1965

MODELS Dl, D3, D5 AND D7

RE-ASSEMBLY OF THE ENGINE-GEARBOX UNIT

Crankcase

If new ball races and bushes are to be inserted, warm the two crankcase halve suitably support them to avoid damage, and press in the new parts in their appropriate positions. When dealing with a Dl engine manufactured before 1955, do not forget that the oil seal part number 90-0284, is located between the two drive-side main bearings. Later Dl and all D3 and D5 engines have a different oil seal part number 90-0749, and this is placed next to the flywheels, inside both bearings.

On the generator side, the oil seal part number 90-0147, should be fitted outside the main bearing. Care must be taken not to press in the seal too far, so as to obscure the oil passage to the main bearing. Engines after numbers DD-101 and BD3-5138 have a circlip between the oil seal and bearing. This means that the oil seal is located approximately 0.10 in. further out, and the parallel portion of the flywheel spindle is extended by this amount. If the later type crankcase assembly part number 90-0826, is used to replace a 1954 D3 crankcase assembly part number 90-0777, the circlip should be removed and the oil seal placed closer to the bearing, unless a later type flywheel and con-rod assembly part number 90-0823, or a flywheel spindle part number 90-0821, is fitted at the same time.

Replace the spring-loaded ball socket (A) Fig. D16 in its recess in the bottom of the offside crankcase.

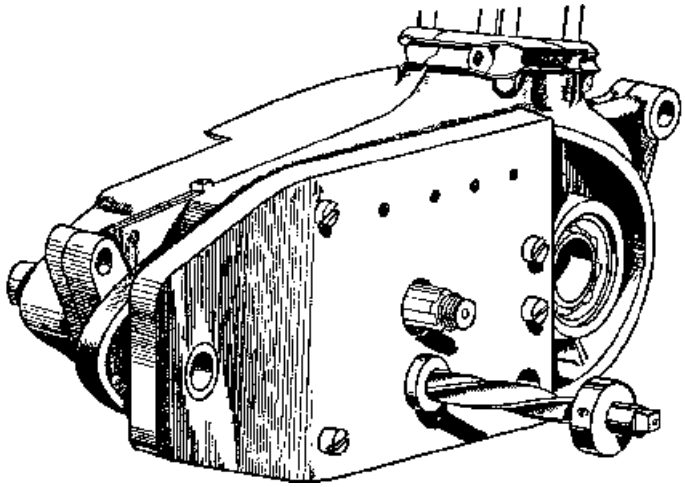

Fig. D11. *Line Reaming the Gearbox Bushes with Service Tool* 61-3199.

If the gearbox phosphor bronze bushes have been renewed, bolt the two crankcase halves together and line-ream the bushes, using Service Toot 61-3199 and reamer number 61-3205 (Fig. D11). Make sure that all swarf is removed after this operation.

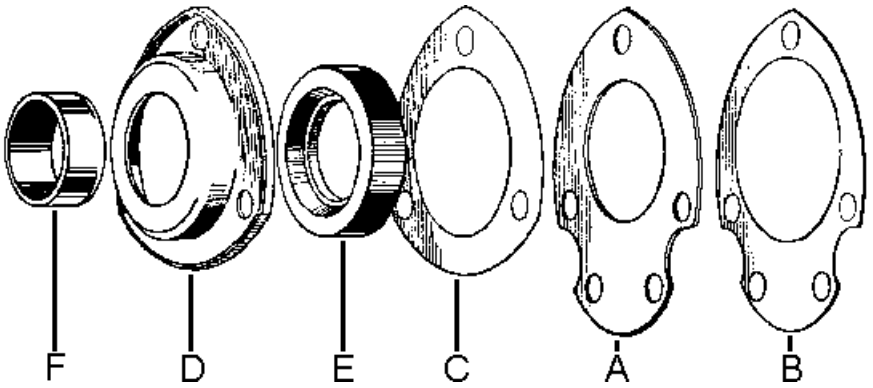

Fig. D11a. *The Oil Seal Assembly.*

Next secure the gearbox mainshaft ball race and layshaft bush retaining end plate (A) Fig. D11a. part number 90-0133, on the nearside case with its two 3/16 in. cheese-headed screws, followed by the triangular oil seal housing washer (C) part number 90-0073, the mainshaft oil seal housing (D) part number 90-0072, and the oil seal (E) part number 89-3006, with the steel sleeve (F) part number 90-0071, in the centre of the assembly. Note that a gasket (B) is fitted between the end plate and the crankcase.

The following details are intended to assist people who wish to complete their own flywheel repairs. Owners are reminded, however, that fully reconditioned and guaranteed flywheel assemblies are available through the B.S.A. Exchange Replacement Service and can be purchased from appointed B.S.A. Dealers or Stockists. This Service is recommended in view of the skill and specialised equipment necessary to make a first-class job.

Flywheel Assembly

The 1955 pattern flywheel spindles 90-0821 (nearside) and 90-0505 (offside), can be used as replacements in all earlier engines having a Wipac generator. For Lucas equipment, flywheel spindles 90-0605 (nearside) and 90-0505 (offside) should be used.

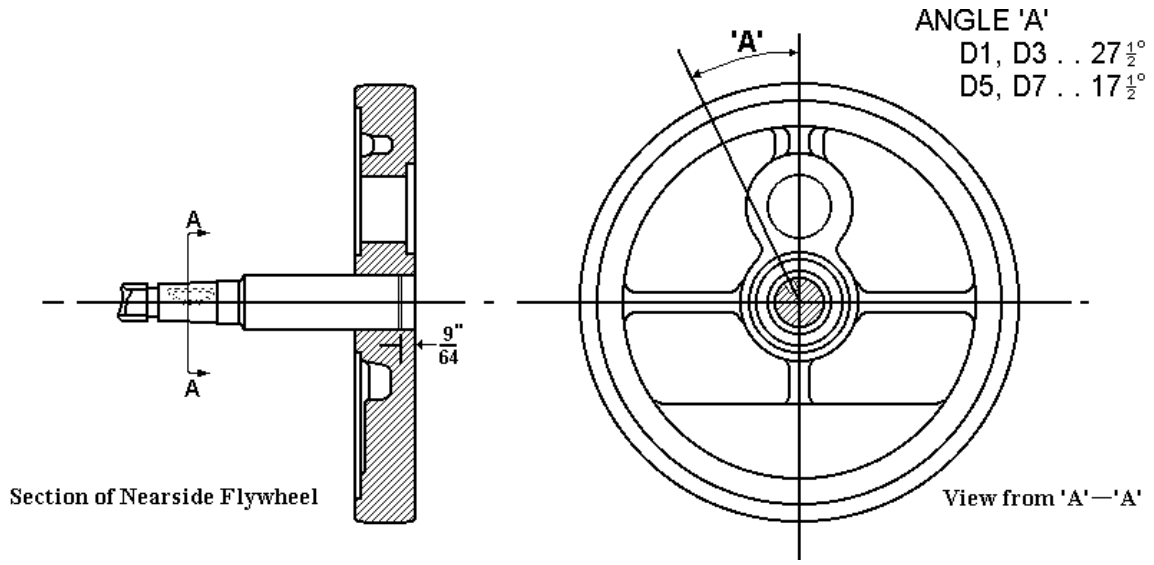

Fig. D12.

When fitted to flywheel assemblies which have the narrow type of big-end bearing (¼ x ¼ in. rollers), these spindles must be assembled so that they are recessed 9/64 in. from the inside face of the flywheels. With the wide big-end bearing ¼ x ⅜ in. rollers), the spindles must he assembled flush with the faces of the big-end recesses in the flywheels. The nearside spindle on all models must be located as shown in Fig. D12.

It is not advisable to attempt to take up wear in the big-end assembly by fitting over-size rollers, since the connecting rod, rollers, and crankpin are carefully matched before leaving the Works. We strongly recommend that a complete replacement assembly be used.

To assemble place the nearside flywheel in bolster, Service Tool 61-3206, and using a suitable hand press insert one side of the new crankpin. Position the second flywheel on to the crankpin and using bridge piece Service Tool 61-3210 pres.- the flywheel on to the crankpin as illustrated in Fig. D13.

The flywheel will now be only approximately aligned and further steps must be taken to ensure that the wheels and shafts are brought within necessary limits. Two of the actual or similar bearings used in the engine should be fitted to the main shafts and the assembly mounted in vee-blocks as in Fig. D14.

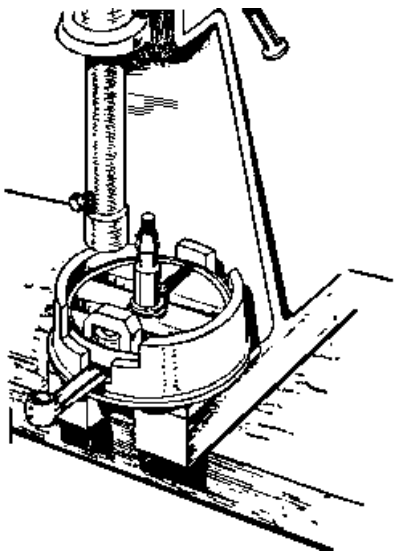

Fig. D13—Reassembly of the Flywheels.

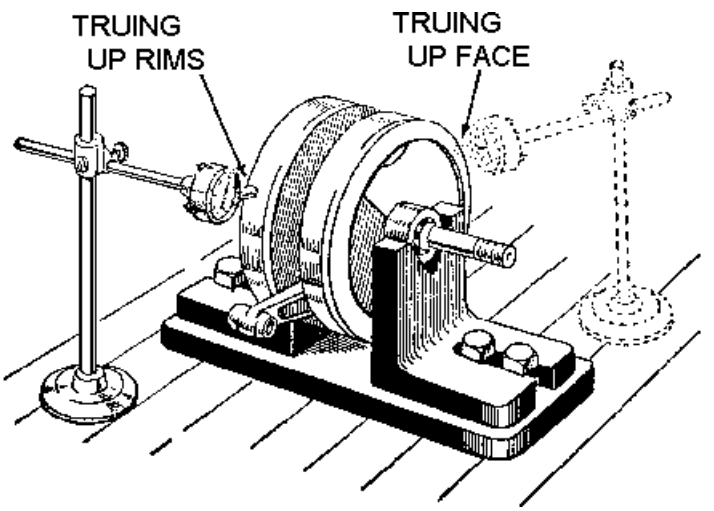

Fig. D14—Checking Flywheels Alignment.

Using a dial micrometer the accuracy of the assembly can be measured. Any necessary corrections should be done by the careful use of a mallet or lead hammer applied to the flywheels and the wheels should be brought within the limit of .004 in. on the rims and .006 in. on the inner faces. Shafts should be trued to within .002 in. maximum.

The big-end assembly having been renewed and the flywheels checked for balance and concentricity, replace the flywheel side plates into their recesses and secure by “dot” punching the edge of the flywheels over the edges of the sheet metal plates, Fig. D15). NOTE – No side plates are used on the D5.

RE-CHECK THE FLYWHEELS FOR TRUTH.

The next step is to check the end float of the flywheel assembly in the crankcase and adjust if necessary. Shim washers of various thicknesses are supplied for this purpose.

Place a .010 in. shim on the offside spindle, and insert the latter through the main bearings and oil seal in the offside crankcase. Fit the distance collar part number 90-0243, or the oil drag fan part number 90-0750, in position over the nearside spindle. The nearside crankcase should then be replaced, and the two halves screwed together temporily. Measure the amount of end float on the flywheel assembly, which should be .004 to .006 in. Remove the nearside crankcase and fit any shims which may be required on the nearside spindle, next to the flywheel.

If the flywheel assembly has not been disturbed, replace the original shims in their original positions.

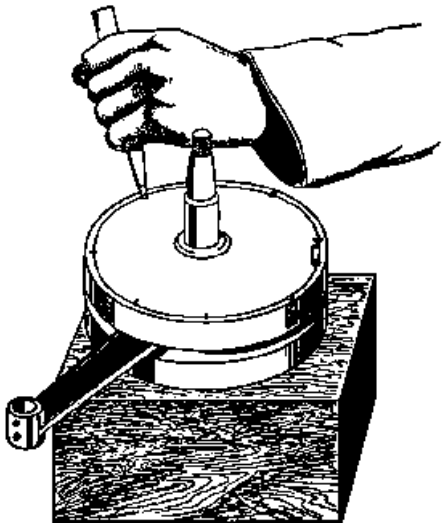

Fig. D15.

Later models with engine prefix letters DD, DDB or ED5, use shims only between the left-hand flywheel and the bearing, these are available in sizes .003/.004/.005/.010 in.

Gearbox

Now fit the gear quadrant selector mechanism to the offside crankcase. Engage the quadrant with the spring-loaded locating plunger in the bottom of the case, (A) Fig. D16, the quadrant to be at its innermost position in relation to the plunger; this is bottom gear. Secure in position by fitting the two bolts (B) with their tab locking washers, turning over the tabs to lock the bolts.

Next pass the splined end of the gearbox mainshaft through the offside ballrace already placed in its recess followed by the mainshaft sliding gear (C), and then the mainshaft primary gear.

Now place the large layshaft gear (D), (this is the gear having the centre machined to engage with the dogs of the selector gear) concave side downward against the phosphor bronze bush in the bottom of the case in mesh with the small mainshaft pinion.

Engage the two central selecting or sliding gears, one already in position on the mainshaft, so that the small dog on the gear selector arm (E) enters the track machined on the side of the lower or layshaft gear (F), the upperside of this gear track engaging with the solid machined ring on the mainshaft sliding gear (C).

Insert the layshaft through the lower gears and engage the gear train (see Fig. D16).

Next pass the footchange pedal lever shaft with its spring-loaded claw assembled (C) through its bearing hole in the offside case. Engage the ends of the spring attached to the claw on either side of the projection on the gear selector mechanism securing the bridge piece between the two bolts, the claw facing the gears.

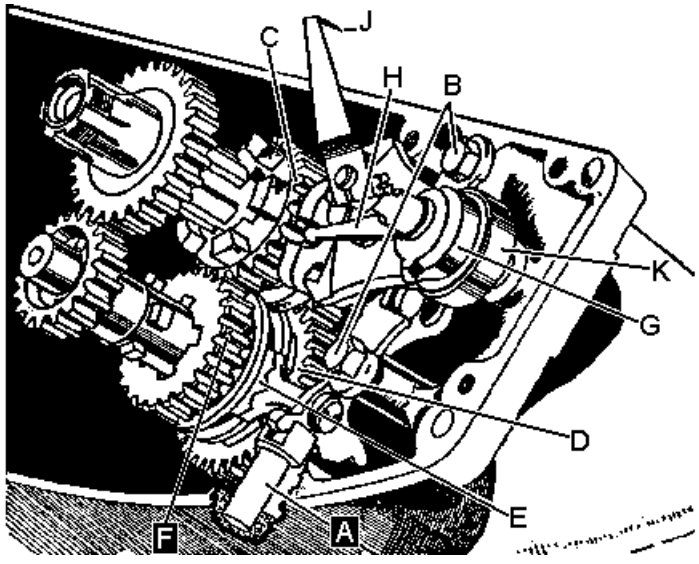

Fig. D16. *The Gear Cluster.*

Apply jointing compound evenly to the edge of one crankcase and allow it to become "tacky". Insert the gear position indicator spindle (H), into its bearing hole in the nearside crankcase, and attach the indicator lever (J), to the outer end of the spindle, pointing upwards. Place the nearside crankcase in position, passing the engine mainshaft and gearbox pinion sleeve through their respective races, taking care that the ball end of the inside gear indicator lever enters its recess on the gear selector arm. Later models do not have this indicator, its place being taken by a thrust pad.

Secure the two crankcase halves together by means of the eleven cheese-headed screws (thirteen on later models), tightening them evenly all round to avoid distortion. Note that a sprung washer is fitted behind the head of each screw.

Place the kickstarter clock-type return spring, part number 90-0089 in position on the kickstart quadrant shaft, then slide the circular distance plate, part number 90-0090 on to the quadrant shaft against the spring between the spring and the alloy case. Insert the assembly on to the gear selector shaft placing one end of the spring into the recess at the rear of the case above the dowel hole. Give one turn of tension to the spring and push the kickstart quadrant home into its recess in wall of alloy case with the quadrant against its stop below the dowel hole.

Clutch and Transmission

Enter the clutch chainwheel with its centre bush in position, flange at the rear, on to the splined end of the gearbox shaft, which is projecting through the case, having previously assembled the ratchet and spring on to the shaft (see Fig. D17).

Place the thrust washer into its recess on the inside of the clutch chain wheel assembly, slide the clutch hub, part number 90-0028, on to the splines and secure by the large nut, part number 21-0007. Enter the mushroom-headed clutch push rod, part number 90-0098, to the hole in the centre of the shaft.

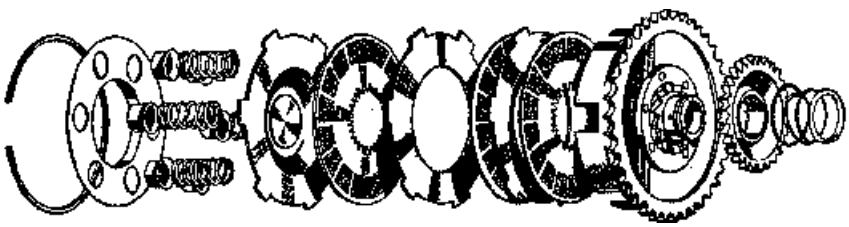

Fig. D17. *The Clutch (exploded view).*

The clutch plates are now inserted into the centre of the chainwheel assembly, cork plate first then steel plate in sequence, the last plate being the domed clutch actuating plate, part number 90-0037 (Fig. D17).

Next insert the six springs into the spring cups and place them in the holes in the spring plate, part number 90-0341, the raised centre of the plate outwards. Using Service Tool number 61-3191, compress the springs, and place the large circlip part number 90-0027, into its groove on the inside of clutch plate housing (Fig. D8, Service Sheet No. 505).

The crankshaft sprocket should now be placed on its taper-keyed engine shaft, followed by the double tab washer, part number 90-012l, one tab resting on the flat on the engine sprocket. Screw the securing nut up tightly, and turn the second tab over on to the nut face.

Place primary chain over the sprockets and fit the spring link. Now fit the dome-shaped alloy primary chain cover with a cemented paper washer on the jointing face, over the primary drive assembly, passing the kickstart quadrant shaft through its hole in rear of the cover. Secure with five cheese-headed screws, the two longest screws in the front holes in the cover. Note that each screw is fitted with a fibre washer.

Fit kickstart pedal and foot gearchange lever to their respective shafts.

Now turn the unit round and insert the second clutch push rod, part number 90-0099, into the hole in gearbox mainshaft. Slide the rubber oil seal washer part number 90-0132, on to the rod.

The gearbox sprocket, is pushed on to the splines projecting through the gearbox end of the nearside case, then secured by nut and splined washer, the edge of which is turned over on to the nut as a locking device.

The flywheel generator alloy cover carries the clutch actuating lever and quick-action mechanism, which is pressed into this cover from the inside when the cover has been warmed. A flat on the roller of the actuating screw positions this part in the cover (Fig. D18).

In the centre of the quick-action screw is a ball and adjusting screw, part number 90-0105, with locknut, part number 89-0366. The metal cover, part number 90-0106, presses over the quick-action screw from the outside of the cover. Attach the extension spring, part number 90-0122, to its hole in the lever and the hole in the inside of the cover.

Place the crankcase outer cover, in position on the nearside case. This cover carries the clutch operating lever and adjuster. Five cheese-headed screws, two inside and three outside, secure the cover to the crankcase.

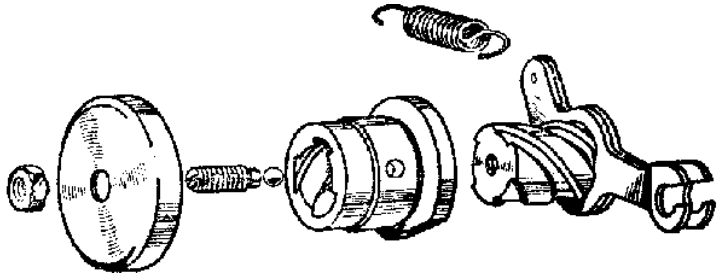

Fig. D18. *The Clutch Actuating Mechanism.*

Flywheel Generator (Wico-Pacy)

Place flywheel on the keyed-taper of the engine mainshaft, followed by the large shakeproof washer, and tighten the nut. Make sure key has not fallen out.

Now insert the electrical ignition unit carrying the plug lead into its recess. Three elongated ears on the outside of this unit allow the screws to be passed through the unit securing it to the flywheel cover (Fig. D4).

The "make and break" cam is now inserted into the centre of this unit on to the keyed end of the engine mainshaft and secured by a 3/16 in. screw and spring washer.

Variation of the ignition timing is obtained by moving the whole unit to and fro' on the elongated slots on the outside of the unit. Adjust "make and break" points if necessary. See Service Sheet No. 503. Set the ignition timing so that the points are just breaking with the piston 5/32 in. (3.75 mm.) before top dead centre.

The watertight cover is now placed in position and secured by the two screws.

The remainder of the unit is assembled as after decarbonisation (see Service Sheet No. 504).

Reassembly of the Lucas Generator

The procedure for reassembly of the Lucas generator is merely the reverse to that described on Service Sheet No. 505 for dismantling, but the following should be specially noted:— Provision is made for the easy removal and replacement of the steady bearing and bearing plate; the cam and steady bearing journal are both press-fits on to the rotor shaft and can be removed by means of a suitable extractor of standard pattern. On reassembly it is imperative that the cam is correctly fitted in relation to the rotor shaft or the performance of the machine will be adversely affected when the engine is run with the ignition switch in the "emergency start" position.

The following precaution must be taken in order that the steady bearing is correctly aligned. During the re-fitting operation, the four contact plate fixing screws should be slackened off and should not he re-tightened until the remainder of the re-fitting operations are completed, i.e. the alternator fixing bolts and the rotor retaining bolt should be fully tightened before finally tightening the contact plate fixing screws. The fixing screw holes in the contact plate are drilled oversize and providing the foregoing precautions are observed the contact plate will automatically align the steady bearing with the rotor shaft.

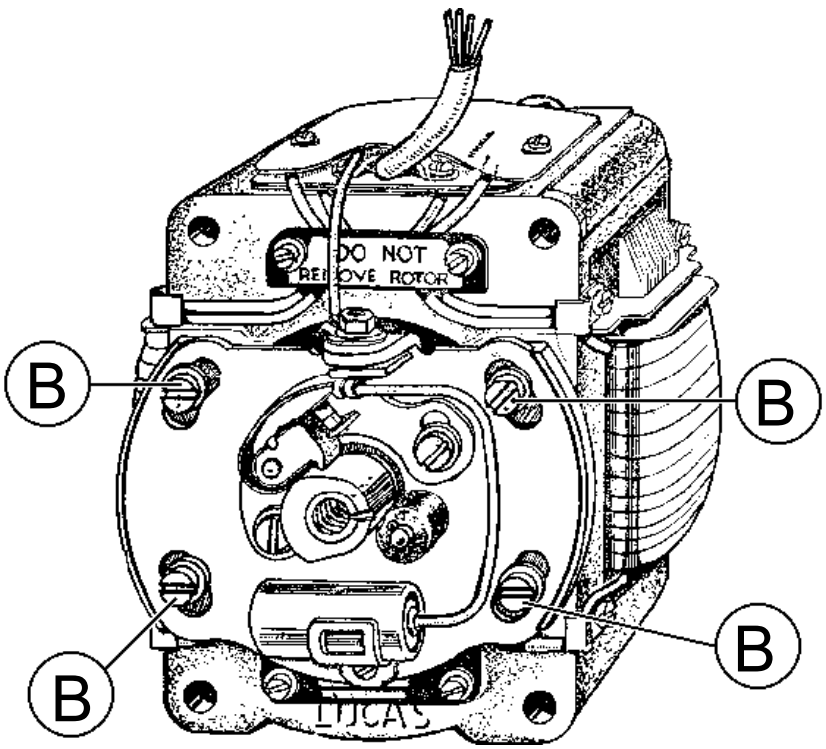

Fig. D18a.

Timing with the Lucas Generator

Variation of the ignition timing is obtained by slackening off the four screws (B) Fig. D18a, and turning the timing control in the desired direction.

Movement in an anti-clockwise direction will retard the spark, and in a clockwise direction will advance the spark.

BSA SERVICE SHEET No. 505

Revised February 1960
Reprinted October 1965

MODELS Dl, D3 PLUNGER, D3, D5 & D7 SWINGING ARM

REMOVING ENGINE-GEAR UNIT FROM FRAME AND COMPLETE DISMANTLING

Removing the Unit

Disconnect the clutch and carburettor controls, the petrol pipe, plug lead, and the electrical connections from the flywheel generator. Take off the rear chain and chainguard. In the case of the D3 swinging arm model with battery lighting, the rectifier is bolted to the chainguard, but there is no need to remove the guard completely. After the front and rear fixing bolts have been removed it can be suspended out of the way by means of a stout wire hooked over the top frame member.

Using the "C" spanner provided in the tool kit; unscrew the exhaust pipe union nut and remove the pipe.

Take off the nuts on the engine bolts and withdraw the bolts. The engine can now be lifted from the frame.

Dismantling

Drain off the oil from both the engine and gearbox units by removing the large hexagonal nut under the gearbox, adjacent to the domed primary chaincase cover and the smaller hexagon nut on the nearside front underside of the engine. The gearbox oil also serves the oilbath for the primary chain and the primary chaincase is drained automatically by the removal of the gearbox drain plug.

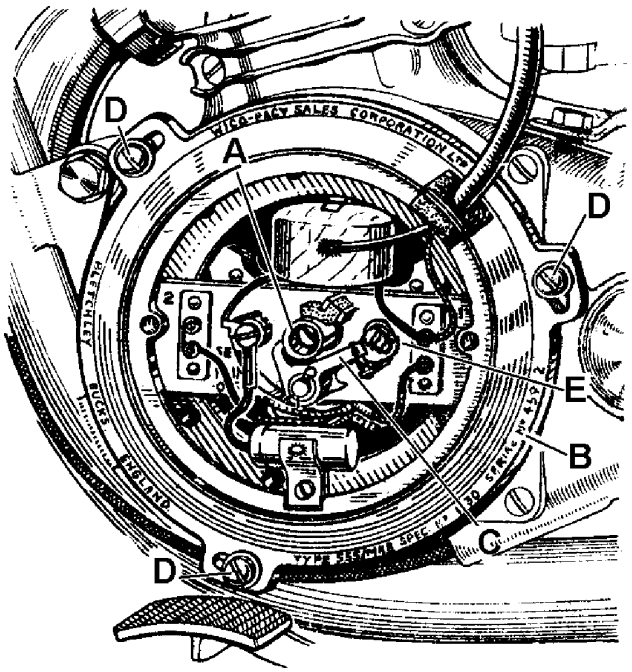

Fig. D4. *The contact breaker mechanism.*

Flywheel Generator (Wico-Pacy)

On the nearside of the engine, three cheese-headed screws (D) Fig. D4, slotted for withdrawal with a screwdriver and located in elongated slots, and one screw (A) in the centre of the contact breaker mechanism, hold the ignition coil and contact breaker assembly cover in position.

Model D7.—The model D7 differs slightly from the other "D" Group machines in that to obtain access to the generator, the pear-shaped cover on the left-hand side of the unit must be removed by taking out the three screws, after this, the procedure for dismantling is identical.

Note that the screw (A) Fig. D4, in the centre of the contact breaker mechanism also secures the contact breaker cam which is keyed on to the mainshaft. The cam will fall from the shaft as the large alloy cover is withdrawn, and care must be taken to see that neither the cam nor its key is lost during this operation.

The right-hand threaded nut holding the flywheel must now be unscrewed to allow the withdrawal of the flywheel. Service Tool number 61–3188 is used for this operation (Fig. D5). Note that a large shakeproof washer is fitted between the nut and flywheel boss.

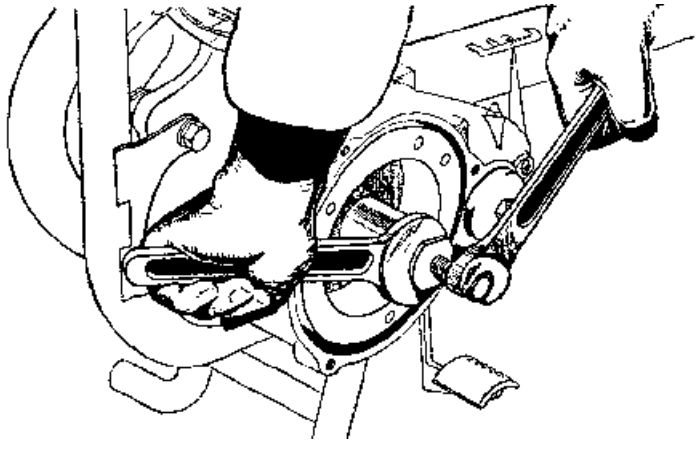

Fig. D5. *Removing the generator flywheel with service tool* 61-3188

When the flywheel is withdrawn it should be placed in its correct position in the ignition assembly unit to ensure that the magnetic properties of the flywheel are retained, or alternatively place a circular steel plate to cover all the magnets in the wheel for the same purpose. Failure to do so may entail loss of electrical efficiency.

On machines with Wico-Pacy equipment, two short screws inside at (A), and three long screws outside at (B) Fig. D6, secure the alloy flywheel housing cover in position.

When Lucas equipment is fitted, the cover is retained by three long screws only.

With the cover removed the rear drive sprocket and gear position indicator are revealed. This indicator is not fitted to later models, its place being taken by a thrust pad, part number 90-0759. On the inside of the cover is the clutch push rod operating lever, mounted behind the adjusting screw (C) Fig. D6.

Pull out the clutch push rod, part number 90-0099 and the rubber oil seal washer, part number 90-0132, from the centre, of the sprocket. Unscrew the sprocket securing nut, first bending back the tab of the locking washer. This nut is left-hand threaded. Remove the nut, washer and sprocket, and take off the rear indicator lever (if fitted).

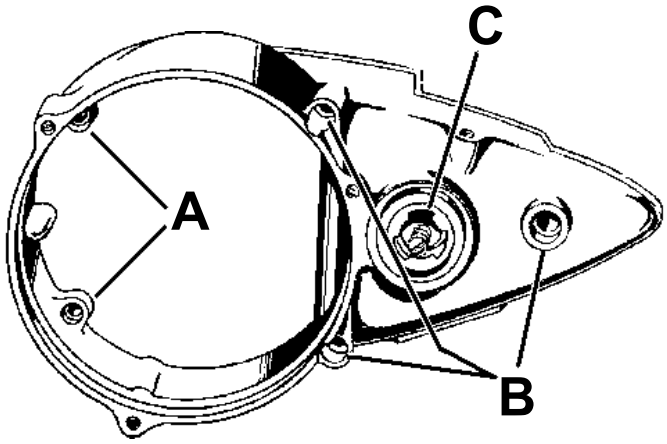

Fig. D6.

Primary Drive Cover

On the offside of the engine the change-speed foot pedal is splined on its shaft and held in position by a pinch bolt (C) Fig. D7. Unscrew and withdraw the pinch bolt and take off the pedal. Now take off the kickstart pedal, this also is fitted to a splined shaft and held in position by a pinch bolt (B) Fig. D7.

By unscrewing the five cheese-headed screws (D), two long ones at the front of the alloy primary drive cover, and three at the rear, this cover can be taken off, revealing the engine sprocket, non-adjustable primary chain, clutch assembly, kickstarter quadrant and clock-type spring.

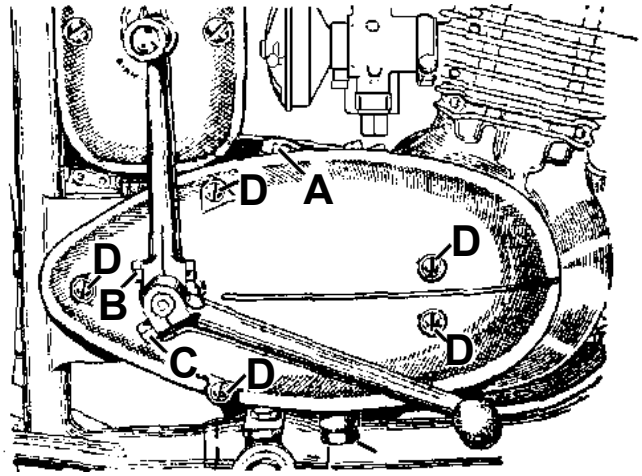

Fig. D7.

The keyed engine sprocket, part number 90–0120, is held on its taper shaft by means of a right-hand threaded nut and double tab washer, one tab of which must be turned back from the engine sprocket securing nut before unscrewing. The second tab is turned over on to a flat on the engine sprocket and need not be touched. Unscrew the nut and take off the tab washer.

Now remove the primary chain by releasing its spring link and using Service Tool number 61–3198, pull the engine sprocket from its tapered keyed shaft. Take care not to lose the key as the sprocket is withdrawn.

Clutch

Using Service Tool number 61–3191 compress the clutch springs to allow the large plate retaining circlip and the clutch plate assembly to be removed (Fig. D8). Take out the clutch plates and withdraw the mushroom-headed clutch push rod, part number 90-0098, from the centre of the mainshaft.

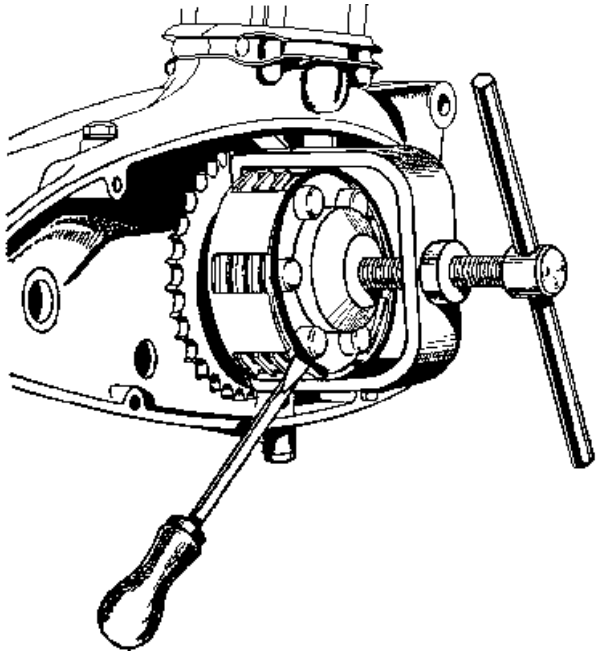

Fig. D8. *Removing the clutch plate circlip with Service Tool number* 61-3191.

The clutch hub nut has a right-band thread and its removal allows Service Tool number 61-3256 to be used to draw the clutch hub from the splined mainshaft. The centre of the hub has a brass thrust washer, part number 90-0283, in a recess, and the whole hub revolves on a central brass bush, part number 90-0076, which is a sliding fit on the mainshaft and is inserted from the rear, or kickstart ratchet side of the assembly.

Crankcase

Before the crankcase halves can be parted the cylinder and piston must be removed. The procedure is detailed under “Engine Dismantling for Decarbonising”, Service Sheet No. 504.

Removal of the eleven cheese-headed countersunk screws, seven short ones along the bottom and rear of crankcase, two long screws and two further screws on the cylinder base will allow the crankcase to be parted. Later models have two additional screws which must also be removed. One is situated just below the rear drive sprocket and the other on the drive side of the crankcase behind the top run of the primary chain.

The front and top rear frame bolt holes in the crankcase are dowelled and great care must be taken in parting the cases to ensure that damage does not occur to either case if leverage is applied at any point by means of a screwdriver or lever.

The mainshaft runs on three ballraces, two on the drive side, part number 89-3023 (inner), and part number 90-0010 (outer), and one on the timing or generator side, part number 89-3023. The two larger races may be pressed out to the inside of the cases, after these have been warmed, and the small race to the outside. Note that on engines after DD-101 and BD3-5138 a circlip has been incorporated between the oil seal, part number 90-0147, and the main bearing on the generator side, the oil seal being outside the bearing.

On the drive side, the oil seal part number 90-4749, is located inside both bearings on Dl engines after 1954 and all D3 engines. Earlier models have the oil seal, part number 90-0284, between the two main bearings. Take note of the number and thickness of any shims fitted either side of the flywheel assembly; and also of the crankshaft distance collar between the flywheels and bearing on the generator side. This collar has been replaced by an oil drag fan on later models.

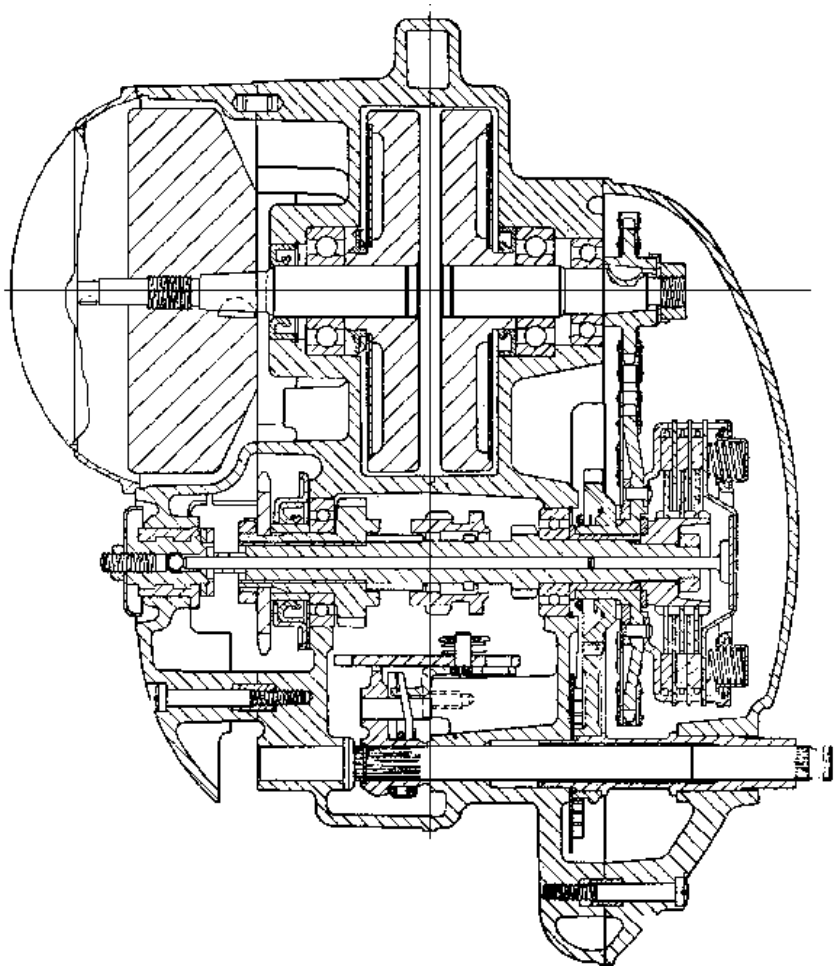

Fig. D8A. *Horizontal section of engine unit.*

Flywheel Assembly

It is advisable at this stage to test the big-end bearing for wear. This is done by taking hold of the connecting rod stem and pulling it upwards until the crank is at top dead centre. Then holding it in this position try gently but firmly to pull and push the connecting rod in the direction of its travel in order to feel whether there is any play.

If the big-end is in a sound condition there should be no play in this direction, although it may be possible to rock the rod sideways, i.e. at right-angles to the axis of the machine. If vertical play is perceptible in the big-end it must be decided whether the amount in evidence is permissible or not. The bearing is not likely to need replacing however, provided that the machine has been carefully used and adequately lubricated, for it is of ample dimensions for the work it has to do. But if for any reason the big-end bearing has deteriorated as the result of neglect or abuse, it should be replaced.

If it has been decided that the big-end bearing must be replaced the flywheels should now be parted, using Service Tool number 61–3206 (Fig. D9). Place the flywheels in the bolster and position the stripping bars, Service Tool number 61–3208. Use the punch Service Tool number 61–3209 to drive out the crankpin. Take off the uppermost flywheel and reverse the lower one in the bolster. Again using Service Tool number 61-3209 drive out the crankpin.

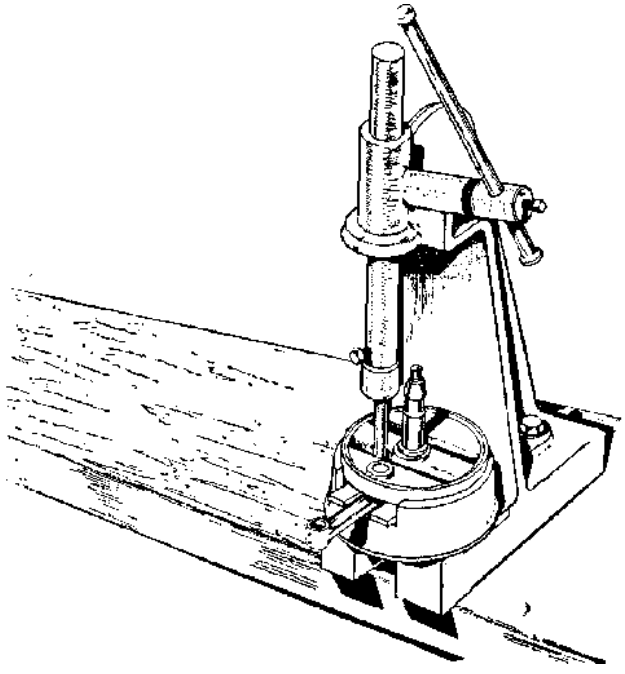

Fig. D9. *Parting the flywheels with Service Tool 61-3206.*

Kickstarter Mechanism

The kickstart ratchet spring, part number 90–0039, is secured in position by a circlip and pressed metal collar. Take off the circlip and collar and remove the kickstarter ratchet pinion.

Gearbox (see also Service Sheet No. 506)

The gearbox control shaft carries on its serrated end inside the case a gear selector claw (G) Fig. D16, part number 90-0190. This is held in position by a circlip, part number 90–0051, and fitted around the boss of this claw is a double-ended coil spring. This is housed inside a metal cover (K) part number 90–0054. The two ends of the spring fit one either side of a peg driven into the claw, and also pass over a projection on the bridge piece of the gear selector mechanism, thus acting as a centralizing device for the claw.

The bridge piece, part number 90–0056, is secured by two ¼ in. bolts (B) and locking washers to the alloy case, and carries the gear selector quadrant, on a central pin positioned by a spring and plate.

The end of the gear selector quadrant is located in a spring-loaded plunger, part number 90-0047, pressed into the bottom of the alloy case (A) Fig. D16.

The mainshaft oil seal housing (D) Fig. D12, part number 90-0072, is held in position on the gearbox end of the drive side crankcase half by three $^{3}/_{16}$ in. screws and shakeproof washers, which, when removed reveal a plate (A), part number 90-0133, held by two $^{3}/_{16}$ in. screws and washers. This plate functions as a positioning plate for the gearbox mainshaft ballrace and layshaft phosphor bronze bush.

The mainshaft oil seal housing contains the gearbox sprocket distance sleeve, part number 90-0071 (F), and an oil seal of the spring-loaded type, part number 89-3006 (E).

Clutch Control

The flywheel generator alloy cover (Fig. D6), carries the clutch actuating lever and quick-action screw, part number 90-0180. If this mechanism needs attention, remove the metal cover, part number 90-0106, which acts as a dust cover to the clutch lever actuating screw, then remove the extension spring, part number 19-0122 from the actuating lever and press out the lever and screw from the case. In the centre of the screw is a steel ball, adjusting screw, part number 90-0105, and locknut, part number 89-0366.

This completes the dismantling of the engine and gearbox unit.

Removal of Lucas Generator

The dismantling of the engine unit is identical with the exception of the removal of the generator.

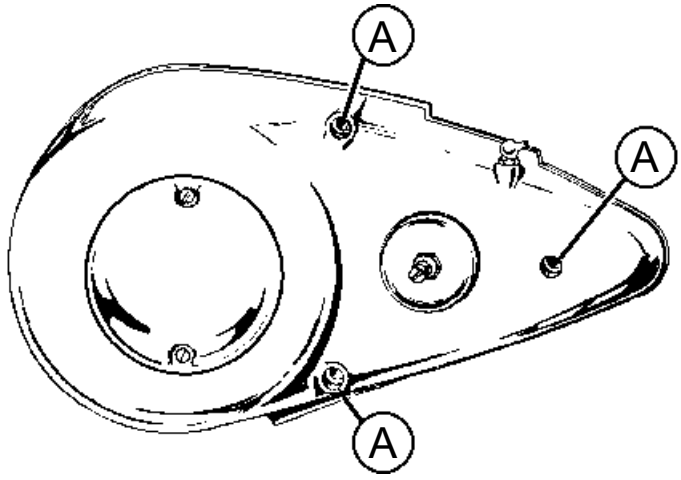

Fig. D10.

Remove the three screws (A) Fig. D10, and take off the cover.

Take off the four ¼ in. nuts holding the stator and remove the centre bolt securing the cam and rotor.

Insert the extractor, tool number 90-0297, screw up tight to remove the rotor from the mainshaft.

BSA SERVICE SHEET No. 503

Reprinted January, 1965.

MODELS Dl, D3, D5 AND D7,

ENGINE ADJUSTMENTS WHICH CAN BE CARRIED OUT WITHOUT DISMANTLING

Contact Breaker Points

Access to the contact breaker mechanism is obtained by removing the small cap in the centre of the generator cover. On early Wipac models this cap is retained by a spring clip as shown in Fig. Dl, but on all other models two small retaining screws are used.

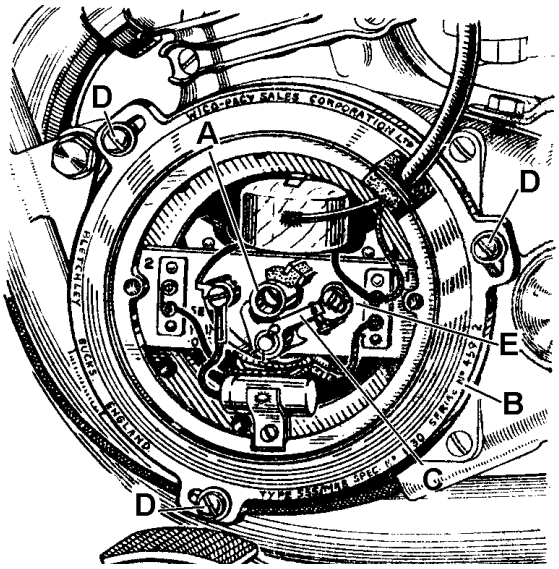

Fig. D1. *Wipac Equipment.*

D7 Models

On D7 models, access to the contact breaker and clutch adjuster, can be obtained after the pear-shaped cover on the left-hand side of the engine has been removed by taking out the three screws.

The contact points must be maintained in good condition and kept free from oil and dirt. They should be cleaned occasionally by passing a piece of smooth clean paper between the points and withdrawing it when the points are closed. If the points are burnt they should be cleaned with very fine emery cloth, and then wiped with a petrol-soaked rag. This is easier carried out if the rocker arm complete is removed. On Wipac magnetos the spring clip on the end of the rocker arm spindle must be removed and the terminal at the end of the spring disconnected to allow the rocker arm to be detached. On Lucas generators the terminal post nuts should be slackened so that the slotted end of the spring can be removed from the post, thus permitting the rocker to be withdrawn from the spindle.

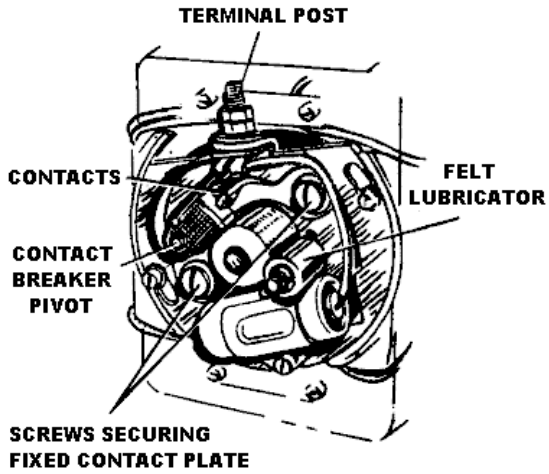

Fig. D1a. *Lucas Equipment*

It is most important that the correct contact breaker gap is maintained. Rotate the engine until the points are fully open and then check the gap with feeler gauges. The gap should be .015 in. for Wipac and .012 in. for Lucas equipment.

If the gap is incorrect the points must be re-adjusted. Slacken the screws securing the fixed contact plate (E) Fig. Dl, for Wipac, and Fig. D1a for Lucas equipment. Move the plate until the contact gap is correct then tighten the securing screws and re-check the gap. Early Wipac models have an eccentric headed screw at (F) Fig. Dl, to facilitate movement of the plate, but on all other models the plate is simply pushed backwards or forwards.

Ignition Timing

Before checking the ignition timing the contact breaker gap must always be checked, as this affects the ignition setting. Rotate the engine until it is at top dead centre, ascertained by a suitable rod inserted through the plug hole. Turn the engine backwards until the piston bas descended $^{5}/_{32}$ in. for D1 and D3 models, $^{1}/_{16}$ in. for D5 and D7 models and the contact points should then be just on the point of opening, i.e. not more than .002 in. apart. This is best determined by inserting a piece of very fine paper (such as cigarette paper) between the points. The paper will be only lightly gripped when the points are just on the point of opening.

If the setting is not correct the three screws in slotted holes (D) Fig. D1, should be slackened, thus permitting the complete contact breaker back plate to be rotated until the correct setting is obtained. Rotating the plate in a clockwise direction advances the ignition. On Lucas models the contact breaker back plate is retained by four screws in slotted holes as shown in Fig. D1a, but the procedure is identical.

Sparking Plug

The sparking plug is of such importance in satisfactory engine performance that it is advantageous to give proper attention to this component. It is poor economy to use any but the most efficient plug. The better plug will soon pay for itself by effecting more complete combustion and loss of power due to partially unburned fuel will be eliminated. The plug most suited to the requirements of this engine is the Champion L10S. Remove the sparking plug every 1,000 miles (1,500 km.) or so, for inspection. If the carburation system is in correct adjustment the sparking plug points should remain clean almost indefinitely. An over-rich mixture will, however, cause the formation of a sooty deposit on the points and, later, outside the plug body (as upper view, Fig. D2). If therefore such a deposit is found, clean it off carefully and check your carburetter. Too large a proportion of oil in the petroil mixture will also cause plug fouling. The continued use of leaded fuel may also eventually produce a deposit on the plug—this time of a greyish colour.

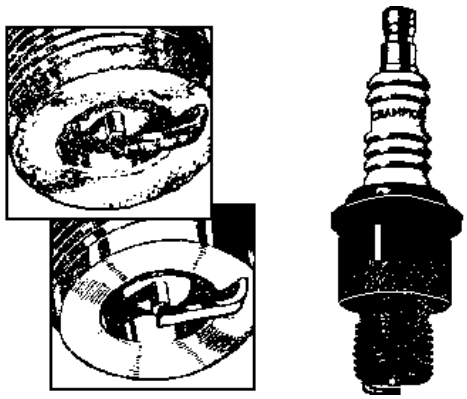

Fig. D2. *The Sparking Plug.*

A light deposit due to any of these causes can easily be cleaned off, but if it is allowed to accumulate, particularly inside the body the plug may spark internally with an adverse effect on engine performance—if, indeed, it does not stop the engine altogether—and the plug should be taken to a garage for cleaning. If eventually the cleaning process fails to restore the plug to its original condition of efficiency, it should be replaced by a new one.

When inspecting a plug also check the gap between the points. This should be .018—.020 in. (.44—.50 mm), and adjustment should be made by bending the side wire. Never attempt to move the centre electrode.

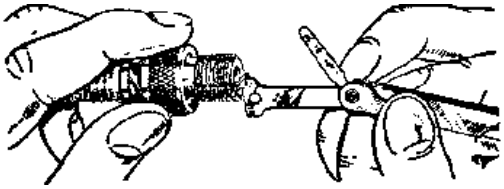

Fig. D3. *Setting the Plug Points.*

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B.S.A. Press.

BSA SERVICE SHEET No. 507

Revised February 1959
Models Dl, D3, D5 and D7 *Reprinted October* 1964

PRIMARY TRANSMISSION

Clutch Adjustment

There must always be a slight amount of play in the clutch withdrawal mechanism in the gearbox, or a short length of free cable at the handlebar lever end. If the play becomes excessive, difficulty will be experienced in changing gear, as the clutch may not fully disengage, in which case the control should be adjusted.

The clutch adjustment will be found at the left-hand end of the gearbox mainshaft (Fig. D21) and it consists of an adjusting pin (A) screwed into the clutch withdrawal quick thread sleeve and a locknut (B) to secure it in position. This adjusting pin presses against the clutch withdrawal rod with a steel ball interposed. (On the model D.7. the adjuster is concealed underneath the pear shaped cover on the left-hand side of the engine.)

The withdrawal mechanism must at all times be so adjusted that there is a slight amount of play between the pin, the steel ball and the operating rod, in order to ensure that the clutch springs may exert their full pressure on the driving and driven plates. If there is not sufficient play there will be a tendency for the clutch to slip continually owing to reduced spring pressure, and this in turn will cause over-heating and serious damage to the clutch itself.

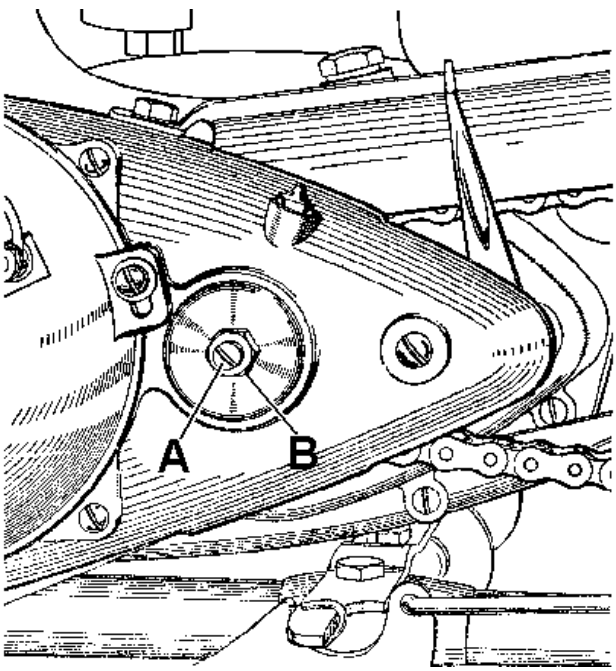

Fig. D21.—Clutch control adjustment

To adjust, release the locknut and holding it with a spanner turn the adjusting pin back one or two turns with a screwdriver. Then, still holding the locknut with a spanner, screw the adjusting pin gently in until it is felt to meet some resistance. Then unscrew it half-a-turn and holding it in this position retighten the locknut. If the adjustment is correctly made in this manner, it will be found that there is a small amount of free play at the clutch lever on the left handlebar before this is felt to take up the spring pressure during the action of declutching.

Front Chain

The front chain runs on short fixed centres and adjustment for tension is neither required nor provided for.

This chain will run for many thousands of miles before examination is required. This operation involves the removal of the primary chain cover (Fig. D19) after the kickstarter and gear change pedals, both of which are mounted on splines and locked by pinch bolts ("B" and "C" respectively) have been removed together with the five securing screws ("D"). The normal up and down play on the front chain is up to ⅜ in. (1 cm.) and the maximum permissible indicating that the chain is unduly worn and requires replacement, is about ¾ in. (2 cm.).

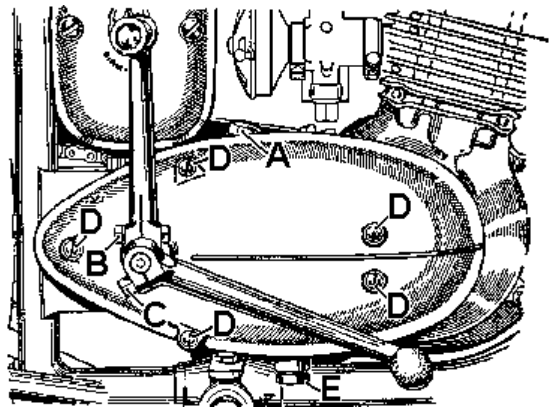

Fig. D19.

Remember when replacing a chain fitted with a detachable connecting link, that the spring fastener must always be put on with the closed end facing the forward direction of travel i.e. on the top run of the chain.

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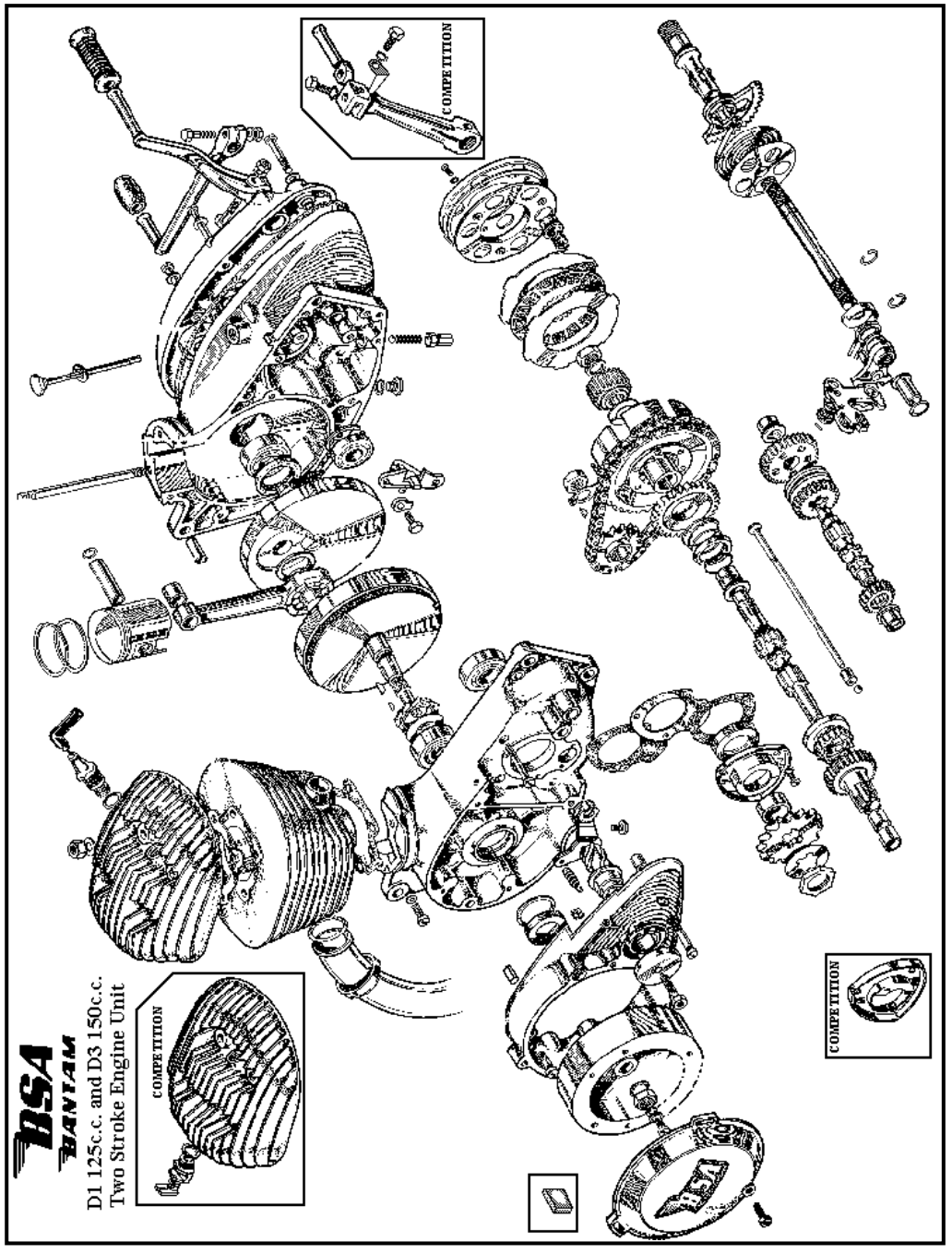
Revised June, 1959.

'D" Group Engine and Gearbox (Exploded View)



NOTE:- On D1 Engines after 1954, and all D3 Engines, the outside crankshaft Oil Seal is placed next to the flywheel instead of between the two bearings.

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Service Dept., Waverley Works. Birmingham, 10.
(Printed in England)

BSA SERVICE SHEET No. 4I2C

Reprinted May 1965.

D3, D5, D7, C12, C15 and B40 SWINGING ARM MODELS REAR SUSPENSION

FRAME

The silent bloc bushes fitted to the rear suspension swinging arm are unlikely to need replacement for some considerable time. If it is found necessary to renew them, first remove the suspension units by detaching the top pivot bolts and the bottom retaining nuts.

Remove the rear wheel and chainguard. Undo the fork spindle nut and tap out the spindle, using a suitable drift.

Lift the rear fork until it is clear of the side plates; it can then be turned and pulled away from the rear.

After the central distance piece has been displaced the bushes can be removed with a suitable drift.

DISMANTLING THE SUSPENSION UNITS

Early C12 models were fitted with a damper spring of 100 lb./inch rate, this was later increased to 124 lb./inch.

The 124 lb./inch spring, part number 29-4570 can be fitted to early machines where it is considered necessary.

The spring is retained by circlips fitted at its base and a service tool, part number 61-5064 has been introduced to facilitate removal.

The tool is assembled as shown in Fig. C46 and when the nut is screwed down sufficiently the spring is compressed thus releasing the circlips. The circlips can be extracted through the apertures in the tool and the spring comes away when the tool is removed.

Reassembly is in the reverse order.

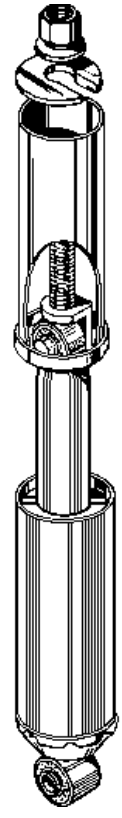

Fig. C46.

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December, 1948
Reprinted February, 1965

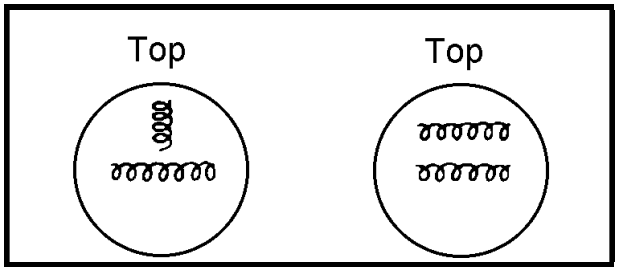
Models D1, D3, D5, D7 and C10L
LAMPS
(Wipac Lighting)

Headlamp

Two types of headlamp have been employed but they differ only with regard to the headlamp switch. Early models have the body of the switch mounted inside the headlamp shell but remotely controlled through a cable and a lever mounted on the handlebars. Later models have a switch mounted in the top of the headlamp so that it can be reached from the normal riding position.

The reflector and bulb holder assembly are housed in the front rim and to obtain access to the bulbs, loosen the screw situated at the bottom of the lamp rim and lift the rim outwards and upwards. To remove the bulb holder, bend down the small tab which projects from the base of the reflector. The holder can then be removed, after turning it anti-clockwise, making the main and parking bulbs easily accessible. When replacing the main bulb be sure that the word "TOP' on the bulb is uppermost.

If the bulb is not marked, assemble as illustrated:—



Correct way to fit double-filament bulbs.

The correct focus has been incorporated in the design of the headlamp and therefore no provision for adjustment has been necessary.

Tail Lamp

To remove the rim of the lamp, undo the small 6BA screw and turn the rim slightly to the left, it can then be easily withdrawn. On later models a bayonet fitting is employed and it is merely necessary to push the lamp cover in, twist it to the left and then pull it away.

The bulb holder is of the bayonet pattern and the bulb is removed by the usual push and turn method. When a stop light is fitted a double filament bulb is used. Ensure that the bulb is the right way up. The portion marked "TOP" should be uppermost when the bulb is inserted, but if the bulb is not marked, check that it is located correctly by operating the foot brake and ensuring that the brighter filament is illuminated.

Switching

No adjustment of the later type switch is necessary but it may occasionally be required to synchronise the earlier type of switch with the handlebar lever. This can be easily carried out after slackening the locknut on the adjuster which connects the Bowden cable to the lever assembly. Screw the adjuster in or out until the switch positions are synchronised with the lever positions, then tighten the locknut. Four positions are provided on the lever and these correspond to Parking, Head Dipped, Head Full On and Off.

Parking Battery

Where D.C. lighting is employed a Varley accumulator is fitted. On models employing A.C. lighting a dry battery is fitted inside the headlamp shell. This is a 3 volt bicycle battery, type 800. To fit a new battery, hold it so that the vertical contact strip faces towards the lamp, the battery should then be positioned in the holding bracket in such a manner that the vertical contact connects with the metal battery holder at the rear of the lamp, while the horizontal contact fits inside its corresponding contact.

Replacement Bulbs

Headlamp (main)	••	D1, D3, D5 and D7 24/24 watt, double filament, 6/7 volt.
		C10L 30/30 watt, double filament, 6/7 volt.
Headlamp (parking)	••	A.C. lighting •• .25 amp. 2.5 volt M.E.S.
		D.C. lighting •• 6/7 volt, 3 watt, M.E.S.
Tail lamp (single filament)	•• ••	•• 6/7 volt, 3 watt S.B.C.
(with combined stop light)		•• 6/7 volt, 18/3 watt, S.B.C.
(with separate twin stop lights)		•• 6/7 volt, 3 watt, M.E.S.
Speedometer •• •• •• ••		•• 6.5 volt, .3 amp.

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February 1953

Revised 1958

MODELS D1, D3 and D5

Wipac Flywheel Ignition Generator Series 55 Mark 8

SPECIAL NOTES

The Series 55 Mark 8, Spec. No. IG 1130 A.C./D.C. generator superseded the 27 watt "Genimag," which was purely an A.C. unit. This change took place on and after engine number YD1-40661. As this unit incorporated extra magnets in the flywheel, all users should make careful note of the fact that, although similar in appearance, the *flywheels of the two units are not interchangeable.* If the latter type flywheel is used with the "Genimag" stator plate, trouble will be experienced with bulbs blowing. Alternatively, if the "Genimag" flywheel is fitted with a later type stator plate, insufficient lighting output will be obtained.

On machines manufactured after August 1955, different generators are used for A.C. and D.C. equipment. These are marked Spec. No. IG 1452 for A.C. only (D1, D3 and D5 models), Spec. No. IG 1454 for D.C. only (D1 models), and Spec. No. IG 1450 for D.C. only (D3 swinging arm models). The two D.C. units are the same, except for the lengths of the leads.

When the generator complete, or the stator plate Spec. No. IG 1130, is replaced by one of the later D.C. units, the yellow link between terminals 9 and 11 in the headlamp switch must be removed in order to limit the charge rate in the "Low" position.

As the later type A.C. and D.C. stator plates are not interchangeable, it is necessary to specify A.C. or D.C. when ordering spares.

From 1950 onwards (engine number YD1-40661) the flywheels are the same for A.C. and D.C. For models prior to this, the complete generator should be changed when renewing the stator plate.

The A.C. generator Spec. No. IG 1452 cannot be converted to D.C. by means of a Wipac "Converta-kit," unless a new three-coil stator plate is also fitted.

DESCRIPTION

This ignition and power unit consists of two assemblies, namely the flywheel rotor, and the stator plate which carries the ignition coil, low-tension coils, contact breaker and condenser. The cam is fitted to the extended crankshaft of the engine and is located by a key.

Additional support is provided for the end of the crankshaft by the inclusion of a self-oiling bush in the centre of the stator housing.

The unit provides a high performance spark output over a very wide range of speeds. While approximately 10,000 volts at only 500 r.p.m. rising to 15,500 volts at 6,000 r.p.m. is obtained, it has been found possible to maintain a large-air-gap between rotor and stator to ensure a trouble-free unit.

A characteristic of the ignition generator unit is that its spark output will not vary over a wide timing range, thus rendering frequent adjustment of the contacts unnecessary, and at the same time allowing a fair tolerance for the accuracy of the setting.

A further feature of the magneto is the accessibility and ease of the contact breaker and other parts, without the necessity of removing the flywheel rotor. In fact, it is unlikely that, at any time it will be necessary to remove more than the stator cover plate; the stator being so designed that all adjustments, and even condenser replacement, can be made from the front of the unit.

No engine timing is necessary; fit the stator plate slots central on the fixing screws and tighten up these screws, locate the cam on the key in the engine shaft, set the contacts to .015 in. and the engine is timed. Any minor adjustment can be made while the engine is running. To advance the magneto, slacken off the stator plate fixing screws and slightly rotate the magneto in the opposite direction to the flywheel rotor.

Occasionally, it may be found that an engine will not start nor run unless the contact breaker points setting is about .006—.008 in., instead of the correct figure of .015 in. This is caused by the points opening before the magnetic flux has been broken, so that no voltage is produced.

The first remedy to try is to reverse the small Woodruff cam key. Should this effect no improvement, a special cam, ground 5° late, can be obtained from the makers.

The low-tension coils are energised by the three magnetic units, which concentrate a powerful magnetic charge within a small space. One of these units energises the ignition coil. The generator has been designed to produce A.C. current directly into a 6-volt 30 watt load or, with the aid of a metal plate rectifier in the external circuit, produce D.C. current for battery charging.

With the IG 1130 generator, a maximum day charge of 2.5 amps is allowed to pass through the battery. During night use with a 6-volt 30 watt lamp load, a generated balance against this battery drain is accomplished at approximately 3,000 r.p.m. of the engine. A charge of ¾ amp is allowed at maximum engine speed.

The IG 1450 and IG 1454 generators have a higher rate of charge, giving slightly more than 3 amps at maximum engine speed. At night, the full lamp load is balanced at approximately 2,800 r.p.m., and a charge of 1.5 amps is obtained at 4,500 r.p.m. Batteries of 5, 10 or 12 amp-hour rating are equally suitable for use with these generators, the higher capacities being recommended.

RUNNING MAINTENANCE

The magneto requires very little maintenance and if the following notes are observed the life of the machine should prove trouble-free.

Check and if necessary re-adjust the contacts once every 5,000 miles (see "Service Instructions").

Occasionally clean the contacts by inserting a dry smooth piece of paper between them and withdrawing while the contacts are in the closed position. Do not allow the engine to run with oil or petrol on the contacts or they will start to burn and blacken, and if they do, lightly polish with a piece of smooth emery cloth.

Moisten the cam lubricating pad with a few drops of thin oil every 5,000 miles.

Do not run with a faulty or damaged high-tension lead and clean away mud and dirt from around the high-tension insulator when necessary.

If the magneto requires any attention beyond the replacement of contact points and condenser, it is recommended that the complete machine should be sent to us or to an authorised Wico service station. The following information is given for the benefit of those unable to do so:—

SERVICE INSTRUCTIONS

Checking the Magneto for Spark

If the engine fails to start and there is an indication of the magneto causing trouble, the spark can be checked by holding the high-tension lead $^{3}/_{16}$ in. away from a point on the frame. When the engine is kicked over in the usual way, a spark should jump this gap. If no spark is visible, see that the high-tension lead is in good condition and examine the contact breaker.

Make sure there are no metallic particles inside the housing, and that the contacts are perfectly clean, and the contact breaker gap is correct to the recommended setting.

If the contacts are found to be in a burnt or badly pitted condition, a faulty condenser is indicated. If the contact breaker appears to be in order, the stator plate may bc removed from the engine, complete with coils.

To do this the following procedure should bc adopted:—

Unscrew the two cover securing screws and remove the cover, unscrew the cam screw and withdraw the cam free of the shaft. The small cam key in some instances may leave its keyway, so care should be taken to make sure of this point when taking the cam from the shaft. Next remove the three stator plate securing screws. The stator can now be withdrawn clear of the engine.

The leads of the ignition coil should be examined to ensure that there is no break in the wiring. One lead will be found to be joined to a tab which is clamped underneath one of the nuts which anchor the stator coil assembly to the stator housing. If this is in order, check the sleeved lead of the primary ignition coil which is connected to the front of the insulated post, which also carries the condenser lead and contact breaker return spring.

The screw which locks the insulated post in position will be found underneath the low-tension coil on the right-hand side looking at the inside of the stator housing when in its upright position.

There is, however, no need to remove this screw for any of the investigations recommended in these instructions. The second screw lying at a larger radius and appearing over the top of the coil is the earthing screw for the number 2 terminal on the front of the machine.

If the leads joined to the insulated post are in order and firmly clamped and the tags not earthing in any way, the ignition coil should be in working order. Should it be necessary to completely remove the stator plate entirely the low and high-tension leads should be freed from the insulated terminal boards on the front of the unit and the plugs respectively, the former by the loosening off of the grub screws and withdrawing the low-tension leads which are coloured through the rubber insulator. The stator plate assembly should then be entirely free of the engine.

In the unlikely event of the high-tension insulation of the coil breaking down, provided this is not internal, it should be possible to detect signs of charring on the binding tape of the coil. If the absence of spark is due to tracking, track burns may be visible on the insulator gasket.

Replacement of Ignition Coil

The removal of the stator coil assembly is effected by first disconnecting the ignition lead from the coil, then freeing the white, red and green low-tension leads from the terminals marked 3, 1 and 4 respectively, and unscrewing the two clamp nuts. The live lead of the primary winding of the ignition coil must then be disconnected from the insulated post by removing the securing screw. The stator coil assembly may then be gently eased off the two plate studs.

In order to slide the ignition coil from the iron limb, it is necessary to straighten the small brass tab which will be found on the side of the coil which faces the stator housing. If the coil is grasped firmly in one hand with the finger under the insulator gasket and on either side of the core, it may be quite easily pulled off.

To refit the ignition coil proceed as follows:—

(a) Hold the coil in the left-hand with the brass contact pointing away from the line of vision and the lead wires projecting downwards from the underside, and drop the leads through the rectangular hole in the insulating gasket, the extended end of which must point in the same direction as the coil tab.

(b) With the other hand, push the coil core through the coil, making sure that the brass locking tab riveted to the iron is on the same side as the coil contact. Drive the fibre wedge provided in between the core and the coil, on the same side as the locking tab and bend over the tab.

(c) Replace the stator coil assembly in position on the stator plate and before pushing right down on the studs, bring the sleeved low-tension lead of the ignition coil inside the base of the right-hand stator core stud. This keeps the lead clear of the flywheel rotor. Pass the low-tension leads through to the front of the unit. Note also that none of the coil leads become clamped in between the stator and the housing.

(d) Press the core down firmly and tighten down the two clamp nuts anchoring the ignition coil earth lead tab underneath the left-hand nut.

(e) Reconnect the sleeved ignition coil lead to the insulated post together with the condenser lead tab and the contact breaker return spring. Firmly screw home the securing screw.

(f) Reconnect the ignition lead to the high-tension terminal of the ignition coil, and reconnect the low-tension leads to the appropriate terminals as follows:—

The white lead to number 3, green to number 4 and red lead to number 1 terminal on the front of the unit.

(g) Make sure that all tabs arc clean and all clamped connections are tight.

IMPORTANT:—*Bend all stray loops of wire to behind the radius of the stator to ensure they do not foul the rim of the flywheel rotor.*

Removal of Condenser

To replace the condenser, remove the condenser terminal nut and free the condenser lead. Unscrew the condenser bracket fixing screw and withdraw the condenser.

B.S.A Service Sheet No. 810A (contd.)

Adjustment and Replacement of Breaker Points

The only adjustable part of the magneto is the breaker plate which provides for the setting of the breaker points. To set these points proceed as follows:—

Turn the engine over until the breaker points are fully open and insert the feeler gauge. Slacken off the locking screw which is to be found immediately above the points, and if the gauge is tight, adjust the fixed contact plate, by means of a suitable screwdriver engaged in the recess provided, in an anti-clockwise direction until the correct setting of 0.035 in. is obtained. Tighten up the fixed contact plate locking screw. The breaker point setting should only be adjusted in the manner described and at no time should the fixed contact platform be bent to provide adjustment. The moving contact is integral with the breaker arm. If the points need replacement it is recommended that both fixed and moving points be replaced at the same time.

When assembling the moulded breaker arm to the magneto it is necessary to lightly prime the pivot pin with oil or soft grease and occasional priming throughout its life will be found to be advantageous.

Care must be taken to put in the correct number of thin spacing washers behind the breaker arm in order to bring the contacts in line with one another. The free end of the contact breaker spring is then anchored to the insulated terminal post with a screw and shakeproof washer. The condenser and primary ignition coil sleeved lead is secured by the same screw and washer. Place one of the spacing washers over the pivot on the outer side of the breaker arm and insert the spring clip in its groove.

The Low-tension Coils

These coils are robust in character and are most unlikely to develop fault. In the event of a fault developing in the coil group, the removal more so than the replacement, of the coil or coils may not be an easy operation, and it is likely that further damage to the windings will occur during the removal process. It is advisable before any steps are taken to remove the low-tension coils, that the coils be thoroughly checked and proved beyond doubt to be at fault. The coils are secured to the iron core by means of a varnish adherent assisted by a fibre wedge. Paper formers are used, so damage to the winding can occur when being taken off.

In view of this, it is strongly recommended that should a fault occur in the low-tension coil group, that application be made for a coil group replacement already secured to the iron core.

The ignition coil can be removed from the stator assembly as previously described and replaced on the new stator core and coil group replacement. Having completed the coil assembly, proceed as instructed under paragraph “Replacement of Ignition Coil”.

Care should be taken to see that the wire connections face toward the front of the machine when assembling the stator coil assembly into the housing.

Any wire loops or wires that could come into contact with the flywheel rotor should be pushed back clear to prevent any fouling or electrical breakdown.

Finally, when connecting the low-tension leads of the frame wiring to the magneto generator, make sure that the white, red and green leads are placed on the machine terminals already carrying that colour of lead. This is part of a colour coding scheme, the complete scheme of which is given with the wiring diagram.

The Flywheel Rotor

The robust construction of the flywheel rotor reduces the possibility of any faults on this unit to a minimum. The three powerful magnet inserts are cast in the rim of the rotor and it is not possible to demagnetise them by ordinary usage. No keepers are necessary when the magneto housing and stator are removed. The boss of the flywheel rotor is located on the crankshaft by a keyed taper and locked by a nut and shakeproof washer. It is unnecessary to remove the rotor unless at any time the engine has to be dismantled. A thread cut on the outside of the rotor boss enables it to be removed by the use of a special extractor. When replacing, the rotor must be perfectly clean inside and out.

B.S.A. MOTOR CYCLES LTD.,
Service Department, Armoury Road,
Birmingham 11. **B.S.A. Press.**

BSA SERVICE SHEET No. 810

December 1948
Reprinted June 1965

Model D1
(up to Engine number YD1-40660)

WICO-PACY "GENI-MAG" EQUIPMENT

DESCRIPTION

The 30-watt "Geni-mag" ignition and lighting unit embodies two assemblies, namely the flywheel and the stator which carries thc ignition coil, lighting coils, contact breaker unit and condenser. The cam is fitted to the extended crankshaft of the engine and is located by a keyway.

The "Geni-mag" ignition unit provides a high performance spark output over a very wide range of speeds, special attention having been paid to the needs of the modern light-weight motor-cycle of the 125 c.c. class and of the motorised bicycle. While an excellent spark performance of about 8,000 volts at only 500 r.p.m. rising to 14,000 volts at 6,000 r.p.m. is obtained, it has yet been found possible to maintain an exceptionally large air gap between rotor and stator, thus considerably increasing the probability of a trouble-free system. Additional support is provided for the end of the crankshaft by the inclusion of a self-oiling bearing located in the centre of the stator housing.

A characteristic of the magneto is that its spark output will not vary over a wide timing range, thus rendering frequent adjustment of the contacts unnecessary, and at the same time allowing a fair tolerance for the accuracy of the setting. A further feature of the magneto is the accessibility and ease of adjustment of the contact breaker and other parts without the necessity of removing the flywheel at any time.

No engine timing is necessary; fit the stator housing slots central over the studs on the crankcase, tighten up the nuts, fit the cam which locates on a key in the engine shaft, set the contacts to .015 in., and the engine is timed. Any minor adjustment can be carried out while the engine is running. To advance the magneto, slacken off the stator housing nuts and slightly rotate the magneto in the opposite direction to the rotation of the flywheel.

The lighting coils are energized by the three magnetic units which concentrate a powerful magnetic charge within a small space and volume, the characteristic being such that brilliant lighting is obtained without flickering at low speed, while the rise of output above the rated wattage is sufficiently low as not to allow the lamps to be seriously over-loaded at maximum engine speeds, which are in the region of 6,000 to 7,000 r.p.m. One of the three magnet units also energises the ignition coil.

RUNNING MAINTENANCE

The magneto requires very little maintenance and if the following notes are observed the life of the machine should prove trouble-free.

Check and if necessary re-adjust the contacts once every 5,000 miles (see Service Instructions).

Occasionally clean the contacts by inserting a dry smooth piece of paper between them and withdrawing while the contacts are in the closed position. Do not allow the engine to run with oil or petrol on the contacts or they will start to burn and blacken, and if they do, lightly polish with a piece of smooth emery cloth. Moisten the cam lubricating pad with a few drops of thin oil every 5,000 miles.

Do not run with a faulty or damaged high-tension lead and clean away mud and dirt from around the high-tension insulator when necessary.

If the magneto requires any attention beyond the replacement of contact points and condenser, it is recommended that the complete machine should be sent to us or to an authorised Wico service station. The following information is given for the benefit of those unable to do so:—

SERVICE INSTRUCTIONS

Checking the Magneto for Spark

If the engine fails to start and there is an indication of the magneto causing trouble, the spark can be checked by holding the high-tension lead 3/16 in. away from a point on the frame. When the engine is kicked over in the usual way, a spark should jump this gap. If no spark is visible, see that the high-tension lead is in good condition and examine the contact breaker. Make sure there are no metallic particles inside the housing and that the contacts are perfectly clean, and the gap is correct to the recommended setting. If the contacts are found to be in a burnt or badly pitted condition, a faulty condenser is indicated. If the contact breaker appears to be in order the stator plate may be removed from the engine complete with coils and the leads of the ignition coil should be examined to ensure that there is no break in the wiring. One lead will be found to be joined to a tab which is clamped underneath one of the nuts which anchor the stator to the stator housing. If this is in order check the other end of the primary ignition coil which is connected to the back of the insulated post which projects into the contact breaker recess at the front of the magneto. The screw which locks this in position will be found underneath the lighting coil on the right-hand side looking at the inside of the stator housing when in its upright position. The condenser lead is also joined to this point. If both these are connected and the tabs are not earthing on the stator plate the ignition coil should be in working order. In the unlikely event of the high-tension insulation of the secondary coil breaking down, it should be possible to detect signs of charring either on the binding tape of the coil, the insulating gaskets or the high-tension insulator.

Replacement of Coil

To remove the coil, the high-tension insulator which is held by two screws outside the housing must be taken off. The removal of the stator is effected by unscrewing the three clamp nuts. The stator may then be gently eased off the three stator plate studs. Care must be taken not to jerk it, otherwise the lead which connects the lighting coils to the terminal on the stator may be broken. The live end of the primary ignition coil lead must then be disconnected from the contact breaker terminal post. In order to slide the coil from the iron limb, it is necessary to straighten the small brass tab which will be found on the side of the coil which faces the stator housing. If the coil is grasped firmly in one hand with the fingers under the insulator gaskets and on either side of the core, it may be quite easily pulled off. To refit the ignition coil proceed as follows:—

(a) Hold the coil in the left hand with the brass contact pointing away from the line of vision and the lead wires projecting downwards from the underside, and drop the leads through the rectangular hole in the two insulating gaskets, the extended end of which must point in the same direction as the coil tab.

(b) With the other hand push the coil core through the coil making sure that the brass locking tab riveted to the iron is on the same side as the coil contact. Drive the fibre wedge provided in between the core and the coil on the same side as the locking tab and bend over the tab.

(c) Connect up the sleeved lead to the terminal post placing the other parts in the following order:— Screw, shakeproof washer, condenser tab, coil lead tab, thick metal washer and insulating washer. Then holding thc outer end of the contact breaker terminal post in the square hole, with the finger of the other hand, drop the screw complete with washers into the round recess at the inner end of the square hole and drive the screw home.

(d) Finally, bend both tabs slightly upwards to ensure that they do not make contact with the metal housing, screw down the stator anchoring the lighting and ignition coil earthing leads under the clamp nuts making sure at the same time that the coil insulator gaskets are bent upwards towards the high-tension insulator hole in the stator housing.

(e) Make sure that all tabs are clean and all clamped connections are tight and before lowering the stator see that none of the coil leads become damped in between the stator and the housing.
Important.— Bend all stray loops of wire to behind the radius of the stator and push down the condenser wire into the well of the stator housing to ensure that they do not foul the rim of the flywheel. The flywheel rim reaches to within about 1/16 in. of the bead of the insulated lighting terminal stud, and it is important to see that the live wire which is soldered to it is pushed down to well below this level.

(f) Refit the high-tension insulator.

Removal of Condenser

To change the condenser it is necessary to lift the stator as before described, and disconnect the lead from the terminal post and unscrew the clamp nut which is located on the contact breaker cover spring post. When replacing, make sure that the condenser lead is pushed down as far as possible into the well formed by the stator housing otherwise there is a danger of the flywheel rubbing and possibly severing it.

Adjustment and Replacement of Breaker Points

The only adjustable part of the magneto is the breaker plate which provides for the setting of the breaker points.

To set these points proceed as follows:—

Turn the engine over until the breaker points are fully open and insert the feeler gauge. Slacken off the locking screw which is to be found immediately above the points and if the gauge is tight rotate the eccentric adjuster in an anti-clockwise direction until the correct setting of .015 in. is obtained. Tighten up the adjusting screw.

The breaker point setting should only be adjusted in the manner described and at no time should the fixed contact be bent to provide adjustment.

The moving contact is integral with the breaker arm. If the points need replacement it is recommended that both fixed and movable points be replaced at the same time.

The breaker arm bearing is of the self-lubricating type and it is only necessary to lightly prime the pivot pin with oil or soft grease when assembling. Care must be taken to put in the correct number of thin spacing washers behind the breaker arm, in order to bring the contacts in line with one another. The end of the contact breaker spring is then anchored to the terminal post with a screw and shakeproof washer. Place one of the spacing washers over the pivot on the outer side of the breaker arm and insert the spring clip in its groove.

The Lighting Coils

In the unlikely event of any fault developing with these coils, the removal and replacement of them is a simple operation and may be performed without disturbing the ignition coil. The windings are in series and are made up in pairs complete with earthing tab and insulated terminal screw. To remove the lighting coils, take off the high-tension insulator and unscrew the three stator clamp nuts. Take out the insulated terminal screw which projects from one of the cavities on the face of the stator plate. Straighten with a pair of pliers the two outer laminations on each coil core, which are bent outwards to hold the coils in position, and slide off the coil formers after slightly raising the stator on the studs in the stator plate. Replace in the following order:—

With the coil which carries the insulated terminal screw on the side nearest to the screw hole in the stator housing, and the slotted flanges of the two coil formers pointing towards the centre of the stator and the slots downwards, slide the two coils on to their cores. Insert the fibre wedges provided into the arc formed between the cores and the coil formers, and bend out the two outer laminations on each leg, taking care not to split the bakelite former on which one of the coils is wound. Push down the stator on to its locating spigot. See that neither the ignition leads nor the lighting coil leads become clamped between the flange at the base of the spigot and the stator. Reassemble the insulated terminal screw into the stator housing. Finally, tighten up the clamp nuts with the tabs in position and push any wire loops well back behind the working faces of the stator legs to prevent them from fouling the flywheel.

The Flywheel

The robust construction of the flywheel reduces the possibility of any faults on this unit to a minimum. The three powerful magnet inserts are cast in the rim of the wheel and it is not possible to demagnetize them by ordinary usage. No keepers are necessary when the magneto housing and stator are removed. The boss of the flywheel is located on the crankshaft by a keyed taper and locked by a nut and shakeproof washer. It is unnecessary to remove the flywheel unless at any time the engine has to be dismantled. A thread cut on the outside of the flywheel boss enables the wheel to be removed by use of a special extractor. When replacing, the flywheel must be perfectly clean inside and outside.

CAUTION

The 27-watt “Geni-mag” which is purely an A.C. unit, has now been superceded by the S55/KM8 ignition generator.

As the new unit incorporates extra magnets in the flywheel, all users should make careful note, that although similar in appearance the flywheels of the two units are not interchangeable. The flywheel of the new type generator can easily be identified because it is clearly marked “WIPAC AC/DC.”

Care must also be taken to use the correct flywheel with the appropriate stator plate, as if the new flywheel is used with the old type “Geni-mag” plate, trouble will be experienced with lamps blowing or alternatively if the new stator plate is used with the old type “Geni-mag” flywheel, insufficient lighting output will be obtained.

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

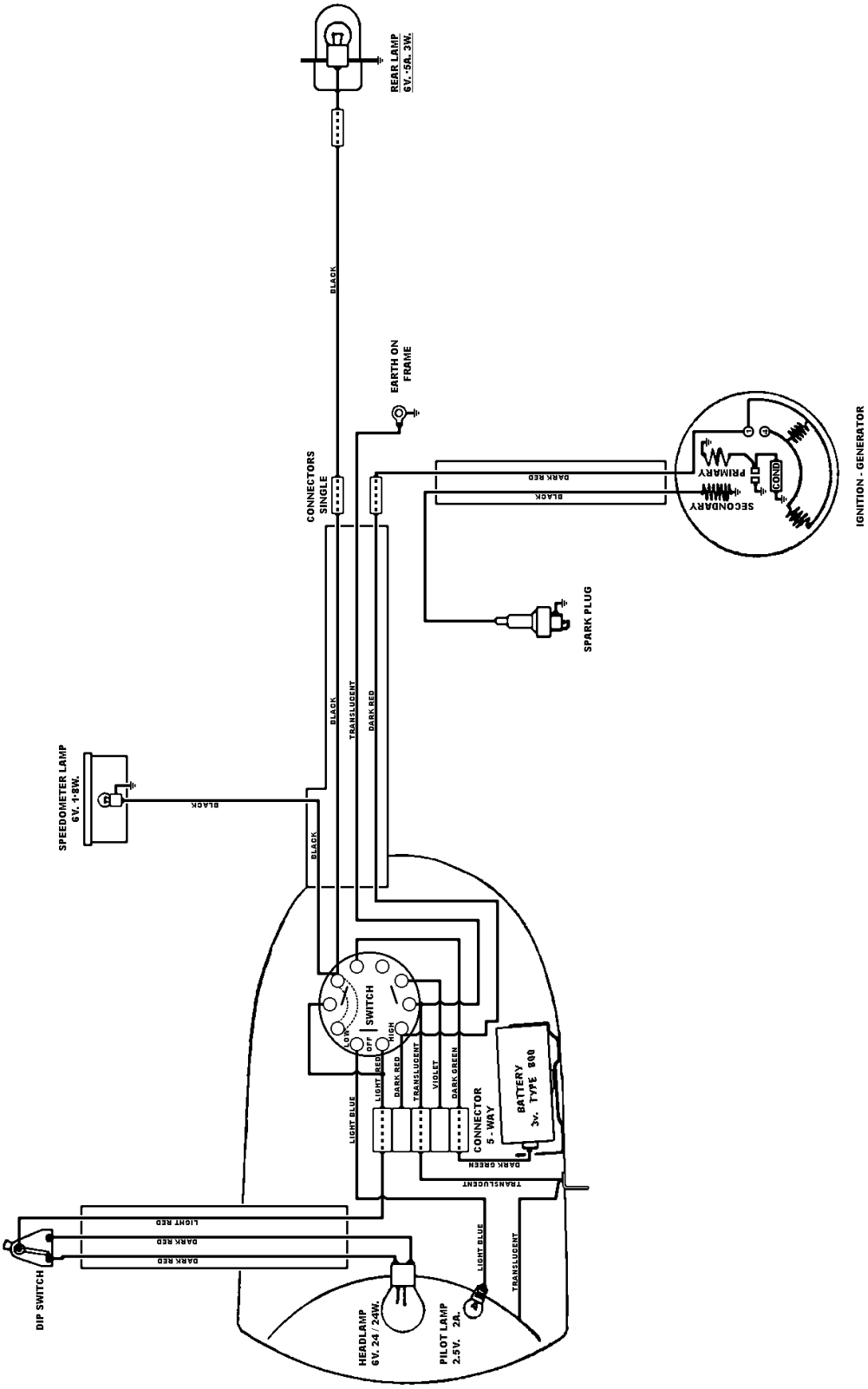
BSA SERVICE SHEET No. 808E

Reprinted June 1965

1956 D Group Models

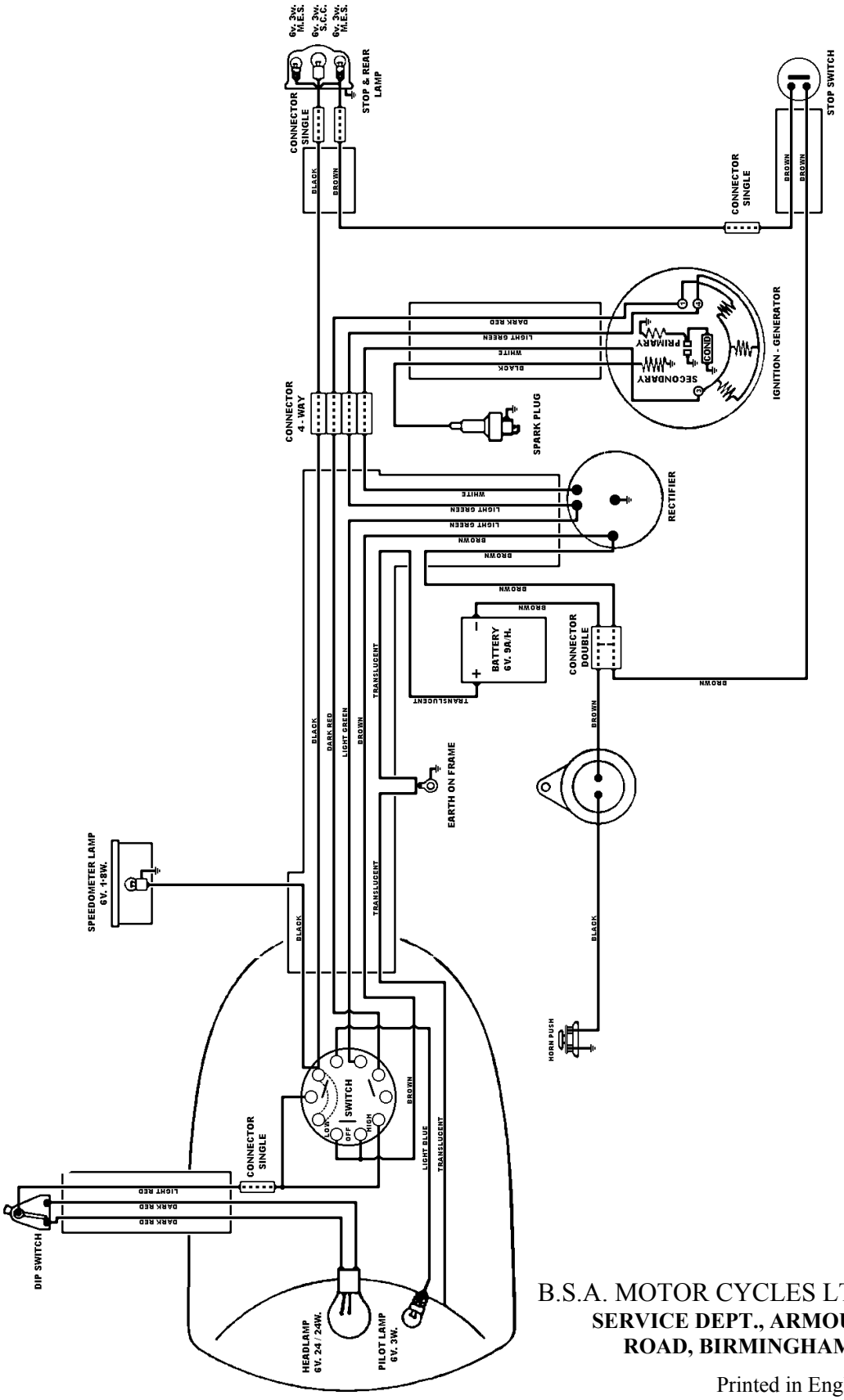
WIRING DIAGRAMS

Wipac A.C. Lighting



Wipac A.C. Lighting

(Positive Earth System)



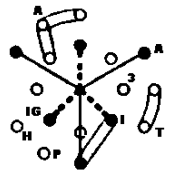
B.S.A. MOTOR CYCLES LTD.,
SERVICE DEPT., ARMOURY ROAD, BIRMINGHAM, 11

Printed in England.

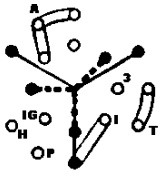
BSA SERVICE SHEET No. 808B

"D" GROUP MODELS
WIRING DIAGRAMS

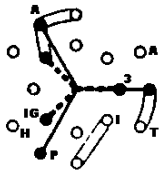
Lucas D.C. Lighting



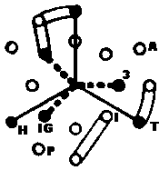
LIGHTING OFF
(TURN LT SW TO 'O')
EMERGENCY IGNITION ON
(TURN IGNITION KEY LEFT)



LIGHTING OFF
(TURN LT SW LEFT TO 'O')
IGNITION OFF
(TURN IGNITION KEY CENTRAL)

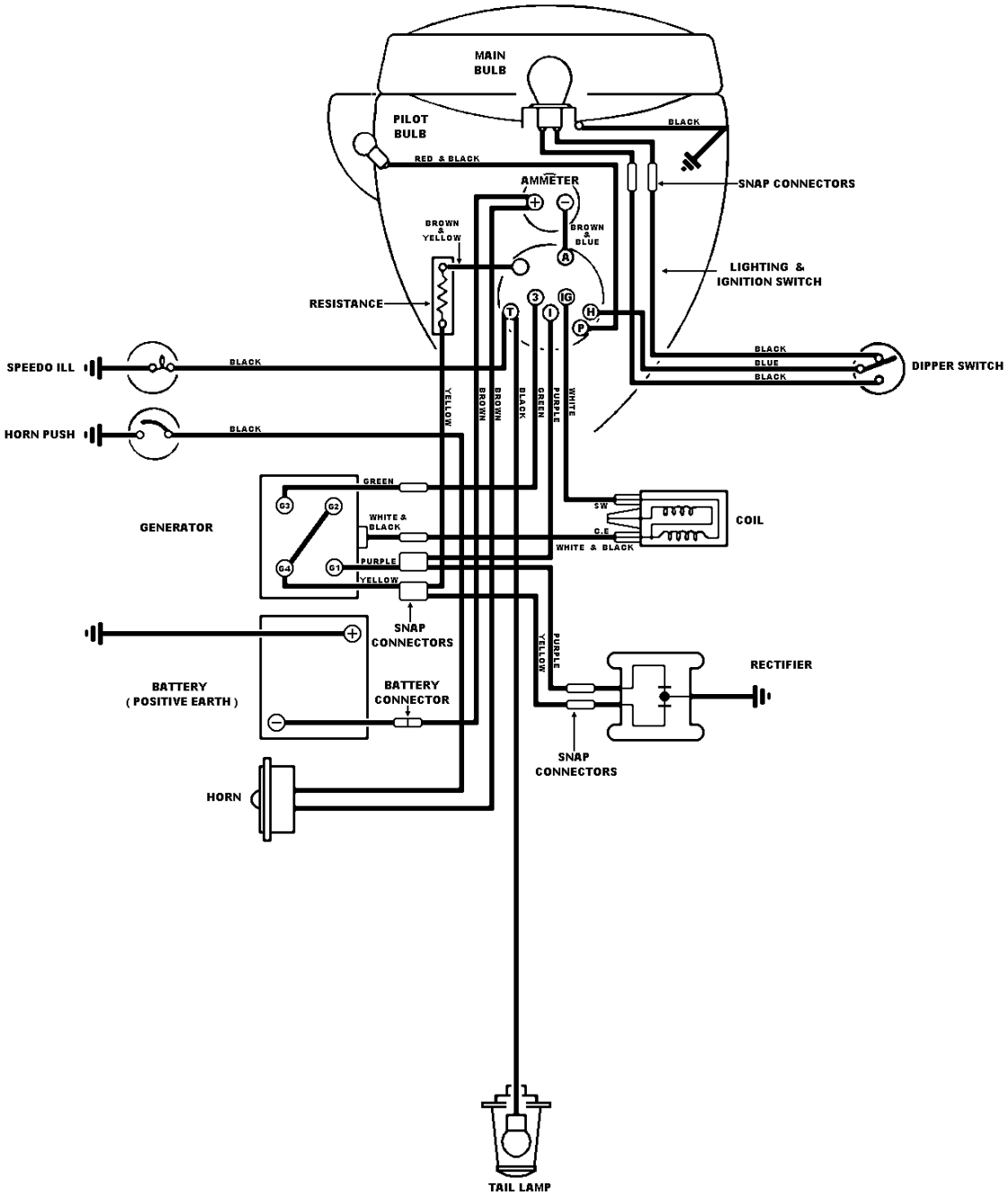


TAIL & PILOT LTS ON
(TURN LT SW RIGHT TO 'P')
IGNITION ON
(TURN IGNITION KEY RIGHT)

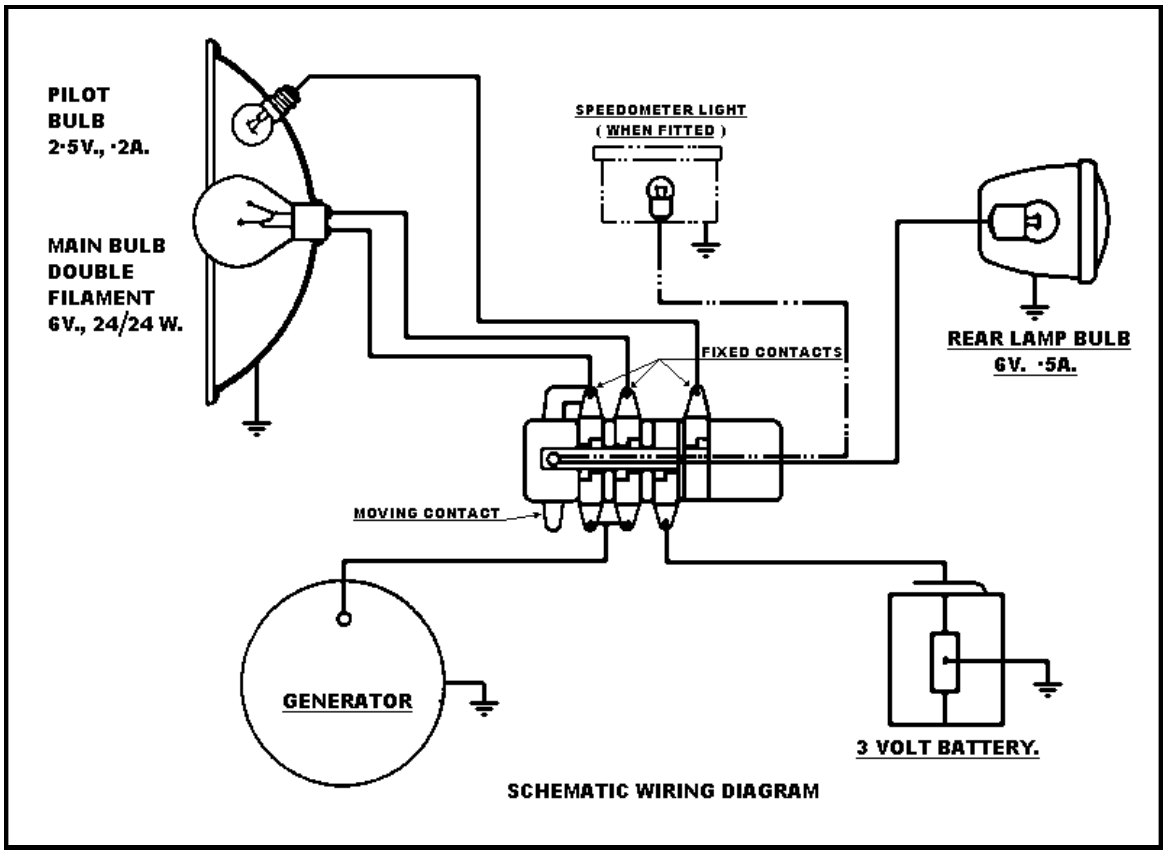


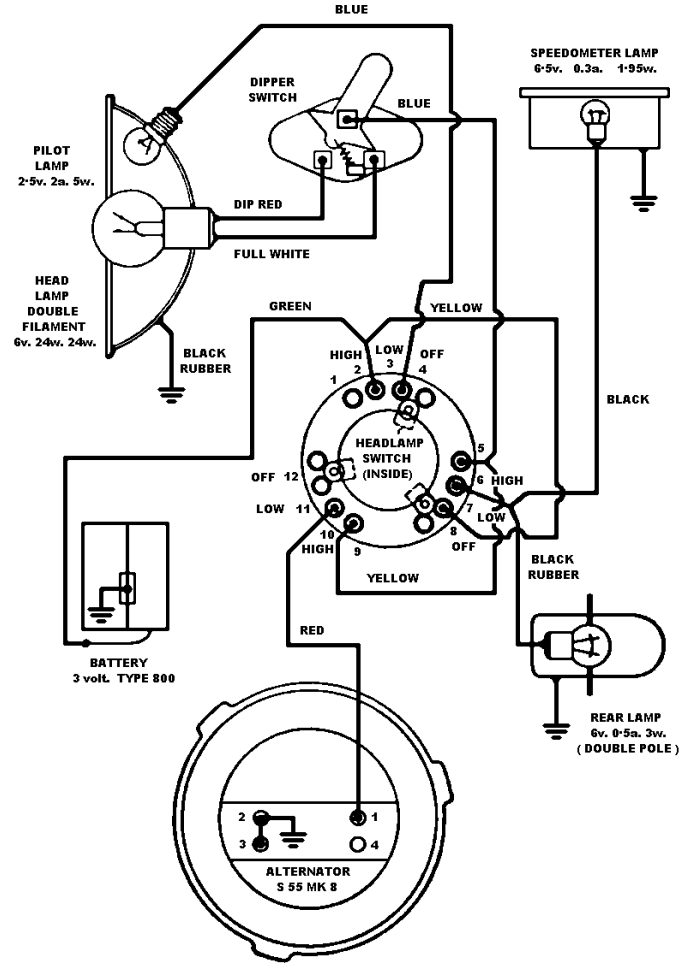
TAIL & HEAD LTS ON
(TURN LT SW RIGHT TO 'M')

DIAGRAMS SHOWING SWITCH POSITIONS LOOKING ON TOP OF SWITCH



Wipac A.C. Lighting





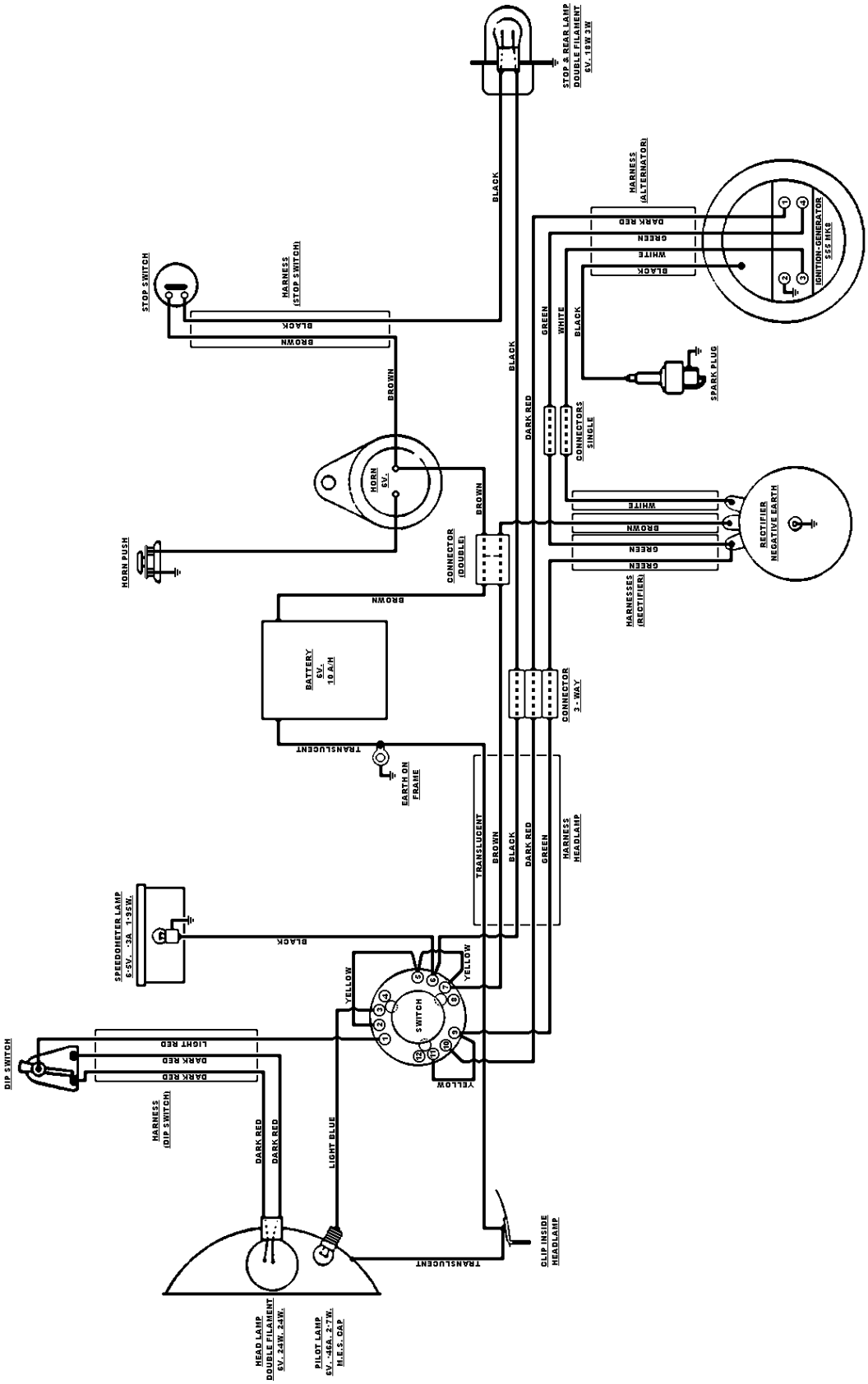
ABOVE: Wiring diagram for Wipac A.C. lighting when fitted with remotely controlled switch operated by handlebar lever.

LEFT: Wiring diagram for Wipac A.C. lighting system when switch is mounted on top of the headlamp shell.

B.S.A. Service Sheet No. 808B (contd.)

Wipac A.C. Lighting

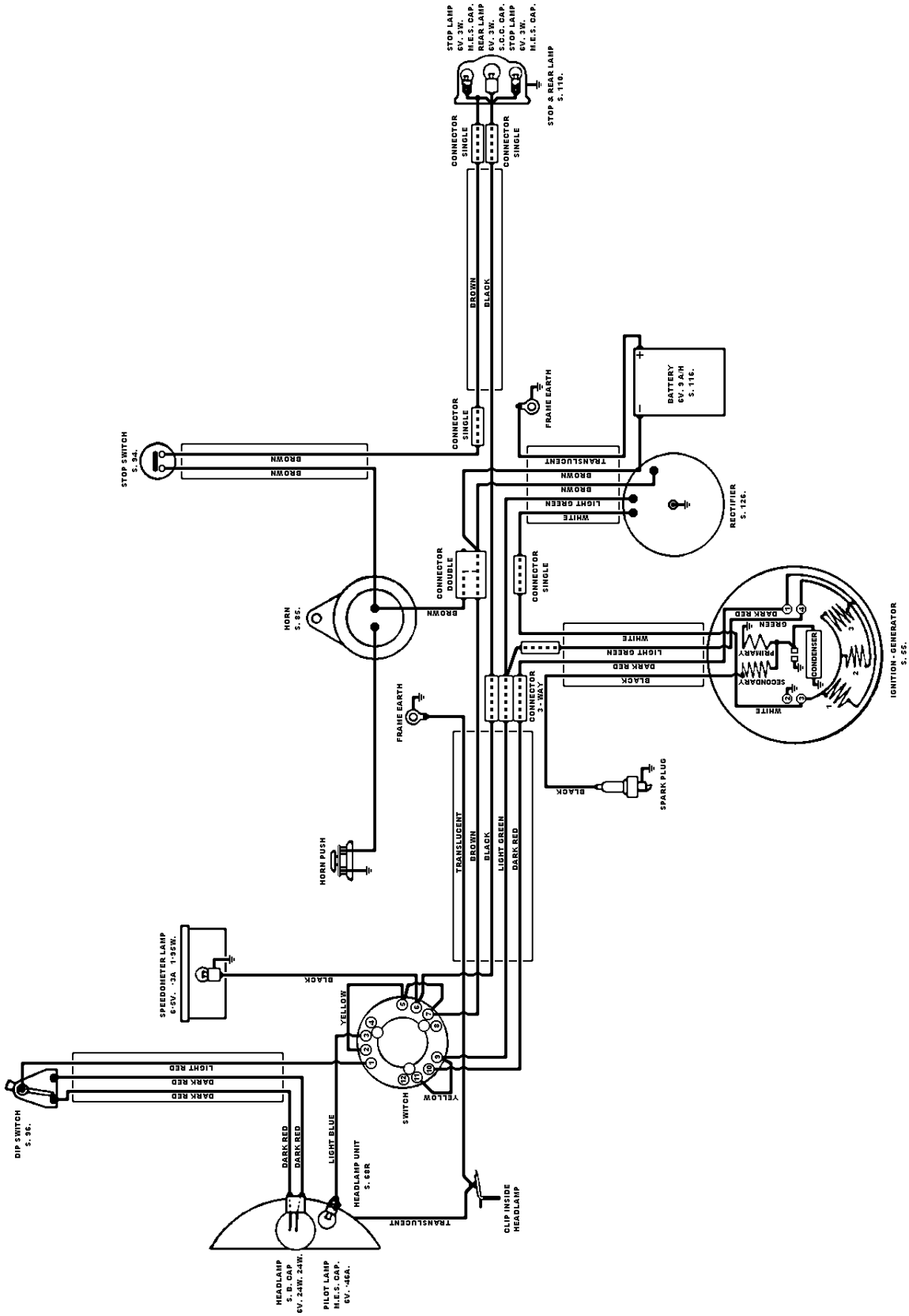
(Negative Earth System)



B.S.A. Service Sheet No. 808B (contd.)

Wipac A.C. Lighting

(Positive Earth System)



B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

BSA SERVICE SHEET No. 710

October 1948

ALL MODELS
CHAIN ALTERATIONS AND REPAIRS

A chain rarely breaks if it is kept properly lubricated and adjusted. Usually it is worn out long before it reaches breaking point. The rear chain is the most heavily stressed and is therefore the one most likely to give trouble. Spare parts should be carried to enable the rider to carry out a repair on the road with the aid of a chain rivet extractor (see Fig. X7). The front chain will probably be worn out before it requires shortening.

How to use the Chain Rivet Extractor

First press down lever (A) Fig. X7 to open the two jaws (B). Insert the link to be removed so that the jaws grip the roller and support the uppermost inner side plate. The punch (C) is then screwed on to the rivet head until the rivet is forced through the outer plate.

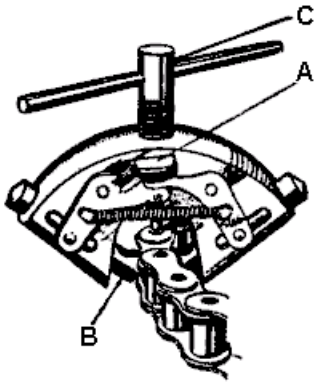


Fig. X7.

To shorten a worn Rear Chain

After a big mileage, the rear chain may have stretched so that no further adjustment is possible by the usual method. In this case it is possible to shorten the chain by one link or pitch, so increasing its useful life. First remove the single connecting spring link (A) securing the two ends of the chain, Fig. X8. If the chain terminates in two ordinary links as in Fig. X8 (in which case the chain will be an even number of pitches) extract the third and fourth rivets (B) from the end and replace the detached three pitches by a single connecting link (C). The connection is made with an additional spring link (D). If one end of the chain has a double cranked link, Fig. X9—in which case the chain will have an odd number of pitches—extract the second and third rivets (A), releasing the cranked link unit complete, which can be retained for further use. Replace with one inner link (B) and again connect up with an additional single connecting link (C).

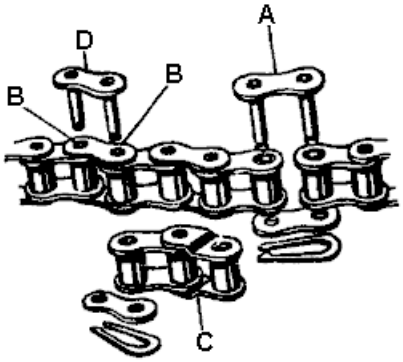


Fig. X8.

To repair a damaged Chain

If a roller or link has been damaged (X) Fig. X9, remove rivets (D), take out the damaged link and replace with one inner link, secured by two single connecting links.

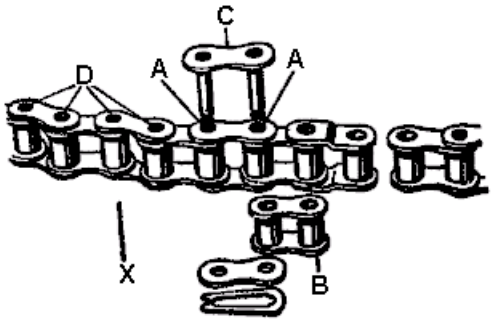


Fig. X9.

It is important that the spring clip fastener should always be put on so that the closed end faces the direction of travel of the chain—i.e. when clip is on top run of chain, closed end is toward front of machine—when clip is on bottom run, closed end is towards rear of machine.

It should be noted that once a rivet has been extracted it must not he used again, so that it is important to check that the correct rivet is being removed before actually removing it. In the case of double cranked links, the complete unit comprises an inner link and the cranked outer link—three rollers in all—and these must never be separated.

Fitting Rear Chain

To fit a new rear chain, turn wheel until the spring link of the old chain is located on rear sprocket. Disconnect, and allow the lower run to drop down. Join the top run of the old chain to the new chain by means of the connecting link, and then by pulling on the bottom run of the old chain the new one will be carried round the gearbox sprocket. Then the old chain can be disconnected and the ends of the new one joined together.

When the rear chain breaks and falls from its sprockets, the new or repaired chain can be replaced without taking off the chainguards. One end of the chain must be fed (from the rear) under the front end of the rear top chainguard on to the gearbox sprocket. A long bladed screwdriver or a piece of stiff wire may assist this operation. When the chain has located on the sprocket teeth, engage a gear and gently turn gearbox over with the kickstarter. This will feed chain round gearbox sprocket. When sufficient length of chain is hanging below sprocket, disengage gear and chain can then be pulled round until both runs can be fed inside rear chainguard and engaged on rear wheel sprocket.

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ALL MODELS
FAULT FINDING

No adjustments should be made, or any part tampered with, until the cause of the trouble is known. Otherwise adjustments which are correct may be deranged.

Engine Stops Suddenly:

Petrol shortage in tank, or choked petrol supply pipe or tap.
Choked main jet, or water in float chamber.
Oiled up or fouled sparking plug.
Water on high-tension pick-up or on sparking plug.

Engine Fails to Start, or is difficult to start:

Lack of fuel, or insufficient flooding if cold.
Excessive flooding, allowing neat petrol to enter the cylinder.
Oil sparking plug, or stuck-up valve or valve stem sticky.
Weak valve spring, or valve not seating properly.
Throttle opening too large, or pilot jet choked.
Contact points dirty, or gap incorrect.
Flat battery, if coil ignition, or faulty electrical connections in ignition circuit.

Loss of Power:

Valve, or valves, not seating properly.
Weak valve spring or springs, or sticking valve.
No tappet clearance, or excessive clearance.
Lack of oil in tank.
Brakes adjusted too closely.
Badly fitting or broken piston rings.
Punctured carburettor float.
Incorrect ignition timing.

Engine Overheats:

Lack of proper lubrication.
Weak valve springs, or pitted valve seats.
Worn piston rings, or late ignition setting.
Carburettor setting too weak, or partly choked petrol pipe.

Engine Misses Fire:

Weak valve spring.
Defective or oiled sparking plug, or oil on contact points.
Incorrectly adjusted contact points or tappets.
Faulty condenser.
Defective sparking plug or high-tension cable.
Loose sparking plug terminal.
Carburetter flooding, due to stuck or defective float.
Partly choked main jet.
Choked vent hole in petrol tank filler cap.

Excessive oil consumption:

Stoppage, or partial stoppage, in pipe returning oil from engine to tank.
Clogged, or partially clogged, filter in sump, or oil tank.
Badly worn or stuck-up piston rings, causing high pressure in engine crankcase.
High crankcase pressure, caused by release valve (breather) action.
Air leak in dry sump oiling system.
Non-return valve in system not seating.
Ball valve in oil pump stuck on its seat.

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
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BSA SERVICE SHEET No. 708C

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CARBURATION.
"D" Group Models.

A CABURETTOR WITH NEEDLE CONTROLLED SINGLE JET

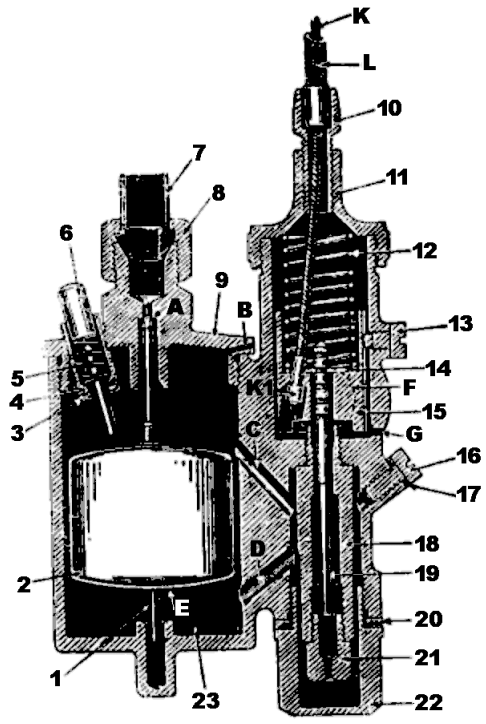

Fig. X13.

This sectioned diagram is taken through the centre of the mixing chamber and float chamber, showing the float and jet and throttle mechanism. The float and needle are shown as one piece as for types 259 and 261, but in type 223 the float needle (1) is separate from the float (2), but is attached thereto by a spring bow fastened to the float at the place marked (E). The cable (K) and its anchoring (K1) are diagrammatic as in practice the cable anchoring is in front of the jet.

HOW IT WORKS

This carburettor is designed to suit small engines and to eliminate any difficulty arising out of the use of very small jets. The control is automatic, the hand lever on the bar operating the throttle (15), which in its turn controls the mixture according to engine speed.

The full power control of mixture is by the main jet (21) feeding the engine through a needle jet (18), in which there is a needle (19). The taper on the needle controls the mixture at lesser throttle openings, and the position of the taper in the needle jet, providing a means for richening or weakening the mixture at various throttle positions. The needle is located in the throttle (19) by a circular spring clip (14) held down by the throttle spring (12) and the needle itself is positioned by the particular groove that the clip (14) is fixed to.

For idling, the fuel supply is controlled by the parallel portion of the needle (19) entering the bore of the needle jet (18), the difference in diameter being the jet orifice, which is small—although in case of obstruction or gumming up due to the petrol and oil system, it can be instantly cleared by opening the throttle.

The petrol feed is into the top of the float chamber (7) where constant levels are maintained, and the petrol at these levels flows to the main jet (21) through a passage (D), and air locks are liberated through the passage (C), back into the float chamber at the top.

The jets (18 and 21) can be got at by undoing jet plug (22). The throttle (15) and adjustable needle (19) can be removed by unscrewing the mixing chamber top (11). The throttle is guided by screw (13) working in a groove in the throttle, and the slot in the throttle enables the cable (K) to be quickly detached.

The intake of the carburetor may have an air strainer and a strangler for closing off the air only for starting when cold.

CARBURETTOR WITH NEEDLE CONTROLLED SINGLE JET

Names of Parts:—

1. Float needle.
2. Float
3. Tickler cotter.
4. Tickler bush.
5. Tickler spring.
6. Tickler
7. Petrol pipe union nipple.
8. Petrol pipe union nut.
9. Float chamber cover.
10. Cable adjuster.
11. Mixing chamber top.
12. Throttle spring.
13. Throttle valve location screw.
14. Jet needle clip.
15. Throttle valve.
16. Feed hole screw
17. Feed hole washer.
18. Needle jet.
19. Jet needle.
20. Jet plug washer.
21. Main jet.
22. Jet plug.
23. Float chamber.

A. Petrol feed needle seat.
B. Air vent hole in float chamber cover.
C. Air release passage from 1st chamber into float chamber.
D. Petrol feed passage from float chamber to main jet (21).
E. The illustration shows the float and needle as one piece, but if the needle is separate, the float has a spring bow at this point to hold the needle in a groove.
F. The choke bore of the carburettor, the size of which is specified according to engine size and maximum revs.
G. Drain hole from mixing chamber to liberate any excess petrol due to flooding.
H. Guide groove in the throttle to prevent incorrect assembly.
J. Cutaway of the throttle. There are various cutaways, which are numbered and marked on the bottom of the throttle. The cutaway affects the mixture up to half-throttle position.
K. Throttle cable.
K1. Throttle cable nipple.
L. Throttle cable outer cover.

GENERAL MAINTENANCE INSTRUCTIONS

Keep the float chamber free from impurities, which are the commonest cause of flooding. Otherwise, if flooding takes place, remove the petrol pipe connection from the lid and clean out all the passages. See that the float needle is not bent, nor the petrol float clogged. If the needle seating is at fault, rub the needle lightly in by twisting it between finger and thumb. (Never use any grinding compound). If the needle itself has a deep groove in it on the taper end, a new needle and float may be necessary. When replacing the float chamber lid, first see that the blunt end of the float needle is in the guide hole at the bottom of the float chamber, and then guide the lid over the taper end of the needle before screwing down. Also see that the tickler works freely and springs back, and that the air hole in the rim of the lid is clear.

If the carburettor is ever removed from the induction pipe, see that it is pushed right home on to the pipe before locking the ring clip. Never fit the carburettor to a pipe on which it is slack, nor ever drive it in to a tight one. A carburettor should be a good push-fit on to the inlet pipe, and should be pushed on true with a screwing motion after having put a little oil on the pipe.

Keep the air intake or gauze free from obstruction and see that the air strangler, if of the knife type fitted into the intake of the carburettor, remains firmly open when opened. If it is inclined to be slack, bend it slightly to stiffen the movement.

If the throttle should become slack after years of use, it should be replaced, otherwise the slow-running may be interfered with. Also, if a throttle has become badly worn, it may be advisable also to replace the needle jet, as this might wear slightly large in diameter through the movement of the needle in the same, thus causing a richer mixture than necessary.

Also bad petrol consumption will be apparent if the throttle needle jet (18) has been worn; it may be remedied or improved by lowering the needle in the throttle, but if it cannot be—then the only remedy is to get a new needle jet.

TRACING FAULTS—ASSUMING ENGINE IN GOOD ORDER AND EXHAUST SYSTEM NOT CHOKED

1. Assure yourself of ample petrol supply, good compression, clean sparking plug and good spark at the points. Also rectify if flooding and verify complete closing and opening of throttle and air strangler, and that the air intake gauze or filter are clean.
2. Verify carburettor to be clean internally and that jet and passages are clear and that there is no air leak at the fitting of the carburettor to the engine. Also verify that main jet and needle jet are screwed up firmly.
3. When the above points are in order, there are only two possible faults in carburation—either the mixture is RICH or WEAK, and **you must determine which of the two is causing inefficient running, and at what throttle opening**, so that the carburettor can be tuned correctly. Indications are as follows:—

For Richness:
Black sooty smoke in exhaust.
Petrol spraying out of carburettor.
Two-stroke engine "four-stroking".
Heavy petrol consumption.
Sparking plug sooty.
Heavy lumpy running.
Four-stroke engines "eight-stroking".

For Weakness:
"Spitting" in the carburettor.
Erratic slow running.
Poor acceleration.
Engine runs better at less than full throttle opening.
Overheating.
Sparking plug dry grey colour around the points.

4. Some causes for above producing:—

Richness:
Punctured float or bent float needle.
Tickler stuck down.
Needle (19) raised too much.
Main jet (21) too large or not screwed up.
In old machines, needle jet (18) worn.
Air filter choked.

Weakness:
Air leaks.
Petrol supply or jet partially choked.
Too small main jet (21).
Needle (19) in too low position.
Air gauze or filter been removed.
Using petrol with water in it.

5. If engine "idles" better after tickling the float and gives better power with air shutter partially closed, the mixture is weak.
   Idling with petrol turned off temporarily and no suspicion of spitting when opening throttle quickly when engine is cold—the mixture is rich.

6. Trouble at half to full throttle is most likely to be connected with the main jet (21) supply. Trouble at quarter to three-quarters throttle opening will be due to needle position. If the power is good, at full throttle, very poor acceleration is the effect of too low a needle position, which can be remedied. Bad, slow-running will probably be due to air leaks.

HOW TO TUNE UP—(READ PARTS TO TUNE UP WITH)

1) Generally speaking: for power at full throttle the main jet is selected and at other lower throttle positions, the needle is either raised or lowered to richen or weaken the mixture.

2) To tune up precisely throughout the throttle range imagine four throttle positions:—
   (a) Throttle slightly open as for idling.
   (b) Throttle about quarter open as for running light.
   (c) Throttle from one-quarter to three-quarters open as for general running.
   (d) Throttle three-quarter to wide open as for full power.

3) From the preceding paragraph start tuning in this order, having read "PARTS TO TUNE UP WITH" and with the engine warmed up:—
   1st (*d*) use the smallest main jet (21) that will give full power when running under load on the level. If the engine runs slightly better with the throttle not quite wide open, the jet is either just right for economy or on the small side.
   2nd (*c*) set the needle (19) position as low as possible in relation to good acceleration and running at half throttle—"spitting" in the carburettor on acceleration means the needle is too low, so try a groove higher.
   3rd (*a* and *b*) if the idling mixture at (*a*) and the take off at (*b*) are weak—the engine spitting and fading out—use a smaller cutaway throttle, or if the engine runs lumpily on a rich mixture use a higher cutaway.
   4th Finally, if any alteration has been made to the throttle cutaway it may be necessary to alter the needle position again: putting in a throttle of a smaller cutaway may require the needle lowering by a groove and alternatively a larger cutaway may necessitate raising the needle.

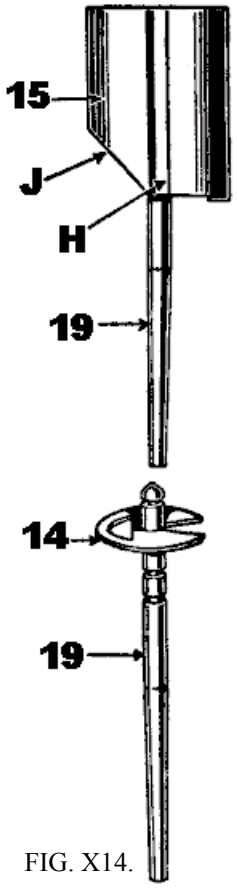

FIG. X14.

PARTS TO TUNE UP WITH

FIG. X15

Main Jet (21) with seal. This jet does not control the slow-running mixture, but it controls the maximum supply of petrol from half to full throttle positions. This jet is interchangeable with other larger Amal carburettors except for the number stamped on it, which indicates the amount of petrol that will flow through. The bigger the number the bigger the jet, and numbers go up and down in fives. Example, 20, 25, 30, etc. These jets should never be reamed out—the seal on the jet you may purchase is a guarantee of its size.

Throttle (15). This part is controlled from the handlebar, and from the shut-off to full-open position progressively increases the amount of gas taken into the engine. The slope at (J) is called the cutaway, and its number is stamped on the bottom. Throttles can be had with different cutaways—the bigger the cutaway and number the weaker the mixture for idling and up to half throttle positions and vice versa. The throttle holds the needle of the needle jet.

Needle (19) for Needle Jet (28). This works up and down with the throttle and the taper end goes into the needle jet, so controlling the amount of petrol at different throttle openings. Its position in the throttle and of its taper in the needle jet is therefore affected by which grove the clip (14) is fixed in: the extreme end groove is No. 1, giving the lowest position and the weakest mixture and vice versa, raising the needle richens the mixture. The spring clip (14) can be sprung off and on. (*The illustration shows clip* 14 *in position* 2.)

Needle Jet (18), see section. The standard jet is not marked in any way, but can be had in other sized bores on request, which are marked accordingly. If the mixture gets rich at half-throttle when the machine is old this needle jet has probably worn large and should be replaced. (Extreme weakness when idling may be corrected by a larger bore needle jet, which can be obtained on special application.)

For Tuning with Engine Running, but Cycle Stationary.

Air Shutter on the intake of the carburettor. This is closed only for starting from cold to reduce the amount of air and to increase the suction on the jet. When tuning, however, the shutter might be used experimentally to indicate if richening the mixture improves matters.

Tickler (6), see section. This is for pressing down the float needle off its seat to allow more petrol to come into the float chamber and so raise the petrol level, and consequently richening the mixture.

NOTE:—For Idling, if excessive richness cannot be cured by a larger cutaway nor will the throttle opening range allow a lower needle position—then change the needle jet for a new one, as the old one may be worn. If weakness prevents idling and cannot be cured by a smaller cutaway throttle and a raised needle position, use a larger bore needle jet, which will have its bore marked on it.

GENERAL HINTS AND TIPS

Starting from Cold. Flood the carburettor by depressing the tickler momentarily three or four times and close the air strangler; set the ignition, say half-retarded, then shut the throttle and open it a little, about one-eight open; then kick-start.

When started, gradually open the throttle to make the engine run faster and when the engine is warmed up, close down again and open the strangler. Should the engine falter either tickle the float chamber again or partially close the strangler until the engine is warm enough to stand the strangler being opened fully.

Starting with Engine Hot. Do not flood the carburettor nor close the air strangler; set the ignition and close the throttle, then, open it again one-eighth of its movement and kick-start. If the engine does not start at once, flood slightly or close the strangler and try again. After starting, open the strangler but if this should cause the engine to falter and not respond to opening the throttle, flood the carburettor momentarily.

Starting Generally. Find out by experiment if and how much it is necessary to flood and also the best position for the air strangler on the carburettor intake.

Usually for easy starting a small throttle opening is desirable and the best position is accompanied by a sucking noise when the engine is being turned over. If this noise cannot be heard, the throttle is probably too wide open and there is, consequently, insufficient "pull" on the starting system.

Given a good engine and a fat spark at the plug, if the engine will not start, the mixture is either too rich or too weak.

Over-richness of the mixture, especially with petroil lubrication, may be caused by over-flooding or by the machine being left with the petrol tap turned on and the float chamber flooding. To clear this over-richness open the throttle wide, also the strangler, and turn the engine over several times, then close the throttle and start again. If the engine does not start at once, the sparking plug points may have become damp or oiled up, so remove the plug and dry the points, and whilst it is out, swing the engine over several times before replacing it; then try again without flooding and with strangler open.

Cable Control. See that there is a minimum of backlash when the control is set back and that any movement of the handlebar does not cause the throttle to open; his is done by the adjuster on top of the carburettor. See that the throttle shuts down freely.

Petrol Feed, verification. Detach petrol pipe union at the float chamber end; turn on petrol tap momentarily and see that fuel gushes out. Avoid petrol pipes with vertical loops as they cause air locks. Flooding may be due to a worn or bent needle or a leaky float, but nearly all flooding with new machines is due to impurities (grit, fluff, etc.) in the tank—so clean out the float chamber periodically till the trouble ceases. If the trouble persists, the tank might be drained, swilled out, etc.

Fixing Carburettor and Air Leaks. Erratic slow-running is often caused by air leaks, so verify there are none at the point of attachment to the cylinder or inlet pipe—check by mans of an oil can and eliminate. Also in old machines look out for leaks cause by a worn throttle (or worn inlet valve guides if a four-stroke engine).

Bad Petrol Consumption of a new machine may be due to flooding caused by impurities from the petrol tank lodging on the float needle seat and so prevent its valve from closing. If the machine has had several years use, flooding may be caused by a worn float needle valve.

Faults. Read "Tracing Faults". The trouble may not be carburation; if the trouble cannot be remedied by making mixture richer or weaker and you know the petrol feed is good and the carburettor is not flooding, the trouble is elsewhere.

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BSA SERVICE SHEET No. 708B

ALL MODELS

CARBURATION AT HIGH ALTITUDES

The carburetter settings of all B.S.A. motor-cycles are designed to give the best all round performance at altitudes of a few thousand feet.

At greater altitudes the air becomes rarefied with the result that the mixture is incorrect.

To overcome this difficulty it is necessary to reduce the size of the main jet, the reduction depending on the altitude at which the machine is mainly used.

The table below shows the percentage of reduction at given altitudes, but it must be emphasized that while the alteration to jet size will correct the mixture, it will not replace the lost power. This can only be corrected by "blowing" or super-charging.

It may also be advisable to re-tune the carburetter for smaller throttle openings, this should be done in accordance with Service Sheet No. 708.

ALTITUDE	PERCENTAGE OF REDUCTION IN JET SIZE
3,000 feet	5%
6,000 feet	9%
9,000 feet	13%
12,000 feet	17%

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
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BSA SERVICE SHEET No. 708

Reprinted June 1965

ALL MODELS

CARBURATION. Monobloc and Seperate Float Chamber Type

How the Carburetter Works

The function of the carburetter is to atomise the petrol and proportion it correctly with the air drawn in through the intake on the induction stroke. The action of the float and needle in the float chamber maintains the level of fuel at the needle jet, and when the engine is stopped and no further fuel is being used the needle valve cuts off the supply.

The twist-grip controls, by means of a cable, the position of the throttle slide and the throttle needle and so governs the volume of mixture supplied to the engine.

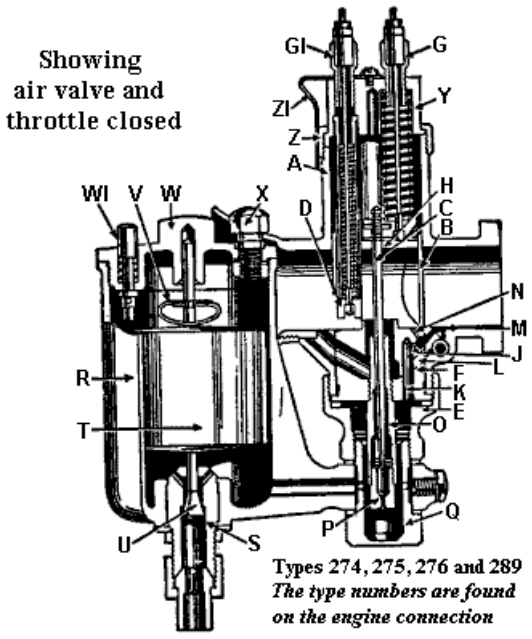
The mixture is correct at all throttle openings, if the carburetter is correctly tuned.

The opening of the throttle brings first into action the mixture supply from the pilot jet, then as it progressively opens, via the pilot by-pass the mixture is augmented from the needle jet. Up to three-quarter throttle this action is controlled by the tapered needle in the needle jet, and from three-quarters onwards the mixture is controlled by the main jet.

The pilot jet (J), which in the older type of carburetter is embodied in the jet block, has been replaced in the Monobloc carburetter by a detachable jet (9) Fig. X5, assembled in the carburetter body and sealed by a cover nut.

The main jet does not spray directly into the mixing chamber, but discharges through the needle jet into the primary air chamber and goes from there as a rich petrol/air mixture through the primary air choke into the main air choke.

Although the maintenance and tuning instruction contained in this Service Sheet apply equally well to the Monobloc and separate float chamber types of carburetter, the new instrument has been designed with a view to giving improved performance, and certain constructional changes have been made.



A.	Mixing Chamber.	P.	Main Jet.
B.	Throttle Valve.	Q.	Float Chamber Holding Bolt.
C.	Jet Needle and Clip above.	R.	Float Chamber.
D.	Air Valve.	S.	Needle Valve Seating.
E.	Mixing Chamber Union Nut	T.	Float.
F.	Jet Block.	U.	Float Needle Valve.
G/GI.	Cable Adjusters.	V.	Float Needle Clip.
H.	Jet Block Barrel.	W.	Float Chamber Cover.
J.	Pilot Jet.	WI.	Tickler.
K.	Passage to Pilot.	X.	Float Chamber Lock Screw.
L.	Pilot Air Passage	Y.	Mixing Chamber Top Cap.
M.	Pilot Mixture Outlet.	Z.	Mixing Chamber Lock Ring.
N.	Pilot by-pass.	ZI.	Mixing Chamber Security Spring.
O.	Needle Jet.		

Fig. X4. *A Sectioned illustration of Needle Jet Carburetter.*

The float chamber is a drum-shaped reservoir, die cast in one piece with the mixing chamber. The material used being zinc-alloy. The float is designed to pivot instead of rising and falling, as in the separate float chamber type, and as it does so, it impinges on a nylon needle controlling the inflow of fuel.

Variations of up to 20° in the angle of the carburetter when fitted, do not affect the working of the float, therefore it lends itself to use for down draught carburation and is not so greatly effected by the degree of lean when cornering. Access to the float (Fig. X6) is gained by removing a plate held in place by three screws.

Compensation for over-rich mixture which results from snap throttle openings, is provided by bleed holes in the needle jet (Fig. X5). A compensatory air bleed is provided, this is the larger of the two holes at the mouth of the air intake, which leads to the space around the needle jet (Fig. X5).

The pilot intake is the smaller of the two holes, and operates in conjunction with the detachable pilot jet (Fig. X5). This pilot mixture is adjusted as before, by an adjusting screw (Fig. 8a).

Hints and Tips—Starting from Cold

Flood the carburetter by depressing the tickler and close the air control, set the ignition say, half-retarded. Then open the throttle about ⅛ in., then kick-start. If the throttle is too far open, starting will be difficult.

Starting—Engine Hot

Do not flood the carburetter, but it may be found necessary with some engines to close the air lever, set the ignition to half-retarded, the throttle to ⅛ in. open and kick-start. If the carburetter has been flooded and won't start because the mixture is too rich—open the throttle wide and give the engine several turns to clear the richness, then start again with the throttle ⅛ in. open, and air valve wide open. Generally speaking it is not advisable to flood at all when an engine is hot.

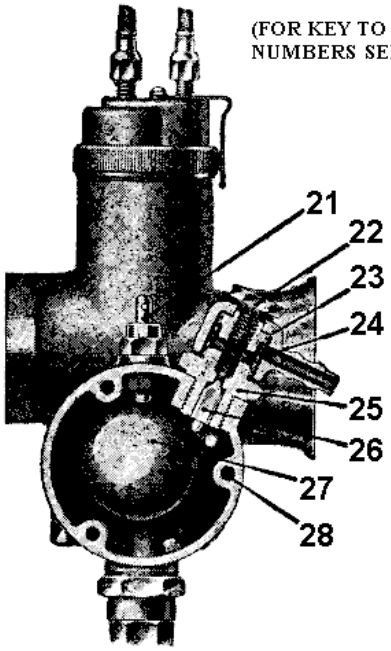
Starting—General

By experiment, find out if and when it is necessary to flood, also note the best position for the air lever and the throttle for the easiest starting. Excessive flooding, particularly when the engine is hot, will make starting more difficult. It is necessary only to raise the level of petrol in the float chamber, by depressing the tickler.

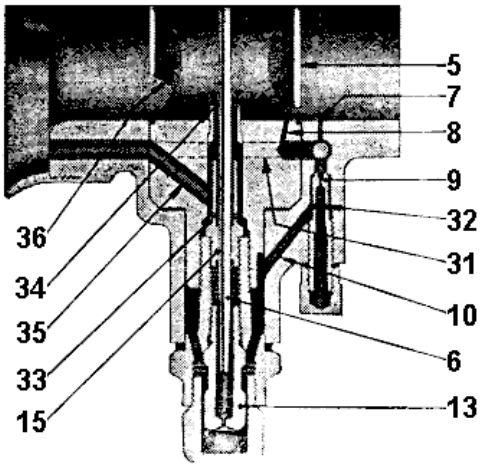
Starting—Single Lever Carburetters

Open the throttle very slightly from the idling position and flood the carburetter more or less according to the engine being cold or hot respectively.

SECTIONAL ILLUSTRATIONS OF CARBURETTERS. Types 375, 376 and 389



(MONOBLOC)
Fig. X6. *Section through Float Chamber.*



Diagrammatic section of Carburetter showing only the lower half of the throttle chamber with the throttle a little open— and the internal primary air passages to the main jet and pilot system.

1. Mixing Chamber Top.
2. Mixing Chamber Cap.
3. Carburetter Body.
4. Jet Needle Clip.
5. Throttle Valve.
6. Jet Needle.
7. Pilot Outlet.
8. Pilot by-pass.
9. Pilot Jet.
10. Petrol Feed to Pilot Jet.
11. Pilot Jet Cover Nut.
12. Main Jet Cover.
13. Main Jet.
14. Jet Holder.
15. Needle Jet.
16. Jet Block.
17. Air Valve.
18. Mixing Chamber Cap Spring.
19. Cable Adjuster (air).
20. Cable Adjuster (throttle).
21. Tickler.
22. Banjo Bolt.
23. Banjo.
24. Filter Gauze.
25. Needle Seating.
26. Needle.
27. Float.
28. Side Cover Screws.
31. Air to Pilot Jet.
32. Feed Holes in Pilot Jet.
33. Bleed Holes in Needle Jet.
34. Primary Air Choke.
35. Primary Air Passage.
36. Throttle Valve Cut-away.

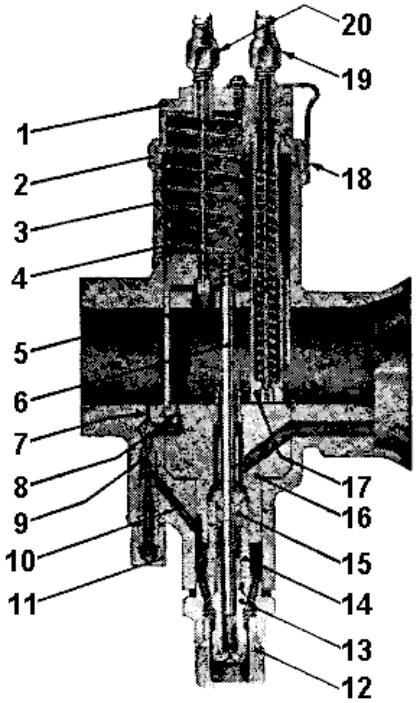
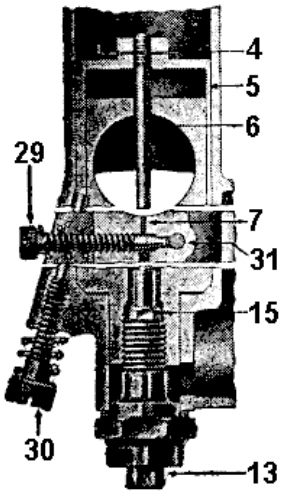


Fig. 7. *Section through Mixing Chamber, showing Air Valve and Throttle closed*



29. PILOT AIR ADJUSTING SCREW

This screw regulates the strength of the mixture for "idling" and for the initial opening of the throttle. The screw controls the depression on the pilot jet by metering the amount of air that mixes with the petrol.

30. THROTTLE ADJUSTING SCREW

Set this screw to hold the throttle open sufficiently to keep the engine running when the twist-grip is shut off.

Cable Controls

See that there is a minimum of backlash when the controls are set back and that any movement of the handlebar does not cause the throttle to open; this is done by the adjusters on the top of the carburetter. See that the throttle shuts down freely.

Petrol Feed

Verification. Detach petrol pipe union at the float chamber end; turn on petrol tap momentarily and see that fuel gushes out. Avoid petrol pipes with vertical loops as they cause air-locks. Flooding may be due to a worn or bent needle or a leaky float, but nearly all flooding with new machines is due to impurities (grit, fluff, etc.) in the tank—so clean out the float chamber periodically till the trouble ceases. If the trouble persists the tank might be drained, swilled out, etc. Note that if the carburetter, either vertical or horizontal, is flooding with the engine stopped, the overflow from the main jet will not run into the engine but out of the carburetter through a hole at the base of the mixing chamber.

Fixing Carburetter and Air Leaks

Erratic slow running is often caused by air leaks, so verify there are none at the point of attachment to the cylinder or inlet pipe—check by means of oil placed around the joint, if there are leaks the oil will be sucked in, and eliminate by new washers and the equal tightening up of the flange nuts. Also in old machines look out for air leaks caused by a worn throttle or worn inlet valve guides.

Explosions in Exhaust

May be caused by too weak a pilot mixture when the throttle is closed or nearly closed—also, it may be caused by too rich a pilot mixture and an air leak in the exhaust system; the reason in either case is that the mixture has not fired in the cylinder and has fired in the hot silencer. If the explosion occurs when the throttle is fairly wide open the trouble will be ignition—not carburation.

Excessive Petrol Consumption

On a new machine may be due to flooding, caused by impurities from the petrol tank lodging on the float needle seat and so preventing its valve from closing. If the machine has had several years use, flooding may be caused by a worn float needle valve. Also excessive petrol consumption will be apparent if the throttle needle jet (O) Fig. X4, or (15) Fig. X5, has worn; it may be remedied or improved by lowering the needle in the throttle, but if it cannot be, then the only remedy is to get a new needle jet.

Air Filters

These may affect the jet setting, so if one is fitted afterwards to the carburetter the main jet may have to be smaller. If a carburetter is set with an air filter and the engine is run without it, take care not to overheat the engine due to too weak a mixture; testing with the air control will indicate if a larger main jet and higher needle position are required.

B.S.A Service Sheet No. 708 (contd.)

Faults

The trouble may not be carburation; if the trouble cannot be remedied by making mixtures richer or weaker with the air control, and you know the petrol feed is good and the carburetter is not flooding, the trouble is elsewhere.

Fault Finding

There are only *two* possible faults in carburation, either *richness* of mixture or *weakness* of mixture, so in case of trouble decide which is the cause, by:—

1. Examining the petrol feed ... { Verify jets and passages are clear. / Verify ample flow. / Verify there is no flooding.
2. Looking for air leaks ... { At the connection to the engine. / Or due to leaky inlet valve stems.
3. Defective or worn parts ... { As a slack throttle-worn needle jet. / The mixture chamber union nut not tightened up, or loose jets.
4. Testing with the air control to see if by richening the mixture the results are better or worse.

Indications of

Richness:

Black smoke in exhaust.
Petrol spraying out of carburetter.
Four strokes, eight-stroking.
Two strokes, four-stroking.
Heavy, lumpy running.
Heavy petrol consumption.
? If the jet block (F) is not tightened up by washer and nut (E) richness will be caused through leakage of petrol.
? Air cleaner choked up.
? Needle jet worn large.
Sparking plug sooty.

Weakness:

Spitting in carburetter.
Erratic slow running.
Overheating.
Acceleration poor.
Engine goes better if:—
Throttle not wide open, or air control is partially closed.
? Has air cleaner been removed.
? Jets partially choked up.
Removing the silencer or running with a racing silencer requires a richer setting and large main jet.

Note

Verify correctness of fuel feed, stop air leaks, check over ignition and valve operation and timing. *Decide by test whether richness or weakness is the trouble and at what throttle position.* See throttle opening diagrams, Fig. X6.

Procedure

If at a particular throttle opening you partially close the air control, and the engine goes better, weakness is indicated; or on the other hand the running is worse, richness is indicated. *Then you proceed to adjust the appropriate part as indicated for that position.*

Fault at Throttle Positions indicated on Fig. X9

To Cure Richness:		To Cure Weakness:
Fit smaller main jet.	1st	Fit larger main jet.
Screw out pilot air screw.	2nd	Screw pilot air screw in.
Fit a throttle with larger cut-away.	3rd	Fit a throttle with smaller cut-away.
Lower needle one or two grooves.	4th	Raise needle one or two grooves.

Notes

It is not correct to cure a rich mixture at half-throttle by fitting a smaller main jet because the main jet may be correct for power at full throttle: the proper thing to do is to lower the needle.

Information on throttle slides and needle position is given in paragraphs (*f*) and (*e*) respectively in the next section entitled "Tuning".

Changing from Standard Petrols to Special Fuels.

Such as alcohol mixtures will, with the same setting in the carburetter, certainly cause weakness of mixture and possible damage from overheating.

TUNING

(*a*) Figs. X8 and 8a are two diagrammatic sections of the carburetter to show:

1. The throttle stop screw.
2. The pilot air screw.

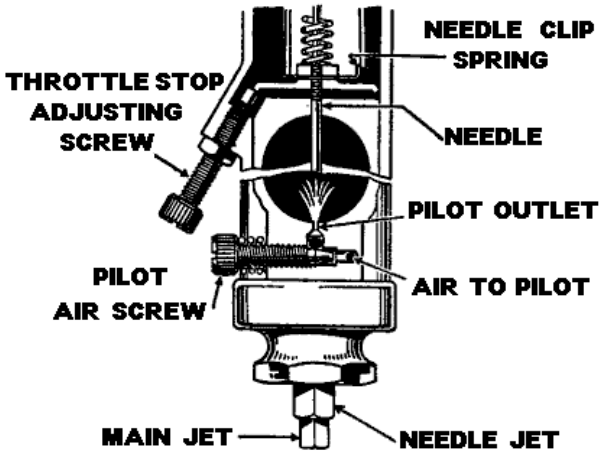


Fig. X8

(*b*) **Throttle Stop Screw**

Set this screw to prop the throttle open sufficiently to keep the engine running when the twist-grip is shut off.

(*c*) **Pilot Air Screw**

This screw regulates the strength of the mixture for "idling" and for the initial opening of the throttle. The screw controls the suction on the pilot petrol jet by metering the amount of air that mixes with the petrol.

NOTE:— The air for the pilot jet may be admitted internally or externally according to one or other of the designs, but there is no difference in tuning.

(*d*) **Main Jet**

The main jet controls the petrol supply when the throttle is more than three-quarters open, but at smaller throttle openings although the supply of fuel goes through the main jet, the amount is diminished by the metering effect of the needle in the needle jet.

Each jet is calibrated and numbered so that its exact discharge is known and two jets of the same number are alike.

Never reamer a Jet out, get another of the right size
The bigger the number the bigger the jet. Spare jets *are sealed*.

To get at the main jet, undo the float chamber holding bolt (Q) Fig. X4, or main jet cover number 12 (Fig. X7). The jet is screwed into the needle jet so if the jet is tight, hold the needle jet also carefully with a spanner whilst unscrewing the main jet.

(*e*) **Needle and Needle Jet**

The needle is attached to the throttle and being tapered either allows more or less petrol to pass through the needle jets as the throttle is opened or closed throughout the range, except when idling or nearly full throttle. The needle jet is of a defined size and is only altered from standard when using alcohol fuels.

The taper needle position in relation to the throttle opening can be set according to the mixture required by fixing it to the throttle with the needle clip spring in a certain groove (see illustration above), thus either raising or lowering it. Raising the needle richens the mixture and lowering it weakens the mixture at throttle openings from quarter to three-quarter open (see illustration, Fig. X9).

(*f*) **Throttle Valve Cut-away**

The atmospheric side of the throttle is cut away to influence the depression on the main fuel supply and thus gives a means of tuning between the pilot mid needle jet range of throttle opening. The amount of cut-away is recorded by a number marked on the throttle, viz.: 6/3 means throttle type 6 with number 3 cut-away; larger cut-aways, say 4 and 5, give weaker mixtures, and 2 and 1 richer mixtures.

(*g*) **Air Valve**

Is used only for starting and running when cold, and for experimenting with, otherwise run with it wide open.

(*h*) **Tickler**

A small plunger located in the float chamber lid. When pressed down on the float, the needle valve is pushed off its seat and so "flooding" is achieved. Flooding temporarily enriches the mixture until the level of the petrol subsides to normal.

Phases of Amal Needle Jet Carburettor Throttle Openings

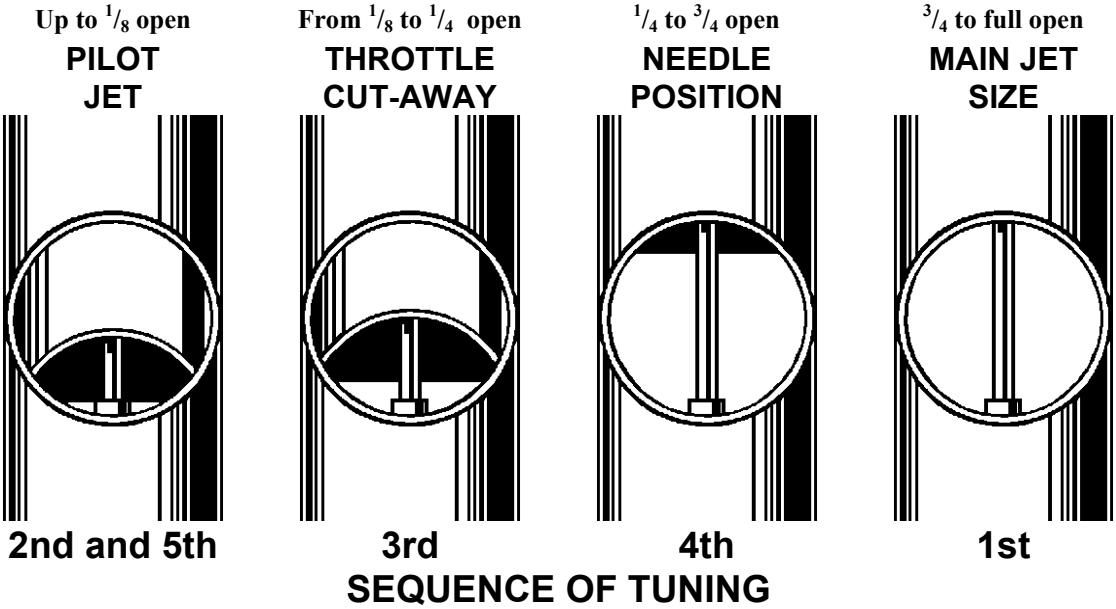


Fig. X9

Sequence of Tuning
Tune up. In the following order only, by so doing you will not upset good results obtained.

NOTE.—The carburetter is automatic throughout the throttle range—the air control should always be wide open except when used for starting or until the engine has warmed up. We assume normal petrols are used.

Read remarks on "Fault Finding" and "Tuning" for each tuning device and get the motor going perfectly on a quiet road with a slight up gradient so that on test the engine is pulling.

1st Main Jet with Throttle in position
Test the engine for full throttle; if when at full throttle, the power seems better with the throttle less than wide open or with the air valve closed slightly the main jet is too small. If the engine runs "heavily" the main jet is too large. If testing for speed work note the jet size is rich enough to keep engine cool, and to verify this, examine the sparking plug by taking a fast run, declutching and stopping engine quickly. If the plug body at the end has a bright black appearance, the mixture is correct; if sooty, the mixture is rich; or if a dry grey colour, the mixture is too weak and a larger jet is necessary.

2nd Pilot Jet with throttle in positions 2 and 5
With engine idling too fast with the twist-grip shut off and the throttle shut down on to the throttle stop screw, and ignition set for best slow running: (1) Loosen stop screw nut and screw down until engine runs slower and begins to falter, then screw the pilot air screw in or out to make engine run regularly and faster. (2) Now gently lower the throttle stop screw until the engine runs slower and just begins to falter, then lock the nut lightly and begin again to adjust the pilot air screw to get best slow running; if this second adjustment makes engine run too fast, go over the job again a third time. Finally, lock up tight the throttle stop screw nut without disturbing the screw's position.

3rd Throttle Cat-away with Throttle in position
If, as you take off from the idling position, there is objectionable spitting from the carburetter, slightly richen the pilot mixture by screwing the air screw in about half a turn, but if this is not effective, screw it back again and fit a throttle with a smaller cut-away. If the engine jerks under load at this throttle position and there is no spitting, either the throttle needle is much too high or a larger throttle cut-away is required to cure richness.

4th Needle with Throttle in position 4
The needle controls a wide range of throttle opening and also the acceleration. Try the needle in as low a position as possible, viz., with the clip in a groove as near the end as possible; if acceleration is poor and with air valve partially closed the results are better, raise the needle by two grooves; if very much better try lowering needle by one groove and leave it where it is best.

NOTE:—If mixture is still too rich with clip in groove number 1 nearest the end—the needle jet probably wants replacement because of wear. The needle itself never wears out.

5th Finally go over the idling again for final touches.

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

BSA SERVICE SHEET No. 705

October, 1948
Reprinted April, 1960

All Models
PERIODICAL ATTENTIONS

Every 1,000 miles.

HUBS.

Inject grease through the nipples located in the centres of the hubs. Do not overdo this, otherwise grease will penetrate to the brake linings and cause ineffective brakes. Three or four strokes of the gun should be ample. Where no grease nipple is provided the bearings should be removed and packed with grease when the machine is in need of complete overhaul.

BRAKE CAM SPINDLES.

Grease sparingly. Two or three strokes of the gun only, or if no grease nipple is provided, apply a few drops of engine oil between the brake arm and the spindle.

SPEEDOMETER DRIVE.

Grease well. Three or four strokes of the gun regularly.

Every 2,000 miles (except 2-stroke models).

ENGINE OIL.

The oil tank and sump should be drained (preferably when the engine is warm after a longish run), and the tank refilled with fresh oil.

In case of new or re-conditioned engines, the oil should be drained and renewed after the first 250 miles, and again after 1,000 miles.

REAR CHAIN.

Remove the rear chain, clean thoroughly in paraffin, and soak in engine oil or molten grease and graphite.

CONTACT BREAKER (except A and C Group Models).

A very small quantity of thin oil should be injected into the lubrication wick, and the face cam smeared with oil. The wick is accessible after removing the spring contact arm (held by the round-headed screw at the opposite end to the contact point) and is located in the hollow end of the round-headed screw which is revealed when the spring arm is removed.

When replacing the arm, it is important that the small curved backing spring is refitted correctly, i.e., with the bent portion facing outwards.

DYNAMO ARMATURE BUSH (A and C Group Models fitted with lubricator).

A few drops of oil injected through the lubricator are sufficient.

Every 5,000 miles.

Drain the gearbox and refill with new oil up to the level of the filler plug.

Drain the telescopic forks and refill each leg with correct amount of new oil.

In the case of new or re-conditioned gearboxes, change the oil after the first 1,000 miles.

New Machines.

CYLINDER HEAD BOLTS (except B and M O.H.V. engines).

Examine the cylinder joint daily, and if leakage becomes apparent, tighten the bolts, working diagonally so as to pull the head down evenly. Do not over-tighten otherwise there is a possibility of distortion or bolt stretch.

CYLINDER BASE NUTS (except B and M O.H.V. engines).

There are five of these—one at each end of the four corners outside, and one inside the tappet chest on the single cylinder models. A Group Models have eight cylinder base nuts and Model C11 six nuts. Tighten after the first 100 miles.

CYLINDER BARREL AND HEAD FIXING (B and M O.H.V. engines).

The barrel and head are both secured to the crankcase by four long bolts coupled to bushes screwed into the latter. Apply a spanner to the upper hexagon for tightening. These bolts have right-hand threads, and, being inverted, are tightened by turning the spanner to the right.

B.S.A. MOTOR CYCLES LTD.,
Service Dept., Waverley Works, Birmingham 10
(PRINTED IN ENGLAND)

BSA SERVICE SHEET No. 704

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ALL MODELS
PISTON CLEARANCES

To avoid the possibility of seizure or piston tap, pistons must be fitted with adequate but not excessive clearance.

The following are the recommended total clearances between the bottom of the piston and the cylinder wall.

MODEL		Tolerances
Dandy 70	7.25 : 1	.003—.004"
D1		.0027—.0045"
D3, C15		.0025—.004"
D5, D7		.003—.005"
C10, C10L		.0045—.0065"
C11, C11G, C12		.0035—.0055"
C15 (Star Group)	6.4 : 1 to 10 : 1	.0017—.0033"
B31		.004—.0055"
B31 (Split skirt)		.0005—.0033"
B32A		.002—.004"
BB32 Gold Star	8 : 1	.003—.0045"
	6.5 : 1	.004—.0055"
	7.5 : 1	.002—.004"
	9 : 1	.003—.0045"
CB32 Gold Star	6.5 : 1	.002—.004"
	8 : 1	.003—.0045"
	8.5 : 1	.003—.0045"
	9 : 1	.003—.0045"
	12.25 : 1	.004—.0055"
	13 : 1	.004—.0055"
DB32 Gold Star	7.25 : 1	.0025—.004"
	8 : 1	.003—.0045"
	9 : 1	.003—.0045"
B40 (Star Group)	7.0 : 1 to 8.7 : 1	.0015—.003"
B33		.0045—.0065"
B33 (Split skirt)		.0006—.00275"
B34A		.0045—.0065"
BB34 Gold Star	7.1 : 1 Standard	.0045—.0065"
	8 : 1	.0025—.0045"
	9 : 1	.0025—.0045"
	6.8 : 1	.0045—.0065"
	11 : 1	.0025—.0045"
CB34 Gold Star	7.25 : 1	.003—.0045"
	8 : 1	.003—.0045"
	9 : 1	.003—.0045"
DB34 Gold Star }	8 : 1	.003—.0045"
DBD34 Gold Star }	8.75 : 1	.003—.0045"

MODEL		Tolerances
M20		.004—.006"
M21		.004—.006"
M33		.0045—.0065"
M33	(Split skirt)	.0006—.00275"
A7	6.7 : 1	.002—.004"
	(Split skirt) 6.7 : 1	.0011—.0031"
	7.25 : 1	.002—.004"
	(Split skirt)	.0011—.0031"
A7	(Star Twin)	.002—.004"
A7	(Split skirt) (Star Twin and Shooting Star)	.001—.0031"
A7	(Shooting Star) 8 : 1 (after Engine No. CA7SS-4501)	.0035—.005"
A50	(Star Twin) 8.0 : 1 to 9.0 : 1	.0011—.0025"
A10	(Golden Flash) 6.5 : 1	.003—.0045"
	(Split skirt) 6.5 : 1	.0025—.0045"
	(Split skirt) 7.25 : 1	.0025—.0045"
A10	(Super Flash and Road Rocket) 8 : 1	.003—.0045"
A10	(Golden Flash) 7.5 : 1 (after Engine No. DA10-651)	.0035—.005"
A10	(Super Rocket) 8.5:1 (after Engine No. CA10R-6001)	.004—.0055"
A10	(Rocket Gold Star) 8.75 : 1	.001—.0025"
A65	(Star Twin) 7.5 : 1 to 9.0 : 1	.0012—.0027"

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

BSA SERVICE SHEET No. 703

Revised April, 1960

All Models

WORKSHOP DATA (BEARINGS) 1956

B.S.A Part No.	Hoffman No.	Skefko No.	Ransome & Marles No.	British Timkin No.	Fischer No.
24-722	RM.9L	CFM7/C2	MRJA.$^{7}/_{8}$	—	RFM.9
24-724	R.325L	402454.B	MRJA.25	—	MFM.25
24-732	325	6305	MJ.25	—	6305
24-4065	135	6207	LJ.35	—	6207
24-4217	L.S.8	RLS.6	LJ $^{3}/_{4}$	—	LS.8
24-6860	—	2K.1178X 2K.1130N1	—	1178X 1130.N1	—
27-261	MS.9	RM.S7	MJ.$^{7}/_{8}$	—	MS.9
27-4027	LS.11	RL.S9	LJ.1 $^{1}/_{8}$	—	—
29-3857	130	6206	LJ.30	—	6206
29-6211	MS.7	RM.S5	MJ.$^{5}/_{8}$	—	MS.7
42-5819	120	6204	—	—	—
65-1388	RMS.11	CRM.9	MRJ.1 $^{1}/_{8}$	—	RMS.11
65-2045	125	6205	LJ.25	—	6205
65-5883	LS.9	RLS.7	LJ.$^{7}/_{8}$	—	LS.9
67-670	R.130L	NFL.30	LRJA.30	—	NFL.30
89-3022	LS.10	RLS.8	LJ.1	—	LS.10
89-3023	LS.8	RLS.6	LJ. $^{3}/_{4}$	—	LS.8
90-10	117	6203	LJ.17	—	6203
90-11	LS.7	RLS.5	LJ.$^{5}/_{8}$	—	LS.7
90-12	S.9	EE.8J	KLNJ.$^{7}/_{8}$	—	EE.8
90-5525	112	6201	LJ.12	—	6201
90-5559	—	—	—	A.2126	—
90-6063	115	6202	LJ.15	—	6202

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

BSA SERVICE SHEET No. 702

Reprinted June. 1959

ALL MODELS
WORKSHOP DATA
ENGINE, BUSH AND SHAFT DIAMETERS
(All Dimensions in Inches, after Reaming or Grinding).

	D1	C10, C11	B31, B32	M33, B33, B34	M20, M21	A7 Up to engine No. ZA7 11192	A7 On and After engine No. AA7 101	A10
Overhead Rocker Arm ··· ···	— —	.569 .567 C10 only	.562 .563	.562 .563	— —	.4995 .5005	.4995 .5005	.4995 .5005
Inlet Valve Guide	— —	.313 .314	.313 .314	.3525 .3515	.3525 .3515	.313 .314	.313 .314	.313 .314
Exhaust Valve Guide ··· ···	— —	.313 .314	.352 .353	.3785 .3795	.3525 .3535	.313 .314	.313 .314	.313 .314
Inlet Tappet Guide	— —	.3125 .3135 C10 only	.3745 .3755	.3745 .3755	.3745 .3755	.3125 .3135	— —	— —
Exhaust Tappet Guide ··· ···	— —	.3125 .3135 C10 only	.3745 .3755	.3745 .3755	.3745 .3755	.3125 .3135	— —	— —
Cam Pinion Bush	— —	— —	.6255 .6245	.6255 .6245	.6255 .6245	— —	— —	— —
Cam Shaft Bush	— —	.687 .688	— —	— —	— —	.7485 .7495	.7485 .7495	.7485 .7495
Idler Pinion Shaft Bush ··· ···	— —	— —	— —	— —	— —	.7485 .7495	.7485 .7495	.7485 .7495
Idler Pinion Bush	— —	— —	.7505 .7495	.7505 .7495	.7505 .7495	.7485 .7495	.7485 .7495	.7485 .7495
Cam Shaft Bush T/Cover ··· ···	— —	1.0005 .9995	— —	— —	— —	— —	— —	— —
Crankshaft Bush G/S ··· ···	— —	.983 .982	— —	— —	— —	1.375 1.3745	1.375 1.3745	1.375 1.3745
Conrod Big End ···	— —	— —	1.7704 1.7702	1.7704 1.7702	1.7704 1.7702	1.4495 1.4500	1.4495 1.4500	1.4495 1.4500
Gudgeon Pin Bush	.4697 .4692	.6255 .625	.7506 .7503	.7506 .7503	.7506 .7503	.6881 .6878	.6881 .6878	.7506 .7503

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
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BSA SERVICE SHEET No. 516

Nov. 1959
Reprinted Nov. 1965

MODEL D7

FRONT FORKS AND STEERING HEAD

Remove the front wheel and mudguard as described in Service Sheet No. 515.

Prise out the top cap (A) Fig. D33 and unscrew the $^{3}/_{8}$ in. nut holding the top spring scroll.

Place a suitable tin underneath the fork end, take out the drain plug (B) and slacken the pinch bolt (C) in the bottom fork yoke.

To release the main tube from the taper in the top yoke pull the lower sliding member out to its fullest extent, unscrew and take out the top nut and screw in Service Tool No. 61-3350. Give the end of the tool a sharp blow with a hammer and draw the leg down through the bottom yoke.

Repeat for the other leg.

Place each leg in turn in a vice, gripping it on the flats of the fork end and unscrew the oil seal holder with Service Tool No. 61-3633.

The main tube can now be drawn upwards from the sliding member complete with the two bearing bushes, leaving the restrictor rod and spring still attached to the lower member. These need not he disturbed unless they are to be replaced.

Replacing Bushes

The lower bush is a press fit on to the main tube and the replacement must be fitted with the chamfered holes in line with the holes in the tube.

To remove the old bush, prise open the joint in the bush with a thin chisel or screwdriver and then tap the bush off.

The upper bush is a push fit in the lower sliding member and is retained in place by a washer and the top oil seal holder.

No difficulty will be experienced in replacing the top bush.

Reassembly

After fitting the new lower bush, slide the upper bush over the main tube with the flange uppermost, and apply a light coating of oil. Pass the tube over the spring and restrictor rod and slide into the lower member.

Holding the assembly in the vice by the fork ends, place the large washer in position over the flange on the top bush and screw on the oil seal holder with Service Tool No. 61-3633.

Take the assembly out of the vice and pass it up through the bottom for yoke, place the top washer in position then screw on the large top nut and secure over the stud of the spring scroll.

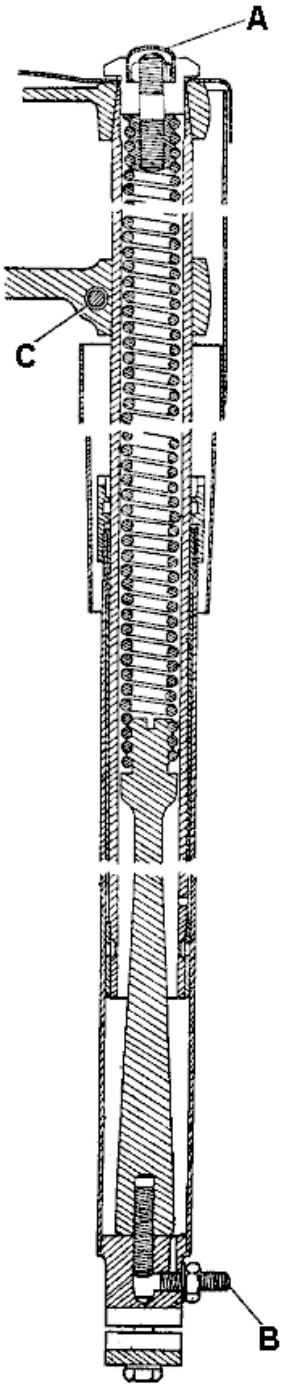


Fig. D33.
Front Fork Section

The $^{3}/_{8}$ in. nut can now be refitted together with the top cap. Repeat the operation for the other leg.

Finally replace the mudguard and front wheel.

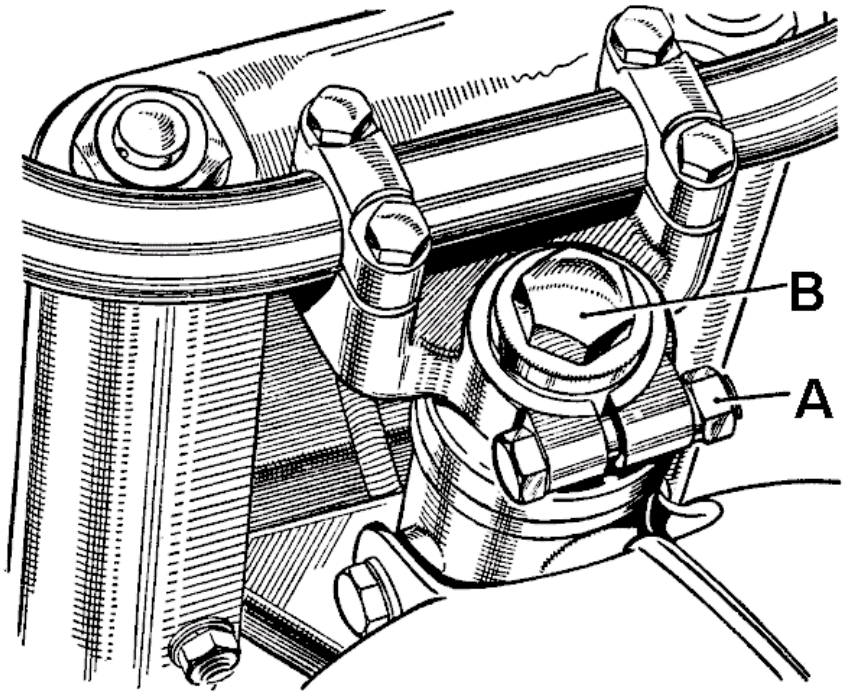
Steering Head

To adjust the steering head bearings place a weight on the saddle so that the front wheel is clear of the ground when the machine is on its stand.

Slacken the pinch bolt (A) Fig. D34 and adjust the nut (B) until the forks move freely from side to side without evidence of play in the bearings.

Take great care not to over tighten the nut (B) as this is liable to indent the bearings in the races.

When the adjustment is correct tighten the pinch bolt (A) securely and recheck the adjustment.



Model D7. Front Fork and steering head.
Fig. D34.

Dismantle the Steering Head

If the only attention required is examination or replacement of the head bearings there is no need to dismantle the forks completely, but the lighting cables to the headlamp will have to be broken at the couplings or sufficient slack obtained to move the forks away from the frame.

Remove the top caps from the forks, unscrew the $^{3}/_{8}$ in. nut and the large nut holding the main tubes.

Slacken the pinch bolt (A) Fig. D34 and take off the nut (B).

Undo the four bolts holding the handlebar clips, place a piece of cloth on the tank, remove the handlebar from the clips and lay it on the cloth.

Take off the top yoke cover, support the forks underneath and remove the top yoke by striking alternately each side underneath the handlebar clips.

After the top yoke has been removed, the steering column and forks can he drawn out of the frame but a suitable tray or container should be held underneath the column to catch the ball bearings which will be released.

The cups, cones and balls should be clean and free from indentations or pitting. The top and bottom cups are identical, Part No. 65-4465, the bottom cone or crown race is Part No. 40-5027, and the top cone is Part No. 65-5319.

If new cups are fitted care must be taken to see that they are seated well down and square with the housing.

Reassembly

Apply a coating of grease to the steering head cups and insert 24 balls, 3/16 in. dia. in each cup.

Slide the column up through the steering head tube, being careful not to displace the balls, place the top cone in position, then the top yoke, and screw on the nut (B) Fig. D34.

Replace the top yoke cover, the $^{3}/_{8}$ in. nuts and the large nuts and washers and the handlebar, adjusting the steering head as previously described.

Finally recouple the headlamp wiring and check the lighting.

B.S.A. MOTOR CYCLES LTD., Service Department, Armoury Road, Birmingham 11.
B.S.A. PRESS

BSA SERVICE SHEET No. 515

MODEL D7

DISMANTLING AND REASSEMBLY OF HUBS AND BRAKES

Both wheels are fitted with ball journal bearings which do not require adjustment. The bearings are packed with grease during assembly and this should last until the machine is in need of a major overhaul.

Front Wheel Removal

With the machine on its centre stand place a box or small wooden trestle underneath the crankcase so that the front wheel is clear of the ground.

Disconnect the brake cable by removing the nut (A) and the screw (B) Fig. D29, at the brake drum end. Slacken the torque arm nut (C) on the cover plate and remove the end caps (D) by unscrewing the four bolts (two in each cap) and as the last bolt is removed support the wheel to avoid damage to the screw threads on the bolt or the screwed sockets. The wheel will now be free.

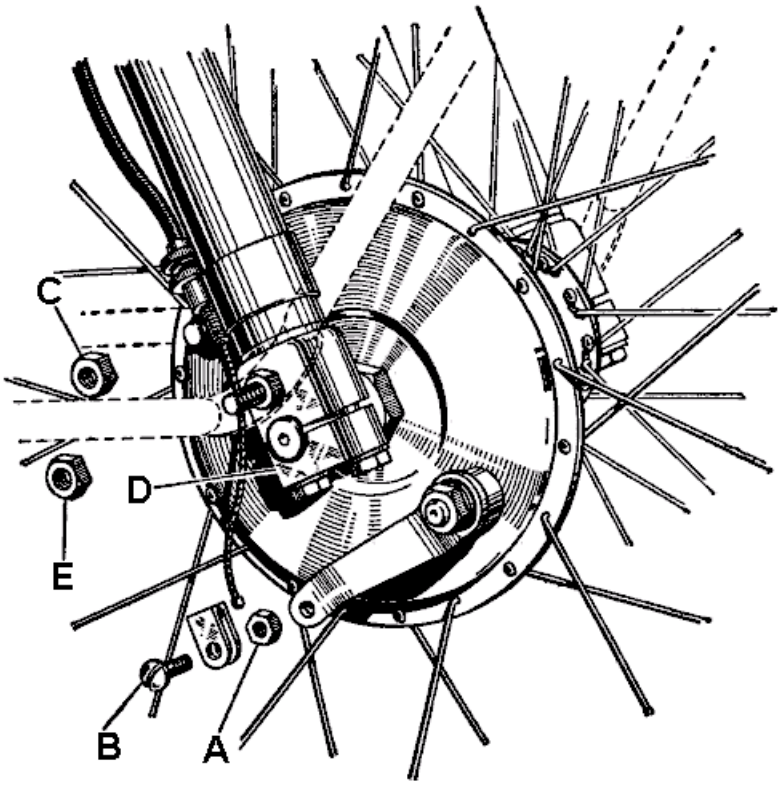


FIG. D29. *Front wheel removal.*

Front Hub Dismantling

Unscrew the large nut (F) Fig. D30, on the spindle. This will be facilitated if the brake is applied by using a short length of tubing, such as a box spanner, over the brake arm.

Take off the cover plate complete with brake shoes, cam and fulcrum pin.

The bearing retainer (G) which is now exposed has a left-hand thread and can be removed by unscrewing in a clockwise direction with a peg spanner, Part No. 61-3644.

Drive out the right-hand or brake-side bearing by striking the left-hand side of the spindle with a mallet or copper hammer. If neither of these is available the bearing can be driven out with an ordinary hammer if a piece of hard wood is placed against the end of the spindle to protect it.

To remove the left-hand side bearing prise out the circlip (H) and, using a suitable piece of tube, drive out the bearing and dust cover from the right-hand side.

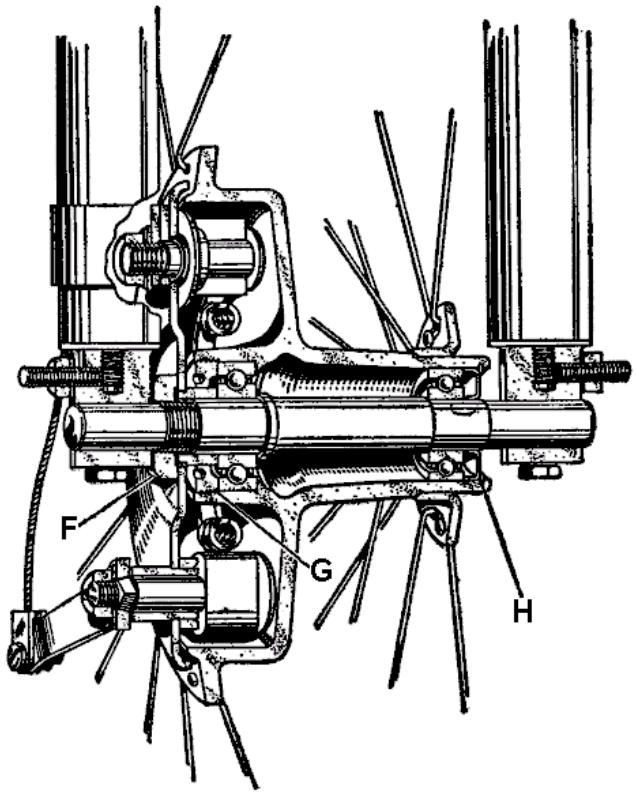


FIG. D30.

Fitting New Bearings

Place the bearing squarely in position on the right-hand side and drive in using a piece of tubing on the outer ring of the bearing. When it is resting on the abutment face in the hub, screw in the lockring using a peg spanner and turning anti-clockwise (left-hand thread).

Insert the spindle, screwed end first from the left-hand side, and tap it gently home so that the bearing inner ring is seated against the shoulder of the spindle.

Place the left-hand bearing over the spindle and drive it into the housing until the dust cap just clears the circlip groove, and replace the dust cap and circlip.

Brake Shoes

Before replacing the cover plate make sure that the brake linings are fit for further use and that the cam spindle is quite free in the cover plate.

Replacement shoes may be obtained through the medium of your dealer from the B.S.A. Exchange Replacement Service, and can be fitted by springing the old ones off the fulcrum and cam spindles then springing the new ones on in like manner.

Replacing the Wheel

Make sure that the cover plate nut (F) Fig. D30, is securely tightened, engage the torque arm bolt of the cover plate in the clip on the right-hand fork leg and replace the fork end clips. Before finally tightening the clip bolts pull the wheel towards the right-hand fork leg.

Replace the brake cable adjuster, clevis pin and split pin and check over the bolts for tightness.

Rear Wheel Removal

With the machine on its stand, disconnect the rear chain at the spring link, place a sheet of paper on the ground under the run of the chain and wind the chain off the rear sprocket on to the paper but leaving it over the gearbox sprocket.

Take off the brake rod adjusting nut (A) Fig. D31, and remove the torque arm bolt (B). Disconnect the speedometer cable by unscrewing the union nut at the end of the cable. The inner cable can then be lifted out of the gearbox drive.

Unscrew the spindle nuts (C) Fig. D31, and pull the wheel out of the fork ends, at the same time freeing the brake rod from the swivel pin on the lever. Tilt the machine over slightly towards the left-hand side and remove the wheel from the right-hand side.

Rear Wheel Dismantling

Unscrew the large nuts (A) Fig. D32, on the spindle, locking the spindle in the same way as described for the front wheel. Remove the brake cover plate complete with shoes and then the speedometer drive gearbox from the right-hand side. (Note the distance piece and driving dogs.)

Next unscrew the bearing retainer (B) which has a right-hand thread and is therefore removed by using a peg spanner in an anti-clockwise direction.

Drive the spindle through the bearing on the brake side so driving out the right-hand bearing.

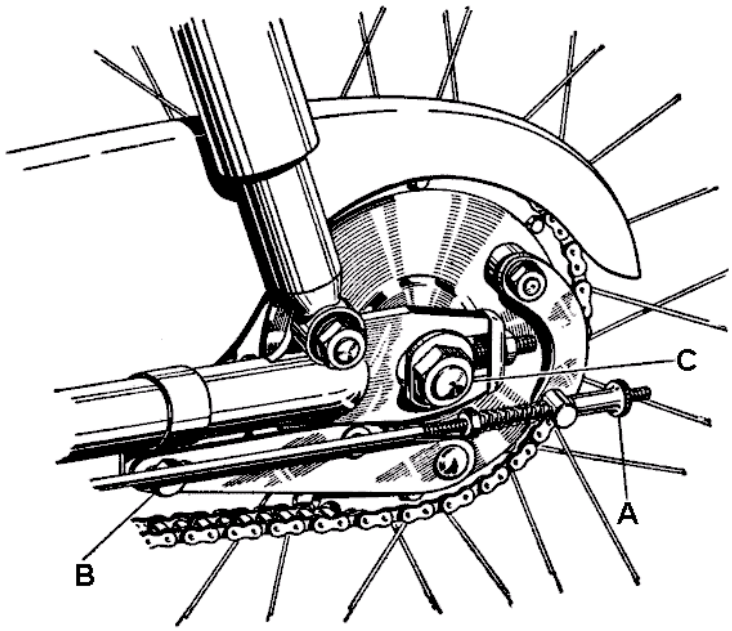


FIG. D31.

The brake-side bearing can now be driven out from the opposite side using a drift against the outer race of the bearing.

Fitting New Bearings

New bearings can be fitted in the reverse order but care must be taken to see that the locking washer is in place behind the drive-side bearing and that the bearing is seated well up to the abutment in the hub shell and the shoulder on the spindle.

After fitting the drive-side bearing and its retainer, insert the spindle from the right-hand side drive in the right-hand bearing to the shoulder on the spindle, slide the distance piece (C) Fig. D32, over the right-hand side of the spindle, then the speedometer gearbox taking care to mesh the driving dogs and screw on the spindle locknut. This nut can be finally tightened after the brake cover plate is fitted.

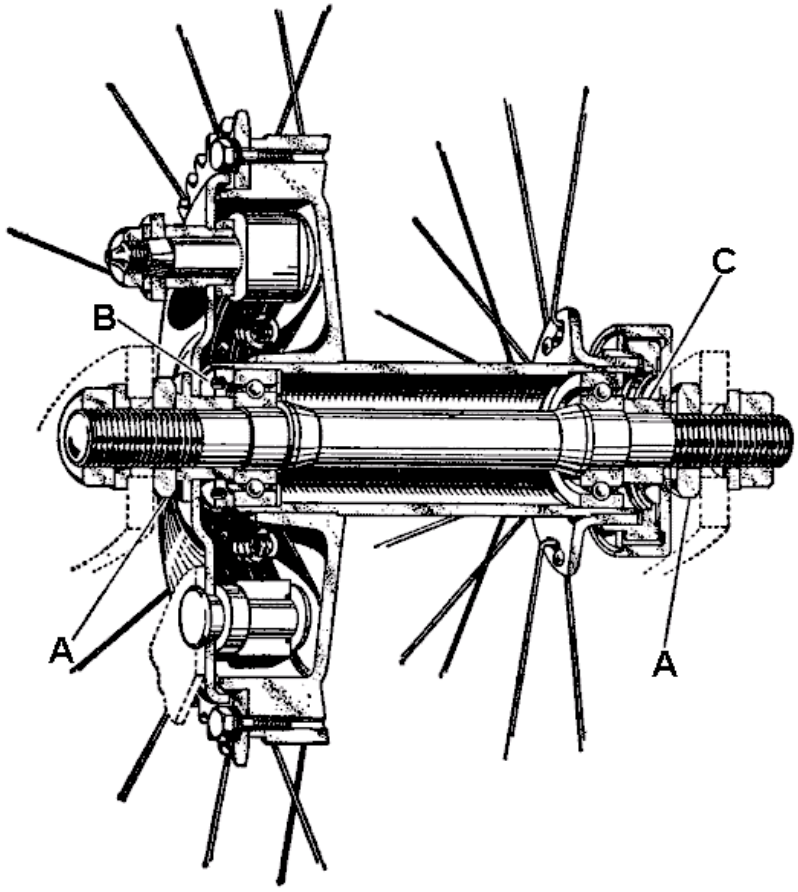


FIG. D32.

Brake Shoes

These are dealt with in the same manner as described for the front wheel and are interchangeable with the front shoes. After replacing the cover plate and nut tighten the locknut on the speedometer drive.

Chainwheel

This is registered on to the brake drum and secured by eight bolts and spring washers.

Rear Wheel Replacement

Procedure is the reverse of that for removal, but care should be taken to see that the wheel is in alignment with the front. This is done by placing a straight edge against the wheels which must touch the front and rear of both tyres. The spring on the chain connecting link must also be fitted with the open end towards the rear wheel when on the top run of the chain. All nuts must be securely tightened.

Front Mudguard

If the front forks or steering head is to be dismantled, it will be necessary to remove the front mudguard. This is done by taking out the two bolts and nuts on the bridge piece midway up the fork legs, and then the two nuts (E) Fig. D29, on each side of the fork ends holding the stays. Spring the stays over the studs and drop the guard down out of the forks.

Rear Chain

The rear chain should be adjusted when the machine is on its stand and the rear wheel in its lowest position.

Adjustment should then be made so that the chain has a total up and down movement of ¾ inch in the centre of the chain run at its tightest point.

To carry out the adjustment slacken off the outer spindle nuts and the nut securing the brake torque arm to the frame. Screwing the adjuster nut in will tighten the chain but it is essential that both adjusters are screwed in or out the same amount in order to maintain correct wheel alignment.

When the chain adjustment has been corrected, care should be taken to see that all the nuts and bolts are securely tightened.

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BSA SERVICE SHEET No. 514

This Sheet supersedes No. 814

Reprinted June 1965

"D" and "C" Group Models

PLUNGER TYPE REAR SUSPENSION

DISMANTLING

First remove the rear wheel, see Service Sheet number 410 for "C" Group models and number 508 for "D" Group models. "C" Group part numbers are shown in brackets where they differ from "D" Group part numbers.

Disconnect the rear mudguard stays, and take out the pinch bolts at the top and bottom of the rear suspension columns. The centre column, part number 90-4117, Fig. D27, can now be driven out using a soft drift so as to avoid damage to the end of the column.

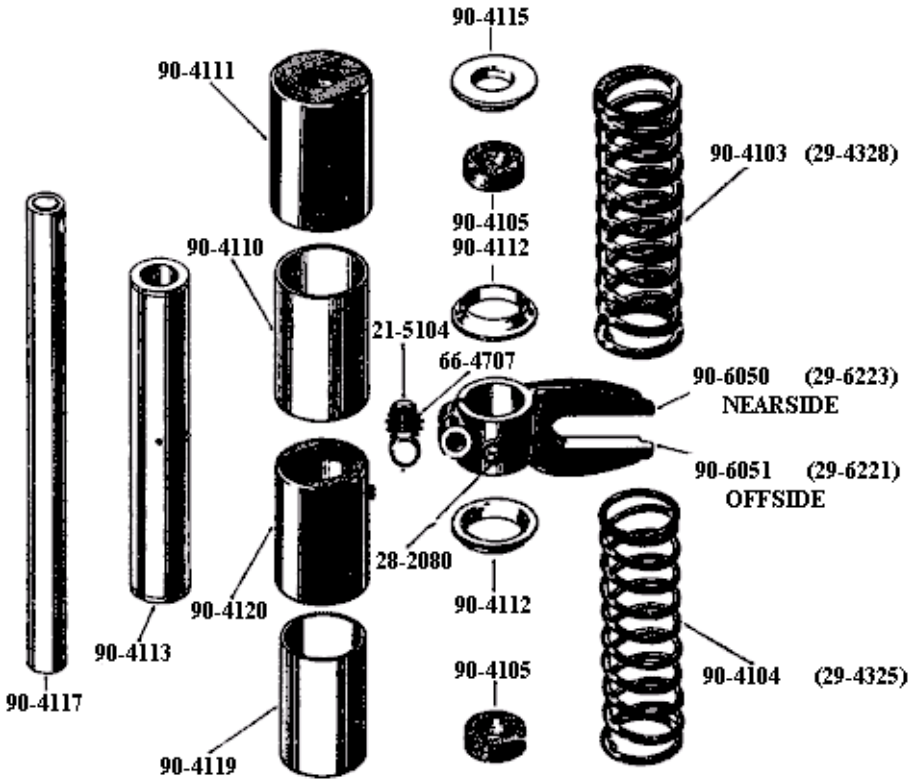

Fig. D27.

Grip the upper and lower shrouds firmly with both hands, compress the springs and lift out the suspension assembly.

Remove the shroud and springs from the sliding member, part number 90-4113. Carefully note the position of the steel washers and rubber bushes for subsequent assembly.

The bushes in the sliding member can now be examined for wear. If they require renewal, the tube complete with bushes must be replaced.

Unscrew the pinch bolt locknut, part number 21-5104, and take out the bolt. Insert a screwdriver into the slot, in the fork end 90-6051 (29-6221), the tube can then be withdrawn.

When replacing the tube ensure that the hole in the side of the tube lines up with the grease nipple in the fork end.

Note that the nearside fork end carries an anchor lug for the brake cover plate. On "C" Group models the head of the right-hand fork end clamping bolt is employed to secure the brake cover plate.

REASSEMBLY

Replace the shroud and springs on the sliding member in the reverse order to that of dismantling.

Take up the assembly and place the lower shroud in the frame lug. Press down on the upper shroud to compress the springs, and slide the assembly between the lugs (Fig. D28).

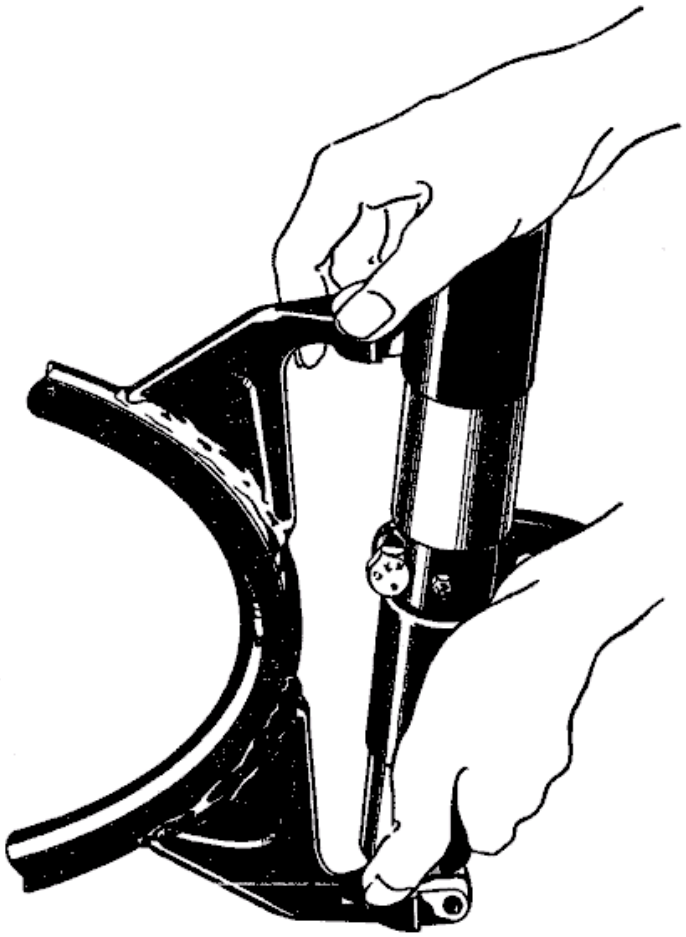

Fig. D28.

Use the champher on the lower end of the centre column to locate the assembly correctly in the frame top and bottom lugs. Insert the column from the top, ensuring that the slots are in line with the pinch bolt hole.

Replace the pinch bolts, mudguard stays and rear whee1, couple up the brake and adjust.

Finally, check over all nuts and bolts for tightness.

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BSA SERVICE SHEET No. 511

October, 1948.
Reprinted June, 1964.

MODELS D1 AND D3

WORKSHOP DATA

All Dimensions in Inches, finished size

	Max.	*Min.*
Cylinder bore D1	2.048	2.047
Cylinder bore D3	2.245	2.244
Con Rod little end bore	.4693	.469
Con Rod big end bore	1.3487	1.3484
Crankpin diameter	.7968	.7965
Chainwheel bush	.8135	.8125
Primary Drive Gear bore	.501	.500
Mainshaft diameter	.499	.498
Layshaft Bush bore	.501	.500
Layshaft Bearing diameter	.4995	.4990
Kickstart Spindle diameter (large)	.7793	.7788
Bore for Kickstart Spindle in Primary Chain Cover	.7815	.7805
Kickstart Sleeve diameter (small)	.6858	.6853
Bore in Crankcase for Kickstart Sleeve	.688	.687
Gear Change Shaft diameter (outer end)	.497	.496
Kickstart Sleeve bore	.5005	.4995
Gear Change Shaft diameter (inner end)	.499	.498
Bore in Crankcase for Gear Change Shaft	.5005	.4995
Bore in Crankcase for Gear Indicator Spindle	.502	.500
Kickstart Ratchet Pinion bore	1.063	1.062
Chainwheel Bearing diameter for Ratchet Pinion	1.060	1.059
Layshaft Bearing diameter for 32 Tooth Gear	.5935	.593

BEARINGS

Location	Crankshaft (2)	Crankshaft (1)	Gearbox	Gearbox Mainshaft
B.S.A. Part No.	89-3023	90-10	90-12	90-11
Hoffman No.	LS.8	117	S.9	LS.7
Skefco No.	RLS.6	6203	EE.8	RLS.5
Ransome & Marles No.	LJ.3/4	LJ.17	KLNJ$^{7}/_{8}$"	LJ$^{5}/_{8}$"
British Timkin No.	—	—	—	—
Fischer No.	LS.8	6203	EE.8	LS.7

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Armoury Road, Birmingham, 11.
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BSA SERVICE SHEET No. 510

Revised June, 1959
Reprinted March, 1965

Models D1, D3, D5 and D7

USEFUL DATA

PETROL TANK CAPACITY (approx.)				1¾ galls. (8 litres). D5 and D7 2 galls.	
"PETROIL" MIXTURE ··· ···				2 filler cap measures per gallon petrol with 6¼ in. filler. 2½ filler cap measures per gallon petrol with 5 in. filler.	
GEARBOX CAPACITY ··· ···				¾ pint (425 c.c.).	
BORE ··· ··· ··· ···				D1—52 mm. D3—57 mm. D5 and D7—61.5 mm.	
STROKE ··· ··· ···				58 mm.	
CAPACITY (Swept Volume) ···				D1—123 c.c. D3—148 c.c. D5 and D7—174 c.c.	
PISTON RING GAP ··· ···				Maximum .013 in. (.325 mm.). Minimum .009 in. (.225 mm.).	
IGNITION TIMING ··· ···				Piston distance before top dead centre with points just opening, $^{1}/_{32}$ in. (3.75 mm.), D1 and D3 $^{1}/_{16}$ in. (1.587 mm.) D5 and D7.	
PLUG POINT GAP ··· ···				.015 in. to .018 in. (.38 to .45 mm.).	
				Standard	Competition	D5 and D7
GEAR RATIOS ··· ··· ···			Top ···	7.0 to 1	8.64 to 1	6.48 to 1
			Second ···	11.7 to 1	14.45 to 1	10.74 to 1
			First ···	22.0 to 1	27.1 to 1	20.2 to 1
TYRE SIZE,	Front ··· ···			2.75 × 19. D5 and D7, 3.00 × 18.		
	Rear ··· ···			Standard 2.75 × 19; Competition 3.25 × 19; D5 and D7, 3.00 × 18.		
TYRE PRESSURES	Front ···			16 lbs. sq. in. (1.125 kg. per sq. cm.). D5 and D7, 16 lbs. per square inch.		
(Standard Model)	Rear ···			20-22 lbs. sq. in. (1.55 kg. per sq. cm.). D5 and D7, 24 lbs. per square inch.		
FRONT CHAIN (3.75 in. × .225 in.)				50 links.		
REAR CHAIN (½ in. × .205 in.)						
Standard,	Rigid Frame ···			116 links.		
	Spring Frame ···			117 links (D3, D5 121 links, D7 Swinging Arm 120 links).		
Competition	Rigid Frame ···			122 links.		
	Spring Frame ···			123 links.		
STANDARD CARBURETTOR JET				D1—75 D3—90, D5 and D7—140.		
JET NEEDLE POSITION ··· ···				Second notch from top, D5 and D7, fourth.		

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BSA SERVICE SHEET No. 509

Reprinted November 1965

Models D1, D3, D5 and C10L — up to 1956
(for C10L 1956 onwards, please see Service Sheet No. 706)

REMOVAL AND DISMANTLING OF THE FRONT FORKS AND STEERING HEAD

Remove the front wheel as described in Service Sheet No. 508.

If only attention to the sliding members and bushes is required it is not necessary to dismantle the top part of the fork assembly but the mudguard must be unbolted from the lower fork members. On early D1 models the mudguard is attached to the upper fork tubes and removal is only necessary if the forks are to be completely dismantled.

Free the top end of the telescopic gaiters from the oil sea1 holders (B) Fig. D25, and slide the gaiters down the lower tubes. Remove the locking clips engaging in the top groove of the oil seal holders, which can then be unscrewed. On early models these clips are secured by the mudguard stay studs and later by the grease nipples which are screwed into the outer fork tube. Very early D1 models have no locking clips and the fork bushes on these models are non-detachable.

Remove the two small nuts (A) Fig. D25, from the top of the two large nuts in the top yoke. On D3 and C10L models the small domed caps must first be removed. They should be levered up with the tang of a file inserted in the small hole in the edge of the dome. The sliding members complete with their springs can then be withdrawn from the bottom of the fixed tubes.

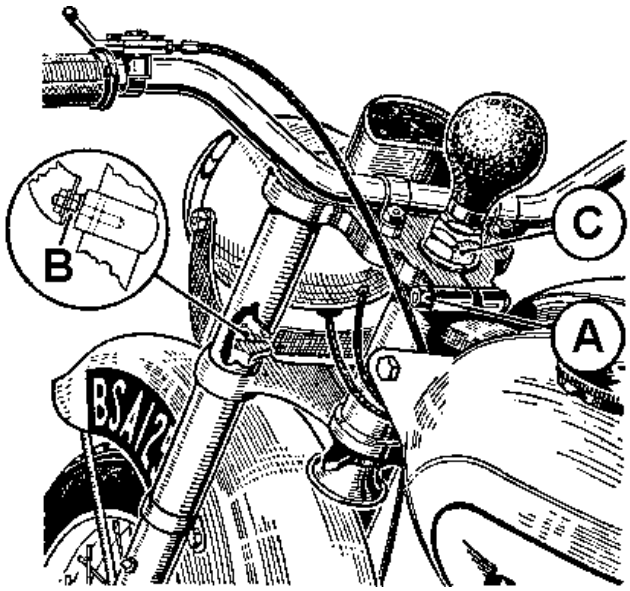

FIG. D24. *Front fork and steering head.*

To detach the springs, hold the lower leg in a vice, as shown in Fig. D26, and using a small punch tap the spring from its thread. The spring can be removed from its upper end housing in a similar manner. Some models have a rubber tube fitted inside the spring to increase the resistance of the fork, and this can only be removed if one end of the spring is detached.

With the sliding tubes removed the lower fork bushes can be withdrawn. Removal of the grease nipples in the side of the outer legs will allow the fork bush distance piece and top bush to be pulled out of the fork outer tube with the aid of a spoke or other similar tool. On D1 models before frame No. YD1-57331 the fork bushes are non-detachable and if they show signs of wear then the fork outer tubes complete must be replaced by the later type.

Detach the clutch cable from the handlebar lever and remove the headlamp switch handlebar lever, when fitted. Removal of the four nuts beneath the fork top yoke which retain the handlebar clips or aluminium cover plate will allow the handlebars to be lifted away from the top yoke. If a bulb type horn is fitted in the steering head this should be removed before the handlebars.

From this point onwards the dismantling procedure for the D1 fork is slightly different from that for the other models and will be described first.

Remove the two nuts (D) Fig. D27, together with washers (E) and the two locknuts (C). Remove the headlamp from its bracket and lower it to the full extent of the wiring harness. This will allow access to the underside of the top yoke so that the speedometer cables can be disconnected and the instrument removed.

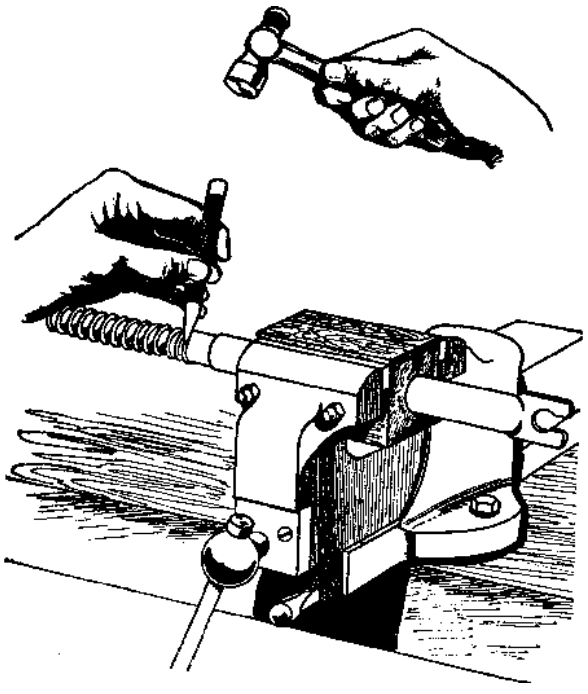

FIG. D26. *Removing the front fork springs.*

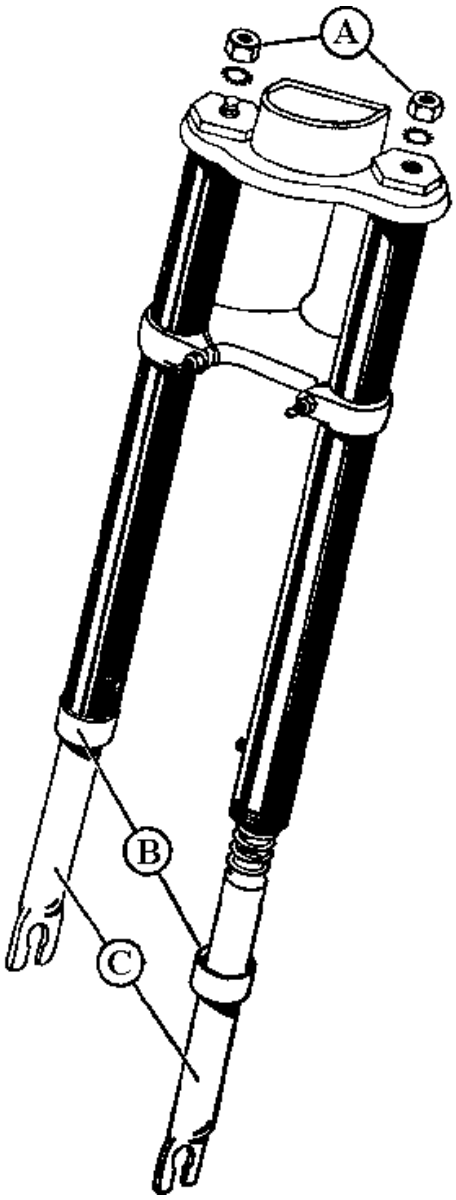

Fig. D25.

Slackening off the pinch bolt at the back of the top yoke will permit the yoke to be removed and placed aside, noting that it will be necessary to hold the lower part of the fork in position to prevent the balls of the lower head bearing dropping away. Pull the headlamp cowl assembly (when fitted) off the fork outer tubes and lift the headlamp over the forks so that it is resting securely on the petrol tank. As the remainder of the fork is withdrawn from the frame head a piece of clean rag should be held underneath the bottom yoke to catch any ball bearings which may escape.

To remove the outer fork tubes place the assembly on a bench and slacken the pinch nuts (A) Fig. D28, in the bottom yoke. Expand the slots in the yoke by inserting a screwdriver as shown in Fig. D28 and draw the tubes down until they are resting on the large washers. Replace the nuts (D) and tap gently to remove the washers. The fork outer tubes can now be withdrawn.

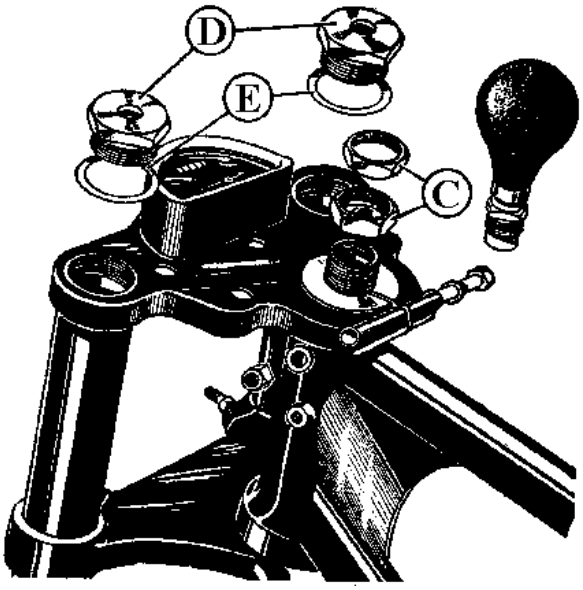

Fig. D27.

The trumpet part of the horn (when fitted) can be removed by unscrewing the slotted collar (B) Fig. D28.

On D3, D5 and C10L models the outer tubes are a taper fit in the top yoke and they should be freed by undoing the pinch nuts (A) Fig. D28, in the lower yoke and slackening the top nuts (D) Fig. D27, by about two turns. A sharp tap on the head of the nut with a hide mallet will free the tube and dismantling can then proceed as for the D1.

To remove the top yoke it is not necessary to undo the castellated sleeve nut on the fork stem and this will hold the lower part of the fork in position until it is ready to be removed.

When the forks have been dismantled the bearing cups can be removed from the frame head by screwing in Service Tool 61-3060 and driving them out from the opposite end with a suitable punch. Do not disturb the cups unless they are pitted or otherwise damaged.

Reassembly

New cups in the steering head should be driven in carefully and squarely to avoid damage and obtain correct alignment. This can best be done with a hide mallet. Grease the cups and place twenty-four $^{3}/_{16}$ in. balls in each cup.

Assembly can then be carried out in the reverse order to dismantling. Do not forget the rubber washers at the bottom of the headlamp cowl tubes (when fitted), the washers on top of the main fork tubes (D1 models), and the dust cover over the top bearing.

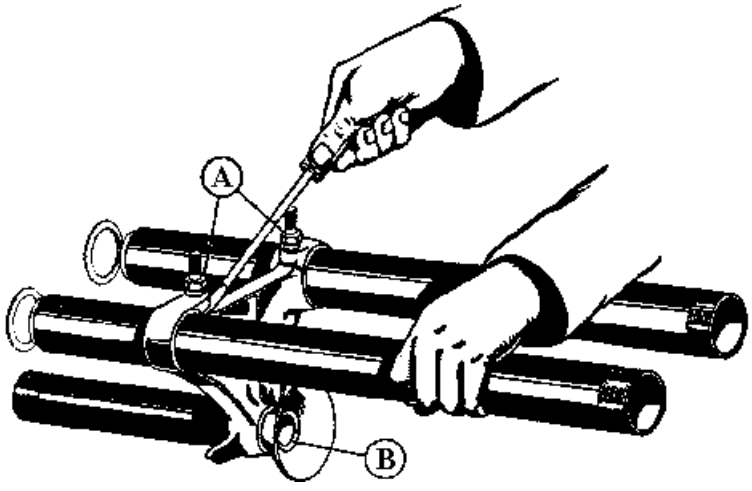

Fig. D28.

On D1 models, when replacing the nuts (C) Fig. D27, ensure that the thicker of the two nuts is at the bottom with its recess facing downwards.

D1 Steering Head Adjustment

Thc method of adjusting the steering head bearings on the D1 models is different to that for the other models. Thc forks should be completely assembled but only the large nuts (D) Fig. D27, should be tightened, after ensuring that the mudguard stay studs on the fork outer tubes are facing each other and in line. Where the mudguard is attached to the sliding tubes, the two grease nipples should be facing outwards. Tighten down the lower of the two nuts (C) Fig. D24, until the forks rotate freely but have no up and down play. Secure the lower nut by means of the locknut and then check to ensure that the bearing is not over-tightened. A "lumpy" feeling as the forks are turned indicates that the adjustment is too tight. When this adjustment is completed the top yoke clamp nut (A) Fig. D24, and the lower clamp nuts (B) should be tightened securely.

D3 and C10L Steering Head Adjustment

The fork can be completely assembled and all the nuts fully tightened before the steering head adjustment is carried out. The fork should bc assembled so that the headlamp cowl tubes are held firmly between the top and bottom fork yokes, with the rubber washers at the lower end of the tubes and the steel washers on top. The fork nuts can then be fully tightened with the exception of the stem nuts and the pinch bolt at the rear of the top yoke. Thc castellated sleeve nut (B) Fig. D29, should then be screwed down with the aid of Service Tool, part number 61-3002, or other similar tool until the forks rotate freely but without up and down play. Tighten the pinch bolt nut (C) to secure the sleeve nut and replace the top cap (A). Check that the bearing adjustment is still correct and replace the handlebar assembly.

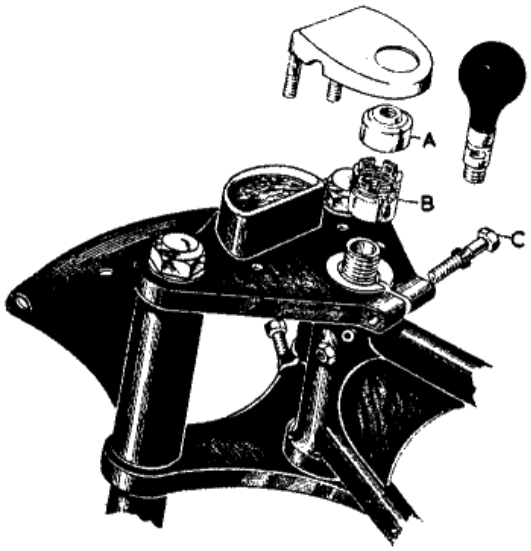

Fig. D29.

Sliding Tube Reassembly (all models)

Place the upper bushes in the outer tubes and push them up as far as they will go with the aid of the distance tube. Line up the holes in the distance tubes with the grease nipple holes in the outer tubes and screw in the nipples. Position the telescopic gaiters on the lower tubes together with the oil seal holders and lower fork bushes. Take care that the oil seals arc not damaged as they pass over the springs. Grease the springs and sliding members, then pass them up into the outer tubes. Position the lower bushes and screw up the oil seal holders. Secure the upper end of the springs in position by means of the nuts (A) Fig. D25, making sure that the fork ends are correctly positioned to receive the wheel spindle, before tightening the nuts. When the oil seal holders are fully tightened they should be secured by the small locking tabs which engage in the top groove of the holders. Make sure that the curved portion of the tab engages properly in the groove before it is tightened down.

BSA SERVICE SHEET No. 508

Revised February 1959
Reprinted May 1965

Models Dl, D3, D5 AND C10L

DISMANTLING AND RE-ASSEMBLY OF THE HUBS AND BRAKES

FRONT WHEEL

To remove the front wheel from the forks, disconnect the brake cable at the brake arm on the cover plate, by removing the ¼ in. diameter round head bolt and nut holding the "U" shaped cable clip. Unscrew the cable adjuster, withdraw the cable and place it out of the way.

Unscrew the two spindle nuts, using the plug spanner, and remove the three mudguard stay bolts on the left-hand fork end bracket. (The latter is not necessary on earlier models, where the mudguard is attached to the outer fork tubes). Lift the left-hand lower fork leg away from the spindle, and pull the wheel away from the right-hand leg, so that the brake anchor plate clears it. The wheel will then drop out.

FRONT BRAKE

Unscrew and remove the spindle nut securing the cover plate. The plate can now be withdrawn and the brake shoes examined. It is not advisable to remove the shoes from the cover plate unless the linings require renewal.

If it is necessary to remove the shoes, first take off the brake lever (A) Fig. D22, and tap in the cam (B) until the cam plate clears the shoes. Insert a screwdriver between the brake shoes adjacent to the fulcrum pin (C) and twist the screwdriver. Place a small lever, (D) between the shoe and the anchor plate and lever the shoe upwards until the spring tension is released. The shoes can then be lifted from the cover plate.

If the shoes require re-lining, see Service Sheet No. 612.

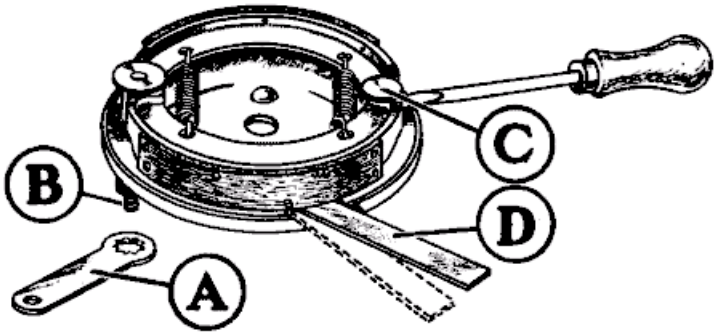

Fig. D22.

FRONT WHEEL BEARINGS (Standard Model)

If it is necessary to remove the bearings for examination or cleaning, unscrew the locknut (L) and spindle nut (A) Fig. D23, and tap the spindle right through, using a hide mallet and soft drift to prevent damage to the threads.

The dust caps (B) can be prised off with the aid of a screwdriver between the cap and the edge of the spoke flange. Care should be taken to work the caps off a little at a time, to avoid distortion. Next unscrew the lock ring (G) securing the outer ring of the ball journal on the brake side. This ring has a left-hand thread.

Take out the felt washers (C) and (H) and the plain steel washers (D).

The ball journals can now be inspected, but they should not be removed unless new ones are required.

If it is necessary to renew the journals the hub should be supported at the brake drum end. With the aid of a suitable soft drift applied to the inner ring of the ball journal, (E) Fig. D23, drive the journal in towards the centre of the hub. This will cause the brake drum side journal to be driven out. When it is clear of the hub, take out the distance piece (F) and pass a drift through the hub until contact is made with the other journal, in order to drive it out.

Note:—This procedure is possible only on machines after engine number YD-2850. Earlier models have no deep counterbore in the hub and the journals must be driven out from opposite ends after the distance piece (F) has been displaced slightly to allow a soft drift to be applied to the inner ring of the race.

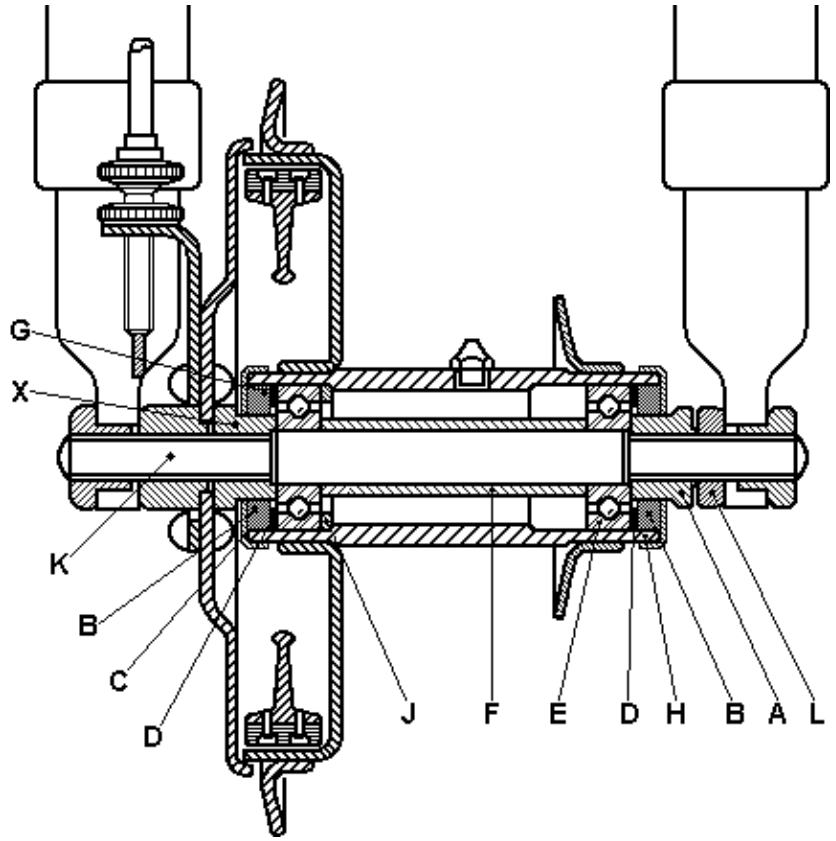

Fig. D23.

COMPETITION MODELS

The front hubs are fitted with adjustable taper-roller bearings as illustrated in Fig. D23a, but instructions for removing the wheel and dismantling the brake are identical with those for standard machines.

To dismantle the bearings, unscrew the two locknuts (M) and (N), remove the brake plate washer (P) and bearing distance piece (R), prise off the dust caps (S), and take out the felt washers (T). The spindle may now be withdrawn from the brake drum side, leaving only the bearings, felt retaining cups (U) and bearing abutment rings (V) and (W) in the hub.

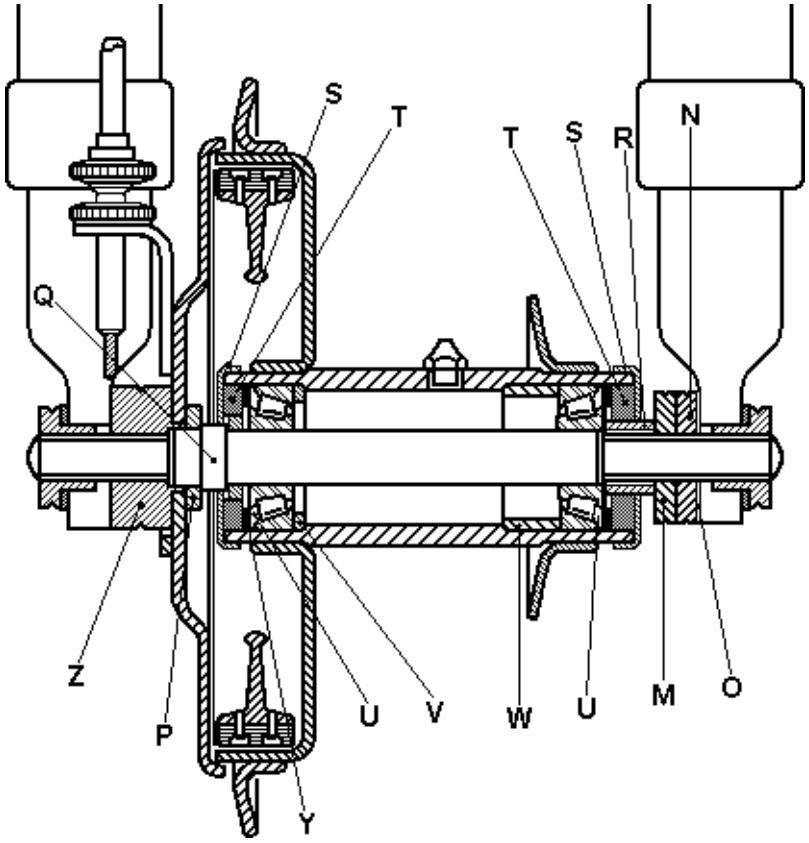

Fig. D23a.

With the hub suitably supported at the brake drum end and a soft drift applied against the abutment ring (V), the ring itself, the bearing and the retaining cup (U) may be driven out in one operation, during which the drift should be moved around the circumference of the abutment ring to ensure even extraction. The hub may now be turned over and the same procedure adopted for removal of the corresponding parts in the other side of the hub.

Note:—The front spindle assembly of the early competition models differed slightly in that the spindle itself had no fixed collar (Q), brake plate washer (P) or bearing thrust washer (Y). These parts replace a shaped nut which was screwed along the brake drum side threaded end of the spindle, tight against the spindle shoulder. Also, a shaped nut was used in the place of the existing distance piece (R) and nut (M). These points should be borne in mind when dismantling and reassembling, but the procedure otherwise is the same as for the current type hub described.

REAR WHEEL

To remove the rear wheel from the frame, disconnect the brake rod by unscrewing the knurled adjusting nut and lift the rod out of the way.

Uncouple the chain at the connecting link, and run the chain off the sprockets after first placing a clean piece of paper or other suitable material underneath the machine to protect the chain from road or floor grit.

Disconnect the speedometer drive by unscrewing the locknut on the speedometer gearbox.

Slacken off the spindle nuts sufficiently to draw the wheel out of the fork ends. Lean the machine over and draw the wheel out under the left-hand chainstay.

REAR BRAKE

The brake cover plate and shoes are identical with those of the front wheel, and the instructions given for removal will apply equally to the rear brake.

REAR BEARINGS

The rear wheel hub is identical with that in the front except that a speedometer drive gearbox is fitted to the offside. This is held in position by a plain washer and an additional locknut; after removing the locknut the gearbox can be drawn straight off the hub barrel. The instructions given for removal of the front hub bearings will apply equally to the rear hub, except that on spring frame models the inner locknut (corresponding to "L" on Fig. D23) is replaced with a plain distance collar.

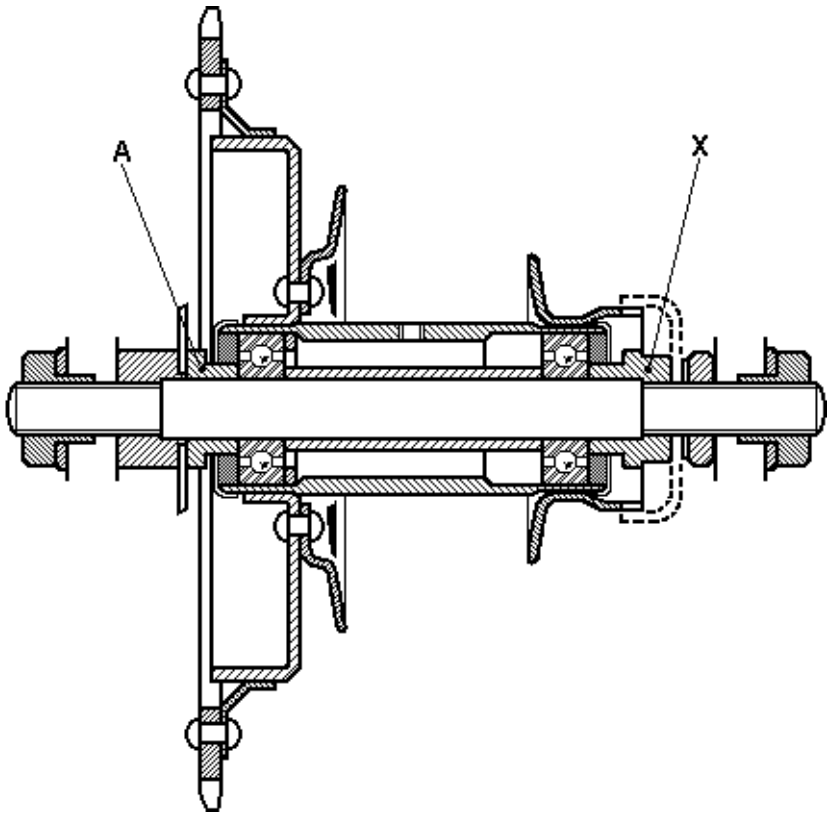

Fig. D23b.

Note:—On later spring frame models (1953 onwards) the distance collar is omitted; correct positioning of the speedometer gearbox being allowed for by the shape of the spindle nut (X), Fig. D23b.

The rear hub spindle assembly is also different in other respects, but removal of the wheel and dismantling of the brake is the same as for earlier models, as also is the procedure for removing the speedometer gearbox. After these operations have been carried out, the spindle can be tapped through from the brake drum side, as the part (A) Fig. 23b, is merely a distance piece; which will then fall away. From this stage, dismantling is again the same as for earlier models.

REASSEMBLY OF THE HUBS

The following applies to all hubs, except the front hub on competition models, and refer to the illustration Fig. D23, unless otherwise stated. If new ball journals are to be fitted first place the distance piece (J) in position in the hub barrel, brake drum side, and press in the hub journal, taking care to see that it is square to the housing. Insert one plain steel washer (D) and then screw in the lock ring (G). This has a left-hand thread. Reverse the hub, insert the inner distance sleeve (F), and push the spindle (K) through the bearing and distance sleeve. At this stage, if the hub has been cleaned out, it should be re-packed with grease. Place the second journal in position and press it into the housing until the inner distance sleeve is firmly gripped, and remove the spindle. Replace the other plain washer (D), felt washers (C) and dust caps (B), and re-insert the spindle so that the "fixed" nut is on the brake drum side, except on the rear hubs of the later spring frame models; where it should be on the opposite side.

The "fixed" nut is marked (X) on both illustrations, Figs. D23 and D23b, and has been left undisturbed on the spindle throughout all the previously mentioned operations. If, for any reason, it has been slackened; it should be retightened firmly against the shoulder of the spindle. The "fixed" nut is located on the longer-threaded end of the spindles fitted to all front wheels and the later type spring frame rear wheel. On the rear wheels fitted to pre-1953 spring frame models and all rigid frame rear wheels the "fixed" nut is located on the shorter-threaded end of the spindle.

The spindle nut (A) may now be replaced and thoroughly tightened, except on the later spring frame rear hub where it is necessary to replace the distance collar (A) Fig. D23b, and the brake cover plate complete with shoes, before finally tightening down with the brake cover plate nut. In each case the tightening of the nut will lock together the spindle, the inner rings of the journals, and the sleeve (F). This assembly should rotate freely in the ball races if the journals have been pressed in squarely. On the outer wheels, the brake cover plate and its nut should now be replaced, and the nut securely tightened. It should be noted that in each case the brake cover plate nut has a spigot which must be correctly located in the centre hole of the brake plate before the nut is tightened. The locknut (L) should now be replaced and tightened against the spindle nut (A) — front hub and rigid frame rear hub only.

Refitting of the speedometer drive gearbox will now complete the reassembly. This may be placed straight over the wheel spindle on the rigid frame models and on the late spring frame models, making sure the driving dogs are located correctly in the recesses in the end of the hub barrel. The plain washer and the outer locknut should then be replaced and tightened securely. On earlier spring frame models the plain distance collar must be replaced before the speedometer drive gearbox is refitted.

Where a speedometer is not fitted, a plain hub-end cap (part number 90-6029) should be fitted in place of the speedo gearbox.

REASSEMBLY (Competition Front Hub)

All references will be to Fig. D23a.

Place the distance piece (V) in position in the brake drum side of the hub barrel and press the outer ring only of the taper-roller race firmly and squarely up to it. Reverse the hub, place in the distance piece (W) and press in the outer ring of the other race in the same manner.

Take the hub bearing thrust washer (V) and slide it along almost the full length of the spindle, up to the spindle shoulder. Place the remainder of the brake drum side bearing (inner ring complete with cage and rollers) in position, backing it up to the thrust washer. Insert the spindle into the hub from the brake drum side, re-pack the hub with grease and slide into position the remainder of the other bearing. Press in the felt retainers (U), followed by the felt grease seals (T), and press on the dust caps (S). Owing to the "fixed" nut used on early spindles, the brake side bearing and oil seal assembly must be positioned in the hub before the spindle is inserted. Refit the bearing distance piece (R) and screw on to the spindle the nuts (M) and (N), locking them together when the correct bearing adjustment is obtained. Over-tightening of the hub bearings will cause rapid wear and when the wheel is refitted into the forks, just perceptible play (about 1/32 in.) should be felt at the rim.

Replace the brake plate washer (P) and the brake cover plate and its nut (Z), the spigot of which must be correctly located through the hole in the centre of the brake cover plate, before tightening securely.

SPECIAL NOTE (All Front Wheels)

The dimension over the front hub locknuts, inside the fork ends, must be maintained between 4.910 -- 4.920 in. To adjust, use shims part number 90-5545 as required, between locknut and bearing abutment nut. On competition models the shims can be interposed at point (O) Fig. D23a, to avoid disturbing the bearing adjustment. It will be necessary to add shims periodically, as bearing wear progresses, and after each re-adjustment.

REPLACING THE WHEELS

Reassembly of the wheels is the reverse procedure to removal, except that care must be taken to locate the brake plate anchorages correctly, over the lower fork sliding member in the case of the front wheel, and over the fork end stud in the case of the rear wheel. Care must also be taken to see that the speedometer gearbox is lined up to the cable. Sharp bends in the cable will result in fracture of the inner wire.

Couple up the brakes and chain, adjust the wheels in the fork ends, lock securely, and finally adjust the brakes by means of their respective knurled thumb screws.

REAR CHAIN ADJUSTMENT

The rear chain is adjusted by means of screw adjusters in the fork ends behind the wheel spindle. Slacken off the nuts (A) Fig. D23c, and screw the adjusters (B) in or out until the chain tension is correct with an up and down movement of three-quarters of an inch (2 cm.). Make sure that the adjustment is equal on both sides of the wheel so that the latter is in correct alignment in the frame. This can be done either by glancing along the line of both wheels when the front wheel is set straight, or by means of a long straight-edge or the edge of a plank placed along the sides of the wheels. The straight-edge should touch both walls of both tyres.

After adjusting retighten the nuts (A).

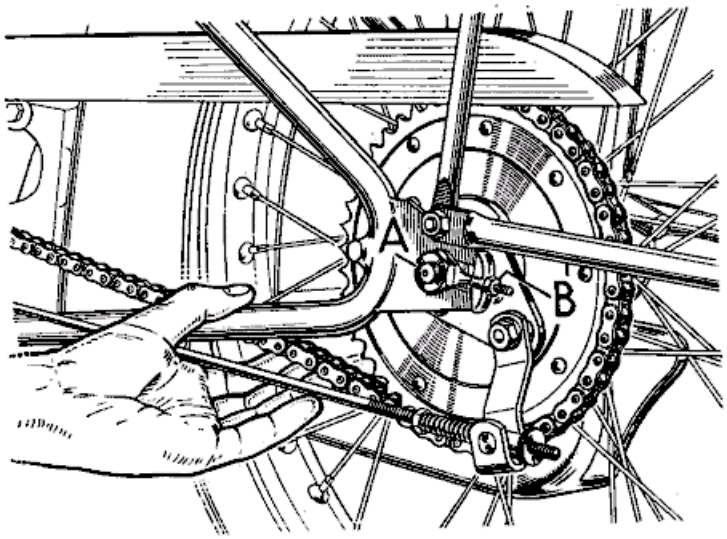

Fig. D23c.

On spring frame machines the rear chain should be adjusted when the machine is on its stand and the rear wheel is in its lowest position. The adjustment should be made so that the chain has a total up and down movement of ½ in. in the centre of the chain run at its tightest point.

In the case of the D3 and D5 swinging arm models, the movement should be ¾ in. (2 cm.) again with the machine on its stand.

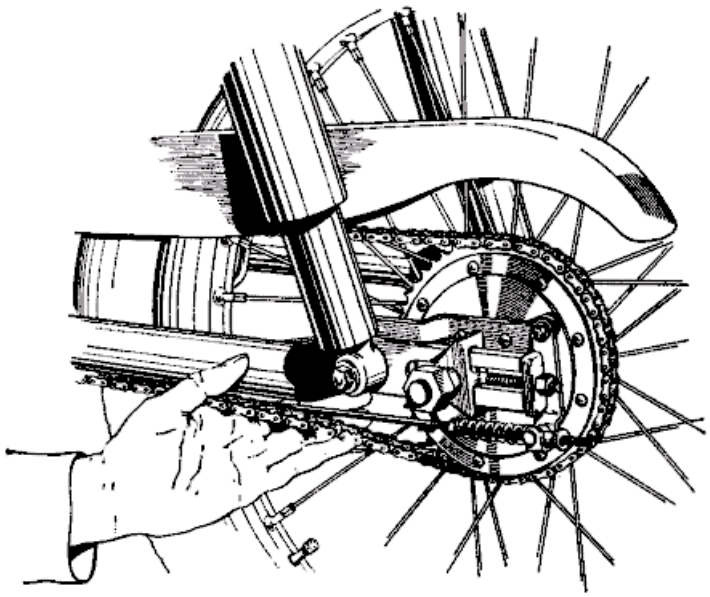

Fig. D23d.

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Models Dl, D3, D5 and D7

ENGINE DISMANTLING FOR DECARBONISING

Decarbonising should be carried out at regular intervals of about three thousand miles (5,000 km.) if consistent results are to be expected. The-symptoms indicating an excessive deposit of carbon are undue roughness of the engine and a tendency to "pink" under load, erratic running with excessive four- and eight-stroking, and an appreciable falling off in power. This latter item is particularly noticeable when the exhaust port becomes fouled with carbon as it causes an obstruction to the free escape of the exhaust gas, and interferes with the correct scavenging of the cylinder which is so necessary for the efficient transfer of combustible mixture from the crankcase.

Before commencing to decarbonise the engine it is necessary to slacken the two bolts holding the petrol tank to the steering head, and to remove entirely the rear petrol tank securing bolt which passes through the frame, and carries the earth wire of the electrical system. Disconnect the petrol pipe from the tank tap, after turning fuel off at tap and raise the rear of the tank about 1 in. to allow the removal of the cylinder barrel over the long securing studs.

Removal of Cylinder

First remove the carburettor from its stub at the rear of the cylinder by releasing the clip bolt by means of which it is attached. The exhaust pipe must also be disconnected by releasing the union nut at the front of the cylinder barrel by means of the special "C" spanner included in the toolkit. If this nut should prove unduly obstinate, a few drops of penetrating oil should be applied to the threaded portion immediately above the nut and a little time should be allowed for this to act before attempting to unscrew the nut. Disconnect the high-tension lead from the sparking plug and unscrew the latter.

The cylinder head and barrel are attached to the crankcase by means of four long studs and when the four nuts on the top of the cylinder head are removed, the head can easily be lifted clear, followed by the cylinder barrel. Take care when removing the latter to support the piston as it emerges from the end of the bore in order that it may not be damaged as it falls clear.

Piston

Place the cylinder head and barrel on one side on a bench and examine the piston. It should not be necessary to remove this from the connecting rod, but if it should be desired to do this for any reason, first remove the circlip from one end of the gudgeon pin using a pair of pointed-nose pliers or some suitable instrument to lever the circlip out. Then holding the piston firmly in the hand, tap the gudgeon pin out from the other end. If it is too tight to move, it can be released by warming the piston by means of a rag soaked in hot water and wrung out. Application of this rag will cause the aluminium alloy at the piston to expand more than the steel gudgeon pin, thus releasing the latter which can then be freely pushed or tapped out. Mark the inside of the piston skirt to indicate the front of the piston as originally fitted.

Scrape any carbon which has accumulated on the crown of the piston, taking care not to damage the relatively soft surface of the metal itself, and after removing all the carbon, polish lightly with fine emery cloth if desired and finally wipe clean with an oil rag.

Piston Rings

Now examine the piston rings noting that these are located in their grooves by means of pegs which en age in the piston ring gaps. If in good condition, the rings will be found to present a uniformly smooth metallic surface over their entire peripheries, and if they are in this condition and obviously have a certain amount of "springiness" as evidenced by the fact that their free gap is considerably greater than the closed gap when in the bore (see Service Sheet No. 506) they should not be disturbed. If, on the other hand, the rings show signs of heat as evidenced by brown or more highly discoloured patches, they should be replaced by new rings, and in this case particular attention should be paid to the fit of the ends of the rings on their locating pegs in the piston ring grooves, and they should also be checked in the bore to ensure that they have an adequate gap. These points will not arise if genuine B.S.A. spares are fitted as the gaps on these are already correct when the rings are sent out, but if for any reason genuine B.S.A. spares are not obtainable, these points must receive careful attention. First place the ring in the cylinder bore in a position where it is clear of the ports and, making certain that it is square by pressing the skirt of the piston against it or a suitable bar of material of the correct diameter, examine the gap which should be not less than .008 in. (.2 mm.). Having satisfied yourself on this point, place the ring in its groove on the piston and make certain that it is free without perceptible up and down play. If it is not free and the groove itself is clean, rub the ring down on a piece of fine emery cloth laid on a dead flat surface, using a rotary motion of the arm to ensure uniform pressure on the ring. As soon as ring is found to be free in its groove, wipe it absolutely clean and fit it into position.

Check also that there is sufficient clearance between the inner portion of the gap and the locating peg in the groove. Do this by closing the ring in its groove by finger pressure until there is no gap, thus showing that there is clearance at the peg underneath. If the gap will not close, indicating that the steps are binding on the peg, ease the steps gently with a dead smooth file. If the piston has been removed from the connecting rod refit it, first putting a smear of oil on the gudgeon pin, not forgetting a new circlip to replace the one which was removed. Note that the piston ring gaps should face towards the rear on Dl models and towards the front on D3, D5 and D7 models. Then put a piece of clean rag over the piston and crankcase mouth and turn your attention to the cylinder barrel and head.

Cylinder Head and Ports

Remove all carbon deposit from the cylinder head, bearing in mind again that the aluminium is soft and easily damaged if the decarbonising tool is carelessly applied, and carefully wipe clean to ensure the removal of all loose particles. Most of the carbon deposit likely to have accumulated in the cylinder will be in the exhaust port, and this is most important as explained above. Scrape this out carefully, taking care not to let the tool slip into the bore and damage the surface of the latter. Examine the transfer and inlet ports for the presence of carbon, although this is unlikely to be heavy, and finally wipe the ports and the cylinder bore absolutely clean.

Big-end Bearing

While the cylinder is off it is as well to test the big-end bearing for wear. This is done by taking hold of the connecting rod stem and pulling it upwards until the crank is at top dead centre. Then holding it in this position try gently but firmly to pull and push the connecting rod in the direction of its travel in order to feel whether there is any play. If the big-end is in a sound condition there should be no play in this direction, although it may be possible to rock the rod sideways, i.e. at right angles to the axis of the machine. If vertical play is perceptible in the big-end it must be decided whether the amount in evidence is permissible or not. The assembly is not likely to require replacement, however, provided that the machine has been carefully used and adequately lubricated, for the big-end bearing is of ample dimensions for the work it has to do. But if for any reason the big-end bearing has deteriorated as the result of neglect or abuse, it should be replaced.

Reassembly

Before attempting to replace the cylinder barrel over the piston, smear the latter generously with engine oil and then place it over the piston, carefully manipulating the rings into the end of the bore and seeing that they enter freely without the application of force. As soon as the cylinder barrel is home, replace the cylinder head and put the washers and nuts on the four holding down bolts. Tighten the nuts in diagonal order so as to avoid distortion.

Examine the sparking plug (see Service Sheet No. 503) and refit if sound.

Before refitting, the exhaust pipe and silencer should be examined for freedom from carbon and cleaned if necessary. Refit the exhaust pipe and carburettor, lower the rear of the tank into position and insert the long securing bolt, after passing it through the earth connection tag attached to the electric wiring harness. Ensure that face of tag is clean and free from dirt or corrosion so that it makes a good contact.

Tighten up rear and front tank securing bolts.

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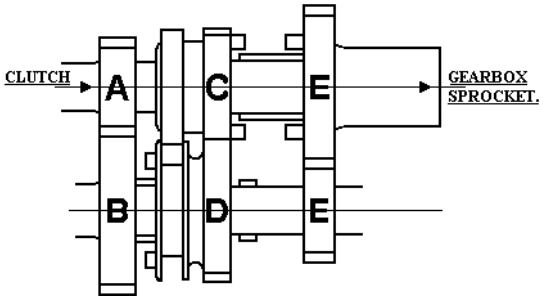
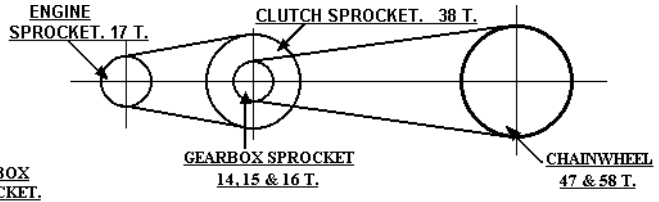
Revised May, 1965.

D GROUP GEAR RATIOS





*Standard ratio from engine numbers ED7-9001 and FD7-3001 upwards

GEARBOX SPROCKET	CHAIN-WHEEL		STANDARD RATIO GEAR REFERENCE LETTER ON DIAGRAM	STANDARD RATIO COMPONENT NUMBER	STANDARD RATIO NO. OF TEETH	* STANDARD RATIO COMPONENT NUMBER	* STANDARD RATIO NO. OF TEETH	CLOSE RATIO COMPONENT NUMBER	CLOSE RATIO NO. OF TEETH
			A	90-1345	15	90-1345	15	90-1489	19
			B	90-0082	32	90-0082	32	90-0448	28
			C	90-1357	22	90-1357	22	90-1357	22
			D	90-1360	25	90-1360	25	90-1492	25
			E	90-0065	28	90-1582	26	90-0474	24
			F	90-1358	19	90-1584	21	90-1495	23
16	46	TOP SECOND BOTTOM		6.426 10.73 20.2		6.426 9.189 16.96		6.426 7.62 9.89	
15	46	TOP SECOND BOTTOM		6.85 11.43 21.5		6.85 9.79 18.08		6.85 8.124 10.54	
14	46	TOP SECOND BOTTOM		7.34 12.25 23.04		7.34 10.49 19.37		7.34 8.70 11.3	
16	47	TOP SECOND BOTTOM		6.58 10.85 20.41		6.58 9.38 17.07		6.58 7.78 10.1	
15	47	TOP SECOND BOTTOM		7.0 11.69 21.98		7.0 10.01 18.48		7.0 8.3 10.78	
14	47	TOP SECOND BOTTOM		7.5 12.52 23.55		7.5 10.725 19.8		7.5 8.9 11.53	
INTERNAL RATIOS		TOP SECOND BOTTOM		1.0 1.67 3.14		1.0 1.43 2.64		1.0 1.186 1.54	

D5 and D7 models prior to frame number D7-5885 used 46T rear chainwheel. Later D7 models used 47T chainwheel.

'A' refers to mainshaft with gear cut direct on to shaft.

'F' is the layshaft complete with gear.

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BSA SERVICE SHEET No. 502

Revised March, 1965.

MODELS Dl, D3, D5 AND D7,

THE PETROIL LUBRICATION SYSTEM

The correct lubrication of the two-stroke engine fitted to these models depends upon a certain quantity of oil being mixed with the petrol. It is preferable for this to be done before the fuel is poured into the tank, and a number of filling stations now supply 'petroil' mixture ready for use. Failing this, the oil and petrol should be thoroughly mixed in a separate container. If this is not possible, the petrol should be put into the tank first and the oil added, after which the machine should be rocked to and fro.

The petrol tap must be turned off when the machine is parked. Failure to do this may result in the carburettor float chamber becoming filled with oil if allowed to stand for a long period.

While the engine is running, oil is induced into the crankcase through the carburettor in the form of oil mist mixed with the fuel supply. As the piston descends, compressing the charge in the crankcase, most of the oil mist separates out and is deposited in the crankcase as liquid oil which lubricates the big-end and main bearings. The petrol and air mixture passes up through the transfer ports into the combustion chamber.

Surplus oil is carried by the action of the fuel transfer to the combustion chamber, where it serves as an upper cylinder lubricant, and is eventually burned by the heat of combustion.

There is no point in increasing the proportion of oil to petrol above that recommended since any excess of oil is merely transferred to the combustion chamber where it is burnt. A higher proportion of oil in the charge means a lower proportion of petrol and therefore a less suitable combustible mixture.

A measure for oil is incorporated in the filler cap, that on earlier models being approximately 5 in. long while the later type is approximately 6 in. long. Two and a half of the former, or two of the latter measures must be used with each gallon of petrol. Both these quantities correspond to 1 part of oil to 20 parts of petrol and this will provide adequate lubrication throughout the life of the engine.

If the special two-stroke self-mixing oils are used, the proportion should be increased to 1 to 16, which equals half a pint to one gallon of petrol.

RECOMMENDED ENGINE OILS

CASTROL XXL	or	TWO-STROKE SELF-MIX OIL
MOBILOIL BB	or	MOBILMIX TT
SHELL X100-40	or	PETROILER MIX No. 2T
B.P. ENERGOL 40	or	ENERGOL TWO-STROKE OIL
ESSO EXTRA 40/50	or	ESSO TWO-STROKE MOTOR OIL

Models D5 and D7

On models D5 and D7 the main engine bearings are lubricated by oil transfer from the gearbox. It is therefore essential that the following undiluted oils be used in the gearbox.

RECOMMENDED GEARBOX OILS

CASTROL XXL
SHELL X100-40
ESSO EXTRA 40/50
MOBILOIL BB
ENERGOL 40

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