



INSTRUCTION MANUAL

250 OHV Star model C15
250 OHV Sport Star model C15 SS80
250 OHV Star Trials model C15T
250 OHV Star Scrambles model C15S
350 OHV Star model B40
350 OHV Star model B40 SS90

INSTRUCTION MANUAL

for



Models

**C15, C15T, C15S, C15SS80,
B40, B40 SS90**

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TECHNICAL DATA

	C15	C15 SS80	C15T and C15T Spec.	C15S and C15S Spec.	B40	B40 SS90
Engine No. ...						
Frame No. ...						
ENGINE:						
Capacity (c.c.) ...	249	249	249	249	343	343
Cylinder bore (mm.)	67	67	67	67	79	79
Stroke (mm.) ...	70	70	70	70	70	70
Compression ratio ...	7.5	8.75	6.4	10.0	7.0	8.75
Valve timing:						
Inlet opens b.t.d.c.	26°	51°	51°	51°	26°	51°
Onlet closes a.b.d.c.	70°	68°	68°	68°	70°	68°
Exhst. opens b.b.d.c.	61½°	78°	78°	78°	61½°	78°
Exhst. closes a.t.d.c.	34½°	37°	37°	37°	34½°	37°
Piston rings:						
Compression (in. wide) ...	.0625	.0625	.0625	.0625	.0625	.0625
Scraper (in. wide) ...	.125	.125	.125	.125	.125	.125
Piston ring gaps:						
Minimum (in.) ...	.009	.009	.009	.009	.009	.009
Maximum (in.) ...	.013	.013	.013	.013	.014	.014
Spark plug:						
Champion ...	N5	N4	N5	N3	N5	N4
Plug points gap:						
Minimum (in.) ...	.020	.020	.020	.020	.020	.020
Maximum (in.) ...	.025	.025	.025	.025	.025	.024
TRANSMISSION:						
			Trials Spec.	Scmble. Spec.		
Gear ratios—Top ...	5.98	5.98	8.48	9.0	5.48	5.78
Third ...	7.66	7.19	13.83	14.67	10.8	6.93
Second ...	10.53	9.91	20.08	22.05	14.94	9.6
First ...	15.98	12.63	26.9	28.53	19.0	12.3
Clutch friction plates	4	4	4	4	4	4
Chain sizes—Front (in.)	¾ Duplex (70 pitches)	¾ Duplex (70 pitches)	¾ Dplx. ¾ Dplx. ¾ Dplx. ¾ Dplx. ¾ Dplx. ¾ Dplx.	(70 p.) (68 p.) (70 p.) (68 p.) (70 p.) (68 p.)	¾ Duplex (70 pitches)	¾ Duplex (70 pitches)
Rear (in.)	½ x .335 (112 pitches)	½ x .335 (112 pitches)	½ x .335 ½ x .335 ½ x .335 ½ x .335 ½ x .335 ½ x .335	(123 p.) (123 p.) (120 p.) (123 p.) (116 pitches)	½ x .335 (116 pitches)	½ x .335 (116 pitches)
Teeth on:						
Engine sprocket ...	23T	23T	23T	18T	23T	23T
Gearbox sprocket ...	17T	17T	16T	18T	19T	18T
Clutch sprocket ...	52T	52T	52T	52T	52T	52T
Rear chainwheel ...	45T	45T	60T	56T	46T	46T
CAPACITIES:						
Fuel tank (gal.) ...	2½	3	2	2	3	3
(1½ litres)	(13.6 litres)	(9-2/5 litres)	(9-2/5 litres)	(13.6 litres)	(13.6 litres)	(13.6 litres)
Oil tank (pints) ...	4	4	4	4	4	4
(2½ litres)	(2½ litres)	(2½ litres)	(2½ litres)	(2½ litres)	(2½ litres)	(2½ litres)
Gearbox ...						
Front forks (pints—each leg) ...	1/6	1/6	1/3	1/3	1/3	1/3
(100 c.c.)	(100 c.c.)	(190 c.c.)	(190 c.c.)	(190 c.c.)	(190 c.c.)	(190 c.c.)
Primary chaincase (pts.)	½	½	½	½	½	½
(140 c.c.)	(140 c.c.)	(140 c.c.)	(140 c.c.)	(140 c.c.)	(140 c.c.)	(140 c.c.)
	C15	C15 SS80	C15T and C15T Spec.	C15S and C15S Spec.	B40	B40 SS90

TECHNICAL DATA (continued)

WHEELS:						
Rim size—Front ...	WM2-17	WM2-17	WM1-20	WM1-20	WM2-18	WM2-18
Rear ...	WM2-17	WM2-17	WM2-18	WM1-19	WM2-18	WM2-18
Tyre size—Front ...	3.25-17	3.25-17	3.00-20	3.00-20	3.25-18	3.25-18
Rear ...	3.25-17	3.25-17	4.00-18	3.50-19	3.50-19	3.50-18
Tyre pressures:						
Front (lbs.) ...	16	17	19	19	17	17
Rear (lbs.) ...	22	21	16	16	21	21
Brakes, dia x width:						
Front (in.) ...	6 x ⅞	6 x ⅞	6 x ⅞	6 x ⅞	7 x 1½	7 x 1½
			Trials Spec.	Scrambles. Spec.		
			(7 x 1½)	(7 x 1½)		
Rear (in.) ...	6 x ⅞	6 x ⅞	6 x ⅞	6 x ⅞	6 x ⅞	6 x ⅞
CARBURATION						
(AMAL):						
Bore (in.) ...	¾	1	¾	1-1/16	1-1/16	1½
Main jet ...	140	200	140	240	190	200
Pilot jet ...	25	25	25	25	20	30
Throttle valve ...	375/4	376/4	375/4	376/3½	376/3	389/3½
Needle position ...	3	2	3	2	3	3
Needle jet ...	.1055	.106	.1055	.106	.105	.106
GENERAL						
DETAILS:						
Front suspension						
movement (in.) ...	5	5	5	5	5	5
Rear suspension						
movement (in.) ...	2½	2½	2½	2½	2½	2½
Contact breaker gap						
(in.) ...	.015	.015	.015	.015	.015	.015
Battery capacity ...	13 amp. hr.	13 amp. hr.			13 amp. hr.	13 amp. hr.
at 20 hr. rate	at 20 hr. rate	at 20 hr. rate			at 20 hr. rate	at 20 hr. rate
Overall length (in.) ...	78	78	81	81½	80	80
Wheelbase (in.) ...	51½	51½	50½	51	54	54
Ground clearance (in.)	5	5	8	7½	7	7
Seat height (in.) ...	30	30	33	32½	32	32
Overall height (in.) ...	37	36	42	41½	39½	39½
Handlebar width (in.)	26	28	31½	31½	26	26
Steering head angle ...	65°	65°	65°	65°	65°	65°
Steering lock angle ...	50°	50°	55°	55°	40°	40°
Weight (lbs.) ...	280	280	275	265	300	295

The recommended inflation pressures are based on a rider's weight of 140 lb. If the rider's weight exceeds 140 lb. increase the tyre pressures as follows:—

Front tyre: Add one lb. per square inch for every 28 lb. increase above 140 lb.

Rear tyre: Add one lb. per square inch for every 14 lb. increase above 140 lb.

If a pillion passenger or luggage is carried, the actual load bearing upon each tyre should be determined and the pressures increased in accordance with the Dunlop Load and Pressure Schedule.

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.

Exhaust Valve Lifter (except models C15 and C15 SS80).—Small lever mounted on left handlebar. Squeeze to lift exhaust valve and therefore relieve engine compression.

Air Lever (except models C15 and C15T).—Mounted on right handlebar, this provides a rich mixture for cold starting when the lever is pushed forward.

Horn.—The horn button is mounted on the left handlebar and is incorporated in the dipper switch. On the Trials model only, the button is separately mounted on the right handlebar.

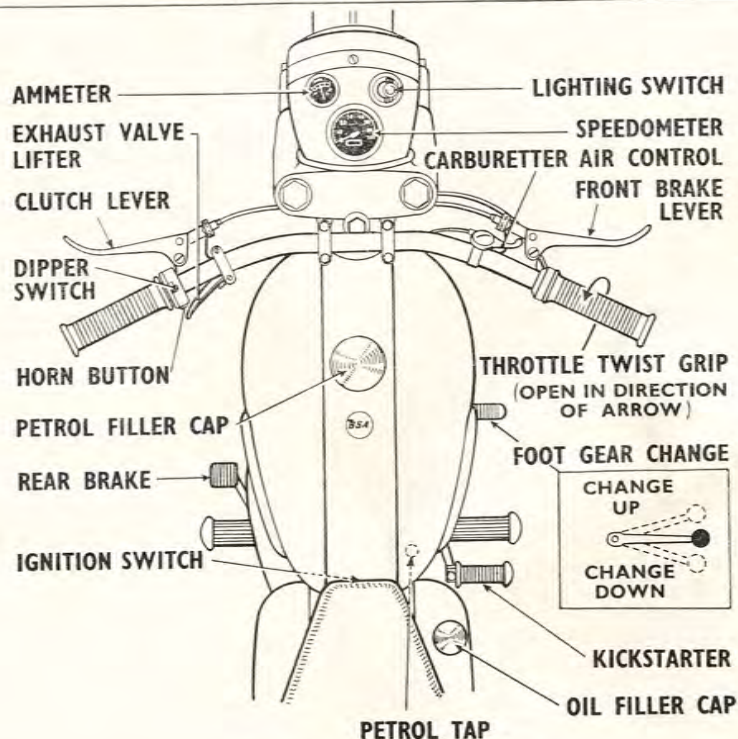
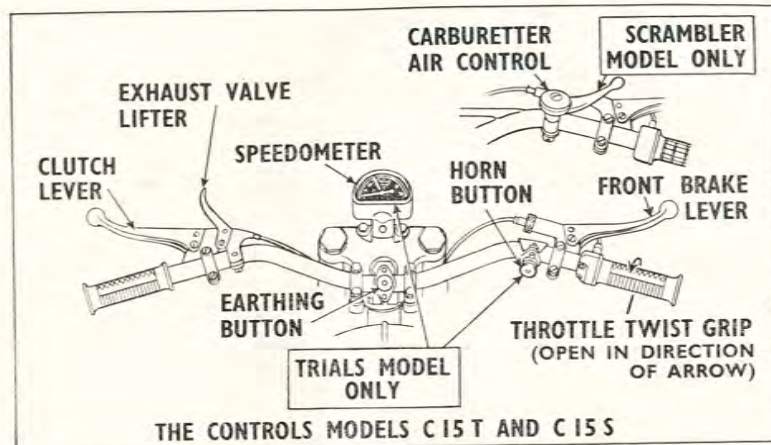


Fig. 1. The Controls.

Note:—The carburettor air control is not fitted to model C15 or to the Trials model. The exhaust valve lifter is not fitted to models C15 and C15 SS80.

Headlamp Dipper Switch (except Trials and Scrambles models).—Controls the switching from main to dipped headlamp bulb filaments, and is mounted on the left 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 affects 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.

Footstarter.—The footstarter 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 serrated button and turn anti-clockwise to lock. To turn off the petrol, reverse this procedure.

Lighting Switch (except Trials and Scrambles models).—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 (except Trials and Scrambles models).—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.

An alternative switch carries a detachable key at its centre. The ignition is switched off when the key is in a horizontal position, and to switch on, turn the key in a clockwise direction. The emergency starting position is obtained by depressing the key, and turning anti-clockwise from the central position.

Speedometer.—This is mounted in the headlamp nacelle.

Carburetter Tickler.—This is a small plunger in the top of the carburetter float chamber. Pressing it down pushes down the float and frees the needle valve thus permitting the carburetter 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 footstarter is pushed down. Turn on the ignition by means of the ignition switch, and close the air lever.

If the engine is cold depress the carburetter 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. Push down the footstarting lever slowly until resistance is felt, then, without releasing the pressure on the pedal, give a firm downward swing which should set the engine in motion. If the engine fails to start at the first attempt repeat this procedure, being careful to avoid rapid kicking at the lever which will serve no purpose and may damage the operating mechanism. When the engine starts, open the air lever about half-way, increasing the opening as the engine warms up.

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

To Stop Engine.

Close the throttle and turn the ignition switch to the "OFF" position. An "earthing" button is provided on Trials and Scrambles models for stopping the engine.

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 gear-change lever downwards to its limit, all these operations being performed simultaneously. Leave the throttle in its new 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 gearchange 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.

USING THE GEARBOX

Correct use of the gearbox must be made in order to obtain best results in all-round performance, especially with regard to the acceleration and hill-climbing capabilities of touring machines (particularly those fitted with a sidecar), and to the attainment of maximum speeds by sports models.

It is not always appreciated that the power delivered by a petrol engine depends upon engine speed. Hence, on a touring machine travelling uphill, the engine speed will fall as a result of the increased load, and with it the power output. In order to maintain sufficient power, a lower gear must be selected in order to increase the engine speed and so obtain more power.

Similarly, for good acceleration from moderate speeds in top gear more power is required and, here again, the solution is to change down to a lower gear. **It is better to allow the engine to "rev" in a lower gear than to labour in a higher one.**

On a sports model, the engine speed must be kept high in order to develop maximum power, and this means that for maximum acceleration and maximum speed the engine must be driven up to peak r.p.m. in the gears. **In particular, to attain maximum speed, it is essential to obtain peak r.p.m. in third gear before changing into top gear.**

Remember, your gearbox translates engine power into power at the rear wheel—use it.

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 500 miles, drain and refill the oil tank with fresh oil and clean the filters (page 16). Repeat this process after 1,500 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 2,000 miles and further changes made every 6,000 miles.

During the "running-in" period it is advisable to check the various adjustments such as tappets 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.

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 500 Miles.

Grease the swinging arm pivot.

Every 1,000 Miles.

Clean air filter.

Every 2,000 Miles.

Change the engine oil and clean the filters.

Check primary chain adjustment.

Check tightness of all nuts and bolts.

Check contact breaker adjustment.

Grease brake cam spindles, and speedometer drive.

Oil central stand.

Check rear chain adjustment.

Check level in gearbox, and primary chain case, and top up if necessary.

Every 6,000 Miles.

Change oil in gearbox.

Clean contact breaker.

Cleaning.

Take care when cleaning the machine that dirt is not introduced into the carburetter, 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.

Maintenance of C15T Special and C15S Special.

Routine maintenance on the competition models should be carried out more frequently depending largely upon the conditions in which the machine is used.

Always use



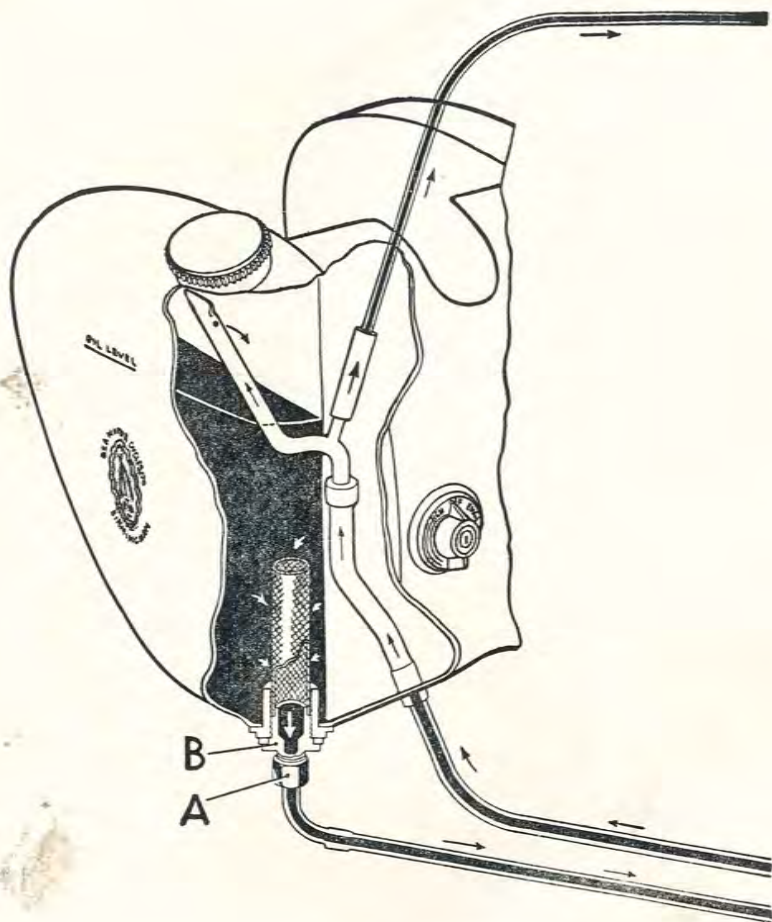


Fig. 2. The Oil Tank.

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 four 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

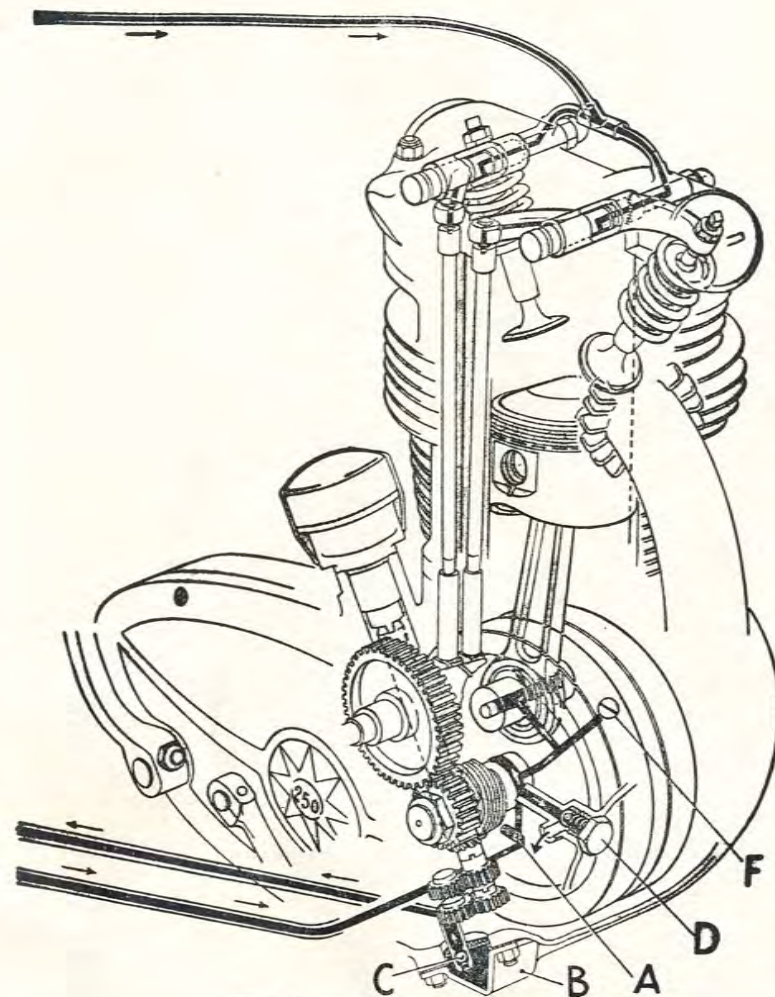


Fig. 3. Lubrication System.

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. In no circumstances should the cap of this valve be removed by the private owner.

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 (Figs. 2 and 3).

Remove the oil tank and crankcase filters for cleaning at regular intervals (see Routine Maintenance, page 12) 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 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 and 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 foot-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.

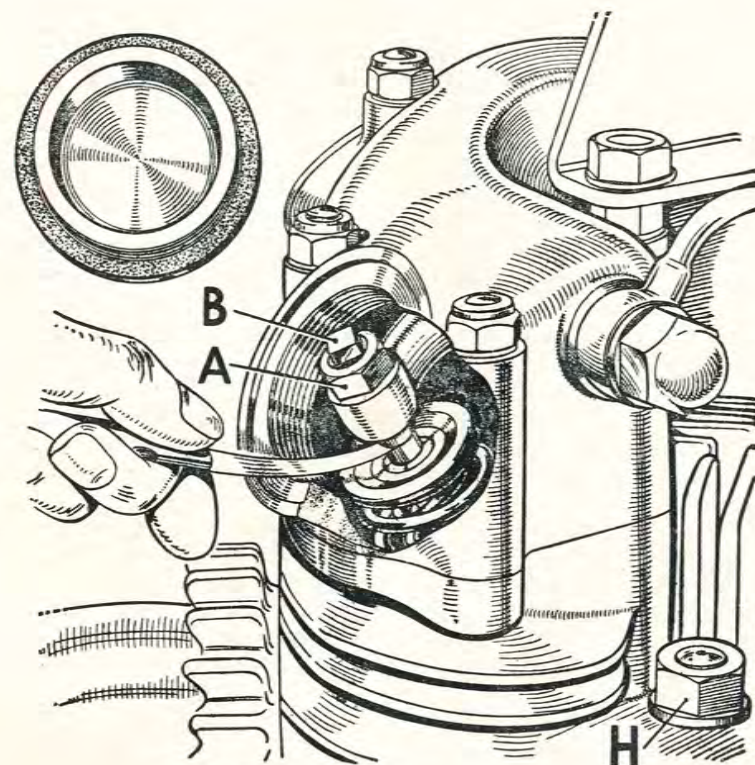


Fig. 4. Tappet Adjustment.

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 for all models are .008-in. (inlet) and .010-in. (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 taking out the securing screw, Fig. 5. The gap between the points when they are fully open should be .015 in. 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 retighten the screw and recheck 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 Prior to engine No. 41600 (model C15), No. 2585 (model C15 SS80), No. 4331 (model B40).

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. At this point both valves will be closed; if they are not, rotate the engine through one revolution. The engine is most easily rotated by engaging top gear and turning the rear wheel. Keep the rod as vertical as possible.

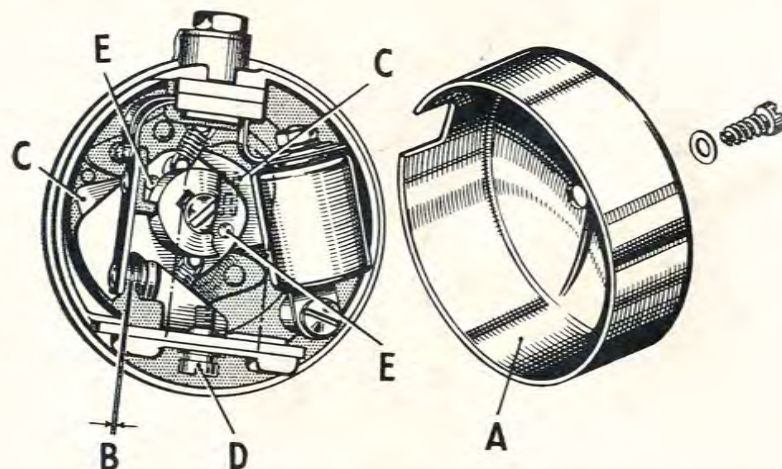


Fig. 5. Contact Breaker and Auto-Advance Mechanism.

In order to ensure that the backlash in the timing gears is taken up, first rotate the engine backwards so that the piston descends about $\frac{1}{8}$ -in., then rotate the engine in a forward direction until the piston is $\frac{1}{16}$ -in. before T.D.C. In this position, 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.

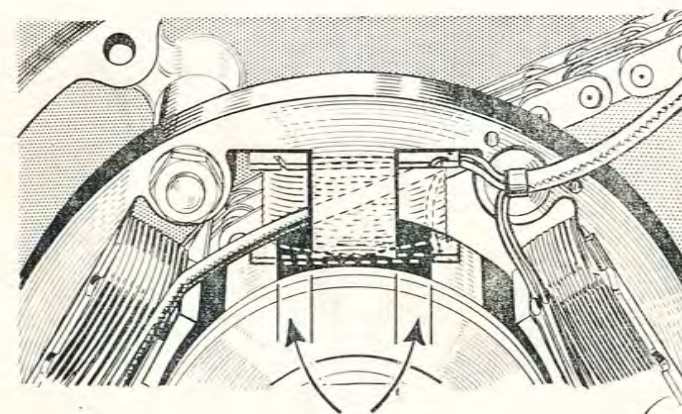
If the ignition setting is incorrect with the piston set as above, slacken the clip screw (E) Fig. 7, and rotate the contact breaker housing gently until the points are just about to open. Retighten the clip screw and recheck the adjustment, as movement of the housing may have disturbed the timing gear backlash.

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

Models C15S and C15T Prior to engine No. 1530 (model C15T), No. 3320 (model C15S).

The C15T and C15S are timed by a different method due to their being equipped with the "Energy Transfer" ignition system. This system is very sensitive in operation and the following instructions should be strictly followed if the best results are to be obtained.

Set the contact breaker gap to .015-in. before commencing to time the engine.



OVERLAP
MUST BE EQUAL ON BOTH
SIDES WHEN POINTS ARE
BREAKING

Fig. 6.

Not applicable after certain engine numbers (see page 20).

Now bring the piston to top of the bore on the compression stroke as described previously, then rotate the engine backwards so that the piston descends about $\frac{1}{2}$ -in., before bringing the rotor into the position shown in Fig. 6. The rotating of the engine backwards first, ensures that the backlash is taken up in the gears. It therefore follows that while bringing the rotor into the position illustrated, the engine should be in a state of constant forward revolution.

Now with the rotor in this position the contact breaker points should be just about to open. This can be checked and if necessary corrected as with the standard models.

Ignition Timing.

250 c.c. Star model C15 from engine 41600.

250 c.c. Sport Star model C15 SS80 from engine 2585.

250 c.c. Scrambles Special, model C15T from engine 3320.

250 c.c. Trials Special, model C15T from engine 1530.

350 c.c. Star model B40 from engine 4331.

350 c.c. Sport Star model B40 SS90 from engine BS101. Also engine numbers B40B336 to B40B393.

The above models are fitted with an auto-advance mechanism having a modified range which results in a revised ignition setting. The method of checking or setting the ignition timing is as detailed on pages 18 and 19, except that with the contact breaker points just about to open, the piston must be .007-in. before T.D.C. Alternatively, a crankshaft angle of 5 deg. can be used, if preferred. Figure 6 will no longer apply to the Scrambles and Trials models.

Note especially that with the Energy Transfer system employed on these two engines, the contact breaker **must** be set at .015-in. before timing the ignition.

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 when checking the contact breaker adjustment, 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 footstarter 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. 7, 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 reassembled.

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 footstarter 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 cam plate pivot, allowing the pivot itself to be taken out rearwards, leaving the cam plate in the box.

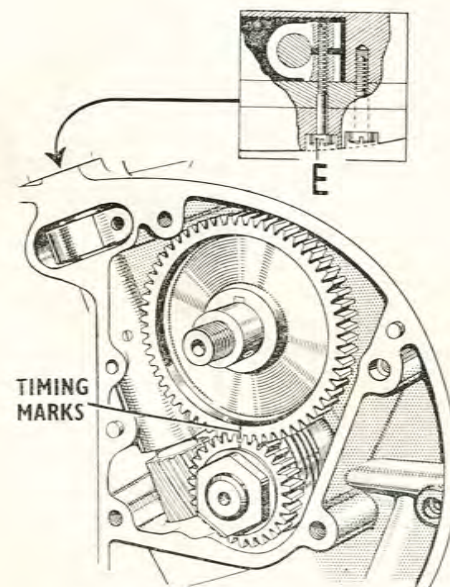


Fig. 7. Valve Timing Marks.

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. 7.

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 carburetter, so that the latter can be withdrawn from its studs and tied back out of the way. On later B40 models and all B40 SS90 machines it will be necessary to remove the air cleaner cover to expose the cleaner which is retained in position by a spring clip. Move this aside and unscrew the adaptor sleeve from the carburetter, leaving the latter free for removal. 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 on the C15 models the housing itself can be removed. Note that there are sealing rings at the top and bottom joint faces of the housing on these models, and if there is any sign of oil leakage at the 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 valve spring compressor (B.S.A. Service Tool 61-3340) 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 $1\frac{1}{8}$ -in.; outer spring $2\frac{1}{32}$ -in. For models C15S, C15 SS80 and B40 SS90 the corresponding lengths are $1\frac{1}{2}$ -in. (inner) and 1.67-in. (outer).

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 deg.

With the valves and seats in good condition or if they have been re-faced 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 re-faced with a proper valve seat cutter to ensure that the seat is concentric with the guide bore.

Before reassembling 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.

When replacing the valve springs on models C15S, C15 SS80 and B40 SS90, the close coils should be at the bottom.

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 $\frac{1}{8}$ -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 $\frac{3}{16}$ -in. 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

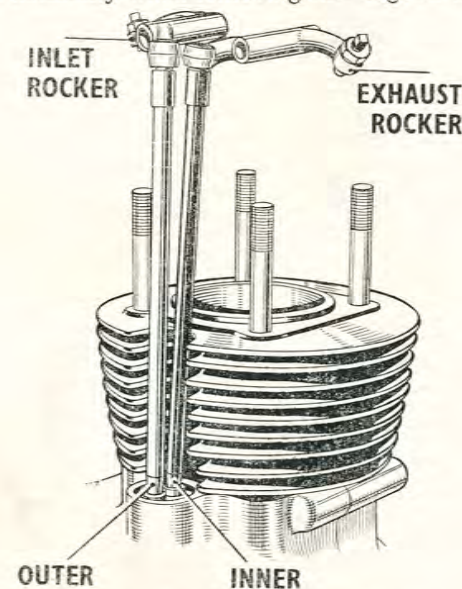


Fig. 8. Fitting the Push Rods.

and only permit a minimum amount of movement. A suitable too 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/.013-in. and although an increase of a few thousandths of an inch is not important, any large increase to say, .025-in. means that the ring should be replaced. The middle ring (i.e., the lower plain ring) is of the tapered variety. One of its side faces is marked "Top" and the ring should be fitted with this face upwards.

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-in. side-float and this permits some sideways movement at the other end of the connecting rod.

Scrupulous cleanliness must be observed when reassembling, 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

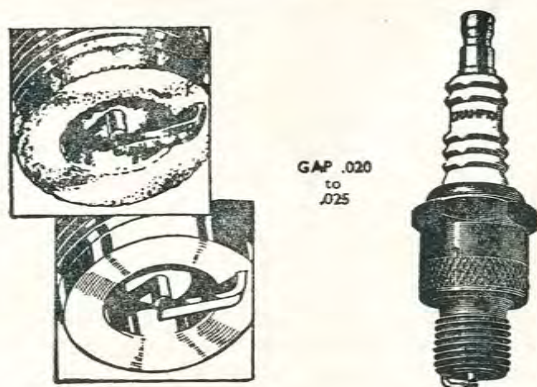


Fig. 9. The Sparking Plug.

the rings so that they pass smoothly into the lower end of the bore. Take 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.

Replace the push rod housing in position alongside the cylinder barrel on the 250-c.c. models, and fit the two push rods on their respective tappets, the outer one operating the inlet push rod, Fig. 8.

Refit the cylinder head with the rocker box already assembled to it, but with the push rod 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 push rods 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 re-fit the dual seat.

Finally, adjust the tappet clearances as described on page 16 and replace the sparking plug.

Sparking Plug.

Adequate attention to the sparking plug is of great importance in obtaining satisfactory engine performance. The Champion 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 2,000 miles (3,000 km.) 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. 9. The bottom of the plug body should remain a smooth black appearance and the central insulation should 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. 9, 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-in. (.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.

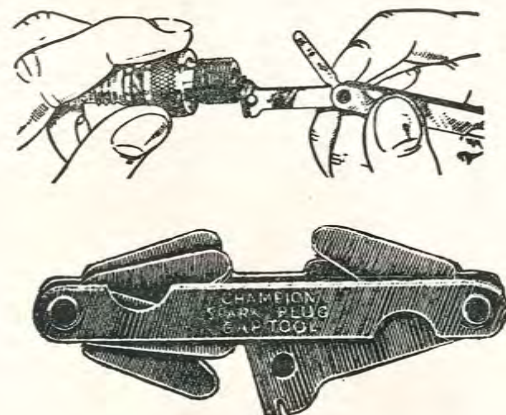


Fig. 10. Setting the Plug Points.

The gap is most easily adjusted with the aid of the special tool illustrated in Fig. 10, which also has feeler gauges attached to assist in measuring the plug gap. This tool is obtainable from any Champion plug stockist or from the Champion Spark 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 panner 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.

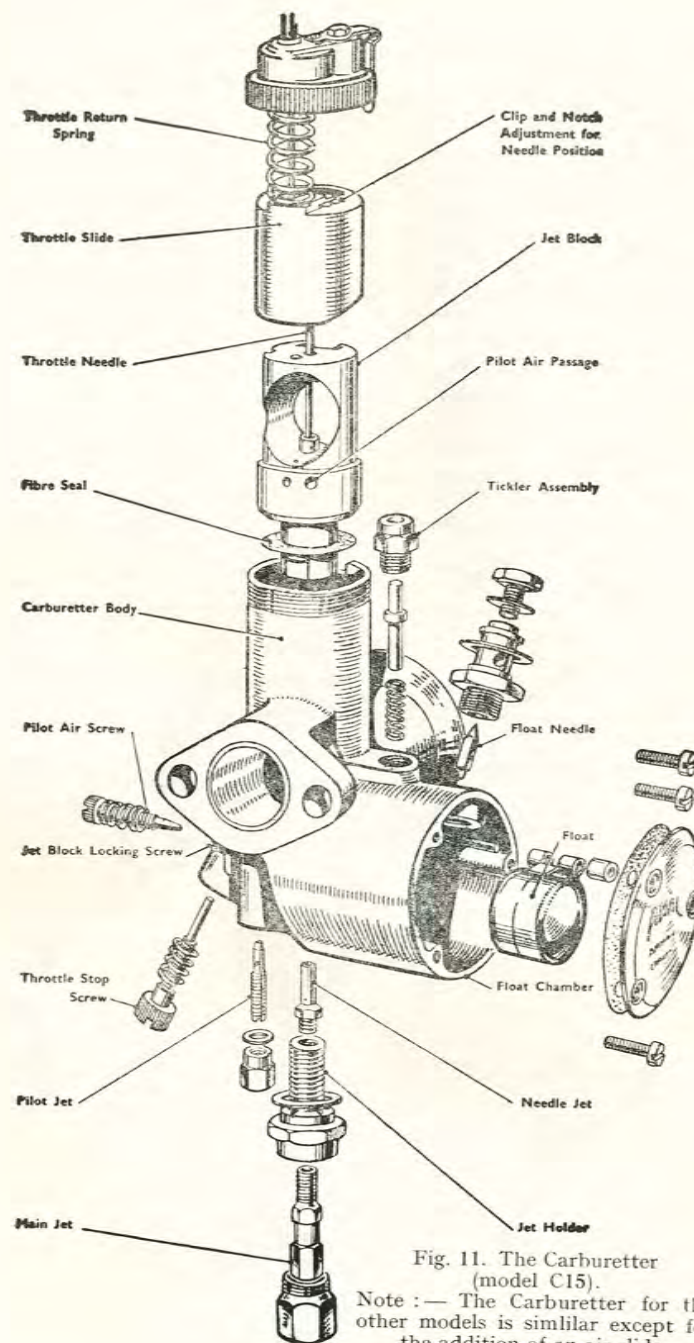


Fig. 11. The Carburettor (model C15).

Note: — The Carburettor for the other models is similar except for the addition of an air slide.

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. 11. 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 one of these as measured from the top (see page 5). 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.

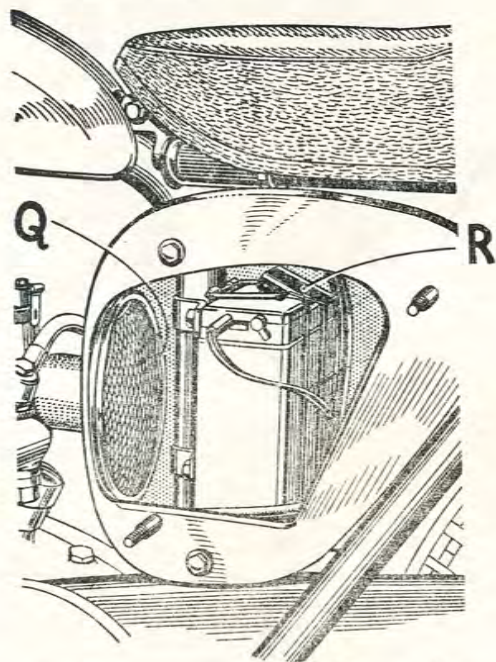


Fig. 12. Air Cleaner and Battery Box.

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 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 tick-over is achieved. If considerable alteration to the throttle stop has been made, the pilot air screw should be readjusted. 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.

Air Cleaner.

The air cleaner is contained within the housing below the seat. At 1,000 mile intervals remove the two screws retaining the cover, which should then be taken off (Fig. 12). Prise out wire circlip (Q) thus releasing the perforated cover and filter element. Wash the element in petrol, and dry thoroughly.

Trials and Scrambles models.—Remove the two screws retaining the cover to expose the air filter. Dismantle and wash the element thoroughly in petrol. When dry dip in a light oil and allow the surplus to drain off before replacing. As this filter is used under exceptional conditions it should be cleaned at a maximum interval of one week, and preferably before every event.



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.

Excessive slackness in the primary chain is undesirable and an adjustable slipper type tensioner is provided on the lower run of the

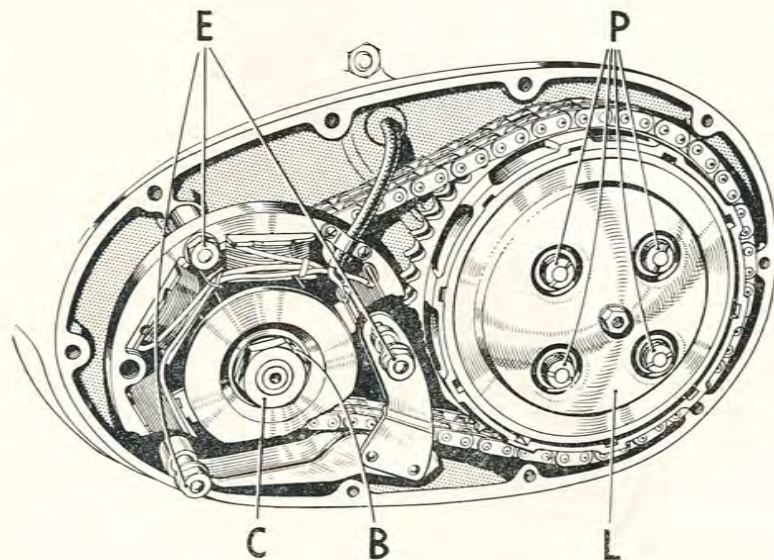


Fig. 13. Primary Chain Tensioner.

chain, except on model C15. The chain is in correct adjustment when there is approx. $\frac{1}{8}$ -in. of free play at the midway position between the sprockets. It is most important that the chain should never be taut.

For adjustment of the chain, the cover must first be removed (see page 36). When the two lower generator retaining nuts (Fig. 13) are slackened, the position of the slipper can be altered to give the correct tension.

The only other maintenance required is to ensure a satisfactory oil level in the chaincase (see page 36).

Care of the Rear Chain.

Lubrication is provided by a chain oiler from the rear of the primary chaincase, which provides a metered supply of lubricant, and should keep the chain in good condition. If maximum life is to be achieved, however, periodically 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 travels of the chain (i.e., forwards on the top run).

Rear chain adjustment involves moving the rear wheel and is described on page 42.

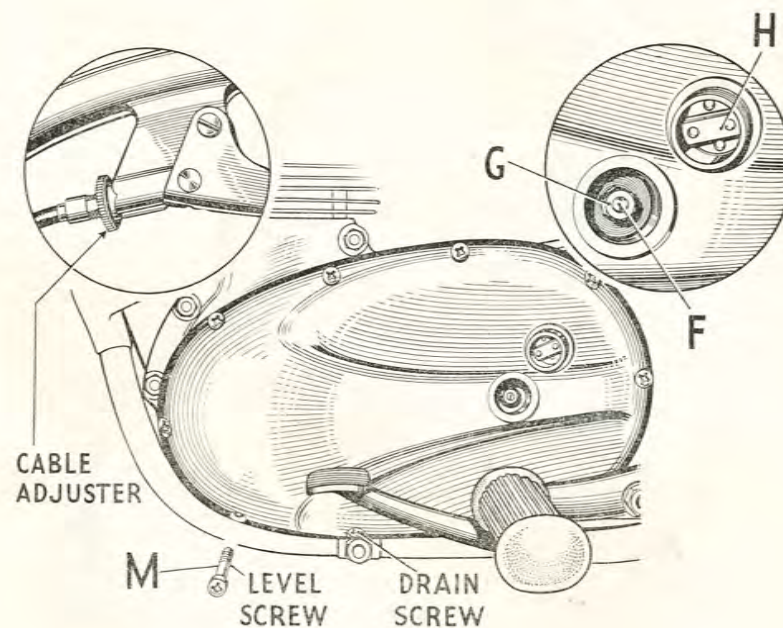
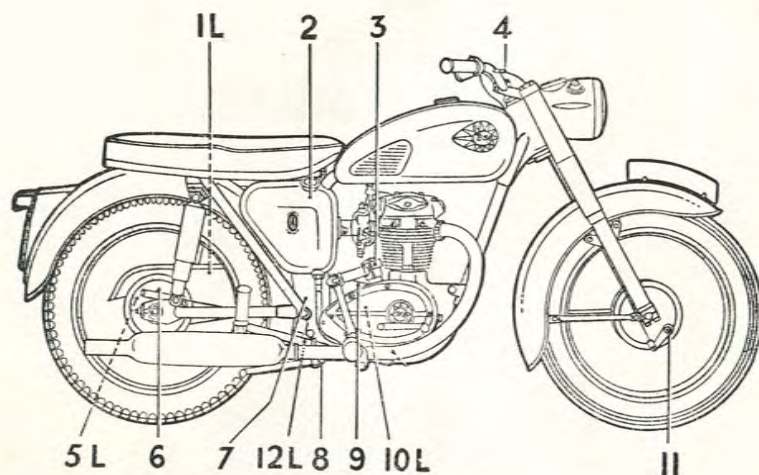


Fig. 14. Clutch Adjustment.



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 LM
Esso	Esso Extra Motor Oil 40/50	Esso Extra Motor Oil 20W/30	Esso Extra Motor Oil 20W/30	Esso Multi- purpose Grease H
B.P. Energol	S.A.E. 40	S.A.E. 30	S.A.E. 20	Energrelase L2
Regent	Havoline S.A.E. 40	Havoline S.A.E. 30	Havoline S.A.E. 20W	Marfak Multi- purpose 2

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. 20-40
Front Forks and Clutch: S.A.E. 20

LUBRICATION

EVERY 2,000 MILES

WEEKLY

Ref.	OIL	Page	Ref.	OIL	Page
2	Oil Tank, drain and refill.	12	2	Oil Tank	12
3	Auto-advance	20	12L	Brake Pedal	12
10L	Primary Chain Case	12/32	—	Control Rod Joints	12
1L	Rear Chain	33	4	Exposed Cables	12

LUBRICATION EVERY 2,000 MILES

Ref.	GREASE	Page	Ref.	OIL	Page
5L 11	Brake Cam Spindles	12	9	Gearbox	12/37
6	Speedo Drive	12	8	Central Stand	12
			2	Filters, Oil Tank and Crankcase	12/16
			5L 11	Brake Cam Spindles (Trials Special and Scrambles Special only)	41

SPECIAL NOTES

- Change Front Fork Oil at 10,000 miles.
- Lubricate Contact Breaker Cam at 6,000 miles.
- Grease Swinging Arm Pivot every 500 miles.
- Lubricate Front Hubs at 5,000 miles (Trials Special and
Scrambles Special only).

Clutch Adjustment.

Provision is made for cable adjustment by a knurled adjuster at the handlebar end (Fig. 14). This is for fine adjustment of the cable only.

The main clutch adjustment consists of a screw pin (F) and locknut (G) mounted on the clutch pressure plate. These are accessible after removal of the inspection cover (H). Slacken off the handlebar adjuster and pressure plate screw locknut. Screw in the adjuster screw until all free motion has been taken up. (Do not use force). Slacken back half-a-turn and retighten the locknut. Readjust the cable.

Primary Chain Case.

The outer cover is retained by screws of three different lengths, and one of these (M) Fig. 14, which is painted red serves as a level plug. To replenish with oil, first remove this screw and then the clutch inspection cover (H) Fig. 14, the latter acting as a filling orifice. Add oil of the correct grade (see Recommended Lubricants, page 34) 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. Note that the screw on the right of (M) is also painted red. This serves as the drain plug.

Removal of Primary Chain Cover.

If for any reason, the generator, clutch or primary chain require attention, the outer half of the primary chain case 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.

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.

Clutch Spring Pressure.

Whenever the clutch has been dismantled, the spring pressure must be re-set carefully. The four retaining nuts (P) Fig. 13, should be screwed in until the underside of the head of each nut is approximately $\frac{1}{8}$ -in. 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 footstarter 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.

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. 15, take out the level plug and replenish with the correct grade of oil until it starts to flow out through the level plug hole.

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 $\frac{3}{4}$ pint and suitable oils are detailed on page 34.

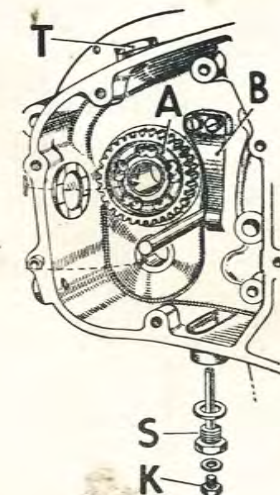


Fig. 15. The Gearbox Drain Plug.

Footstarter Spring.

Removal of the outer timing cover as described on page 21 gives access to the spring. Its outer anchorage is released when the lockplate has been prised off the flats on the footstarter spindle. The inner anchorage hooks round the head of a special screw, which must not be disturbed, otherwise the footstarter stop plate inside the gearbox will be released, necessitating the removal of the inner timing cover before it can be replaced.

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. 16. 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 footstarter 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.

Brake Adjustment.

For obvious reasons the brakes should always be kept at maximum efficiency and for this to be maintained, the shoes should be just clear of the drum when the brake is off, and close enough for immediate contact when the brake is applied. The brakes must not be adjusted so closely however, that they are continually in contact with the drum, otherwise excessive heat may be generated, resulting in deterioration of braking efficiency.

The front brake adjuster is situated at the handlebar end of the cable (see page 7) and rotation of the self-locking sleeve shortens or lengthens the cable, so adjusting the shoes in the drum.

The rear brake is adjusted by turning the self-locking sleeve (A), Fig. 18, in a clockwise direction, (viewed from the rear of the machine), to shorten the effective length of the brake rod, and open the shoes in the drum.

Note that for maximum efficiency the angle between the operating lever and cable or rod should not exceed 90 deg. when the brake is fully applied.

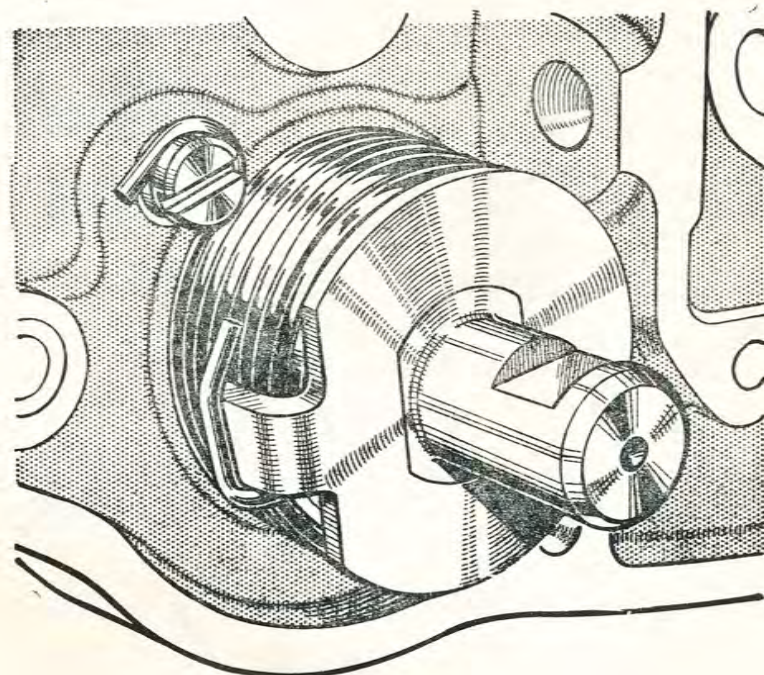


Fig. 16. Fitting the Footstarter Spring.

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. 17, 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

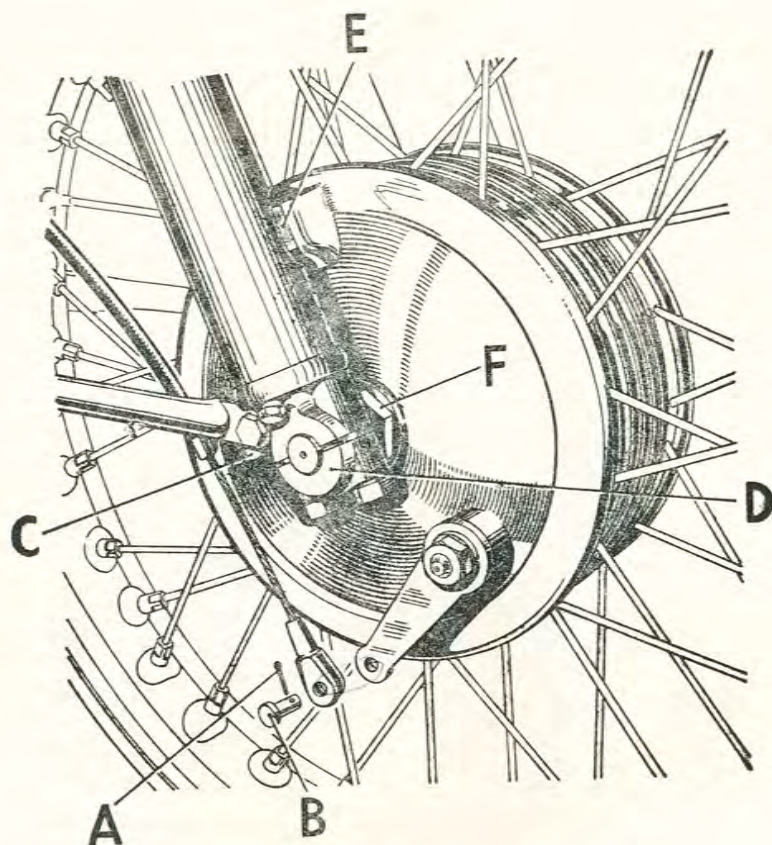


Fig. 17. Removing the Front Wheel.

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 Wheel Removal and Replacement (Trials Special and Scrambles Special).

To remove the front wheel, first disconnect the brake cable at the lever on the brake plate and then slacken the pinch bolt at the bottom of the nearside fork leg. Insert a stout tommybar through the hole at the head of the wheel spindle and unscrew it from the hub. Note that it has a left-hand thread and unscrews by turning in a clockwise direction. Support the wheel as the spindle is withdrawn, and when it is clear, the wheel can be pulled away from the offside fork leg and removed from the machine.

After removal do not allow the wheel to fall on to the bush which projects from the brake drum side of the hub. Although the bush is pressed in, it may, if subjected to a sharp blow, be forced back into the hub. If this should happen, the bush can be retrieved and re-positioned with the aid of the wheel spindle.

When replacing the wheel note especially that the brake plate stop must be located in its recess at the rear of the offside fork leg. It is most important that after the spindle has been tightened and before the pinch bolt is locked up, the forks are depressed once or twice to enable the nearside fork end to position itself on the spindle. If this precaution is not observed, the fork leg may be clipped out of position and will not function correctly.

Front Brake Cam Spindle Lubrication (Trials Special and Scrambles Special)

Move aside the spring clip on the spindle boss and apply two or three spots of engine oil every 2,000 miles. Excessive oiling may allow the lubricant to reach the brake linings.

Front Wheel Bearings (Trials Special and Scrambles Special)

A grease nipple is provided at the centre of the hub but constant lubrication is unnecessary. The bearings are packed with grease during assembly and all that is required is two or three applications of the grease gun at intervals of 5,000 miles.

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. 18, followed by the anchor arm (D), and disconnect the speedometer cable at its union on the worm 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.

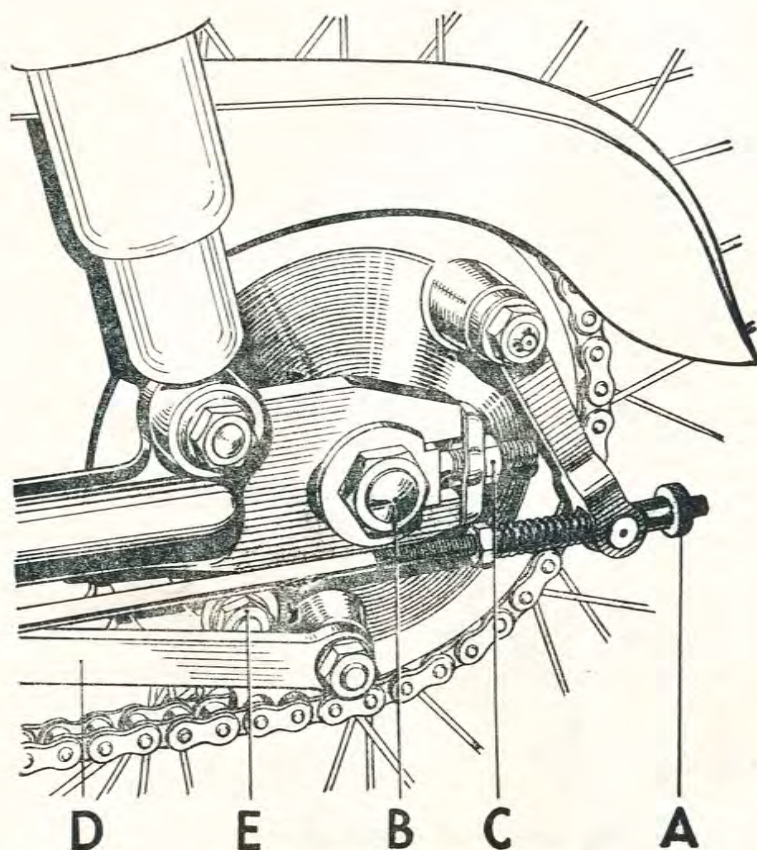


Fig. 18. Rear Chain Adjustment.

Rear Chain Adjustment (Fig. 18).

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 $1\frac{1}{8}$ -in. and if it carries 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, and the front lever fitted to the Trials and Scrambles Specials, 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.

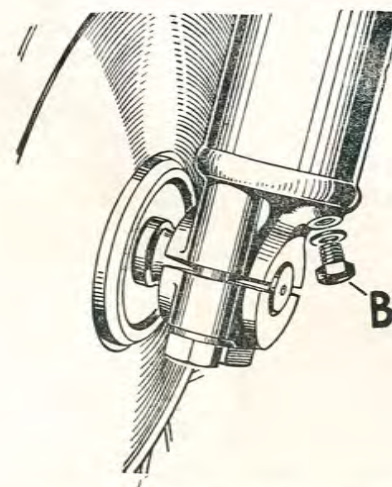


Fig. 19. Front Fork Drain Plug.

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.

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

When new shoes have been fitted, the brakes must be centralized. 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. 18, 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. 20, and the drain plug in the lower end of the fork sliding member as shown at (B) in Fig. 19. 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.

Replace the drain plugs and pour the correct amount of oil into each leg (see page 4). 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 Extra Motor Oil 20W/30; B.P. Energol S.A.E. 20; Regent Havoline S.A.E. 20W.

Steering Head Adjustment.

The steering head should be tested occasionally for play and to ensure that the forks rotate 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 nuts (C) and (E) Fig. 20, then tighten down the cap nut (D) until the adjustment is correct. Hold the handlebar 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 ballraces are damaged. When the adjustment is correct, tighten the clamping nuts (C) and (E). The latter clamps the fork shafts and must be quite tight.

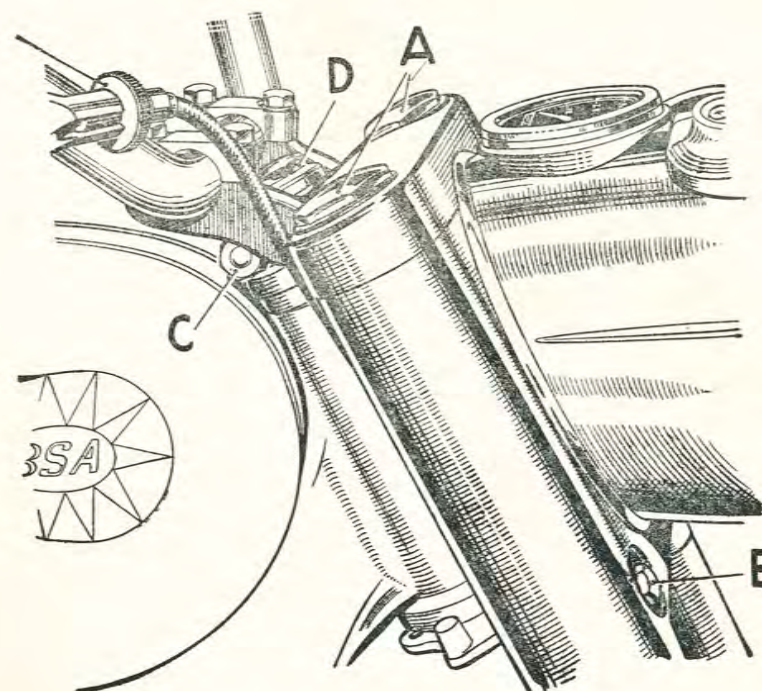


Fig. 20. Front Fork and Steering Head.

Rear Suspension.

The swinging arm pivot should be greased at 500 mile intervals. In the case of Competition models this should be carried out before every event. Grease should be applied until it can be seen to exude from the bushes, excess grease should then be wiped away.

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 remaining nuts at the bottom.

Trials and Scrambles Specials. The pressure on the springs can be varied by means of a three position cam adjuster at the lower end of the unit and the springs can therefore be adjusted to suit the load conditions or nature of the ground. A suitable spanner for this adjustment is provided in the toolkit.

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.



THE ELECTRICAL EQUIPMENT

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.

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—Discharged Battery (See page 8).

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 in this position 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 due to the reducing amount of energy thus available for transfer to the coil, misfiring occurs. This, incidentally serves as a reminder to switch back to the normal position, when the coil will be operating under battery ignition, and full power will be available.

Running without a Battery.

If it is required in an emergency to run the machine without the battery in position, unscrew the terminals and remove the battery. The NEGATIVE lead which previously went to the battery must be earthed to the frame, and the stop light must be disconnected. If this is not done the rectifier may be seriously damaged.

Alternator.

Except for an 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. Therefore, at weekly intervals, and more often in warm climates, the electrolyte level in the battery cells must be checked.

The battery is mounted in a special compartment beneath the dual seat (Fig. 12). Lift the clasp (R) which releases the battery from its carrier and withdraw the battery. Remove the battery lid, unscrew the filler plugs, and, if necessary, add distilled water to maintain the level indicated by the blue line. Do not use tap water, as it may contain impurities detrimental to the battery, nor use a naked light when examining the condition of the cells. The ordinary battery filler is unsuitable for this purpose.

Cleaning.

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

Filling and Soaking of MLZ 9E Batteries—when new.

Discard the vent hole sealing tapes.

Pour into each cell pure dilute sulphuric acid of appropriate specific gravity to the **coloured line denoting the maximum filling level** and allow the battery to stand at least one hour. Thereafter keep the acid just level with the blue line by topping up with distilled water.

Specific gravity of electrolyte (corrected to 60°F., 15.5°C.) for filling both uncharged and dry-charged batteries:—

- (a) In climates ordinarily below 90°F. (32.2°C.) use acid of 1.270 s.g.
- (b) In climates ordinarily above 90°F. use acid of 1.210 s.g.

Battery—Maintaining Condition.

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 at about 1.5 amperes to prevent any tendency for the plates to become permanently sulphated.

Battery Earth.

The A.C. lighting/ignition unit has been designed for positive (+) earth systems. If the battery connections are reversed the equipment will be damaged.

Contact Breaker Unit.

Setting—after first 500 miles and, thereafter, every 2,000 miles. The contact breaker points must always be kept free from grease or oil, and the gaps checked at regular intervals, as above (see also page 5).

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 traces 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. This maintenance of the contact breaker unit also applies to models C15T and C15S.

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 grease 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.

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. 21.

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 pre-focus 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.

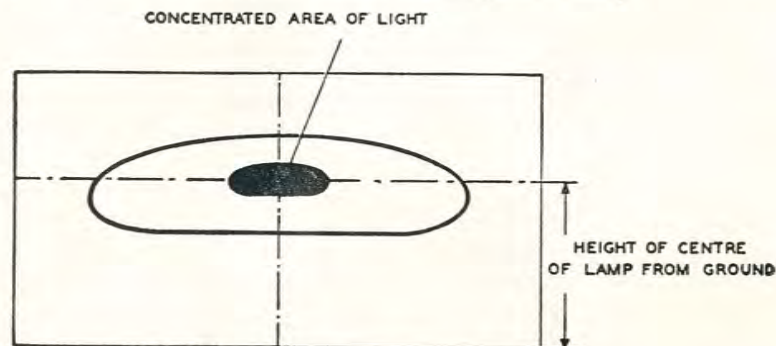


Fig. 21. Headlamp Beam Setting Pattern.

Bulb Replacement—Headlamp.

Lucas bulb No. 312 6-volt 30/24-watt Pre-focus. 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 adaptor inwards and turn it to the left. Lift off the adaptor and withdraw the defective bulb. After fitting the replacement bulb, reverse the above procedure to reassemble the lamp.

Parking Light.

Lucas bulb No. 988 6-volt 3-watt. 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.

Stop Tail Lamp.

Lucas bulb No. 384 6-volt 6/18-watt (C models 6-volt 3/18-watt). Access to the bulb is gained by slackening the two lens retaining screws. When fitting the replacement bulb note that the securing pins are offset to ensure correct insertion into the bulbholder.

Horn.

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

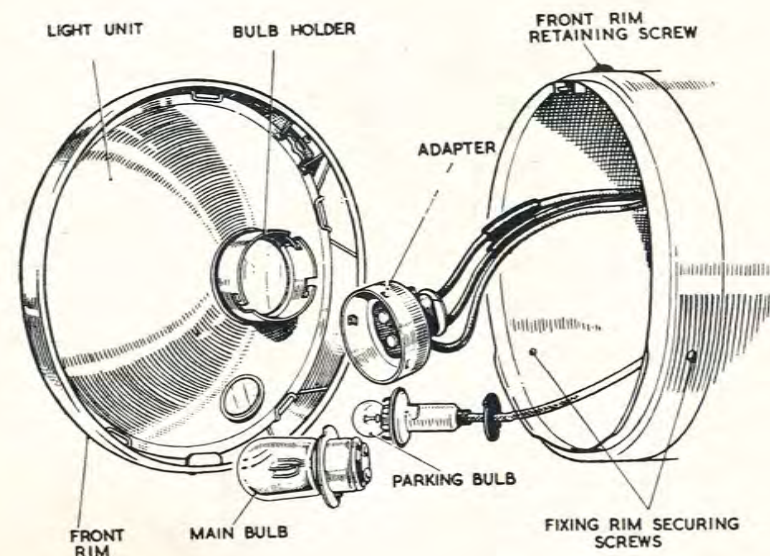


Fig. 22. Headlamp Dismantled for Bulb Renewal.

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 on 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.

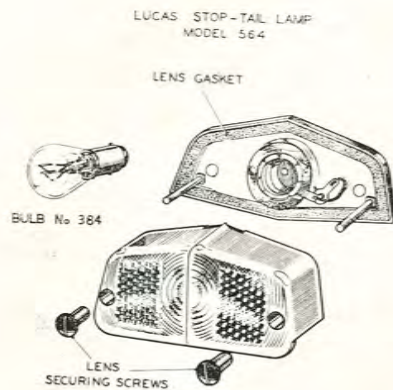


Fig. 23. Stop Tail Lamp Dismantled for Bulb Renewal.

Wiring Diagram.

A diagram of the electrical circuit appears on pages 53, 54 and 56. The insulation of the wires is individually coloured and these colours are indicated on the diagram.

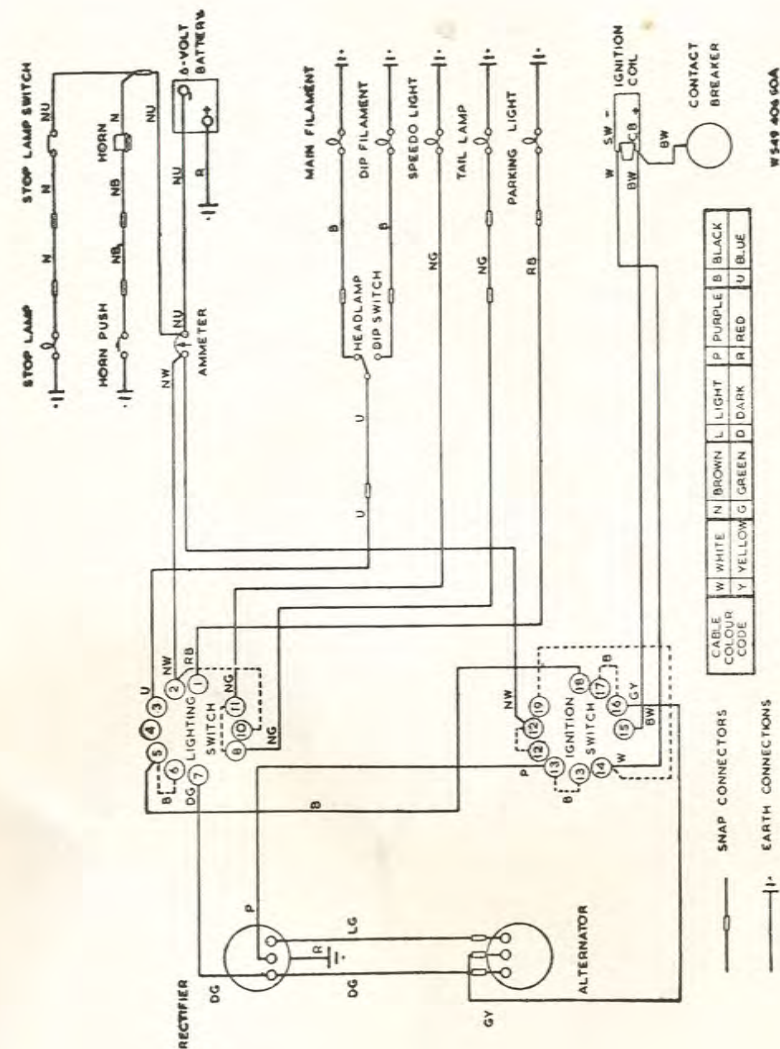
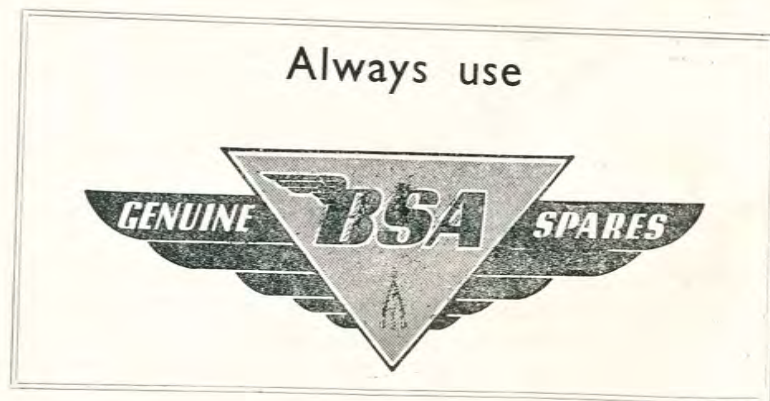


Fig. 24. Wiring Diagram, Models C15, C15 SS and B40. (See also Fig. 25).

LUCAS ENERGY TRANSFER IGNITION USED ON B.S.A. C15 TRIALS AND SCRAMBLE MOTOR CYCLES

These machines are equipped with an ignition system known as Energy Transfer Ignition. This system incorporates certain characteristics of both magneto and coil ignition.

Electrical energy for ignition (and lighting when fitted) is provided by the alternator. This alternator has six stator windings of which four are used for ignition purposes the remaining two coils being available to serve the needs of any lighting circuits—exclusive of the stop lamp which, when fitted, is fed from a tapping off one of the ignition coils. The alternator has an engine-driven rotor containing six high-energy permanent magnets.

Energy Transfer Ignition.

The four ignition windings of the stator are connected in series with each other and with the primary winding of a separately mounted ignition coil—an ignition coil designed specially to operate on the energy transfer principle. A contact breaker mechanism of a 15D1 distributor has its contacts connected in parallel with the ignition coil primary winding. Since one side of the stator windings, and of the ignition coil primary winding, and of the contact breaker is earthed, these three parts of the circuit are, in effect, connected mutually in parallel. Closure of the contact breaker contacts thus short-circuits the ignition coil primary winding and, at the same time, creates a closed circuit of the four series-connected stator ignition windings. As the magnet rotor turns, voltages are induced in the stator windings giving rise to alternating currents during the period that the contacts are closed. At the instant of contact opening, however, a pulse of electro-magnetic energy, developed by the alternator during the contacts closed period, is discharged through the ignition coil primary winding. The effect of this energy pulse in the primary winding is to induce a high voltage in the ignition coil secondary winding, and this H.T. voltage is applied by way of the distributor to the appropriate spark plug.

Timing (See pages 19, 20).

Accurate ignition timing is an important requirement in the operation of an energy transfer system. The contact breaker is arranged to open only at peak instants in the alternating current cycle in order that maximum electro-magnetic energy is transferred from the alternator to the ignition coil and a good spark obtained at the plug.

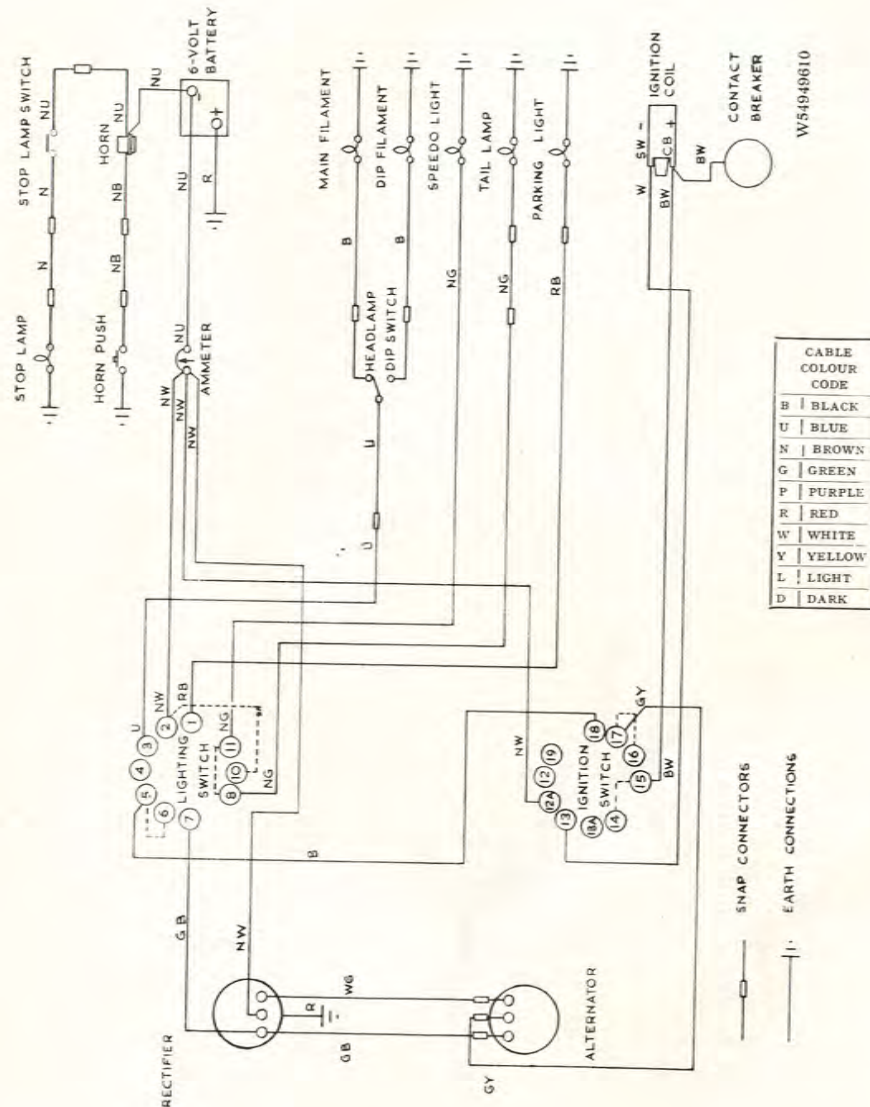
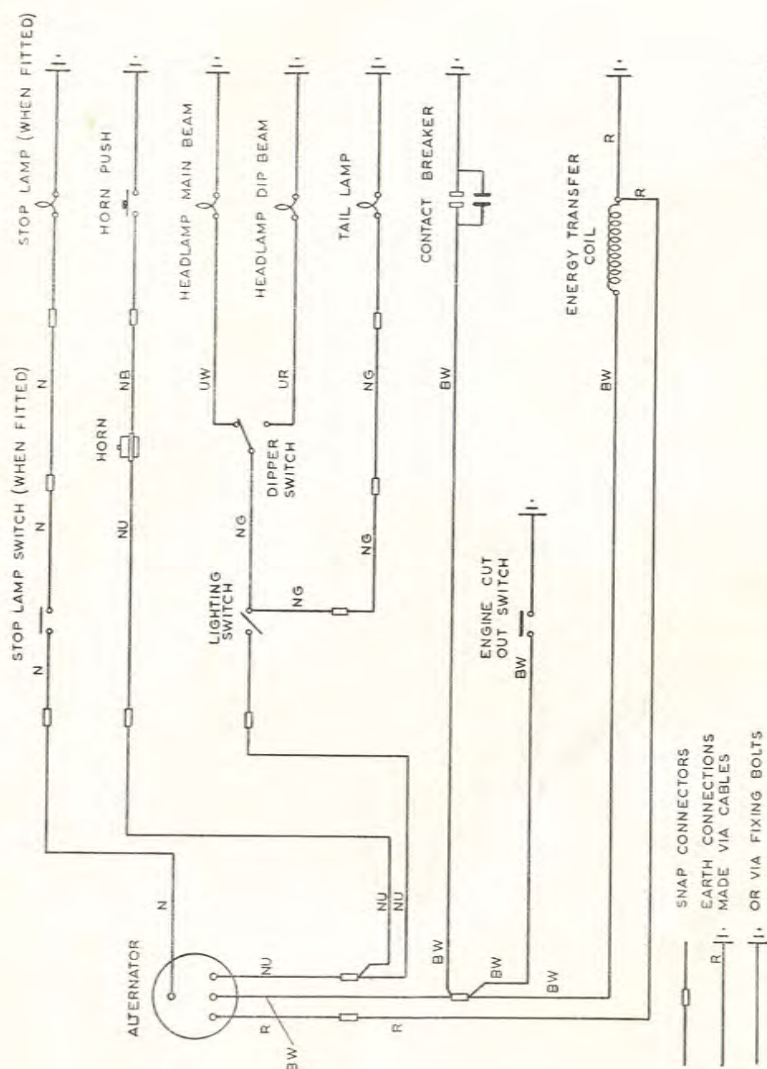


Fig. 25. Wiring Diagram for model C15 from Engine No. C15-29839, model C15 SS80 from Engine No. CSS-1101 and model B40 from Engine No. B40-3601. All B40 SS90 Engines.



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Fig. 26. Wiring Diagram Models C15T and C15S.

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 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 footstarter, 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 Cheyne(Cycles)	147-149, Holburn Street	50341/2	Motobike, Aberdeen
Aberystwyth	Gwalia 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.
Alloa	J. G. Robertson(Cycles) Ltd.	55-57, High Street	193	
Andover	Corbett & Ellis (Andover) Ltd.	Weyhill Road	2991	
Ashington	Mains of Ashington	Laburnam Terrace	3204	
Aylesbury	Eborn's Garage	44, Walton Street, Aylesbury.	3150	Eborn's Aylesbury.
Banbury	Trinder Bros.	2A-4, Broad Street	2546	
"	Taylor-Dow Ltd.	Southam Road	2641	
Barnesley	T. Garner & Son	Sheffield Road	2856	
Barnstaple	Bob Ray Ltd.	43, High Street	4266	
Basingstoke	Fred Slade	May Place, London Street	1338	
Bath	R. U. Holoway & Son	32-34, St. Johns Road	Bathwick 5034/64101 2374	
Bedford	The Imperial Cycle Co.	58, St. Lyses	2374	
Belfast	W. J. Chambers & Co.	105 & 108, Donegall Pass	27253-4	Fastnote, Belfast.
Biggleswade	Bryants	25, 27, 72 & 74, Shortmead Street.	3103	
Birkenhead	Bob Simister Ltd.	540-544, New Chester Road, Rock Ferry.	Rock Ferry 1452	

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address
Birmingham	County Cycle & Motor Co. Ltd.	265-266, Broad Street	Midland 2671	
"	C. E. Cope & Sons Ltd.	104, Bath Row (Repairs) (closed Saturday 1 p.m.)	Midland 2817	
"	Shovelbottom's Ltd.	481-487, Hagley Road, Edgbaston 17.	Bearwood 2246-7	
"	Aston Auto Motors	376, Ladypool Rd., Sparkbrook 12.	South 2212-3247	
"	Aston Auto Motors	173-177, Aston Road, 6	Aston Cross 3201-2	
Blackburn	S. & G. Motor Cycles (Blackburn) Ltd.	15-, 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 Bos. Ltd.	473 & 475, Christchurch Road.	Boscombe 33231/2	
Bradford	Sidneys Motor Cycles	107, Manningham Lane	29889	
"	J. K. Hirst Ltd.	41, Wakfield 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	Ralphs	110, Birmingham Road	3228	
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	2275/6	
Cardiff	Car Distributors (Cardiff) Ltd.	134-140, City Road	30022	
"	Robert Bevan & Son	29-35, Castle Street	27477/8	
Carlisle	W. T. Tiffen & Son	Irishgate, Carlisle	25024	Tiffin, Irishgate, Carlisle.
Carmarthen	Eddie Stephens Motors	22/23, Water Street	Carmarthen 6233	
Chatham	Grays of Chatham Ltd.	11-19, High Street	4005	
Chelmsford	Hadlers Garage Ltd.	New Street	4844-5	Hadler, Chelmsford.
Cheltenham	H. & L. Motors Ltd.	Bath Street	2887	
Chester	Davies Bros. Ltd. (Chester)	34, Bridge Street	25510	
Chesterfield	Walter Wragg Ltd.	95, Lordsmill Street		

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
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	
Colne	.. C. H. Schofield (Motors) Ltd.	Market Place	859	
Coventry	.. Coventry Motor Mart Ltd.	86, London Road	22146-7	Coventry Motor Mart.
Crawley	.. Lewis Thirkell	60-62, The Boulevard ..	Crawley 25507	
Crewe	.. Cooke's Garages	10-20, Nantwich Road ..	2011	Cooke's Motors, Crewe.
Croydon	.. Godfreys Ltd.	228-234, London Road ..	Croydon 3641-2	Gofrabike, Croyden.
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	.. Schwiezo Bros. Ltd.	177, Lowfield Street ..	Dartford 4279	
Derby	.. Ingles Provincial Garages) Ltd.	Walbrook 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 & 193, High Street ..	Dudley 53464	
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	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.
"	C4 J. R. Alexander & Co. Ltd.	272, Great Western Street	Douglas 7516	Alex Moto, Glasgow 3802/3/4.

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Gloucester	.. Harpers of Gloucester	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	
Harrogate	.. H. Acland (Prop. 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.	52b, Commercial Street	2239	Kear Hereford
Holbeach	.. Gordan 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	29802/33990	
"	.. Jordans of Hull	Storey Street	16131	Gumpton, Hull.
Ilford	.. J. J. Double (Motor Cycles) Ltd.	Mildmay Parade, Cranbrook Road	Crescent 0191/2	
Ilkeston	.. Ray Gamble	Pelham Street (off Bath Street).	7723	
Ipswich	.. Revetts Ltd.	Clarkson Street	873	
Jersey	.. Colebrooks (J. D. Poingdestre).	22½ New St. Johns Road, St. Helier.	53726/7	Central 642
Keighley	.. Dick Ratcliffe	Coldshaw Garage, Haworth.	315	Colbrooks, Jersey.
Kendal	.. Tom O'Loughlin Ltd.	66, Stricklandgate ..	Haworth 3133	
Kings Lynn	.. Peter Guest Ltd.	123/5, Wooton Road ..	315	
Kirkcaldy	.. County Motors (Kirkcaldy) Ltd.	123/5, Wooton Road ..	4129	
Lancaster	.. Pye Motors Ltd.	Junction Road	Dysart 5631	
Launceston	.. J. Wooldridge & Son	Parliament Street ..	3553	
Leeds, 1	.. Watson-Cairns & Co. Ltd.	Western Road	21	Wooldridge, Launceston.
Leicester	.. E. W. Campion & Son Ltd.	157-8, Lower Briggate ..	33024/5	Watson-Cairns, Briggate, Leeds.
Lincoln	.. Wests (Lincoln) Ltd.	Welford Place	58054	
Liverpool, 3	.. Cundles (Liverpool) Ltd.	116, High Street	21262	
Llwhaden	.. James Bowen & Sons (Llwhaden) Ltd.	41, Byrom Street	Central 4148	Cundles, Central 4148.
		Llwhaden, near Narberth, Pem.	Llwhaden 6	

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
London, N.W.1	J. Grose Ltd.	.. 379-381, Euston Road ..	Euston 5231	
" W.1	Godfreys Ltd.	.. 208-210, Great Portland Street.	Euston 4632-4	Gofrabike, London.
" S.E.18	Cleare & Co. Ltd.	.. High Street	Woolwich 0174	
" W.5	Kays of Ealing Ltd.	.. 8-10, Bond Street ..	Ealing 2387	Sparesokay, Ealux, London.
" W.18	E. S. Longstaff Ltd.	.. 88, High Road, Woodford	Buckhurst 6369-6757	
" 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.	.. 220, Barking Road, East Ham.	Grangewood 8088	Gofrabike, Forgate.
" N.5	Glanfield Lawrence (Highbury) Ltd.	25, 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	Slocumbes Ltd.	.. 239, Neasden Lane, Neasden.	Gladstone 3355	
" S.W.17	Elite Motors (Tooting Ltd.).	951-961, Garrat 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	
"	Alex Parker	.. 31/33, Palatine Rd., Northden.	Wythenshaw 2062	
"	Fred Fearnley Ltd.	.. 692-4, Ashton Old Road	East 1445-6	Fernbike, Manchester.
Mansfield	Henstocks	.. 128, Chesterfield Road ..	329	Henstock 329, Mansfield.

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
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	
Newport, (Mon.)	R. J. Ware & Sons	.. 69, Commercial Street	66206	
Northampton	Glanfield Lawrence	.. 40-44, Wellingborough Rd.	1272	
Norwich	Chapmans (Norwich) Ltd.	38-42, Duke Street ..	24727	
Nottingham	E. W. Campion & Son Ltd.	Arkwright Street and Queens Road.	83444	
Oldham	Alan Taylor (Northern Ltd.).	192, 207-211, Manchester Street.	Main 4456	
Oldbury	Bromford Garage	.. Bromford ..	Broadwell 2225	
Oswestry	Roy Evans (Motor Cycles).	Willow Street ..	1144-7	
Oxford	Temples	.. 69, St. Thomas Street ..	47496/7	
"	Faulker & Son	.. 12, Cardigan Street ..	57279	
"	John Avery	.. 228/230 & 240, Banbury Road.	57362/3	
Parkstone	Bob Foster	.. 472-6, Ashley Road ..	3500/1	
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 ..	23734	
Preston	Loxhams Garages Ltd.	Central Garage, Charnley Street.	Sales Dept. 4242, Service Dept. 4243	Loxhams, Preston.
Pulborough	Gray & Rowsell (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	

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address
Ripon ..	T. Ellis ..	2, High Skellgate, Yorks.	1079	
Romford ..	Brookland Motorcycle Spares Ltd.	94, North Street	61880 43347	
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 Wrang Ltd.	Stanley Works, Wellington Street.	26098	26098 Sheffield.
Shrewsbury ..	J. R. Meredith ..	Coleham Head ..	6529	
Sittingbourne	Scoones Garage ..	9, West Street ..	66	Scoones, Sittingbourne.
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	
Southsea ..	Percy Kiln ..	65, Elm Grove Southsea ..	Portsmouth 23734	
St. Helens ..	Geoff. Duke Ltd. ..	Greenfield Rd., Garage	3918	
Stockton-on-Tees	T. Cowie Ltd. ..	Norton Road ..	65361	
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.	Wheatsheaf Corner, North Bridge Street.	57666/7	
Swansea ..	Glanfield Lawrence (Swansea) Ltd.	13-14, Fisher Street ..	50311	
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 ..	Popegrove 2103 & 1435	

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

Town.	Name of Stockist.	Address.	Telephone No.	Telegraphic Address.
Uxbridge ..	Miles Motors ..	60, High Street ..	Uxbridge 6000	
Wakefield ..	Parkinsons (Wakefield)	38-52, Ings Road ..	2087	
Walsall ..	The Motor Cycle Mart	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.
Wellington, (Salop)	Bill Doran & Wright.	Matt Park Street Garage ..	138	
Westcliff-on-Sea	J. Costin & Sons ..	237, 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	
Wolverhampton	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	
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:

Messrs. Joseph Lucas Ltd., Birmingham.

Carburettors:

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

Dual Seats:

Motoplas Co. Ltd., Waverley Works, Birmingham, 10.

Electrical Equipment:

Messrs. Joseph Lucas Ltd., Birmingham.

Horns:

Messrs. Joseph Lucas Ltd., Birmingham.

Speedometers:

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

Tyres:

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

SPECIAL NOTE

Claims under guarantee, whether to B.S.A. Motor Cycles Ltd., or any of the manufacturers listed above, should be submitted through the B.S.A. Dealer from whom the machine was purchased.

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 Waverley Works, Birmingham 10. 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.