

Instruction Manual

Investigative

250cc. OHV Star model C15

This instruction manual is intended to acquaint the B.S.A. owner with details of the controls, general maintenance and technical data which may be required for normal operation of the machine.

It does not contain the information necessary to carry out stripping for major overhauls, but if any owner feels he is competent to carry out this type of work a service manual and an illustrated, priced, spares catalogue for this machine can be obtained from your B.S.A. spares stockist or local distributor.

Owners in the British Isles can obtain these publications direct from B.S.A. Motor Cycles Ltd., Service Department, Birmingham 11. The service manual is priced at seven shillings plus sixpence postage, and the spares catalogue is five shillings plus sixpence postage. Always quote full engine and frame numbers when ordering these publications.

INSTRUCTION MANUAL

for



Model C15

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CONTENTS

	<i>Pages</i>
Brakes	40
Carburation	26
Cleaning	11
Clutch	30, 31
Contact Breaker	15
Controls	6
Decarbonising	19
Driving	8
Electrical Equipment	49
Gearbox	36
General Hints	55
Ignition Timing	16
Lubrication Chart	32, 33
Lubrication System	12
Periodical Maintenance	10
Preparing the Machine	6
Running-in	9
Spares Stockists	56
Sparking Plug	24
Suspension and Steering	45, 47
Tappet Adjustment	14
Technical Data	4, 5
Transmission	29
Wheels	39
Wiring Diagram	54

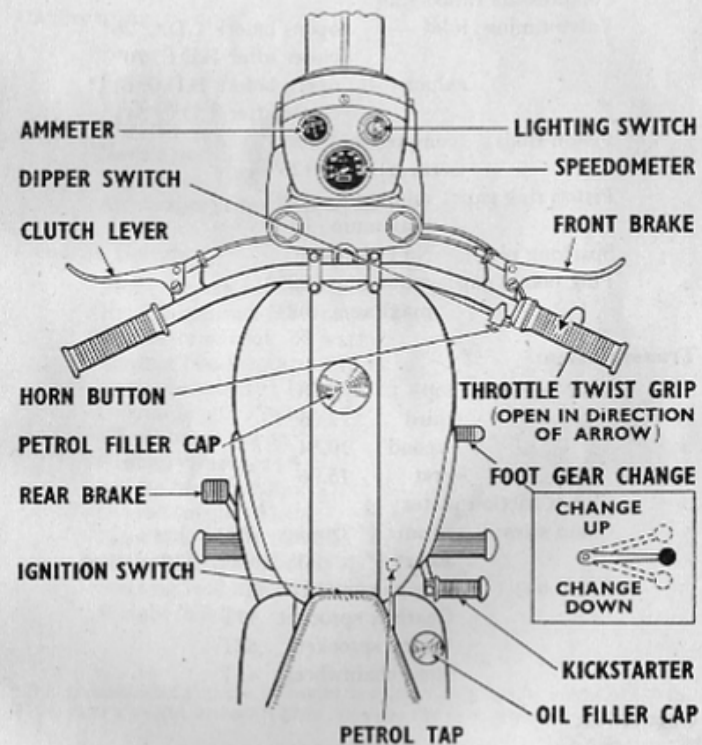


Fig. 1. The Controls.

TAKING OVER THE MACHINE

Before running the machine make sure that the oil tank, gearbox, primary chain case and front forks are properly topped up with oil and that the battery is filled and charged. (See appropriate chapters for filling instructions). Normally these preparations will be carried out by the dealer who is selling the machine and the new owner has only to arrange the controls to his liking and the machine is ready for the road.

The Controls.

The new rider should make sure that he is quite familiar with all the controls before attempting to ride the machine. The foot controls are adjustable, and should be positioned so that they can be reached without moving the feet from the footrests. Handlebars and footrests should be adjusted so that a comfortable and natural riding position is achieved. Both footrest retaining nuts have a left-hand thread. Make sure that the bolts retaining the handlebar clamps are tight after completing any adjustment and after adjusting the footrests, re-set the brake pedal stop pin, so that the pedal is situated comfortably below the foot.

Handlebar Controls.

Twist Grip.

Mounted on the right handlebar it controls the throttle opening. To open the throttle (i.e., to increase engine speed) turn the grip so that the top moves towards the rider. Full movement is about a quarter of a turn.

Front Brake.

Hand lever mounted on the right handlebar in front of the twist grip. Squeeze the lever towards the bar to operate the brake. Finger adjustment for the cable is provided at the cable adaptor on the lever.

Clutch.

Hand lever mounted on the left handlebar in front of the grip. Squeeze the lever towards the bar to free the clutch, i.e., disengage the drive between the engine and the rear wheel. Finger adjustment for the clutch cable is provided at the cable adaptor on the lever.

Horn.

The horn button is mounted on the right handlebar and is incorporated in the dipper switch.

Headlamp Dipper Switch.

Controls the switching from main to dipped headlamp bulb filaments, and is mounted on the right handlebar.

Foot Controls.

Rear Brake Pedal.

On the left-hand side of the machine and controls the rear brake only.

Gearchange Pedal.

On the right-hand side of the machine and effects the change from one gear to another. The lever is of the positive stop type and returns to the central position after each change. Upward movement of the lever selects the next higher gear, downward a lower gear. Neutral is between first and second gear.

Kickstarter.

The kickstarter is on the right-hand side of the machine behind the footrest. Depression of the lever rotates the engine.

Other Controls.

Petrol Tap.

Under the right-hand rear end of the petrol tank. To turn on the petrol, pull out the round serrated button, and to turn the petrol off, push in.

Lighting Switch.

Situated on the top of the headlamp and has three positions: (1) all lights off but battery being charged when engine is running; (2) pilot bulb, rear lamp and speedometer bulbs illuminated; (3) headlamp bulb, rear lamp and speedometer bulbs illuminated and the switching from main to dipped beam controlled by the dip switch.

Ignition Switch.

Mounted on the fairing immediately behind the engine and has three positions; ignition, off and emergency. Turn to the IGN position before attempting to start the engine. If, for any reason, the battery is exhausted turn the switch to EMG position and start the engine in the normal way. As soon as the engine is running at a moderate speed, rotate the switch rapidly to IGN position, when it should continue to run normally. Make sure that the switch is always returned to the central OFF position whenever the engine is stopped.

Speedometer.

This is mounted on the top of the headlamp.

Carburettor Tickler.

This is a small plunger in the top of the carburettor float chamber. Pressing it down pushes down the float and frees the needle valve thus permitting the carburettor to receive excess petrol.

DRIVING

To Start the Engine.

Stand astride the machine. Make sure that the gear is in neutral, i.e., between first and second gear. If the machine is in gear it will move forward as the kickstarter is pushed down. Turn on the ignition by means of the ignition switch.

If the engine is cold depress the carburettor tickler for a moment. Do not jab it up and down as this may damage the top of the float. Open the throttle very slightly as excessive throttle opening will prevent easy starting. Disengage the clutch and push down the kickstarter lever to free the clutch plates. Release the clutch lever and allow the kickstarter lever to return almost to the top of its travel. Give the kickstarter lever a vigorous kick downwards and the engine should start. If the engine does not start at the first attempt allow the kickstarter lever to return again almost to the top of its travel for the next kick.

When starting with the engine warm there is no need to flood the carburettor.

To Stop Engine.

Close the throttle and turn the ignition switch to the OFF position.

To Engage First Gear.

With the engine idling slowly disengage the clutch by pulling in the handlebar lever and, after a moment, depress the gear lever as far as it will go so that first gear is selected. If the lever will not move through its full travel and the gear does not engage, move the machine backwards and forwards slightly maintaining a light pressure on the lever until the gear is felt to engage.

Open the throttle slightly and gently release the clutch lever until the clutch can be felt to take up the drive. Open the throttle a little more and very slowly release the clutch as the machine moves away. Do not rev the engine excessively or allow the clutch to slip for longer than is necessary to get the machine away in first gear.

To Change Gear (Up).

Close the throttle, disengage the clutch and raise the gearchange pedal as far as it will go. All these operations should be performed simultaneously. Immediately after changing gear, re-open the throttle and re-engage the clutch.

To Change Gear (Down).

Open the throttle slightly, disengage the clutch and press the gearchange lever downwards to its limit, all these operations being performed simultaneously. Return the throttle to its original position and re-engage the clutch as soon as the gear change has been completed.

To Select Neutral.

Neutral is situated between first and second gear. To select neutral from first gear, with the clutch withdrawn raise the gear-change pedal gently until it is felt to click into position. If the lever is raised too far it will travel through to second gear. To select neutral from second gear, press the lever down until it is felt to click into position.

Riding Hints.

Avoid violent acceleration and braking, particularly on wet roads. Always use both brakes together and apply them smoothly and progressively. Try to anticipate the need to change gear or brake, so that your riding is not jerky or untidy. Maintain a natural riding position as this provides maximum control and prevents discomfort on long journeys.

Violent pressure on the gear lever is not desirable and a smooth firm movement of the pedal is most effective. After a little practice, smooth and quiet gearchanges will be possible at all times.

RUNNING IN

The rider who has just purchased a new machine will do well to remember that all the internal parts are just as new as the enamel and plating which can be seen, and they must be well "run-in" before the engine can be given any really hard work.

The "running-in" process is the most important period in the life of the engine, and the handling it receives during the first 1,000 to 1,500 miles will determine the service it will provide in return.

It is advisable not to exceed one third throttle in any gear during the early stages. If excessive speeds are used there is risk of piston seizure and other troubles, and in any event until the machine has been "run-in" it cannot be expected to give its best performance. In particular, avoid rapid acceleration, and do not allow the engine to labour on hills in a high gear when a change to a lower gear would ease the load.

As the mileage builds up the permitted throttle opening may be increased until, when the "running-in" process has been completed, full throttle can be employed.

Do not let the oil level in the tank get too low, as economy in oil may prove very expensive at a later date. Running consistently with the oil level too low may cause the oil to become unduly hot. It must be remembered that the oil cools as well as lubricates, and a new engine tends to run a little hotter than one that is well "run-in." After the first 250 miles, drain and refill the oil tank with fresh oil and clean the filters (page 14). Repeat this process after 1,000 miles, and thereafter every 2,000 miles. The correct grades of oil are given in the lubrication chart (centre pages). The oil in the

gearbox should also be changed at 500 miles and further changes made every 2,000 miles.

During the "running-in" period it is advisable to check the various adjustments such as tappet clearances, contact breaker gap, clutch adjustment, etc., rather more frequently than usual, and to check the tightness of all nuts and bolts to make sure that the initial bedding down does not loosen any components.

It is a good idea to add a small quantity of upper cylinder lubricant to the petrol each time the tank is replenished. If this is difficult to obtain, add about an eggcupful of engine oil to every two gallons of petrol.

ROUTINE MAINTENANCE

To keep the machine in good condition and provide trouble-free running, maintenance must be regularly carried out. The following list of items requiring regular attention will serve as a guide to the periods between servicing and the method of carrying out the various adjustments will be found under the appropriate headings in the later chapters.

Weekly.

Check tyre pressures and remove any embedded stones or pieces of metal.

Oil brake pedal pivot and all exposed joints and cables.

Monthly.

Examine the battery and top up if necessary. More frequent examination is advisable in a hot climate.

Every 250 Miles.

Check the level in the oil tank, and top up if necessary.

Every 1,000 Miles.

Grease brake cam spindles, swinging arm pivot, and speedometer drive.

Oil central stand.

Check rear chain adjustment.

Check level in gearbox and primary chaincase and top up if necessary.

Every 2,000 Miles.

Change the engine oil and clean the filters.

Change the oil in the gearbox.

Check primary chain adjustment.

Check tightness of all nuts and bolts.

Every 6,000 Miles.

Check contact breaker adjustment.

Cleaning.

Take care when cleaning the machine that dirt is not introduced into the carburettor, hubs, etc. Do not attempt to rub off dry dirt or mud as this will damage the enamel. Wash off any dry dirt with a copious supply of clean water, preferably from a hose. Any oily areas should be treated with a detergent before being hosed down. Dry the machine with a piece of clean rag and, if possible, clean it on a warm dry day so that all moisture is removed, before polishing with a good wax polish. Exposed threads and controls which might suffer from rusting should receive a smear of oil to protect them. Do not use caustic soda solution for cleaning aluminium components.

Always use



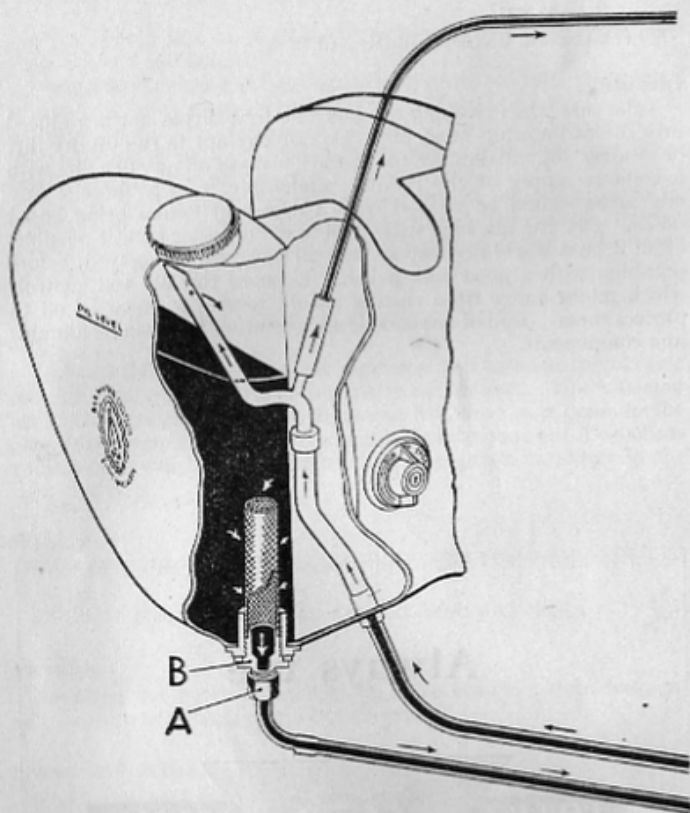


Fig. 2. The Oil Tank

Lubrication System.

The lubrication system is of the dry sump type and is operated by a double gear pump situated in the bottom of the crankcase on the right-hand side. (See Fig. 3). The oil tank capacity is 4 pints and oil is drawn from the oil tank to the supply pump (top set of gears). It is then pumped past the non-return valve *A*, and along the hollow mainshaft to the big end.

After lubricating the engine the oil flows down through a filter to the bottom of the crankcase from which it is drawn by the return pump (lower set of gears) past the non-return oil valve *C*, and

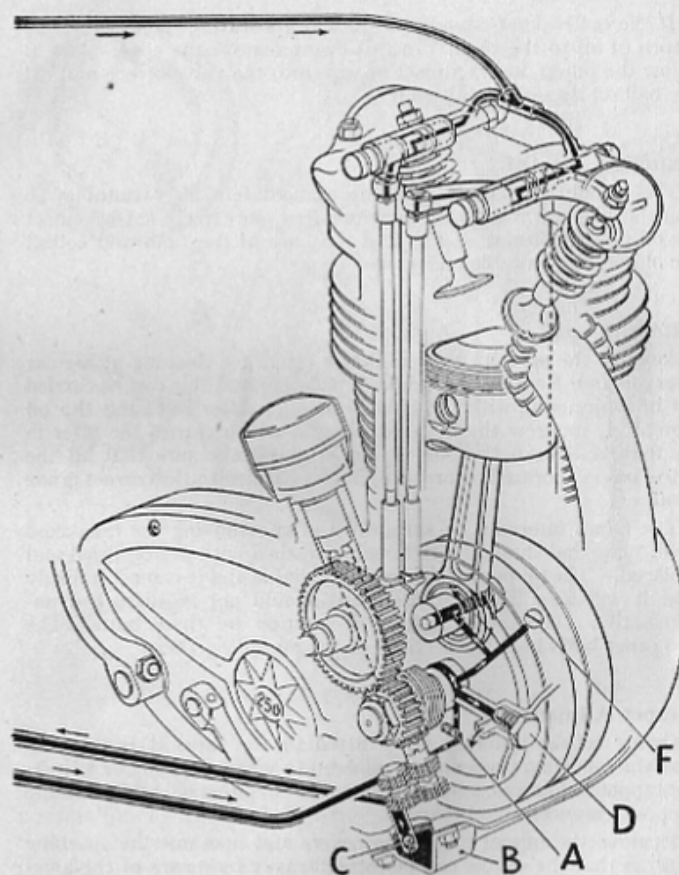


Fig. 3. Lubrication System

delivered up the return pipe to the tank. At the junction of the return pipe to the tank a by-pass pipe leads a supply of oil to the rockers, push-rod ends, etc.

The valve *A* prevents oil transfer from the tank to the crankcase while the machine is standing, and together with the sludge trap *F*, does not require attention until such time as the engine is completely dismantled.

A by-pass valve *D* ensures a constant pressure in the system. Surplus quantities of oil are discharged into the crankcase.

If the ball valve *C* should be stuck in its seating there will be no return of oil to the tank. In this event remove the cover plate *B* below the pump, insert a piece of wire into the valve orifice and lift the ball off its seating to free it.

Changing the Oil.

This should preferably be done immediately after running, so that the oil is warm and will, therefore, flow more freely. Disconnect the oil pipe union nut *A*, Fig. 2 at the base of the tank and collect the old oil in a suitable receptacle.

Filters.

Remove the oil tank and crankcase filters for cleaning at regular intervals (see Routine Maintenance page 10) and this can be carried out in conjunction with the change of oil. After releasing the oil pipe at *A*, unscrew the hexagon plug *B*, which carries the filter in the tank, and wash thoroughly in petrol. Make sure that all the petrol has evaporated before replacing. Refill with the correct grade of oil.

The pump filter can be withdrawn after removing the crankcase cover plate and should be thoroughly washed with petrol, dried and replaced. The oil pump is extremely reliable and it is most unlikely that it will give trouble therefore it should not be disturbed unnecessarily. The pump is held in position by three bolts. The two other bolts hold the sections of the pump together.

Tappet Adjustment.

Owing to the quieting ramp fitted to the cams it is essential that the following procedure is adhered to when checking or adjusting tappet clearances. The engine must be quite cold whenever the tappet clearances are checked.

Remove the tappet inspection covers and take out the sparking plug, so that the engine can be rotated easily by means of the kick-starter lever.

Rotate the engine forward until the inlet valve has just closed, i.e., the push rod is just free to rotate. This is the correct position for checking or adjusting the exhaust valve clearance. Slide a feeler gauge between the end of the valve and the adjusting pin as shown in Fig. 4. If the clearance requires adjusting slacken the locknut *A* and adjust the pin *B*, until the correct feeler gauge will just slide between the valve and the pin.

Hold the pin *B* in its correct position and tighten the locknut *A*. Check the clearance to ensure that tightening the locknut has not affected the setting.

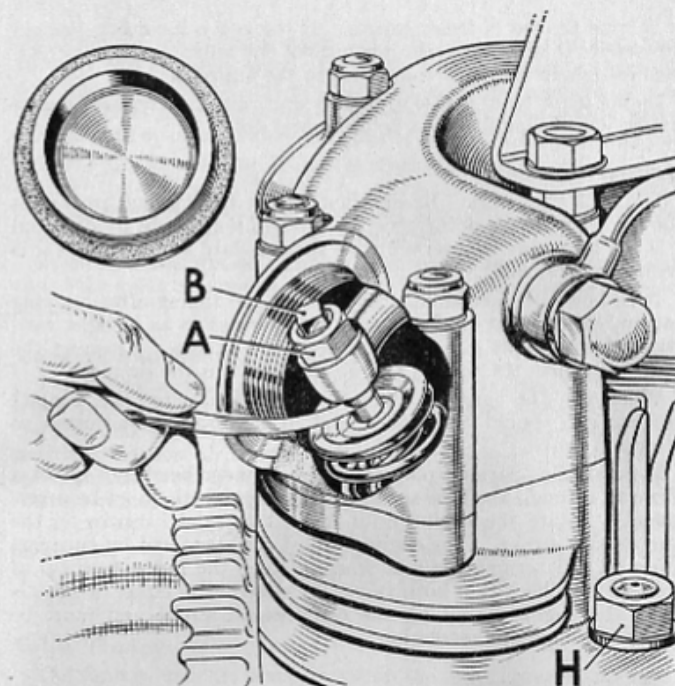


Fig. 4. Tappet Adjustment.

When the exhaust valve clearance has been adjusted rotate the engine forward again until the exhaust valve clearance is just taken up, but before the valve actually starts to open. This is the correct position for checking and adjusting the inlet valve clearance.

The valve clearance should be adjusted in a similar manner to that described for the exhaust valve.

The correct clearances are: .008 inches for the inlet valve and .010 inches for the exhaust. When the adjustment is complete, replace the sparking plug and the inspection covers, taking care not to damage the washers.

Contact Breaker.

The contact breaker is exposed by removal of the cover *A*, after pressing aside the spring clip Fig. 5. The gap between the points when they are fully open should be .015 inches. Rotate the engine slowly until the rocker is on the peak of the cam then check the gap

at *B* with the aid of feeler gauges. If the gap is incorrect, slacken the screw *D* and move the plate until the adjustment is correct, then re-tighten the screw and re-check the adjustment.

Do not allow oil or grease to find its way on to the contact breaker points, which should always be clean and dry.

Ignition Timing.

To check the ignition timing, first expose the contact breaker as above. It is a rare occurrence for the ignition timing to alter and it is not advisable to interfere with the standard setting unless it is known to be at fault.

It is, however, advisable to check over the timing after carrying out any adjustment to the contact breaker points as a slight variation of the points gap tends to alter the timing. (Opening the points advances the timing, closing them retards the timing).

Whenever the ignition timing requires checking the contact breaker gap should be verified and, if necessary, re-adjusted as described above.

Remove the sparking plug from the cylinder head and insert a slim rod through the hole so that the piston position can be determined. Rotate the engine until it is at top dead centre on the compression stroke. The engine is most easily rotated by engaging top gear and turning the rear wheel. Keep the rod as vertical as possible and check that both valves are closed as, if either of them is open, the engine is not on the compression stroke and must be rotated through one revolution.

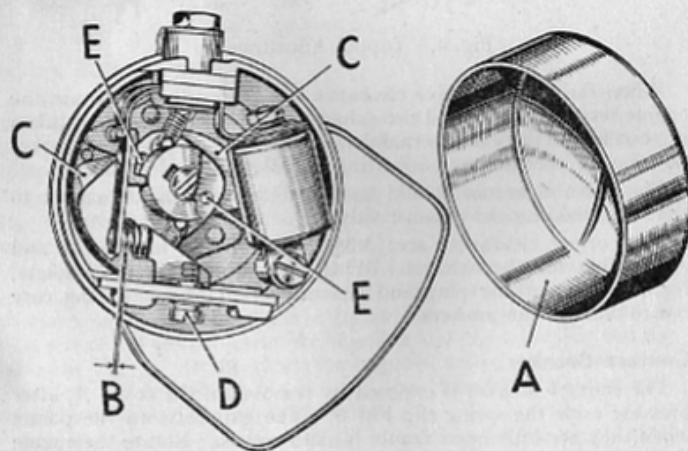


Fig. 5. Contact Breaker and Auto Advance Mechanism.

Rotate the engine backwards until the piston is 1/16 inch from the top of its stroke, when the contact breaker points should be just about to open. This is best determined by inserting a piece of thin paper (such as cigarette paper) between the points, which are about to open when the paper can be withdrawn by a gentle pull.

If the ignition setting is incorrect with the piston set as above, slacken the clip screw *E*, Fig. 6 and rotate the contact breaker housing gently until the points are just about to open. Re-tighten the clip screw and re-check the adjustment.

If the contact breaker unit has been withdrawn from the crankcase, take great care not to damage the sealing ring when re-inserting the unit.

Advance and Retard Mechanism.

The timing is automatically advanced and retarded by means of a governor mechanism below the contact breaker. Therefore, when the engine is stationary the timing is fully retarded and this is the normal condition for checking the ignition timing. As the engine speed increases the ignition timing is steadily advanced until it is fully advanced at normal road speed.

Inspect the mechanism and make sure that the weights *C*, Fig. 5, move freely. Oil the bearings *E* with a few drops of light oil. Do not over lubricate or the excess oil may find its way on to the contact breaker points.

Valve Timing.

The timing gears are situated within the inner cover on the right-hand side of the engine. To obtain access to these gears, first remove the exhaust system and then the kickstarter and gearchange pedals from their shafts, followed by the seven cover retaining screws. Note that these screws have recessed heads and require a screwdriver of a special type. Note also that the small-headed screw *E*, Fig. 6, at the top of the cover, clamps the contact breaker unit and it will, therefore, be necessary to check the ignition setting after the cover has been re-assembled.

To remove the inner cover, disconnect the clutch cable and withdraw both cable and adaptor from the rear of the cover. Care must be taken to ensure that the small ball located in the thrust button on the clutch actuating lever is not lost. Prise the kickstarter spring lock plate off its locating flats on the spindle, thus releasing both spring and lock plate. Next, take off the camshaft nut after straightening its locking washer, followed by the thrust washer immediately behind it.

The cover plate adjacent to the gearchange spindle must be removed next (two screws), and the split pin withdrawn from the camplate pivot, allowing the pivot itself to be taken out rearwards, leaving the camplate in the box.

Removal of the eight recessed head screws allows the cover to be withdrawn. It is necessary to exercise great care in taking off the cover to avoid unintentional removal of other components. The cover should be gently eased off, while thumb pressure is applied to the spindle ends.

With the piston at top dead centre on the compression stroke, the valve timing will be correctly set if the marks on the gears are positioned in accordance with the illustration Fig. 6.

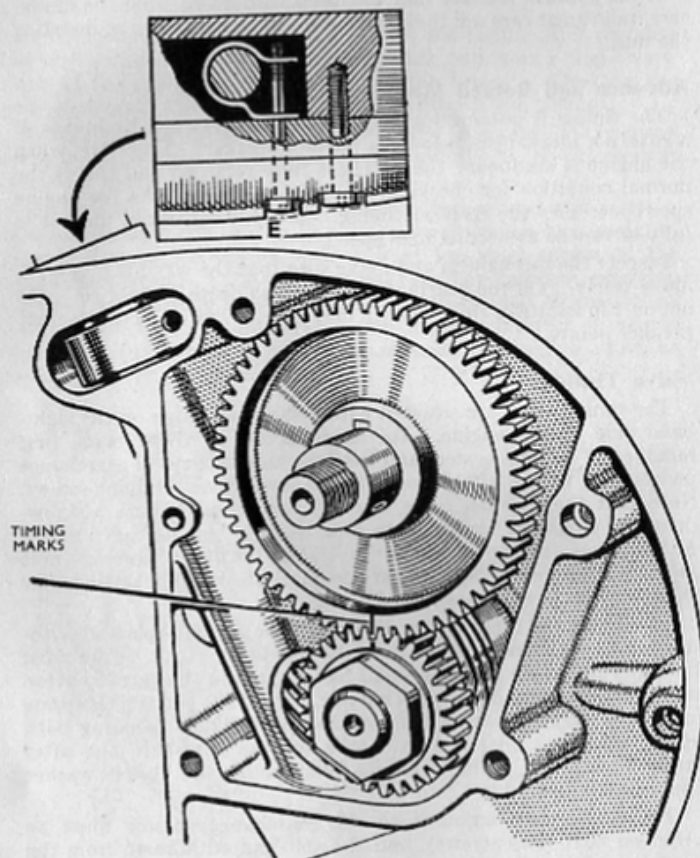


Fig. 6. Valve Timing Marks.

Decarbonisation.

Decarbonisation should only be carried out when there are definite symptoms that excessive carbon build up inside the engine is interfering with performance. The usual symptoms are an increased tendency to pink (a metallic knocking when under heavy load) and a general falling off in performance with a tendency for the engine to run hotter than usual.

It is customary to attend to the valves during decarbonisation as this provides a reasonable interval between valve overhaul and avoids the necessity for dismantling the engine specially for this purpose at a later date.

To facilitate removal of the petrol tank in order to carry out decarbonising, first take off the dual seat which is attached to the frame by the top bolts of the rear suspension units and clipped to a cross tube at the front. Turn off the petrol tap and detach the petrol pipe by unscrewing the hexagon on top of the float chamber union.

The petrol tank is mounted on rubber pads and is secured by a single bolt, which passes through a rubber sleeve in the centre of the tank, to its anchorage on the frame. Remove the rubber cap on the tank top, unscrew the nut, and withdraw the tank complete with rubber sleeve and other components, leaving the bolt attached to the frame. With the tank removed, the engine steady bracket can be detached from the frame top tube. Note the order of assembly of the nuts and washers.

The exhaust pipe is a push-fit in the cylinder head, and can be withdrawn after releasing the nuts holding the exhaust system to the frame. Disconnect the rubber adaptor between the air cleaner and carburettor, so that the latter can be withdrawn from its studs and tied back out of the way. The oil feed pipe to the rocker spindles should now be removed, and the sparking plug unscrewed.

Set the piston at top dead centre on the compression stroke (i.e., both valves closed) and take off the four nuts *H*, Fig. 4 holding the cylinder head to the barrel. Leave the rocker box assembly in position on the cylinder head, and raise the latter until it clears its fixing studs. Rotate the whole assembly about the push rods so as to clear the frame top tube, and lift off. Take the push rods out of their housing and then remove the housing itself. Note that there are sealing rings at the top and bottom joint faces of this housing, and if there is any sign of oil leakage at these joints, the seals should be replaced. The rocker box can now be removed from the cylinder head, thus exposing the valves and springs. If it is necessary to dismantle the rockers and spindles take care not to damage the rubber sealing rings, when inserting the spindles into the rocker box.

Compress each valve spring with a suitable valve spring compressor until the split collets can be removed. This will enable the springs to be released and the valves can then be withdrawn

from the cylinder head. Examine the valve springs, and if they have shortened appreciably, then they should be replaced. These springs are not expensive items, and it is false economy to continue to use them when their useful life is exhausted. The correct free length of these springs when new is: inner spring 1-5/8 inch; outer spring 2-1/32 inch.

Scrape off all the carbon on the top of the piston, taking great care that the soft aluminium surface of the piston is not scored. The best tool for this job is an old screwdriver, the edges of which have been rounded by wear and provided that a little patience is employed, all traces of carbon can be removed to leave the surface smooth and unmarked.

Also scrape the carbon from the ports and combustion chamber, taking care not to damage the valve seat faces with the decarbonising tool. It is not advisable to decarbonise the cylinder head by immersing it in caustic soda solution, because of the harmful effect this solution has on aluminium.

Examine the cylinder head gasket carefully. Both sides should be clean and bright and if any dark patches are found on either surface, a new gasket should be fitted.

If the valves and their seats are only discoloured or lightly pitted, then it will be sufficient merely to grind them in with a little grinding paste, but if there is considerable evidence of pitting, then the faces must be re-cut with proper equipment. If the valve is pitted it should be returned to a dealer for a re-grinding as attempts to grind the valve in with grinding paste will only cause premature wear of the valve seat. Probably the valve seat in the cylinder head will still be in good condition, but if it is pitted the head should be taken to your dealer for re-facing with a proper valve seat cutting tool. The valve seat angle is 45°.

With the valves and seats in good condition or if they have been refaced then they will require lightly grinding in to ensure that a good gas seal is created. Smear a small quantity of fine grinding paste on to the face of the valve head and return the valve to its seat. A light spring inserted under the valve head greatly facilitates the grinding operation as it assists in raising the valve so that it can be rotated to a new position. Rotate the valve backwards and forwards by means of a special rubber suction tool obtained from your dealer, at the same time maintaining a slight pressure. Raise the valve and turn it to a new position after every few movements. Grinding should be continued until the mating surface of the valve and seat show uniform metallic surfaces all round.

If the valve guides are worn the old ones can be driven out by means of a simple punch applied from inside the cylinder head. New guides should be driven in from the top as far as their circlips will allow. Note that the circlip fits into a recess in the head.

Whenever new guides have been fitted the valve seats must be refaced with a proper valve seat cutter to ensure that the seat is concentric with the guide bore.

Before re-assembling the valves and springs all traces of grinding paste must be removed from both the valve and seat and the valve stem smeared with clean engine oil. Replace the valve, then compress the valve springs with the aid of a suitable tool until the collets can be inserted. A blob of grease on the valve stem will assist in keeping the collets in position as the valve spring is released. Make sure that the split collet retaining the valve spring collar is correctly seated in the recess on the valve stem.

Removing the Cylinder Barrel.

It should not be necessary to remove the cylinder barrel unless it is felt that the piston rings require attention. This may be shown by such symptoms as excessive blue smoke in the exhaust and by lack of compression, although if the valves are not in good condition this is more likely to be the cause of the latter symptom.

Rotate the engine until the piston is at the bottom of its travel, then lift the barrel upwards until the piston emerges from the bottom of the bore. Steady the piston as it comes free from the cylinder so that it is not damaged by violent contact with the crankcase mouth. As soon as the cylinder has been withdrawn cover the crankcase with a clean piece of rag to prevent the entry of foreign matter.

Examine the cylinder carefully for wear and if a deep ridge has formed at the top of the bore then a rebore may be necessary and you should consult your dealer for confirmation. Pistons 1/2 mm. and 1 mm. oversize are available for rebore purposes but owners in Great Britain can take advantage of the Exchange Replacement System to obtain a rebored barrel with matched piston through their local B.S.A. spares stockist. The barrel will also require a rebore if there are any deep scores as this will cause loss of compression and excessive oil consumption.

The outside face of the piston rings should possess a smooth metallic surface and any signs of discolouration mean that the ring must be replaced. The rings must also possess a certain amount of springiness so that the ends lie at least 3/16 inch apart when released from the barrel.

The rings should be free in their grooves but with a minimum side clearance. If the rings are stuck in the grooves remove them and clean out all the carbon from the groove and the inside face of the ring. Care is necessary when removing the rings as they are brittle

and only permit a minimum amount of movement. A suitable tool for removing the carbon from the ring grooves is a piece of old piston ring ground as a chisel.

To check the piston ring gaps place each ring in the least worn part of the cylinder bore and make sure that it is square in the bore by locating it with the top of the piston. Measure the gap between the ends of the ring with a feeler gauge. The correct gap when new is .009/.012 inches and although an increase of a few thousandths of an inch is not important, any large increase to say, .025" means that the ring should be replaced.

It is not necessary to remove the piston unless it requires replacement or further dismantling of the engine is to be carried out. If removal is necessary first prise out one of the gudgeon pin circlips by inserting a suitable pointed instrument in one of the two notches provided. Before the gudgeon pin can be withdrawn the piston must be warmed by wrapping it in rag that has been soaked in boiling water and wrung out. Alternatively, an electric iron can be applied to the crown of the piston until it is thoroughly warmed. When the piston is warm withdraw the gudgeon pin with a suitable extractor. If an extractor is not available the gudgeon pin can be driven out with a good fitting drift but the piston must be carefully supported to avoid any side strain on the connecting rod. As soon as the piston is removed mark the inside of the skirt so that it can be replaced the correct way round.

While the cylinder barrel is off the crankcase it is a good opportunity to try the connecting rod for signs of wear. The rod should revolve freely without any signs of up and down movement at the big end. Rotate the flywheel until the crankpin is uppermost with the connecting rod vertical. Grasp the rod firmly and try to move it up and down. If any play can be detected the big end and connecting rod assembly will require replacement. Do not confuse sideways movement at the little end with up and down play. The big end should have approximately .020 side-float and this permits some sideways movement at the other end of the connecting rod.

Scrupulous cleanliness must be observed when re-assembling, and the components should be smeared with fresh oil before replacing. Warm the piston before inserting the gudgeon pin and make sure that the new circlip is correctly located in its groove. Slide each piston ring carefully over the piston, until it reaches its groove. The barrel should be slid over the piston, at the same time compressing the rings so that they pass smoothly into the lower end of the bore. Take great care that the rings are not trapped or damaged and if the job is being done single handed a band for compressing the piston rings will facilitate the operation.

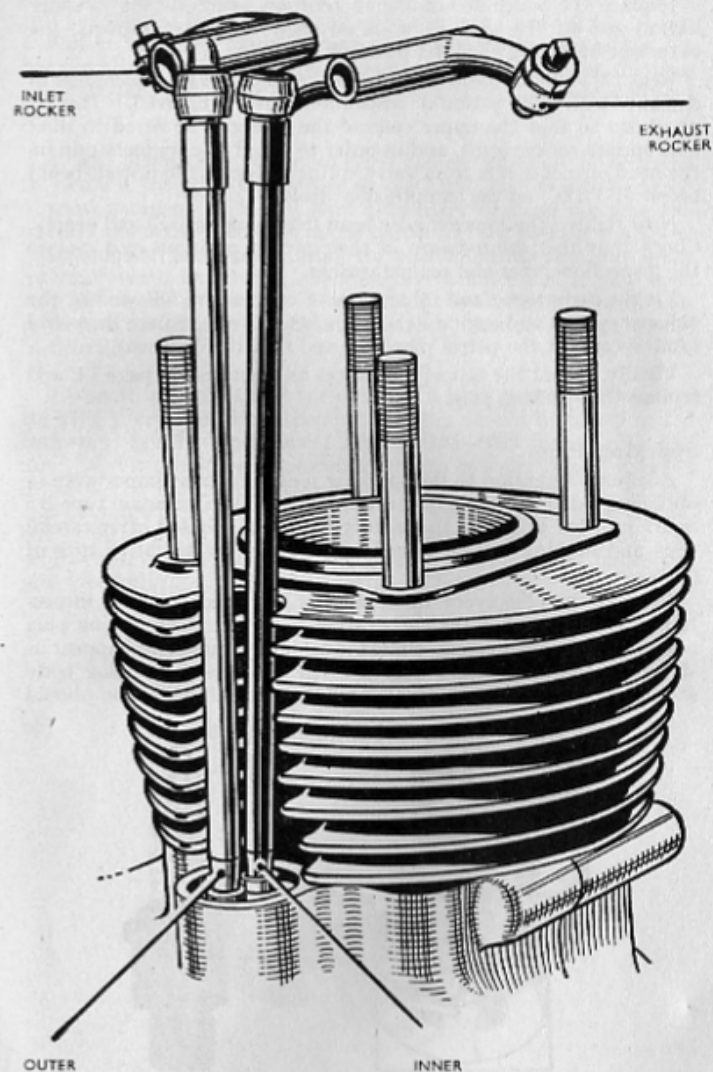


Fig. 7. Fitting the Push Rods.

Replace the pushrod housing in position alongside the cylinder barrel, and fit the two pushrods on their respective tappets, the outer one operating the inlet pushrod Fig. 7.

Refit the cylinder head with the rocker box already assembled to it, but with the pushrod inspection cover removed. This is necessary so that the upper ends of the rods can be fitted to their appropriate rocker arms, and in order to avoid any undue strain on the head or rocker box from valve spring pressure, the piston should be set at T.D.C. on the compression stroke.

Now tighten the four cylinder head fixing nuts firmly and evenly. Check that the pushrods are in their proper positions and replace the inspection cover and sealing washer.

Fit the carburettor and its air cleaner connection, followed by the exhaust system and engine steady bracket. Next, replace the petrol tank, reconnect the petrol pipe line, and refit the dual seat.

Finally, adjust the tappet clearances as described on page 14, and replace the sparking plug.

Sparking Plug.

Adequate attention to the sparking plug is of great importance in obtaining satisfactory engine performance. The Champion type N5 Sparking Plug fitted by the factory has been adopted after careful tests and nothing will be gained by fitting any alternative type of plug.

Remove the plug every 1,000 miles (1,500 kms.) or so for inspection. Providing that the carburation is correct the sparking plug points should remain clean almost indefinitely and should appear as shown in the lower view, Fig. 8. The bottom of the plug body should remain a smooth black and the central insulation should

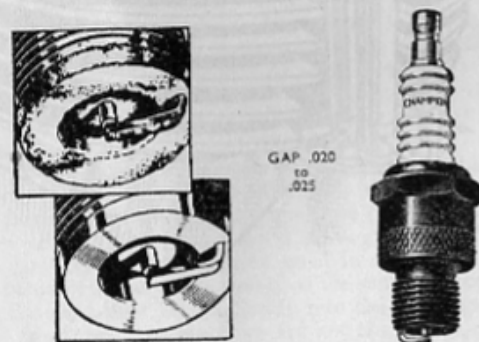


Fig. 8. The Sparking Plug.

remain natural colour. If the mixture is too rich, a sooty deposit will form on the body of the plug as in the upper view of Fig. 8, but a weak mixture will cause the end of the plug to become white. A heavily leaded fuel may cause a greyish deposit to form on the plug and excess oil will show its presence by a shiny black deposit and gum.

A light deposit due to any of these causes can easily be removed by cleaning the plug on a proper air blast unit such as is to be found at most garages, but if it is found necessary to clean the plug frequently the cause should be investigated. If the deposit is allowed to accumulate, particularly inside the plug body, the plug may spark internally with an adverse affect on performance and it may even stop the engine altogether. If eventually the cleaning process fails to restore the plug to its original efficiency, then a new one should be fitted.

It is most important that the plug gap is kept correct. Whenever the plug is removed for inspection, the gap should be tested and if necessary, re-set. The correct gap is .020—.025 inches (.50—.60 mm.), and it should be measured by means of feeler gauges inserted between the earth electrode and the central electrode. If the gap is not correct it should be adjusted by bending the earth electrode, but in no circumstances must any attempt be made to bend the central electrode as this will damage the insulation and make the plug ineffective.

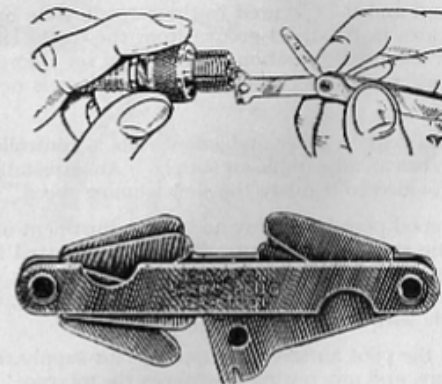


Fig. 9. Setting the Plug Points.

The gap is most easily adjusted with the aid of the special tool illustrated in Fig. 9, which also has feeler gauges attached to assist in measuring the plug gap. This tool is obtainable, priced 2/- from any Champion Plug stockist or from the Champion Sparking Plug Co. Ltd., Feltham, Middlesex.

Before replacing the plug make sure that the threads are clean and that the copper washer is in good condition. If it has become worn or badly flattened a new one must be fitted to ensure a gas-tight seal. Screw the plug in as far as possible by hand, then use a tubular box spanner for final tightening, to avoid the possibility of damage to the insulator. An adjustable spanner should not be used.

The insulation on the top of the plug should be wiped quite clean before replacing the cap, and then finally, the cap itself should be wiped to remove dirt and grease.

CARBURATION

The carburettor is of simple and robust construction and the only attention that may be required is adjustment of the pilot jet and throttle stop.

An exploded view of the carburettor is shown in Fig. 27. Opening the twist grip throttle control raises the throttle slide thus controlling the supply of air to the engine. The tapered needle controlling the supply of fuel is attached to the throttle slide so that a balanced mixture is always provided. The needle has five notches at its upper end and it is secured in the throttle slide by a spring clip which locates in the third groove from the top. The throttle valve size and the needle position are carefully set before despatch from the factory and no alteration to these settings is necessary or desirable.

Mixture control at tickover and low speeds is controlled by the pilot jet which has an adjustable air supply. An adjustable throttle stop is also provided to regulate the slow running speed.

To achieve good petrol economy accurate adjustment of the pilot jet and throttle stop is important. These are adjusted before the machine leaves the works, but the best setting may vary slightly to suit riders requirements or particular localities. The adjustment should be made with the engine warm.

Screwing in the pilot air screw restricts the air supply thus giving a richer mixture, and unscrewing it weakens the mixture. The best way to adjust is to screw in the pilot air screw until the mixture is obviously too rich and the engine starts to run irregularly then unscrew the adjuster until the engine runs evenly. If it is unscrewed too far the engine may cut-out or may spit back through

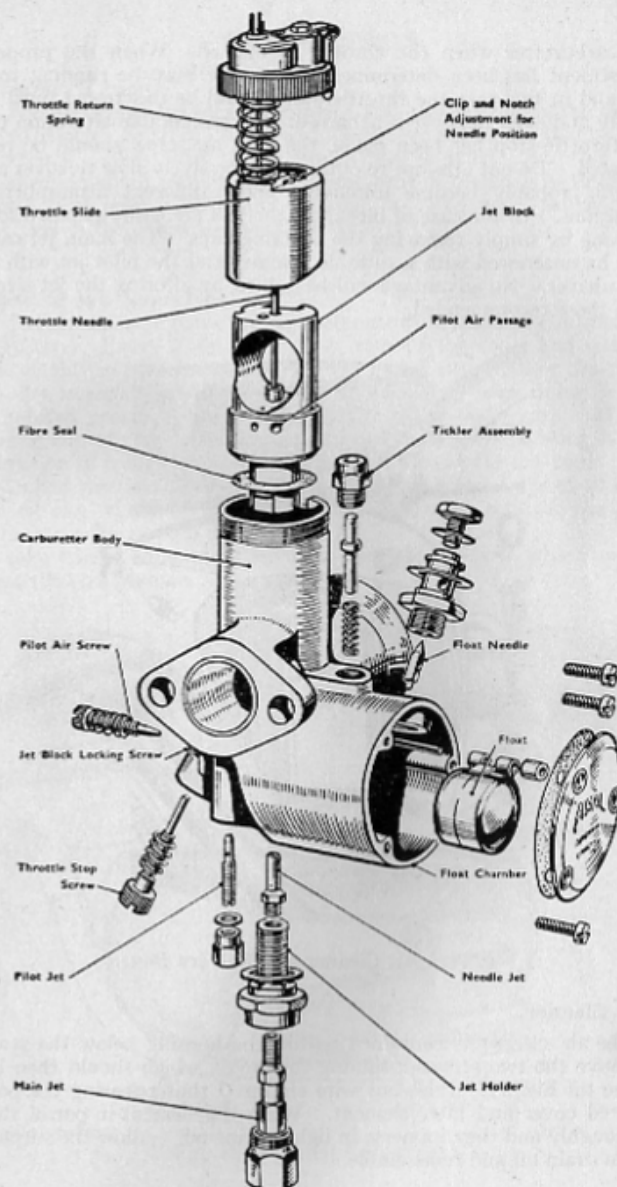


Fig. 10. The Carburettor.

the carburettor when the throttle is opened. When the proper adjustment has been determined, the engine may be running too fast and in this case the throttle stop should be unscrewed until a steady and even tickover is achieved. If considerable alteration to the throttle stop has been made, the pilot air screw should be re-adjusted. Do not attempt to obtain an excessively slow tickover as it will probably become unreliable under different atmospheric conditions. In the case of blockage, the jets are easily exposed for cleaning by simply removing the covering caps. The main jet can then be unscrewed with a suitable spanner and the pilot jet with a screwdriver. No advantage will be gained by altering the jet sizes from those recommended.

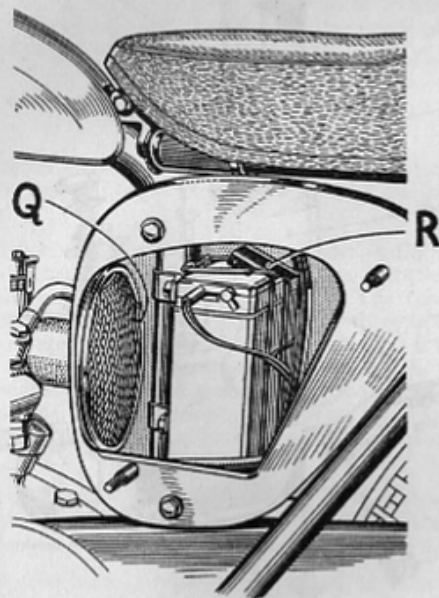


Fig. 11. Air Cleaner and Battery Box.

Air Cleaner.

The air cleaner is contained within the housing below the seat. Remove the two screws retaining the cover, which should then be taken off Fig. 11. Prise out wire circlip *Q* thus releasing the perforated cover and filter element. Wash the element in petrol, dry thoroughly and then immerse in light engine oil. Allow the surplus oil to drain off and re-assemble.

TRANSMISSION

Primary Chain.

The unit construction of the engine and gearbox allows the use of fixed centres between clutch and engine sprockets, so that a pre-stretched endless chain of the duplex type is fitted. A spring link connection is not provided, and adjustment of the chain is unnecessary. The only maintenance required, is to ensure a satisfactory oil level in the chaincase, see page 30.

Care of the Rear Chain.

To maintain the rear chain in good condition it must be lubricated regularly. Every 2,000 miles or so, remove the chain and wash it thoroughly in petrol to remove all dirt and grease. Allow the chain to dry completely then immerse it in a tray containing warm graphited grease. When replacing the chain make sure that the spring clip of the connecting link has its closed end pointing in the direction of travel of the chain (i.e., forwards on the top run).

In bad weather it may be advisable to add a few drops of oil with an oil can whenever possible, at the same time rotating the rear wheel to achieve even distribution.

Rear chain adjustment involves moving the rear wheel and is described on page 43.

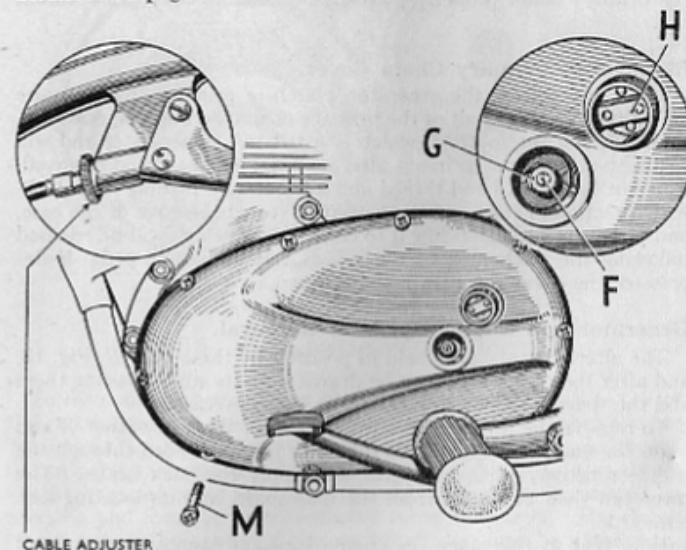


Fig. 12. Clutch Adjustment.

Clutch Adjustment.

The main clutch adjustment consists of a screwed pin *F* and locknut *G*, mounted on the clutch pressure plate. These are accessible after removal of the inspection cover *H*. Release the locknut, and screw the central pin in or out according to requirements. Tighten the locknut and re-check the adjustment. The opposite end of the clutch thrust rod is actuated by a ball pressure pad, forming part of the cable operated lever, and in order to ensure complete engagement of the clutch, there must always be a slight amount of clearance between the ball and the thrust rod end. This can be detected by the presence of a small amount of play in the cable on the handlebar lever where small adjustments may be made to the cable length by means of the finger adjuster, Fig. 12.

Primary Chain Case.

The outer cover is retained by screws of three different lengths, and one of these *M*, Fig. 12 serves as a level plug. To replenish with oil, first remove this screw and then clutch inspection cover *H* Fig. 12, the latter acting as a filling orifice. Add oil of the correct grade (see Recommended Lubricants page 32) and allow to stand until any surplus oil has drained away. Replace the level screw and inspection cap. The machine should be on horizontal ground when this operation is carried out. Too little oil will not lubricate the primary chain properly, excessive quantities may cause clutch slip.

Removal of Primary Chain Cover.

If for any reason, the generator, clutch or primary chain require attention, the outer half of the primary chaincase must be removed. First take off the footrest, which is fitted to a taper shaft and will require a sharp blow to free it after its fixing nut has been removed. This nut has a left-hand thread and unscrews by turning in a clockwise direction. Take out all the screws round the edge of the case, and place a receptacle below it to catch the oil which will be released following the slackening of the screws. If the brake pedal is depressed, the cover can then be withdrawn.

Generator and Engine Sprocket Removal.

The alternator stator is held in position by three nuts *E*, Fig. 13, and after their removal it can be drawn from its studs, leaving these and the spacing sleeves in position on the crankcase.

To remove the rotor, bend back the tab of the lockwasher *B* and undo the mainshaft nut *C*. If difficulty is experienced through the engine rotating, engage top gear and apply the back brake. The rotor can then be pulled from the mainshaft, and its locating key removed.

Note that at this stage the engine sprocket cannot be drawn off its shaft, because of the endless primary chain. If it is required to

remove the sprocket, the clutch must be taken off, see page 31, so that the two sprockets and the chain can be removed as a unit.

When re-assembling, take care to ensure that the air gaps between the rotor and stator poles are equal, and that the stator is fitted to the same studs from which it was removed. It is most important that both stator and rotor are fitted the correct way round.

Clutch Dismantling.

Remove the four spring retaining nuts *P* Fig. 13, and withdraw the springs and their cups. The pressure plate *L* and the remaining clutch plates can then be withdrawn, and if these are the only items requiring attention, the clutch need not be dismantled further. The steel plates should be smooth, and if badly scored, they should be replaced. The segments on the driving plates are bonded in position, and will not normally require replacing for a considerable mileage.

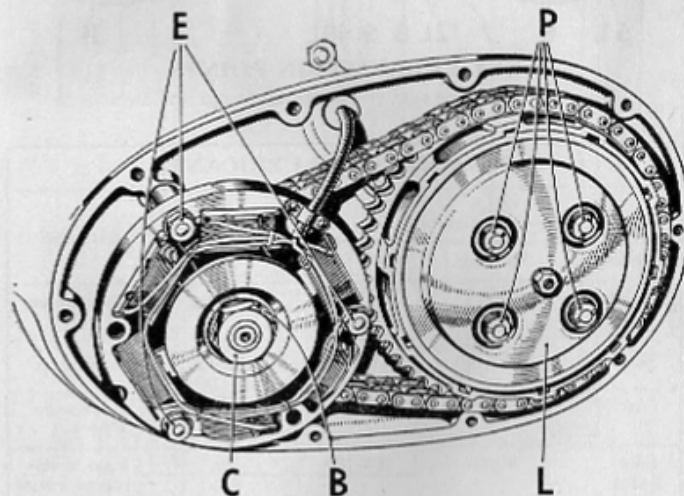
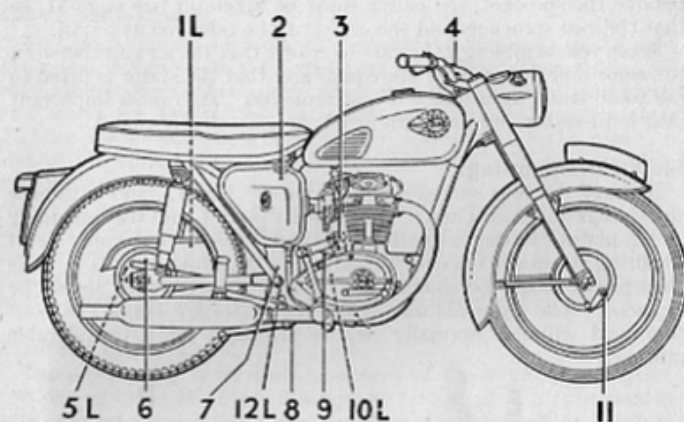


Fig. 13. Clutch and Generator Removal.

To dismantle the remainder of the clutch, bend back the tab of the lock washer and unscrew the mainshaft nut. Note that the tab washer has a special tongue fitting into the hub of the clutch and it must be re-assembled in this manner. Similarly, the thrust washer, exposed when the mainshaft nut is removed, is recessed on one side and must be fitted with the recess outwards. The clutch thrust rod in the centre of the mainshaft can now be withdrawn. If difficulty is experienced with the shaft rotating while attempting



KEY LUBRICATION POINTS

(L indicates left-hand side, remainder right-hand or both sides).

RECOMMENDED LUBRICANTS

OILS Engine and Gearbox			OIL Front Forks and Clutch	GREASE
Brand	Summer	Winter		
Mobiloil	BB	A	Arctic	Mobilgrease MP
Shell	X100-40	X100-30	X100-20	Retinax A
Castrol	XXL	XL	Castrolite	Castrolase Heavy
Esso Extra	40/50	20W/30	20	Esso Multi- purpose grease H
B.P. Energol	S.A.E. 40	S.A.E. 30	S.A.E. 20	Energolase L2

FOR OVERSEAS. Recommendations as above if obtainable.
If not, the following rule should be observed: The higher the
Temperature the higher is the S.A.E. number required.

Engine and Gearbox: Summer S.A.E. 40-50
Winter S.A.E. 40-20
Front Forks and Clutch S.A.E. 20

LUBRICATION					
EVERY 2,000 MILES			WEEKLY		
Ref.	Oil	Page	Ref.	Oil	Page
2	Oil Tank ...	10	2	Oil Tank ...	10
9	Gearbox ...	10	9	Gearbox ...	—
3	Auto-Advance	17, 51	12L	Brake Pedal ...	10
10L	Clutch Case ...	10, 30	—	Control Rod joints ...	10
1L	Rear Chain ...	29	4	Exposed Cables ...	10

LUBRICATION EVERY 1,000 MILES

Ref.	Grease	Page	Ref.	Oil	Page
5L 11	Brake Cam Spindles	10	—	—	—
7	Swinging Arm Pivot	10	8	Central Stand ...	10
6	Speedo. Drive ...	10	—	—	—

SPECIAL NOTES

- Clean Oil Tank and Crankcase Filters at 2,000 miles.
- Check Front Fork Oil level at 10,000 miles.
- Lubricate Contact Breaker Cam at 6,000 miles.
- Drain and refill Oil Tank and Gearbox every 2,000 miles.

to unscrew the nut, engage top gear and arrange for an assistant to apply the rear brake.

The clutch is mounted on 25 roller bearings which run on a sleeve attached to the gearbox mainshaft by means of a taper diameter and key. The sleeve is fitted with an extractor thread thus enabling the clutch to be withdrawn from the shaft as a unit, without disturbing the roller assembly, Fig. 14.

Before the clutch can be laid aside, it will be necessary to remove the generator and engine sprocket so that the two sprockets and the chain can be removed as a unit. Details for this operation are given on page 30.

Lay the clutch on a bench with the chainwheel face down i.e., spring studs *A* (Fig. 15) uppermost, when the clutch centre *B* can be lifted off the sleeve *C*, on which it is a sliding fit. This will leave the chainwheel *D*, rollers and sleeve still undisturbed. The clutch centre can now be dismantled by removal of the four countersunk headed screws, exposing the cush drive inserts, which should be removed only if there is any doubt as to their efficiency. The new rubber inserts *E* should be fitted as shown in Fig. 15 with the thicker segments on the pressure or driven side of the vanes. Replace the four thick segments first and compress them slightly by rotating the housing, thus enabling the thin segments to be fitted.

When re-assembling the clutch, note that the plates are alternately plain and segmented, the first plate to be fitted, i.e., the one located at the back of the clutch, being plain.

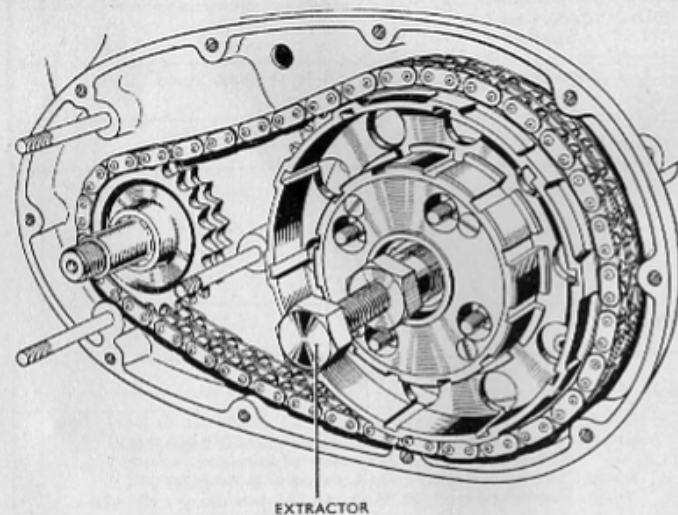


Fig. 14. Removing the Clutch.

With the clutch removed, a detachable plate is exposed, which is registered in the back half of the chaincase and attached to it by six recessed head screws. The centre boss of the plate carries an oil seal, which should be replaced if it is suspected of being faulty. The seal bears on an extension to the bush in the high gear and care must be taken not to damage the surface of the bush in any way. Removal of the plate leaves an aperture, through which the gearbox sprocket can be taken out after releasing its locknut and tab washer.

Clutch Spring Pressure.

Whenever the clutch has been dismantled, the spring pressure must be reset carefully. The four retaining nuts *P* Fig. 13, should be screwed in until the underside of the head of each nut is approximately 1/8 inch from the face of a spring cup. This figure is an arbitrary one and it is a simple matter to vary it according to circumstances. If the springs are compressed excessively, the handlebar lever will be stiff to operate and tiring to the hands; alternatively, if the spring pressure is insufficient, the clutch will tend to slip.

Adjust for true running of the plates by declutching and then operating the kickstarter pedal, when it will be seen whether the spring pressure plate rotates truly or not. If necessary, adjust the nuts individually until true running is obtained.

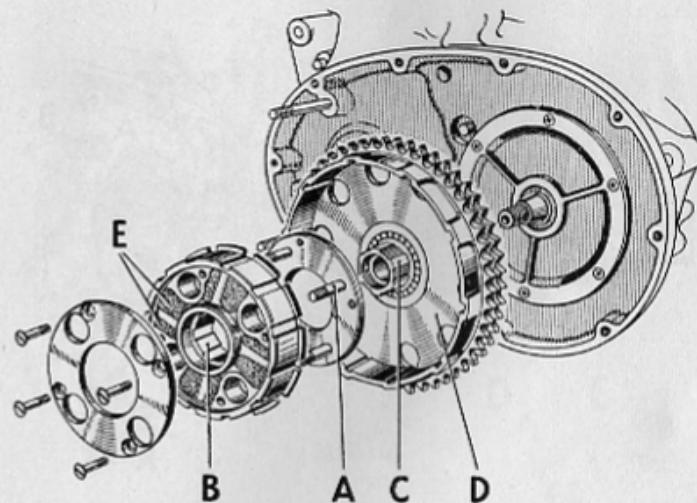


Fig. 15. Cush Drive Unit.

Gearbox.

Apart from topping up at regular intervals, very little maintenance should normally be required. The gearbox drain plug *S* incorporates a level plug *K* and, to top up, remove the filler plug *T* Fig. 16 take out the level plug and replenish with the correct grade of oil.

To drain the oil, which should preferably be undertaken while the oil is warm after a run, unscrew the drain plug *S*, carrying the level plug with it. The capacity of the gearbox is approximately 1½ pint, and suitable oils are detailed on page 32.

The gears are contained in a separate housing formed in unit construction with the crankcase and can be removed from the right side of the box. They become accessible after both inner and outer timing covers have been taken off, so that the valve timing pinions are uncovered at the same time. Dismantling up to this stage is, therefore, the same procedure as for exposing the valve timing pinions described on page 17, and further dismantling will be assumed to commence at this point.

If it is proposed to dismantle the gearbox entirely, it will also be necessary to remove the clutch, so that the mainshaft can be withdrawn through the high gear *A* Fig. 16. If the clutch is not removed only partial dismantling can be carried out, since only the two outer gears on the layshaft can be withdrawn and none from the mainshaft, although this may be sufficient for the required purpose.

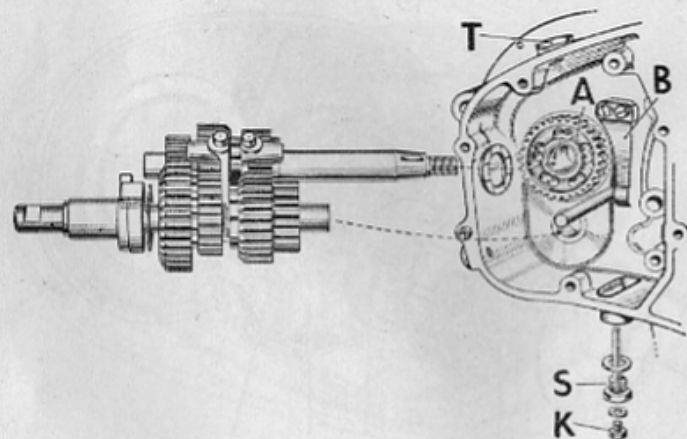


Fig. 16. The Gearbox and Gears.

Having exposed the gears and timing pinions, unscrew the fulcrum bolt *E* Fig. 17, carrying the return spring *D* for the plunger quadrant *G*, thus enabling the quadrant assembly, shaft and spring to be removed as a unit. The camplate will then fall away from the gearshaft forks and can be taken out of the box. The camplate spring blade *B* Fig. 16, attached to the back wall of the box need not be disturbed. All the gears, together with the layshaft, mainshaft and gearshaft forks can be removed as a cluster, leaving the fork spindle in position in the box. The gears can be dismantled individually from the shafts, but it is important to note that the outer one on the mainshaft (the smallest gear) is a press fit on the shaft, and cannot be removed. It also retains the adjoining gear. Similarly, the innermost pinion on the layshaft is pressed on and retains its adjacent gear in position, so that it, too, cannot be taken off.

Do not disturb the mainshaft bearing unless it is known to be faulty. Wash it in petrol to remove all traces of oil before testing it for play. If it must be removed, first take off the rear chain sprocket through the aperture in the chaincase, behind the clutch (see page 35). The bearing can then be tapped out of the box with the aid of a suitable punch, carrying with it the mainshaft high gear. To assist this operation, it will be beneficial if the box is first warmed

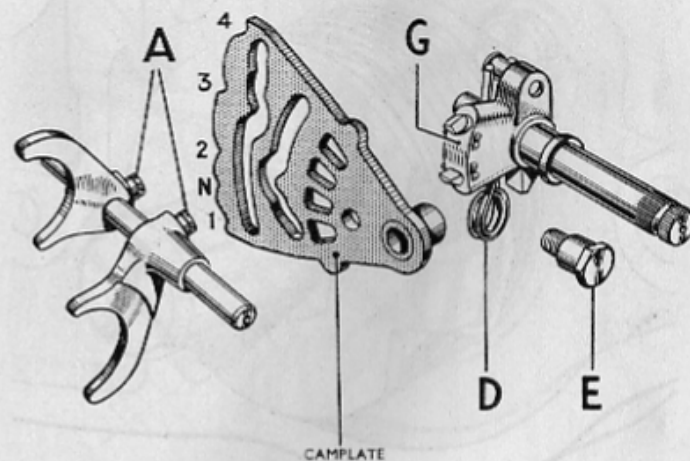


Fig. 17. Gearchange Mechanism.

Re-assembly should not present any difficulty if carried out step by step in the reverse order to the instructions given for dismantling, but it will be found advisable to engage the 2nd gear notch of the camplate with its spring blade before replacing the inner cover so as to facilitate the re-fitting of the camplate pivot. Note also, that although the gearshaft forks are interchangeable it is preferable to replace them in their original positions and that, at the same time, their actuating rollers *A* Fig. 17, should be examined to ensure that they are in good order.

Kickstarter Spring.

Removal of the outer timing cover as described on page 17 gives access to the spring. Its outer anchorage is released when the lockplate has been prised off the flats on the kickstarter spindle. The inner anchorage hooks round the head of a special screw, which must not be disturbed, otherwise the kickstarter stop plate inside the gearbox will be released, necessitating the removal of the inner timing cover before it can be replaced.

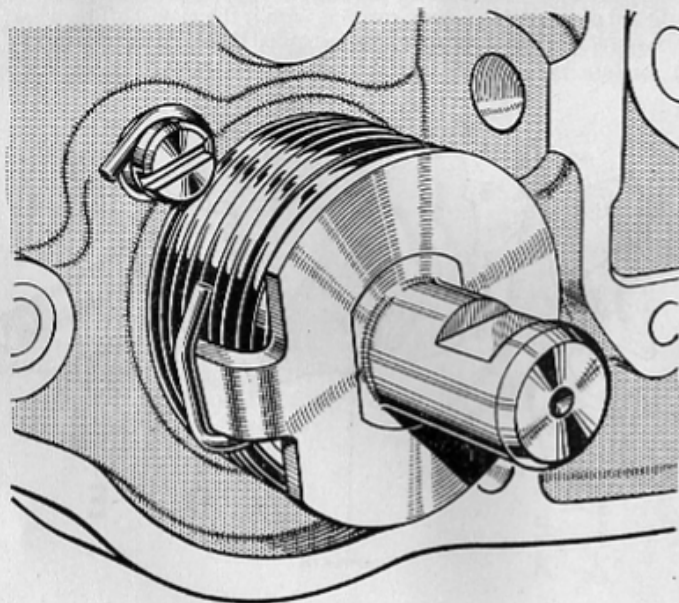


Fig. 18. Fitting the Kickstarter Spring.

When fitting a new spring, first locate the inner anchorage on the screw head; engage the tab on the lockplate with the outer spring anchorage, rotate the plate against the spring pressure, and fit it to the spindle as shown in Fig. 18. In order to prevent loss of oil from the gearbox it will be advisable to replace one of the cover screws loosely in position, immediately below the kickstarter spindle.

WHEELS

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 complete overhaul.

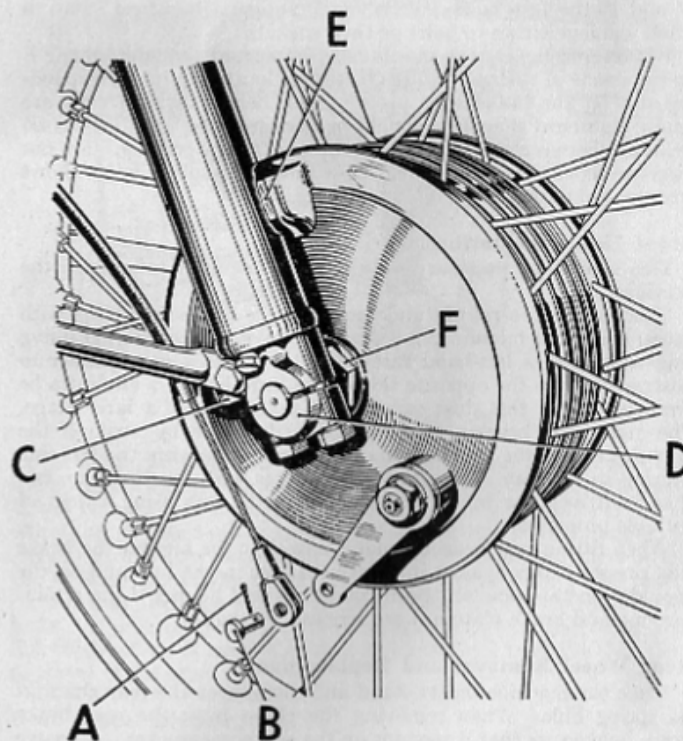


Fig. 19. Removing the Front Wheel.

Brake Adjustment.

Both brakes are provided with knurled finger adjusters. For the rear brake, the adjuster is at the rear end of the brake rod *A* (Fig. 21), and for the front brake, at the cable abutment on the handlebar lever (Fig. 23). The brakes should not be adjusted too closely, as, if they should rub, the heat generated may distort the brake drum and melt the grease in the hub.

Front Wheel Removal and Replacement.

Place a box or similar article underneath the crankcase so that the front wheel is clear of the ground. Disconnect the brake cable by removal of split pin *A*, Fig. 19, and fulcrum pin *B*, at the cable end, and withdraw the cable from its abutment *C* on the lower end of the fork leg, in which it is a push fit. Now remove the end caps *D*, and as the last bolts are removed, support the wheel so as to avoid damage either to bolts or their sockets.

When replacing the wheel it is most important that the tongue *E* on the inside of the right leg of the fork is located in its corresponding slot on the brake shoe plate. Also, before the end caps are finally tightened the wheel should be positioned so that there is no clearance between the spindle nut *F* and the fork end lug. Do not forget to replace the brake cable, or to renew the split pin if it shows any signs of damage.

Front Hub Dismantling.

This should be necessary only if it is required to replace the bearings.

Unscrew the central nut and withdraw the brake shoe plate with shoes, cam, and fulcrum pin. Next, remove the bearing retaining ring which has a left-hand thread, and requires a peg spanner to unscrew it. On the opposite side of the hub there is a circlip to be removed before the dust cap can be taken out at a later stage. The right side bearing can now be driven out by striking the opposite end of the spindle with a hide mallet, leaving the left side bearing in the hub. This bearing together with its dust cap, can then be driven out from the right side of the hub using a drift of suitable proportions.

When fitting new bearings make sure that the one on the brake side presses firmly against its abutment face in the hub and on the shoulder on the spindle. Both conditions will be met if the retaining ring and brake plate nut are screwed up tightly.

Rear Wheel Removal and Replacement.

Place the machine on its stand and disconnect the rear chain at its spring link. When removing the chain from the rear brake drum, make sure that it remains on the gearbox sprocket. Remove the brake rod adjusting nut *A*, Fig. 21, followed by the anchor arm, *D*, and disconnect the speedometer cable at its union on the worm

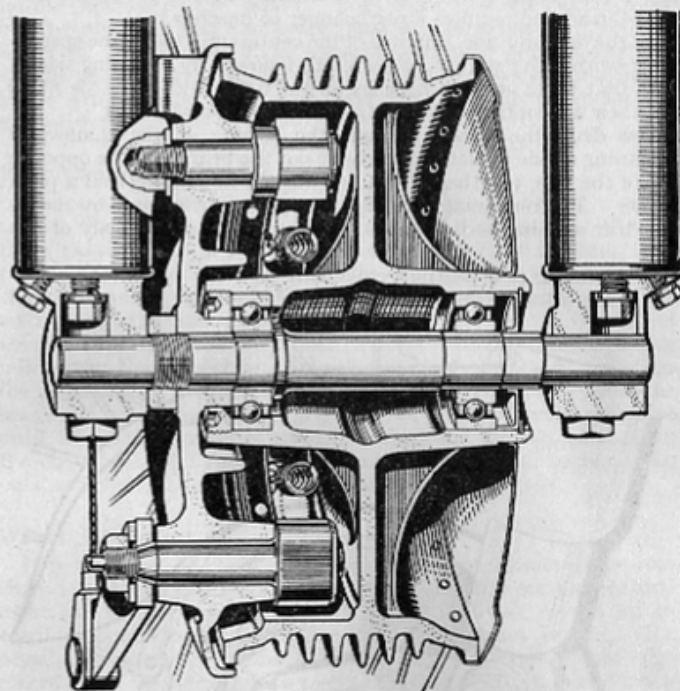


Fig. 20. Front Hub Arrangement.

drive housing. Now unscrew the wheel spindle nuts, *B*, so that the wheel can be withdrawn rearwards from the swinging arm fork ends. It will be necessary to cant the machine to the left side, so that the wheel can be taken out from under the right side of the mudguard.

Take care not to disturb the setting of the chain adjusters while the wheel is out of the frame, and when replacing the wheel make certain that the adjusters are pressed firmly against the end of the forks. It is important that the hairpin spring on the connecting link in the chain is refitted so that its closed end faces the direction of travel of the chain.

Rear Wheel Dismantling.

Dismantling should normally be necessary only if the bearings require replacement. Unscrew the central nut on the left side and take off the brake shoe plate, complete with shoes, cam and fulcrum

pin. Next, remove the bearing retaining ring which has a right-hand thread and requires a peg spanner to unscrew it.

On the opposite side, removal of the central nut allows the speedometer worm drive unit to be detached, followed by a spacing sleeve. Note that there are driving dogs on the unit which must be fitted into their appropriate slots in the hub when re-assembling.

Now drive the spindle through the bearing on the chainwheel side, using a hide mallet, thus driving out the bearing in the opposite side of the hub, together with a felt washer, its housing and a plain washer. The remaining bearing can now be driven out by means of a drift of suitable dimensions, inserted through the body of the hub.

When fitting new bearings make sure that the one on the chain-wheel side presses firmly against its abutment face in the hub, and

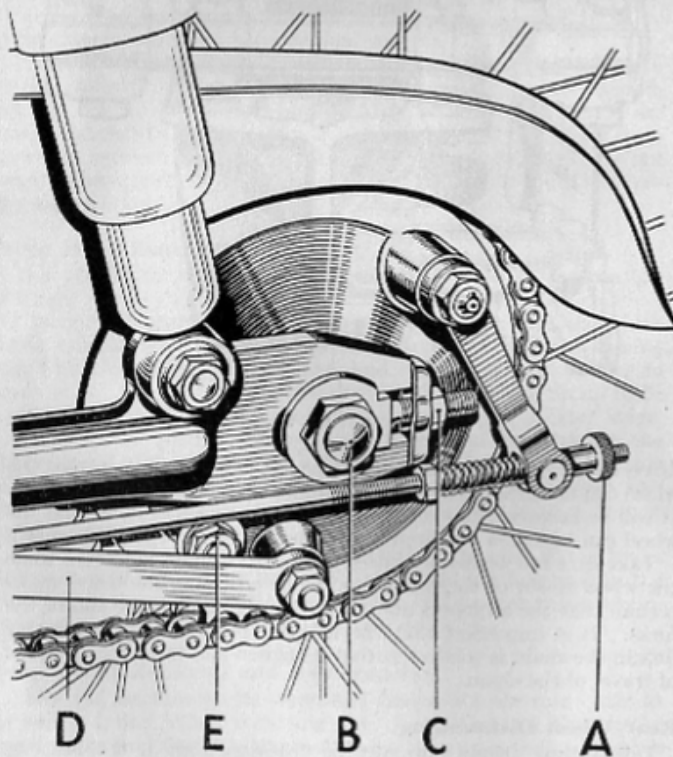


Fig. 21. Rear Chain Adjustment.

on the shoulder on the spindle. Both conditions will be met if the bearing retaining ring and brake plate nut are screwed up tightly. Similarly, the bearing on the opposite side must press against the spindle shoulder but, in this case, it is free to move endwise in the hub. After refitting the speedometer drive unit, tighten its locking nut securely.

Rear Chain Adjustment.

The rear chain must be adjusted when the machine is on its stand so that the wheel is at the lowest point in the suspension. Rotate the wheel slowly until the tightest point on the chain is found, then check its up and down movement in the centre of the chain run. The total movement should be 1/2 inch and if it varies from this setting then the chain must be adjusted by moving the rear wheel usually in a rearward direction. Chains stretch with increasing mileage, so that the chain slackness invariably increases. Slacken the spindle nuts *B*, the nuts retaining the anchor strap *D*, and the brake rod adjusting nut *A*. Tighten the nuts *C* equally each side until the chain tension is correct. When the amount of slack in the chain is correct re-tighten the wheel spindle and anchor strap nuts and check the adjustment of both chain and brake.

Wheel Alignment.

It is advisable to check the wheel alignment whenever the rear chain is adjusted, although if it is known that the previous adjustment was satisfactory and the adjuster nuts *C* are moved by an equal amount, then the alignment should remain correct. The wheel alignment can be checked by means of a long straight edge placed along the sides of the wheels. The straight edge should touch the front and rear of both tyres.

Brake Shoe Removal and Replacement.

After the brake plate has been removed from the wheel, the brake cam lever should be detached and the cam spindle pushed in slightly to allow the shoes to clear the brake plate. The lever on the front brake has a square hole of tapering dimensions and must be refitted the correct way round. The rear cam lever has a serrated hole and can be replaced in a new position if required. Insert a screwdriver between the brake shoes at the fulcrum pin and twist the screwdriver so as to open the shoes at this point.

Place a small lever between one of the shoes and the cover plate and lever the shoe away from the plate until the spring pressure is released. Both shoes can then be lifted away from the cover plate.

The shoes can be replaced by the reverse procedure. Hook the springs on to the shoes and place the ends of the shoes in position on the fulcrum pin and cam lever. Then push the shoes outwards until the springs pull them into their correct position.

Note: The brake shoe springs are quite strong and care should be taken that the fingers are not trapped by the brake shoes during these operations.

Brake Shoe Relining.

With the shoes removed the linings can best be removed by drilling away the heads of the rivets and punching the shanks out to the inside of the shoe with a suitable punch.

New linings are die pressed to suit the curvature of the shoes, but will require drilling and counter-boring for the rivets. Position the lining and hold it in place at one end by means of clamps. Using the holes in the shoes as guides, drill holes of the correct size for the rivets adjacent to the clamp. Turn the shoe over, and counter-bore the holes just drilled sufficiently deep so that the rivet heads will stand below the lining surface; this is important, since the rivets will otherwise score the brake drum.

Insert the rivets into the holes and rivet them over on the inside of the shoe. This is easily accomplished by holding in a vice a short length of rod, whose diameter is equal to that of the rivet head, and using it as an anvil upon which to rest the rivet head while hammering the shank over. This will also make sure that the rivets do not stand proud of the lining.

Move the clamps to the next pair of holes, taking care that the lining is kept in firm contact with the shoe the whole time, and repeat the above procedure. When the lining is finally riveted down, bevel off the ends of the linings and file off any local high spots.

Complete relined brake shoes are available through the Exchange Replacement Service which operates in the British Isles only.

When new linings or new shoes have been fitted, the brakes must be centralised. To do this, replace the brake cover plate, complete with shoes, fulcrum pin and cam in the brake drum. Slacken the fulcrum pin nut *E*, Fig. 21, and turn the cam so as to open the brake shoes in the normal manner. The fulcrum pin will then move in its housing until both shoes are pressing equally on to the drum. Tighten the fulcrum pin nut firmly and release the brake.

FRAME AND FORKS

Front Forks.

Under normal conditions the only servicing which the front fork requires is occasional renewal of the oil. The need for this may be indicated by excessive movement of the fork, but it should only be necessary after considerable mileage.

Remove the plug *A* (Fig. 23) and the drain plug in the lower end of the fork sliding member as shown at *B* in Fig. 22. Allow all the oil to drain out, then apply the front brake and depress the forks a few times to drive out any oil remaining in the system.

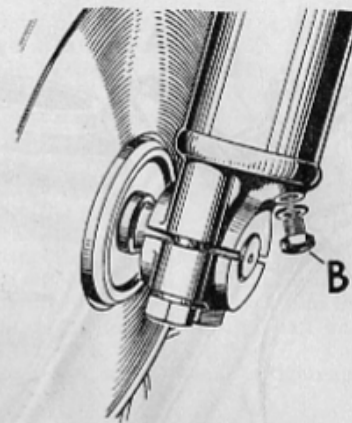


Fig. 22. Front Fork Drain Plug.

Replace the drain plugs and pour $3\frac{1}{2}$ fl. ozs. (100 c.c.) of an S.A.E. 20 oil into each leg. Replace the top plug and tighten it firmly.

The following oils are recommended for use in the front forks: Mobiloil Arctic; Shell X100-20; Castrolite; Esso 20; B.P. Energol S.A.E. 20.

Steering Head Adjustment.

The steering head should be tested occasionally for play and to ensure that the fork rotates freely. Support the crankcase on a box so that the front wheel is clear of the ground, then grasp the front fork legs and attempt to push them backwards and forwards. If any play is detected the steering head must be adjusted.

Slacken the clamping nut *C* Fig. 23, then tighten down the cap nut *D* until the adjustment is correct. Hold the handlebars lightly and move them round slowly. The steering must be free, and the forks must rotate smoothly. If the movement is "lumpy" it is a sign that the adjustment is too tight, or that the ball races are damaged. When the adjustment is correct, tighten the clamping nut *C*.

Fork Dismantling.

Complete dismantling of the forks should not be necessary until after a very large mileage has been covered and; in any case, cannot be accomplished without the aid of special extractors. First, drain the oil from the forks (*A*) Fig. 22, and remove the front wheel as described on page 40, followed by the front mudguard complete with stays etc. Unscrew the cap nut *A*, take out the fork spring and slacken the clamp bolt *E* in the bottom yoke, Fig. 23. An

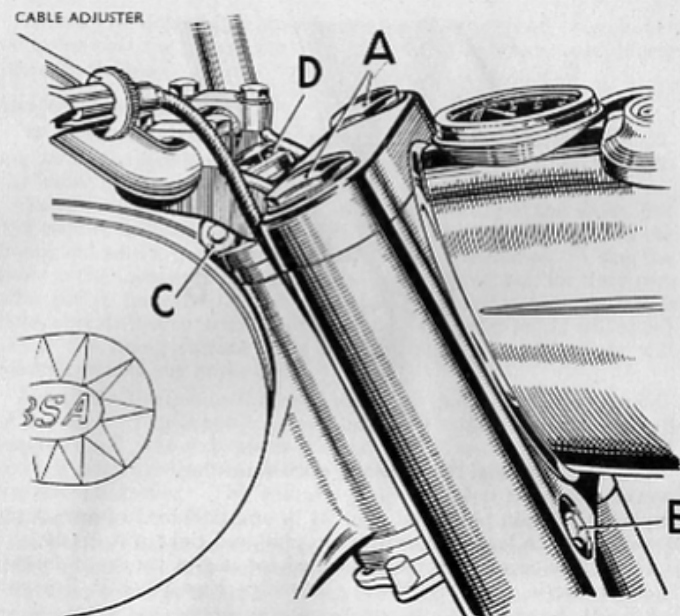


Fig. 23. Front Fork and Steering Head.

extractor, B.S.A. Part No. 61-3350, can now be fitted in place of cap nut A and by striking the top of the tool with a hammer, the fork shaft be freed from its taper seat in the top yoke. The complete leg can be drawn down through the bottom yoke and removed from the machine. Repeat the operation for the other fork leg. Hold the bottom of the sliding shaft by gripping the wheel spindle lug in a soft jawed vice. The collar at the top of the sliding shaft carries an oil seal and dust shroud, and it can be unscrewed by means of a "C" spanner. The oil seal is retained by the dust shroud and should not be disturbed unless examination shows that it requires attention. If a new seal is fitted it is important to remember that the lip must face downward.

If it is intended to complete the dismantling of the fork, the restrictor rod should next be removed from inside the sliding member. The rod is retained by a bolt, the head of which is recessed into the wheel spindle lug, and will require the use of a box spanner. The base of the rod is slotted and when refitting, the slot must be positioned so that it registers with the drain plug. The top bearing, together with its spacing sleeve, is pressed into the sliding member and before either top or bottom bearings are accessible, the sliding member and inner shaft must be drawn apart. This is a difficult

operation to carry out without proper equipment, and owners are strongly advised to take the unit to a B.S.A. dealer for dismantling, as a special service tool is required for this purpose. Once the shafts are apart (which operation will automatically draw out the top bearing and spacing sleeve), the bottom bearing can be drawn off the shaft following removal of the stop nut.

Before fitting a new top bearing make sure that the spacing sleeve is inserted first, and that it is a tight fit in the sliding member. This is essential since the sleeve may otherwise move its position and interfere with the hydraulic damping.

When replacing the legs, pass the inner shaft up through the bottom yoke, insert the special tool previously used for extraction purposes through the top yoke, and screw into the top of the shaft. Tighten the nut on the tool to pull the shaft into the taper in the top yoke, and retighten the clamp bolt E. Unscrew the service tool and replace nut A, which should be tightened firmly.

Rear Suspension.

The two suspension units comprise a telescopic damper unit and a totally enclosed coil spring. The hydraulic dampers require no attention whatsoever. They are sealed during manufacture and if they suffer damage or become ineffective they must be replaced.

The complete suspension units can be removed from the frame after detaching the pivot bolts at the top and the retaining nuts at the bottom.

Frame.

The frame will not require any attention unless the machine has been involved in an accident. It should then be inspected very carefully and the wheel alignment checked. If the frame is damaged or distorted, it should be returned to your B.S.A. dealer for repairs.

Provided that they have received proper lubrication, the swinging arm bearings should not require replacement until after an appreciable mileage has been covered. However, if it becomes necessary to replace the bearings, the swinging arm must be removed, so that the pivot spindle can be extracted from the frame lug. These two items are pressed together and consequently will be difficult to separate without suitable equipment. It is advisable, therefore, to have the work of fitting new bearings carried out by a B.S.A. dealer.

For those who wish to carry out this work themselves, it will be necessary first to dismantle the rear part of the machine. The frame members which are attached to the ends of the pivot spindle, can then be swung away after unscrewing the bolts, so that the spindle can be taken out of the frame lug, the two components being an interference fit together.

After fitting new bearings, note that only one spacing washer is used, and this is fitted between the right-hand bearing and the frame lug. Correct placing of this washer is important because of chain and wheel alignment.

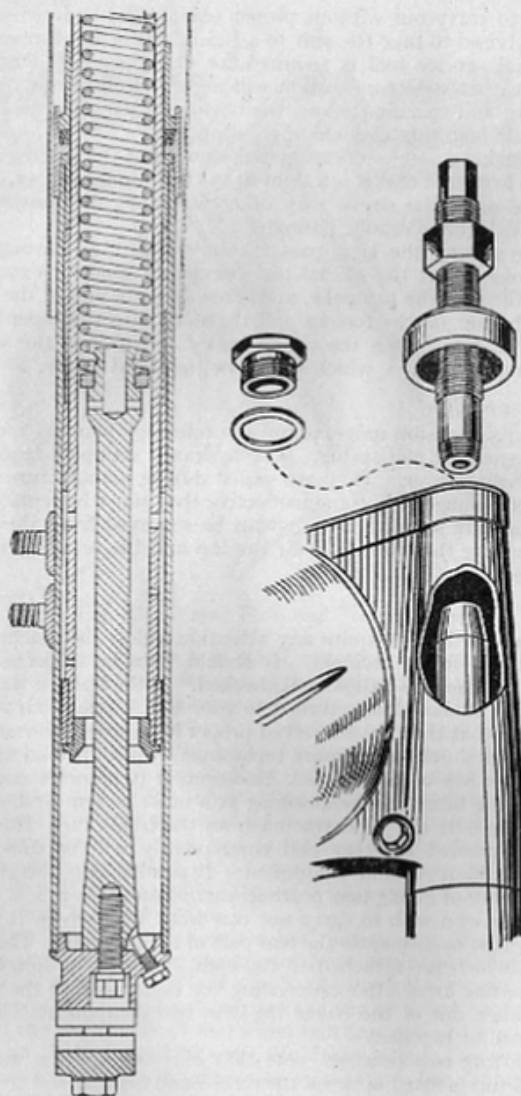


Fig. 24. Dismantling the Front Fork

MAINTENANCE OF THE ELECTRICAL EQUIPMENT

Charging System.

Electrical energy in the form of rectified alternating current passes through the battery from the Lucas A.C. Lighting - Ignition Unit — the rate of charge depending on the position of the lighting switch. The A.C. Lighting - Ignition Unit comprises a 6-pole alternator and rectifier. The rectifier converts the alternating current output of the alternator to uni-directional current which is essential for battery charging.

Output Control.

Under normal running conditions (i.e., ignition switch in IGN position) when lights are not in use, the alternator output is sufficient only to supply the ignition coil and to charge the battery. When the lighting switch is turned, the output is automatically increased to meet the additional load. Full alternator output is obtained only when the lighting switch is in the HEAD position.

Emergency Starting.

An EMERGENCY starting position is provided on the ignition switch, for use if the battery has become discharged and a normal start cannot therefore be made. Under these conditions, the alternator is connected direct to the ignition coil, allowing the engine to be started independently of the battery. It should be noted that with the ignition switch at EMG and the engine running, the battery receives a charging current, so that its terminal voltage begins to rise. This rising voltage opposes the alternator voltage and, in the event of a rider omitting to return the ignition key to IGN after an emergency start has been made, misfiring may occur, so serving as a reminder to do so.

Operation with Battery Disconnected.

If continuous running without a battery is required, disconnect the cable from the negative terminal of the battery and attach to an earthed point on the machine.

MAINTENANCE

Alternator.

Except for a occasional inspection of the snap-connectors in the three output cables—these connectors must be clean and tight—the alternator requires no maintenance.

Rectifier.

The rectifier requires no maintenance beyond checking that the connections are clean and tight. **The nut clamping the rectifier plates together must not under any circumstances be slackened, as it has been carefully set during manufacture**

to give correct rectifier performance. A separate nut is used to secure the rectifier to the frame of the motor cycle and it is important to check periodically that the rectifier securing nut is firmly tightened.

Battery—Topping Up.

During charging, water is lost by gassing and evaporation. Fortnightly, or more often in warm climates, check the electrolyte level in the battery cells; if necessary, add distilled water to raise the electrolyte level with the top edges of the separators. Do not use tap water as it may contain impurities detrimental to the battery.

The battery is mounted in a special compartment beneath the dual seat (Fig. 11). Lifting the clasp *R* releases the battery from its carrier, so that it can be withdrawn for replacement of the electrolyte.

Remove the battery lid, unscrew the filler plugs, and, if necessary, add distilled water carefully to each cell to bring the electrolyte just level with the top edges of the separators.

The use of a Lucas Battery Filler will be found helpful in this topping-up process, since it ensures that the correct electrolyte level is obtained automatically and also prevents distilled water from being spilled over the battery top.

Cleaning.

Wipe away all dirt and moisture from the top of the battery.

Checking the Condition of the Battery.

Occasionally check the condition of the battery by taking measurements of the specific gravity of the electrolyte in each of the cells. A small-volume hydrometer is required for this purpose—this instrument resembles a syringe containing a graduated float, which indicates the specific gravity of the acid in the cell from which the sample has been taken. Do not take measurements immediately after "topping-up" the cells as the electrolyte will not be thoroughly mixed.

Specific gravity readings and their indications are as follows:—

Climates under 90°F.		Climates over 90°F.	
1.270—1.290	Cell fully charged	1.200—1.220	
1.190—1.210	Cell about half discharged	1.120—1.140	
1.110—1.130	Cell completely discharged	1.040—1.060	

The reading for each of the cells should be approximately the same. If one cell gives a value very different from the rest, it may be that acid has been spilled or has leaked from the particular cell, or there may be a short circuit between the plates, and in this case the battery should be examined by a Lucas Service Depot or Agent.

Never leave the battery in a discharged condition. If the motor cycle is to be out of use for any length of time, have the battery

fully charged and every fortnight give it a short refreshing charge to prevent any tendency for the plates to become permanently sulphated.

Battery Earth.

The A.C. Lighting—Ignition Unit has been designed for positive (+ve) earth systems. If the battery connections are reversed the equipment will be damaged.

Contact Breaker Unit.

Setting—after first 500 miles and, thereafter, every 6,000 miles. To check the contact breaker gap, turn the engine over slowly until the contacts are seen to be fully open and insert a feeler gauge between the contacts (Fig. 5). The correct gap setting is 0.014"–0.016". If the gap is correct, the gauge should be a sliding fit.

To adjust the gap, keep the engine in the position giving maximum opening, and slacken the screw at the side of the fixed contact plate. Slide the fixed contact carrier in its slotted hole, until the correct gap is obtained. Re-tighten the screw.

Cleaning—every 6,000 Miles.

Remove and clean the cover. Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean with fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a clean petrol-moistened cloth. Cleaning of the contacts is made easier if the contact breaker lever carrying the moving contact is removed.

To take out the moving contact, remove the terminal nut and withdraw the nylon washer. The contact breaker spring and heel can now be lifted out of the unit body. After cleaning, check the contact breaker setting.

Lubrication—every 6,000 Miles.

No grease or oil must be allowed to get on or near the contacts when carrying out the following procedure. Smear the surface of the cam very lightly with Mobilgrease M.P. or, if this is not available, clean engine oil (S.A.E. 30-40) may be used. Lubricate the centrifugal timing control in the base of the unit with clean engine oil, paying particular attention to the pivots.

Ignition Coil.

The coil requires no attention beyond keeping its exterior clean, particularly the terminals, and occasionally checking that the connections are tight. When the high tension cable shows signs of perishing or cracking it must be renewed, using 7 mm. p.v.c.-covered or neoprene-covered rubber ignition cable. To fit a new cable, pull the old cable and connector from the socket in the neck of the coil and fit a new connector with the replacement cable.

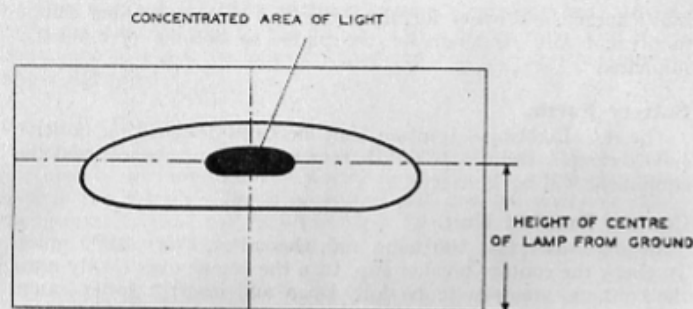


Fig. 25. Headlamp Beam Setting Pattern.

Lighting Equipment—Headlamp Beam Setting.

When the motor cycle carries its normal load the headlamp driving beam should be projected straight ahead and parallel with the road surface.

Many garages possess a Lucas Beam Setter. This is a scientific instrument enabling accurate beam setting to be effected, and owners are strongly advised to make use of this service whenever possible. When such facilities are not available, the headlamp can be set by marking off a smooth blank wall and shining the lamp on it from a distance of 25 feet. Details are shown in Fig. 25.

When checking setting:—

- (a) Front of motor cycle to be square with screen.
- (b) Motor cycle to be carrying normal load and standing on level ground.
- (c) Recommended distance for setting is at least 25 feet.

To make an adjustment slacken the three screws securing the headlamp fixing rim and move the lamp until the correct setting is obtained. Finally, re-tighten the securing screws.

With the Lucas prefocus bulbs fitted in these lamps, the filament is correctly positioned during manufacture in relation to the focal point of the reflector. No further focusing is necessary.

Bulb Replacement—Headlamp.

Lucas bulb No. 312 6-volt 30/24-watt Prefocus. To gain access to the headlamp bulb, slacken the front rim retaining screw, situated at the top of the fixing rim. Disengage and withdraw the front rim and Light Unit assembly, removing the upper edge first. Press the bulbholder inwards and turn it to the left. Lift off the bulbholder and withdraw the defective bulb. After fitting the replacement bulb, reverse the above procedure to re-assemble the lamp.

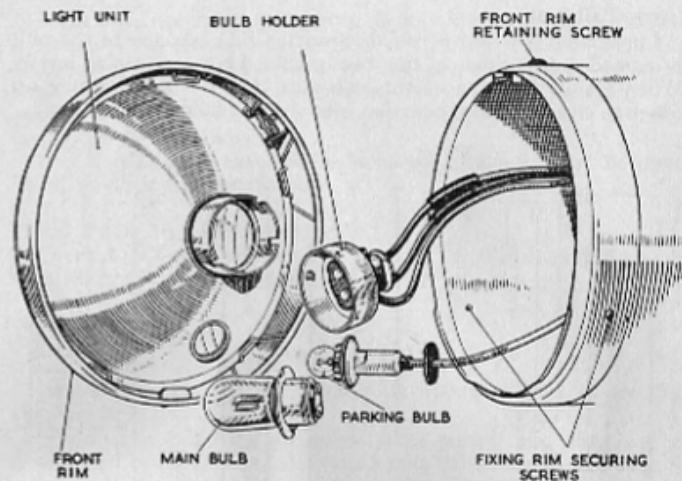


Fig. 26. Headlamp Dismantled for Bulb Renewal.

Parking Light.

Lucas bulb No. 988 6-volt 3-watt M.C.C. Disengage and withdraw the front rim and Light Unit assembly. The parking light bulbholder and bulb can then be withdrawn from the reflector in which it is a push-fit.

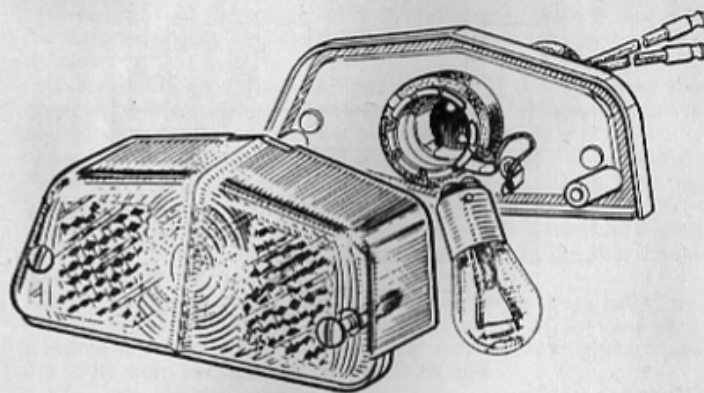


Fig. 27.

Stop-Tail Lamp Dismantled for Bulb Renewal.

Stop Tail Lamp.

Lucas bulb No. 384 6-volt 6/18-watt S.B.C. Access to the bulb is gained by slackening the two moulded cover retaining screws. When fitting the replacement bulb note that the securing pins are offset to ensure correct insertion into the bulbholder.

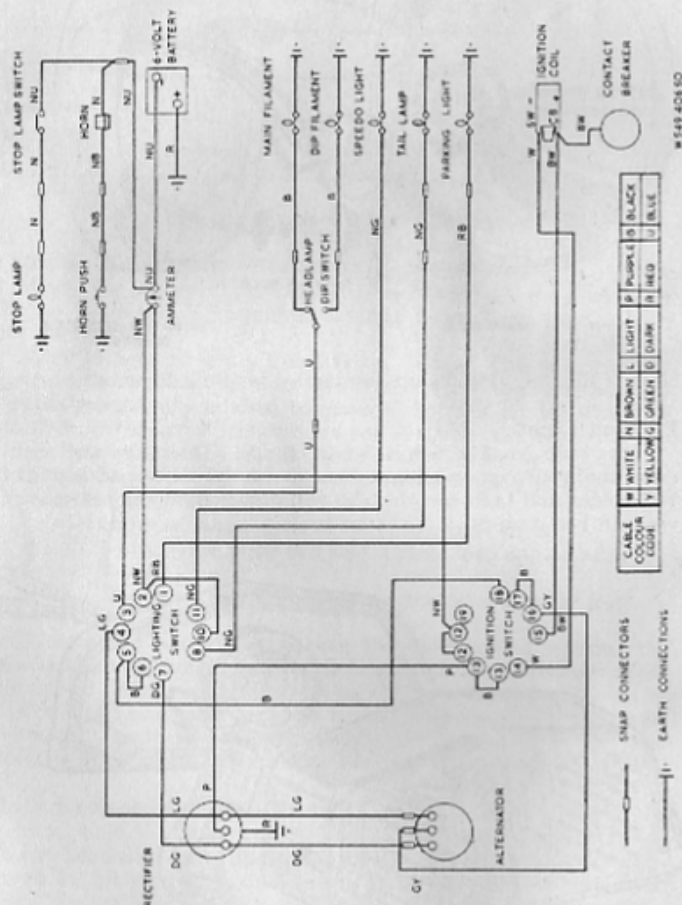


Fig. 28. Wiring Diagram.

Horn.

The horn is pre-set to give its best performance and, in general, no further adjustment is necessary.

If the horn becomes uncertain in its action, giving only a choking sound, or does not vibrate, it does not follow that the horn has broken down—the trouble may be due to a discharged battery, a loose connection, or short-circuit in the wiring of the horn. In particular, ascertain that the horn push bracket is in good electrical contact with the handlebars.

It is also possible that the performance of a horn may be upset by its mounting becoming loose.

Horn Push and Dipper Switch.

Every 5,000 miles the moving parts of the dipper switch should be lubricated with thin engine oil.

GENERAL HINTS

Periodically check all nuts and bolts with a spanner to see that they are tight.

Occasionally clean the air holes in the petrol tank filler cap, as if these get choked, petrol starvation may cause engine stoppage.

After a very large mileage, it is advisable—when the tank is almost empty—to remove the petrol tap, clean the filter above the tap, and wash the tank out with petrol to remove any collection of dirt or water which may have accumulated. Blow through the tap before replacing.

Difficult starting or engine stoppage is usually due to faults in either the carburation or the ignition system, and in the event of these troubles arising, the following checks will enable the cause to be located.

Make sure that there is petrol in the tank, and that it is reaching the carburetter, by depressing the tickler and flooding the float chamber.

Examine the main jet, which can be reached by unscrewing the hexagon at the base of the carburetter body. Removing the jet and blowing through it will clear any obstruction.

See that the high tension lead to the sparking plug is connected. Remove the plug, and if oily or sooted, clean it. Check that the plug is sparking correctly by connecting high tension lead and laying the plug on its side on top of the cylinder, then turn the engine over several times by means of the kickstarter, when the plug should spark regularly.

Poor compression may indicate either that tappets are badly out of adjustment, that valves need grinding-in, or in the case of a machine which has covered a very big mileage, that piston rings are badly worn and need replacement.

The wiring is connected by means of snap connectors at various convenient places on the machine and it is desirable occasionally to check it over and make certain that these connections are all tight.

LIST OF B.S.A. STOCKISTS



Save time and postage by contacting your nearest B.S.A. Stockist for B.S.A. Spare Parts, Spare Part Catalogues, Instruction Books, Transfers, etc. All B.S.A. Dealers carry stocks of B.S.A. Spare Parts but the following appointed Stockists maintain a comprehensive range.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Aberdeen	J. Dawson	24-26, Thistle Street	25556	
"	George Cheynet (Cycles)	147-149, Holburn Street	50341/2	Motobike, Aberdeen
Aberystwyth	Gwalha Motor Co.	North Parade	525	
Accrington	Bill Snape Ltd.	379, 392 and 396, Blackburn Road.	4724	
Aldershot	Phillips Bros. (Aldershot) Ltd.	Birchett Road	1111-2	Phillips, Cycles, Aldershot.
Alton	J. G. Robertson (Cycles)	55-57, High Street	193	
Andover	Corbett & Ellis (Andover) Ltd.	Weyhill Road	2991	
Ashington	Mains of Ashington	Laburnum Terrace	3204	
Aylesbury	Eborn's Garage	44, Walton Street, Aylesbury.	3150	Eborn's Aylesbury.
Banbury	Trinder Bros.	2A-4, Broad Street	2546	
Barnsley	T. Garner & Son	Sheffield Road	2866	
Barnstaple	Bob Ray Ltd.	43, High Street	4266	
Bath	R. U. Holway & Son	32/34, St. John's Road	Bathwick 5084	
Bedford	The Imperial Cycle Co.	58, St. Lyes	2374	
Belfast	W. J. Chambers & Co.	106 & 108, Donegall Pass	27253-4	Fastmote, Belfast.
Biggleswade	Bryants	25, 27, 72 & 74, Shortmead Street.	3108	
Birkenhead	Bob Simister Ltd.	540-544, New Chester Road, Rock Ferry.	Rock Ferry 1452	
Birmingham	County Cycle & Motor Co. Ltd.	265-266, Broad Street	Midland 2671	
"		104, Bath Row (Repairs) (closed Saturday 1 p.m.)	Midland 2817	
"	C. E. Cope & Sons Ltd.	481-487, Hagley Road, Edgbaston 17.	Bearwood 2246-7	
"	Shovelbottom's Ltd.	376, Ladypool Rd., Sparkbrook 12.	South 2212-3247	

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Birmingham	Aston Auto Motors	173-177, Aston Road, 6	Aston Cross 3201-2	
Blackburn	S. & G. Motor Cycles (Blackburn) Ltd.	15-17, Great Bolton St.	6678	
Blackpool	J. Hall & Son (Blackpool) Ltd.	102-6, Devonshire Road	22130	
Blandford	Badger Garages Ltd.	Salisbury Road	615	
Bolton	Charlie Robinson (Motor Cycles Ltd.)	119 & 121, Higher Bridge Street.	3931	
Boscombe	Craze Bros. Ltd.	473 & 475, Christchurch Road.	Boscombe 33231/2	
Bradford	Sidneys Motor Cycles	107, Manningham Lane	29889	
"	J. K. Hirst Ltd.	41, Wakefield Road	22543	
Bridgwater	Anderson & Wall Ltd.	18, St. Mary Street	2416	Anderson & Wall, Bridgwater.
Brighton	Redhill Motors (Brighton) Ltd.	104, North Road	25281	
Bristol	S. J. Fair Motors Ltd.	201-3, Cheltenham Road	4-6238/4-1015	
Bromsgrove	Harold Tozer (Bromsgrove) Ltd.	110, Birmingham Road	3228	
Brynmarwr	Jayne's Motors	Cwmbach Garage	Brynmarwr 271	
Bury St Edmunds	Barclay Motors Ltd.	Kings Road Corner	2345/9	
Cambridge	King & Harper Ltd.	Milton Road Corner	3201	Motors, Cambridge.
Canterbury	Halletts of Canterbury	St. Dunstan's Street	3046	
Cardiff	Car Distributors (Cardiff) Ltd.	134-140, City Road	30022	
"	Robert Bevan & Son	29-35, Castle Street	27477/8	
Carlisle	W. T. Tiffin & Son	Irishgate, Carlisle	25024	Tiffin, Irishgate, Carlisle.
Carmarthen	Eddie Stephens Motors	22/23, Water Street	Carmarthen 6233	
Castleford	Barrett's Motors Cycle (Castleford) Ltd.	27-35, Aire Street	2983	
Chapel-en-le Frith	Eric W. Bowers	Town End	144	
Chatham	Grays of Chatham Ltd.	11-19, High Street	4005	
Chelmsford	Hadlers Garage Ltd.	New Street	4844-5	Hadler, Chelmsford.
Cheltenham	Leslie Paynter	Bath Street	2887	
Chester	Davies Bros. Ltd. (Chester)	34, Bridge Street	25510	
Chichester	W. Goodridge & Co. Ltd.	East Street	2033	
Clydebank	John A. Weddell	72/114, Dumbarton Road	Clydebank 1429	
Colchester	G.B.R. Motors Ltd.	1-2, East Hill	6131/2	

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Colne ..	C. H. Schofield (Motors) Ltd.	Market Place	859	
Coventry ..	Coventry Motor Mart Ltd.	86, London Road ..	2146-7	Coventry Motor Mart.
Crewe ..	Cooke's Garages ..	10-20, Nantwich Road ..	2011	Cooke's Motors, Crewe.
Croydon ..	Godfreys Ltd.	228-234, London Road ..	Croydon 3641-2	Gofrabike, Croydon.
Dagenham ..	Reginald Smith (Motor Cycles) Ltd.	Imperial House, New Rd.	Rainham 3284-2786	
Dalton-in-Furness ..	H. Holme ..	24-26, Ulverston Road ..	25	
Darlington ..	The Duplex Motor & Cycle Co. Ltd.	10-16, Grange Road ..	Darlington 2071	Duplex, Darlington.
" ..	White Bros. (Darlington) Ltd.	201/205-9, Northgate ..	67757	
Dartford ..	Schwieso Bros. Ltd. ..	177, Lowfield Street ..	Dartford 4279	
Derby ..	Ingles Provincial Garages Ltd.	Wallbrook Road ..	45289	
Doncaster ..	W. Cusworth (Doncaster) Ltd.	7, Hall Gate ..	4594	
Douglas (I.O.M.) ..	Gilbert Harding Ltd.	18, Duke St., & 5, Market Street.	Douglas 170	
Dudley ..	Chas. E. Cope & Sons Ltd.	98 & 195, High Street ..	Dudley 3464-5-6	
Dundee ..	George McLean Ltd.	Ward Road ..	5087	Vehicles, Dundee.
Dunstable ..	B. G. England (Dunstable) Ltd.	Half Moon Hill, London Road.	843-4	
Eastbourne ..	Jempsons Ltd.	118-120, Seaside ..	756	Jempsons, Eastbourne.
Edinburgh ..	J. R. Alexander & Co. Ltd.	10-14, Lothian Road ..	4455	Motorcycles, Edinburgh.
Elgin ..	Farquharsons ..	55-57, High Street ..	7188	Elgin 7188.
Enfield ..	D. J. Shepherd & Co. (Enfield) Ltd.	434-6, Hertford Road, Enfield Highway.	Howard 1631	
Exeter ..	P. Pike & Co. Ltd.	Alphington Street ..	58241	Piko, Exeter.
Frome ..	J. Difazio Motor Cycles Ltd.	25, Catherine Street ..	2913	
Gateshead, 8 ..	O. Carmichael & Son Ltd.	71, 75, 79, 83 & 87, High West Street.	71815	
Glasgow, C3 ..	Bell Bros. (H.P.) Ltd.	223, St. Georges Road ..	Douglas 6414	Douglas 6414, Glasgow.
" ..	J. R. Alexander & Co. Ltd.	240-286, Great Western Road.	Douglas 7516	Alex Moto, Glasgow
Gloucester ..	Harpers of Gloucester Ltd.	23a, Worcester Street ..	23187	Gloucester 23187.
Grimsby ..	H. J. Gresswell & Son Ltd.	13, 15 & 19, Osborne St.	2202	
Guernsey ..	Millard & Co. Ltd.	Victoria Road ..	777	Millard Motors, Guernsey.
Guildford ..	E. Pascall (Guildford) Ltd.	11-12, Woodbridge Road ..	Guildford 2274-5-6	

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Harrogate ..	H. Acland (Prop. H. Baynes).	11, Bower Road ..	5125	
Harrow ..	Pinks of Harrow ..	Station Road ..	0044-5, Spares 3328	Pink, Harrow.
Hatfield ..	W. Waters & Sons Ltd.	32, Great North Road ..	2255	
Hereford ..	A. Kear & Co. ..	52, Commercial St. ..	2239	Kear, Hereford
Holbeach ..	Gordon Woodman Ltd.	34, Fleet Street ..	3221	
Hornchurch ..	T. W. Kirby Ltd.	10, Roneo Corner ..	8785	
Hounslow ..	Stanley's Motors ..	46-8, Lampton Road ..	Hounslow 1949	Stanley's, Hounslow.
Huddersfield ..	Earnshaw ..	Manchester Road ..	1232	
Hull ..	Browns (Witham) Ltd.	47-49, Witham ..	29802	
" ..	Jordans of Hull ..	Storey Street ..	16131	Gumpton, Hull.
Ilford ..	J. J. Double (Motor Cycles) Ltd.	1, 2, 3 & 4 Mildmay Parade, Cranbrook Road.	Valentine 0191, 0192, 7723	
Ilkeston ..	Ray Gamble ..	Pelham Street (off Bath Street).	873	
Ipswich ..	Revetts Ltd. ..	Clarkson Street ..	3726/7	
Jersey ..	Colebrooks (J. D. Poingdestre).	22½ New St. Johns Road, St. Helier.	Central 642	Colebrooks, Jersey.
Keighley ..	Dick Ratchiffe ..	Coldshaw Garage, Haworth.	Haworth 3133	
Kendal ..	Tom O'Loughlin Ltd.	66, Stricklandgate ..	315	
Kirkcaldy ..	County Motors (Kirkcaldy) Ltd.	Junction Road ..	Dysart 5631	
Lancaster ..	Pye Motors Ltd.	Parliament Street ..	3553	
Launceston ..	J. Wooldridge & Son ..	Western Road ..	21	Wooldridge, Launceston.
Leeds, 1 ..	Watson-Cairns & Co. Ltd.	157-8, Lower Briggate ..	33024/5	Watson-Cairns, Briggate, Leeds.
Leicester ..	E. W. Campion & Son Ltd.	Welford Place ..	58054	
Lincoln ..	West's (Lincoln) Ltd.	116, High Street ..	21262	
Liverpool, 7 ..	Bee Cycle & Motor Co. Ltd.	17-19, Remshaw Street ..	Royal 6375-6	Bee Cycles, Liverpool.
" ..	Cundles (Liverpool) Ltd.	41, Byrom Street ..	Central 4148	Cundles, Central 4148.
Llawhaden ..	James Bowen & Sons (Llawhaden) Ltd.	Llawhaden, near Narberth, Pema.	Llawhaden 6	
London, N.W.1 ..	J. Grose Ltd.	379-381, Euston Road ..	Euston 5231	
" ..	W.1 ..	Godfreys Ltd. ..	208-210, Great Portland Street.	Gofrabike, London.
" ..	S.E.18 ..	Clear & Co. Ltd. ..	1, Woolwich High Street	Woolwich 0174
" ..	W.5 ..	Kays of Ealing Ltd. ..	8-10, Bond Street ..	Ealing 2387
				Sparesokay, Ealux, London.

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
London, S.E.13	F. Parks & Son Ltd.	404, High St., Lewisham	Lee Green 0535	
"	E.8 .. Eleanor Motors	265-7-9, Mare Street, Hackney.	Amherst 5134-3923	
"	E.7 .. Godfreys Ltd.	418, Romford Road, Forest Gate.	Grangewood 1234-5	Gofrabike, Forgate.
"	E.6 .. Godfreys Ltd.	230, Barking Road, East Ham.	Grangewood 8088	Gofrabike, Forgate.
"	Glanfield Lawrence (Highbury) Ltd.	28-32, Highbury Corner	North 2791	
"	N.12 .. George Grose Ltd.	834, High Road, Finchley	Hillside 2149	
"	N.12 .. Glanfield Lawrence Ltd.	407, High Road, Finchley	Finchley 0091	Glanfin, Norphone, London.
"	N.15 .. Godfreys Ltd.	94, 96 & 104, High Road, Tottenham.	STA 9960	Gofrabike, London.
"	S.E.11 Writers Ltd.	161-5, Kennington Lane	Reliance 1362	
"	S.W.11 Owen Bros.	19, Battersea Rise, Clapham Junction.	Battersea 7816	
"	S.W.6 Claude Rye Ltd.	897-921, Fulham Road, Fulham.	Renown 6174	Ryebikes, Walgreen, London.
"	S.W.9 Pride & Clarke Ltd.	158, Stockwell Road	Brixton 6251	Priclarke, London.
"	W.12 Turners Stores	81-83, Goldhawk Road, Shepherd's Bush.	Shepherd's Bush 2436	
"	W.3 .. Whitbys of Acton Ltd.	273, The Vale, Acton	Shepherd's Bush 5355-6	
"	S.E.15 West End Motors Ltd.	171, High Street, Peckham	Newcross 2589	
"	N.W.10 Slocombes Ltd.	251-253, 269 & 271 Neasden Lane, Neasden.	Gladstone 3355	
"	S.W.17 Elite Motors (Tooting Ltd.).	951-961, Garratt Lane, Tooting Broadway.	Balham 1200	Elitemota, Toot, London.
Lowestoft	R. Wright	67-69, London Road South	645	
Macclesfield	A. Watling	49, Buxton Road	3592	
Maidstone	Redhill Motors (Maidstone) Ltd.	The Broadway, Maidstone	3096	
Manchester, 3	Tom Davies (Motors) Ltd.	233, Deansgate	Blackfriars 0681	
"	22 Alex Parker	31/33, Palatine Rd., Northden.	Wythenshaw 2062	
"	Fred Fearley Ltd.	692-4, Ashton Old Road	East 1445-6	Fernbike, Manchester.
Mansfield	Henstocks	128, Chesterfield Road	329	Henstock 329, Mansfield.
Middlesbrough	J. T. Dickinson (Middlesbrough) Ltd.	160-162, Lindthorpe Rd.	3861	Payacob, Middlesbrough.
Neath	Fred Rist	16 & 17, Windsor Road	Neath 780	
Newcastle-on-Tyne	Dene (Newcastle) Motor Co. Ltd.	Haymarket	2-9165/6	Ened, Newcastle-on-Tyne.
Newton Abbot	J. E. Green & Co.	87, Queen Street	653	

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Newport, (Mon.)	R. J. Ware & Sons	69, Commercial Street	66206	
Norwich	Chapmans (Norwich) Ltd.	38-42, Duke Street	24727	
Nottingham	E. W. Campion & Son Ltd.	Arkwright Street and Queens Road.	83444	
Oswestry	Roy Evans (Motor Cycles).	Willow Street	1144-7	
Oxford	Temples	69, St. Thomas Street	2485	
"	Faulkner & Son	12, Cardigan Street	57279	
"	John Avery	228/230 & 240, Banbury Road.	57362/3	
Parkstone	Bob Foster	472-6, Ashley Road	3500	
Perth	M. Shaw & Sons	143, High Street	483	
Peterborough	Burrows Bros.	55-57, Westgate	2154	
Plymouth	P. Pike & Co. Ltd.	Millbay Road	Plymouth 63108	Piko, Plymouth.
Pontardulais	T. Griffiths	Forest Gate	Pontardulais 323	
Portsmouth	Jenkins & Purser Ltd.	277-281, Copnor Road	2339	
"	Glanfield Lawrence	147-157, Fratton Road	74331	
"	Percy Kiln Ltd.	65-67, Elm Grove	4793	
Preston	Loxhams Garages Ltd.	Central Garage, Charnley Street, Fishergate	Sales Dept. 4242, Service Dept. 4243	Loxhams, Preston.
Pulborough	Gray & Rowsell (Bury Bury Ltd.).	Bury Gate, Pulborough	Bury 4	
Radcliffe	Will Lord (Motor Cycles) Ltd.	115, Blackburn Street	2002	
Reading	Phillips & Bloomfield Motors Ltd.	10-24, South Street	2635	
"	Stocker & Shepherd Ltd.	129/133, Oxford Road	2212-3983	
Redhill	The Redhill Motor & Cycle Works Ltd.	50-54, Brighton Road	327	
Rotherham	Ernest Cross	55-59, Drummond Street	Rotherham 3987	
Salisbury	Pankhurst (Weymouth) Ltd.	78-79, Exeter Street	Salisbury 5222-3	
Scarborough	E. Andrew of Scarborough Ltd.	149, Victoria Road	Scarborough 1857	
Sevenoaks	Angus Motor Cycles	Station Parade	3338	
Sheffield, 1	Walter Wragg Ltd.	Stanley Works, Wellington Street.	26098	26098 Sheffield.
Shrewsbury	J. R. Meredith	Coleham Head	6529	
Sittingbourne	Scoones Garage	9, West Street	66	Scoones, Sittingbourne.

B.S.A MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Slough	.. Sid Moram ..	.. Wexham Corner, High St.	Slough 23767	
Southampton	Alec Bennett Ltd.	.. 152, Portswood Road ..	54081-2-3	
Southport	.. H. F. Brockbank ..	.. 62, King Street ..	5054	
St. Helens	.. Geoff. Duke Ltd.	.. Greenfield Rd., Garage	3918	
St. Ives	.. Hallens (Hunts.) Ltd.	8/10, The Broadway ..	St. Ives 3071	Hallens, St. Ives.
Stockport	.. Theobald & Coppack	6, Chestergate ..	2843	Theobald Coppack, Stockport.
Stoke-on-Trent	J. & N. Bassett ..	.. Howards Place, Shelton	2890	
Stourbridge	.. Pearsons Cycle Depot	31, Market Street ..	5677	
Sunderland	.. Dunns Garage (Sunderland) Ltd.	Wheatshaf Corner, North Bridge Street.	57666/7	
Swansea	.. Glanfield Lawrence (Swansea) Ltd.	.. Rutland Street ..	50311	
Swindon	.. Easters of Swindon ..	.. 73-75, Cricklade Road ..	4196	
Taunton	.. W. P. Edwards (Motors) Ltd.	.. Station Road ..	2943	Edwards, Motor Cycle, Taunton.
Thames Ditton	.. Comerfords Ltd.	.. Portsmouth Rd., Thames Ditton.	Emberbrook 5531	
Torquay	.. P. H. Sharam Ltd.	.. 244-6, Union Street ..	4184 & 7255	
Troon	.. Cooper Bros. ..	.. 117-129, Templehill ..	925	
Truro	.. W. H. Collins & Son	Kenwyn Mews ..	Truro 2168	
Tunbridge Wells	G. E. Tunbridge ..	.. 21, London Road ..	416	Motors, Tunbridge Wells.
Twickenham	.. Blays of Twickenham Ltd.	192-9, Heath Road ..	Popesgrove 2103 & 1435	
Uxbridge	.. Miles Motors ..	.. 60, High Street ..	Uxbridge 6000	
Wakefield	.. Parkinsons (Wakefield) Ltd.	38-52, Ings Road ..	2087	
Walsall	.. The Motor Cycle Mart (Walsall) Ltd.	12, Ablewell Street ..	3363	
Warrington	.. Jack Frodsham Ltd.	.. 37a, Winnick Street ..	34713	
Watford	.. Lloyd Cooper & Co. Ltd.	61, Queen's Road ..	2125	Lloyd Cooper, Watford.
Westcliff-on-Sea	.. J. Costin & Sons ..	.. 233-241, London Road ..	Southend 42215	
Weston-super-Mare	.. Wyverns of Weston Ltd.	3, Locking Road ..	524	Wyverns, Weston-super-Mare.
Weybridge	.. W. L. Lewis & Sons	51, Church Street ..	2210	
Weymouth	.. Tilleys (Dorset) Ltd.	9, Frederick Place, St. Thomas Street.	72	
Whitehaven	.. Mark Taylor ..	.. 21, King's Street ..	252	

B.S.A. MOTOR CYCLE SPARES STOCKISTS—continued.

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Wolver-hampton	C. E. Cope & Sons Ltd.	169, Stafford Street ..	24605-6	
Worcester	.. W. J. Bladder & Son ..	.. 52, Sidbury ..	2438	Bladder, Sidbury, Worcester.
Worksop	.. Ezra Sugden Ltd.	.. 109, Gateford Road ..	3053	
Worthing	.. Gray & Rowsell (Worthing) Ltd.	.. 56, Broadwater St., West	1224	
Yeovil	.. The Yeovil Motor Mart	Hendford ..	267	Motor Mart, Yeovil.
York	.. C. S. Russell (York) Ltd.	Lawrence Street ..	23793	Russell, Lawrence Street, York.

PROPRIETARY INSTRUMENTS, FITTINGS AND ACCESSORIES

No expense is spared to secure as standard equipment the most suitable and highest quality instruments and accessories. Nevertheless, the Company's guarantee does not cover such parts, and in the event of trouble being experienced the parts in question should be returned to and claims made direct on the actual manufacturers, who will deal with them on the terms of their respective guarantees, as follows:—

Batteries:

Joseph Lucas Ltd., Birmingham.

Carburettors:

Amal Ltd., Holford Works, Perry Barr, Birmingham.

Dual Seats:

Motoplas Co. Ltd., Armoury Road, Birmingham, 11.

Electrical Equipment:

Joseph Lucas Ltd., Birmingham.

Horns:

Joseph Lucas Ltd., Birmingham.

Speedometers:

Smiths Motor Accessories Ltd., Cricklewood, London,
N.W.2.

Tyres:

Dunlop Rubber Co. Ltd., Fort Dunlop, Birmingham.