

Riders' Instruction Book

for

B64

Models

C10 250 c.c. S.V.

C11 250 c.c. O.H.V.

1946

"TO you who have just bought this B.S.A. Motor Cycle we say: "Welcome to the ranks of B.S.A. riders, and may your motor cycling miles be many and thoroughly enjoyable."

We at B.S.A. have done our utmost to design and produce for you a machine which will give that reliability and excellence of performance which you have every right to expect. We know that before your B.S.A. left the factory every single component had passed the expert eyes and precision instruments of trained inspectors—that every detail of its assembly had been carried out and checked by skilled mechanics, and that on its final road test it had to pass the critical judgment of a man whose job—day in, day out—is riding and "passing off" motor cycles.

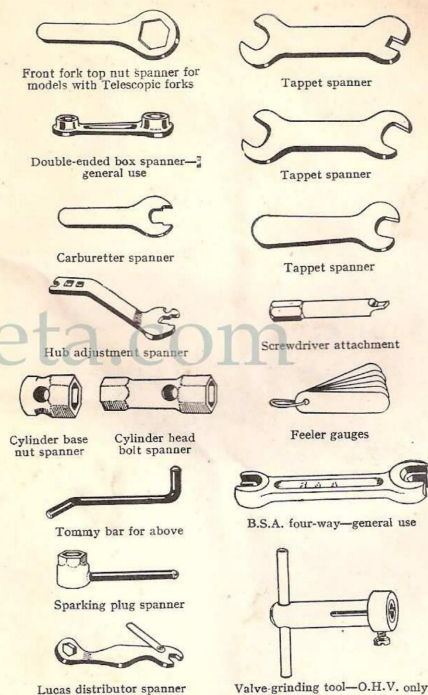
Henceforward the maintenance of your machine's performance and reliability is in your hands. That is the reason for this book, written with the sole idea of helping you—whether you be novice or expert—to carry out those periodical maintenance details which will keep your machine in perfect running trim.

USEFUL DATA.

	C10	C11
Petrol tank capacity (galls.)...	2½	2½
Oil tank capacity ...	4 pints	4 pints
Gearbox capacity ...	½ pint	½ pint
Bore (mm.) ...	63	63
Stroke (mm.) ...	80	80
Capacity (c.c.) ...	249	249
Tappet clearances (cold):		
Inlet ...	.004in.	.003in.
Exhaust ...	.006in.	.003in.
Compression ratio ...	5/1	6.5/1
Piston ring gap:		
Maximum ...	.010in.	.010in.
Minimum ...	.006in.	.006in.
Valve timing: Inlet ...		
Opens before t.d.c. 25°		
Closes after b.d.c. 70°		
Exhaust ...		
Opens before b.d.c. 70°		
Closes after t.d.c. 25°		
Ignition timing (piston distance from t.d.c. with points just opening) ...		
... 1/32in.	1/32in.	1/32in.
Distributor points gap ...	.012in.	.012in.
Plug points gap ...		
... .015—	.015—	.015—
... .018in.	.018in.	.018in.
Gear ratios: Third ...		
... 6.6	6.6	6.6
Second ...		
... 9.8	9.8	9.8
First ...		
... 14.5	14.5	14.5
Tyre sizes: Front ...		
... 3.00-19	3.00-20	3.00-20
Rear ...		
... 3.00-19	3.00-20	3.00-20
Tyre pressures:		
Front (per square inch) ...	20lb.	20lb.
Rear (per square inch) ...	28lb.	28lb.
Chain sizes:		
Front and Rear ...	½x.305in.	½x.305in.
Engine sprocket ...	16T	16T
Standard carburettor jet ...	80	80

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THE TOOLKIT.



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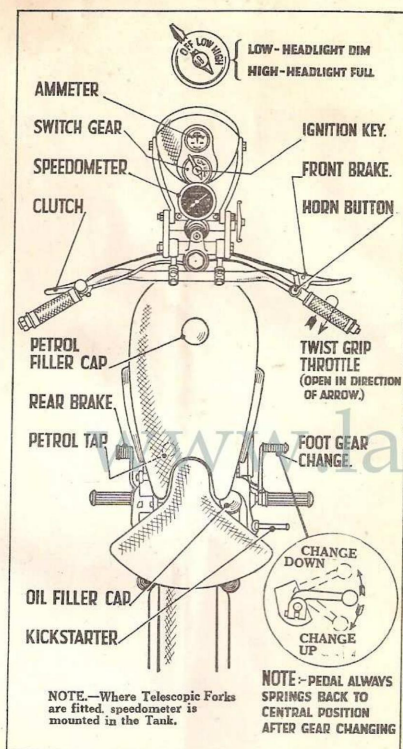


Fig. 1. The Controls.

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THE CONTROLS.

HANDLEBAR CONTROLS.

Twist-grip Throttle.

Controls engine speed. To open throttle (to increase engine speed) turn grip towards rider. Full movement about one quarter of a turn.

Front Brake.

Hand lever on right bar, below twist grip throttle. Pull lever towards bar to apply brake and note that this operates front brake only.

Clutch Lever.

Larger hand lever below left bar. Pull towards bar to declutch, i.e., disengage the drive between the engine and the rear wheel. As the clutch lever is slowly released, the drive is restored gradually and without sudden jerks. Always declutch to change gear.

Speedometer.

Mounted on bracket on front forks. Registers machine's speed and mileage.

FOOT CONTROLS.

Rear Brake Pedal.

On left-hand side, operates rear brake only.

Foot Gear Change Pedal.

On right-hand side, effects the change from one gear to another. To engage first gear from the neutral position, the pedal is moved upwards. Second and third gears are engaged by moving

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the pedal downwards. The pedal automatically returns to central position, ready for next gear change.

Kickstarter Pedal.

On right-hand side behind gear change pedal. Depression of this pedal rotates engine. See instructions on starting engine.

GENERAL.

Petrol Tap.

Located under rear end of tank. Tap has one serrated knob and one hexagon knob. To turn petrol off, serrated knob is pushed in. To turn petrol on, hexagon knob is pushed in.

Lighting and Ignition Switch.

On panel at rear of headlamp. Controls lighting of lamps as indicated on markings, and small key switches ignition on or off.

Ammeter.

On top of headlamp. Enables rider to see at a glance whether dynamo is supplying charge to battery, or whether battery is discharging.

Fork Shock Absorber.

On right lower fork link. Enables rider, by tightening or loosening the wing nut, to control the fork damping action provided by the friction disc and star washer. Intelligent use of the shock absorber will do much to prolong the life of the fork spring and add considerably to the rider's comfort and control over his machine. It should be adjusted to give a gentle floating fork action at all times, so that on main roads only a small amount of damping action is required, whilst over rough surfaces, it should be tightened to suit.

DRIVING.

To Start Engine.

Set gear control in neutral position, i.e., between first and second gear position.

If cold, first depress carburettor tickler momentarily. Open twist grip control a small amount, and give kickstarter a vigorous kick downwards.

To engage First Gear.

Depress clutch lever and move gear change pedal *upwards* to its limit. If difficulty is experienced in engaging first gear when stationary, rock the machine backwards and forwards, maintaining slight pressure on the gear change pedal, until the gear is felt to engage.

To Move Off.

Open throttle slightly and gently release clutch lever. As clutch engages open throttle a little further.

To Change Gear (Up).

Close throttle, disengage clutch and press gear-change pedal *downwards* to its limit, all these operations being performed simultaneously. Engage clutch and re-open throttle together immediately after changing. **Note.**—Violent pressure on the gearchange pedal is neither necessary nor desirable.

To Change Gear (Down).

Open throttle slightly, disengage clutch and draw gearchange pedal *upwards* to its limit, all these operations being performed simultaneously. Re-engage clutch immediately.

NOTE.—When changing gear, either up or down, it is preferable—after moving pedal—to hold it in position with the foot until after the clutch lever has been released, when the gears will be felt to engage.

HINTS ON "RUNNING-IN" A NEW MOTOR CYCLE.

The rider who has just purchased a new machine will do well to remember that all the hidden working parts are just as new as the enamel and plating which he can see, and like a new pair of shoes or a new suit, these hidden parts have got to get "worn-in" before they become a nice comfortable fit.

This wearing-in—or running-in as we call it—is the most important period in the life of the engine, and the handling you give it during the first 1,000 to 1,500 miles will determine what sort of service it is going to give you for the following 10-20-30,000 miles.

Give your machine a reasonably easy time during that initial period, give the wearing surfaces a chance to get nicely bedded-in under the best conditions, and you'll have a much sweeter-running engine as the result.

Avoid sudden and sharp acceleration, especially when the engine is not pulling under load.

Don't force it up hills in top gear when a change down will ease the load.

Have the patience to wait until that running-in period is up before you see what she'll really do.

Carry out the periodical maintenance details described later with faithful regularity.

Don't be sparing with the grease-gun (except in the case of hubs), and above all—don't let the oil level in the tank get low. Economy in oil may prove very expensive at a later date. Full details of lubrication points and the correct grades of oil are given on the lubrication chart at end of book.

And one more tip that's worth while—have a small quantity of upper-cylinder lubricant added to the petrol each time you fill up—or if this is difficult to obtain, add about an egg-cup full of engine oil to every two gallons of petrol.

HOW THE LUBRICATION SYSTEM WORKS.

The engine lubrication system (see Fig. 2) is of the dry sump type operated by a double gear pump, situated in the bottom of the crankcase on the right-hand side. All oilways are internal except for the supply and return pipes from the tank. The oil flows from the tank through a filter in the tank, to the supply pump (the top pair of gears) and thence past the pressure valve *A* along the hollow mainshaft to big-end bearing.

After lubricating the big-end and circulating through the engine in the form of mist, the oil drains down through a filter in the bottom of the crankcase, from which it is drawn by the return pump (lower pair of gears) past ball valve *C*, and delivered up the return pipe to the tank.

Incorrect seating of the ball valve *A*, will allow oil to transfer from the tank to the engine whilst

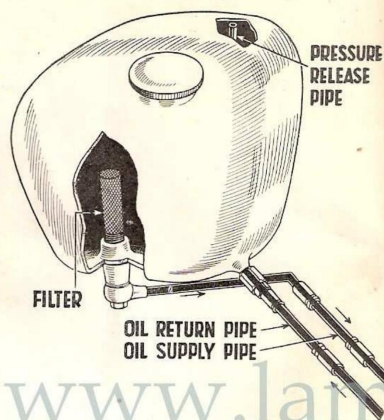
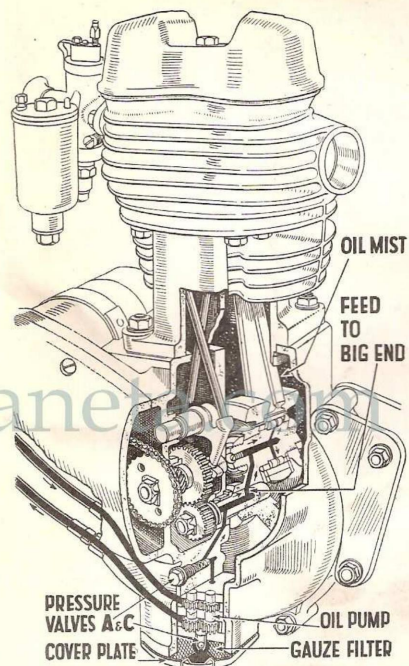


Fig. 2.

DIAGRAM OF THE LUBRICATION SYSTEM
ON BOTH S.V. and O.H.V. MODELS



the machine is stationary. In this event, unscrew the plug over the valve, and remove spring and ball. Clean the ball and its seating and replace. If the ball valve C should get stuck in its seating, there will be no return of oil to the tank. To correct, remove the cover plate below the pump and insert a piece of wire into the valve orifice, and lift the ball off its seating to free it. To check the flow of oil in the lubricating system, remove the tank filler cap whilst the engine is running. Oil should be seen issuing from the return pipe from the crankcase. The tank and crankcase should be drained periodically, and replenished with clean oil (see Periodical Maintenance).

Any restriction in the pressure release pipe in the tank will cause an increase in pressure inside the oil tank, and will result in leakage of oil at the filler cap. This can be put right by inserting a length of flexible wire into the pipe at its lower end (just in front of the rear mudguard) and pushing the wire right up the pipe, thus clearing any obstruction.

To remove the oil tank filter for cleaning, remove the oil pipe banjo union plug at the bottom of the tank. The filter will come out with the plug. The filter should be placed in a can large enough to cover it with petrol, and thoroughly washed. Before replacing make sure that it is quite dry of petrol.

The pump filter can be withdrawn after removing the cover plate and should be thoroughly washed with petrol, dried and replaced.

On no account try to remove the oil pump.

PERIODICAL MAINTENANCE.

WEEKLY.

Cleaning. Obviously regular and thorough cleaning will keep your machine looking smart and will help to retain both its new appearance and value. But it helps also to lengthen its life and maintain efficiency if the cleaning process is carried out correctly.

Take special care to prevent dust and grit from working into such parts as hubs, carburetter, dynamo, brakes and gearbox.

To rub dry and caked mud from the frame, tank and mudguards means that the enamel on these parts will be subjected to an abrasive action which will quickly destroy the polish. Soak the mud first, and then float it off with copious supplies of clean water supplied either with a hose or a sponge. If a hose is used, take care not to direct the stream of water directly on to the hub bearings, dynamo or carburetter.

When all dirt is removed dry and polish off with a clean duster.

Engine and gearbox are best cleaned with brush and paraffin, and dried off when clean with clean rag.

An occasional coating of the cylinder head and fins with cylinder paint prevents rust formation and also helps heat radiation.

Oil Tank. Inspect level of oil at least once a week. Oil level should never be allowed to fall below the oil level mark on outside of tank. When topping-up do not fill the tank completely—leave about one inch margin between the oil and top of tank.

Tyres. Examine carefully for cuts and remove any flints or metallic scraps which may have become embedded in the cover. Check pressure with a gauge, and inflate to correct pressure if necessary.

Fork Links. Grease or heavy oil should be injected through the nipples provided until it exudes at the link ends.

Steering Head. Give two or three strokes of the grease gun every week.

Brake Pedal. Give two or three strokes of the grease gun every week.

Control Rod Joints and Exposed Cables. Give a few drops of oil weekly.

Battery. Top-up as often as necessary to maintain level of electrolyte one-quarter inch above top of plates. ALWAYS USE DISTILLED WATER WHEN TOPPING UP. This can be obtained cheaply at any garage or chemist's shop.

Gearbox. Examine oil level and top-up if necessary to the level plug (E, Fig. 7).

EVERY 1,000 MILES.

Hubs. Inject grease through nipples in centre of hub. Do not over-lubricate as grease may be forced on to the brake linings and cause ineffective brakes. Three or four strokes of the grease gun should be ample. DO NOT LUBRICATE WITH OIL. Check hubs for excessive play in bearings by trying side-play and up-and-down movement at wheel rim. There should be a slight amount of side-play. If excessive adjust hub bearings as explained on page 17.

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Fork Links. Check that no side-play has developed in the links and that the fork moves freely up and down. If necessary, adjust links as explained on page 19.

Steering Head. Lift machine and place a box under the crankcase so that front wheel is clear of the ground. Test for play in the steering head by trying up-and-down movement. Check also that steering is free. If necessary, adjust as explained on page 19.

Brake Cam Spindles. A few spots of oil is all that is required.

Tappet Adjustment. Check when engine is cold. Clearances should be—for the side valve model .004 inlet, .006 exhaust; for the o.h.v. model both tappets should have .003 clearance. The correct method of checking and adjusting tappets is explained on page 21.

Distributor. Lightly smear the surface of the steel contact breaker cam with grease, and drop a spot of oil on to the pivot on which the contact breaker works. DO NOT OVER-LUBRICATE THESE PARTS—excessive lubrication here may result in ignition failure.

Clutch Adjustment. There should be a slight amount of play in the clutch control arm on the gearbox—or a short length of free cable at the handlebar lever end. If the play becomes excessive difficulty will be experienced in changing gear, as the clutch may not fully disengage, in which case the control arm should be adjusted as explained on page 23.

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Chains. Check that there is not more than half-an-inch up-and-down movement at the centre of the front chain and not more than three-quarters of an inch in the case of the rear chain. If excessive adjust as explained on page 25.

EVERY 2,000 MILES.

Oil Tank. Drain out the old oil (preferably after a run while the engine is still warm), wash out with flushing oil or thin machine oil—NOT paraffin or petrol—and refill with new oil. Remove filter and wash thoroughly in petrol or paraffin and make sure that it is absolutely dry before replacing.

Oil Pump Filter. Remove plate below oil pump and wash the gauze filter in paraffin, dry and replace it.

Gearbox. Remove drain plug at bottom of gearbox and drain out old oil. Wash out gearbox with flushing oil and refill with new oil to level of plug on side of gearbox.

Primary Chain Oilbath. Drain, and replenish with new oil to level of plug at side of case.

Note.—In the case of new machines it is advisable to drain the oil tank and sump after the first 250 miles, and again after 1,000 miles. The gearbox should be drained after the first 500 miles. Thereafter these operations need only be carried out at 2,000 miles intervals.

Full details of lubrication points and correct grades of oil are given on the lubrication chart at end of book.

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HOW TO CARRY OUT THE VARIOUS ADJUSTMENTS CALLED FOR IN THE PREVIOUS SECTION.

Hubs. The adjustment of the hub bearings can only be carried out when the wheels are removed from the frame. To take out the front wheel on model with girder fork lift the front of the machine on a box placed under the crankcase. Detach the speedometer drive and front brake cable and then unscrew the two spindle nuts. Wheel should then drop clear of the forks. To remove front wheel on models with telescopic forks, detach brake cable, then slacken pinch bolt (A, Fig. 3). Unscrew spindle B (this has a left-hand thread). Spindle can then be pulled out. Slide distance piece C outwards to its fullest extent, and wheel will drop out. In replacing wheel, it is most important that

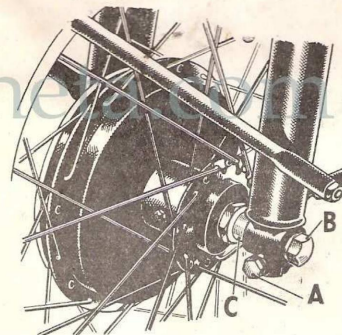


Fig. 3. Removal of front wheel on models with telescopic front fork.

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when spindle is replaced, and before pinch bolt is tightened, fork must be depressed several times to enable nearside fork-end to position itself on distance bush. Failure to observe this precaution may result in fork leg being clipped out of position, and fork will not function correctly.

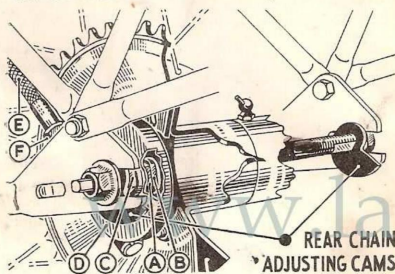


Fig. 3A. Section of hub showing adjustment.

To remove the rear wheel first disconnect the rear chain, slacken the nut holding the brake anchor plate and remove the knurled adjusting nut on the rear brake rod. On machines fitted with telescopic front forks disconnect the speedometer drive by unscrewing nut *F* (Fig. 3A). Then loosen the two spindle nuts and wheel should slide out.

The adjustment of the bearings is carried out by loosening the locking nut *A* (Fig. 3A) and tightening or loosening the adjusting nut *B* as required. On machines fitted with telescopic front forks, nuts *A* and *B* are not accessible until the speedometer drive is removed. This is held in position by nut *C* with washer, and when this is unscrewed, the drive unit *D* can be lifted off. Do not over-tighten the

adjusting nut—the wheel must have just perceptible side play at the rim when replaced. When adjustment is correct lock up the adjusting nut by tightening the locking nut against it. The method of adjustment applies to both hubs.

When replacing the wheels note that the spindle nuts are shouldered, and it is important that the shoulders should be located correctly in the forks.

Forks. On models with girder forks, first release the shock absorber to give the fork completely free movement. Next release the locknuts on both sides of the fork links (*A*, Fig. 4A). Now with a spanner engaging the flats at the end of the spindle *B*, screw anti-clockwise to take up play or clockwise to give more play. As the spindles engage in tapers only a slight adjustment may be necessary, and it is advisable to adjust one spindle at a time and check fork movement before proceeding to the next.

On models fitted with telescopic forks, no fork adjustment is provided. The only maintenance likely to be required is if, after considerable mileage, forks appear to develop excessive up and down movement. If this occurs, remove large hexagon headed cap (*A*, Fig. 4) at the top of each fork leg, and top up oil level. Each leg holds approximately quarter pint, and only Castrolite, Mobiloil Arctic, Single Shell, Esolube 20 or Prices Motorine E should be used. Replace end caps after topping up.

Note. On no account must the fork legs be completely filled with oil, or they will be unable to function. When the oil level is correct, the distance from the top of the oil in each leg to the top face where the cap *A* screws in is approximately 17 in.

Steering Head. It is necessary first to raise the front wheel clear of the ground—a block or box

under the crankcase is the best method. On models fitted with girder fork loosen the clip bolt (*C*, Fig. 4A), then gently tighten the adjusting nut (*D*, Fig. 4A) until there is no perceptible shake in the head. Do not over-tighten or steering will be stiff and the ball races will be damaged. Remember to tighten the clip bolt after adjustment is complete.

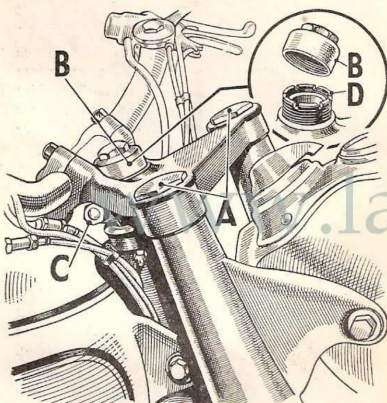


Fig. 4. Front fork and steering head on models with telescopic fork.

On models fitted with telescopic forks, remove steering head locknut (*B*, Fig. 4). Slacken clip bolt *C* and tighten the adjusting sleeve *D* until slackness has been taken up. Do not over-tighten. Finally tighten clip bolt, and replace steering head locknut.

Tappet Adjustment. It is most important that tappet clearances are correctly maintained, and clearances should be frequently checked—and adjusted if necessary—always when the engine is cold. Before checking it is necessary to make sure that the cams are in the correct position, otherwise an

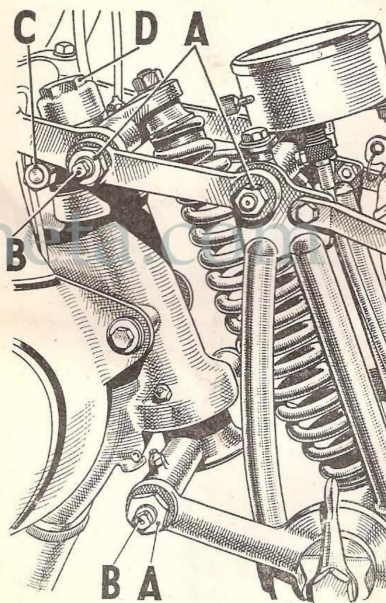


Fig. 4A. Adjustment of forks and steering head.

incorrect measurement may result. The correct position is arrived at by turning the engine over until the piston is at the top of its movement on the compression stroke. The simplest method is to lift the machine on to the rear stand and engage any gear. Then remove the compression plug in cylinder head (on side valve model) or the sparking plug (o.h.v. model), and with a piece of wire feel the top of the piston while rotating the engine a little in both directions by turning the rear wheel. When the piston is at the top of its stroke with both valves closed, and neither valve is opened by slight backward or forward rotation of the engine, proceed to check the tappet clearances.

Side-valve Model. Remove the tappet cover by unscrewing the four securing bolts. Check clearance between head of tappet and base of valve stem with feeler gauge. This should be .004in. in the case of the inlet valve and .006in. in the case of the exhaust. If clearances are incorrect hold the tappet head (A, Fig. 5) with a spanner and unscrew the locking nut B. Now hold the flat C rigid with another spanner and turn tappet head to right to reduce clearance or to left to increase. When correct

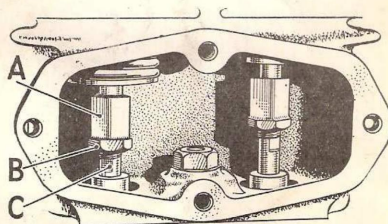


Fig. 5. Tappet adjustment.

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adjustment is obtained, lock B hard against A, and then finally check clearance.

O.H.V. Models. Remove the rocker cover by unscrewing the central securing bolt. Check the clearance by inserting gauge between end of rocker and the valve stem (Fig. 6). The correct clearance

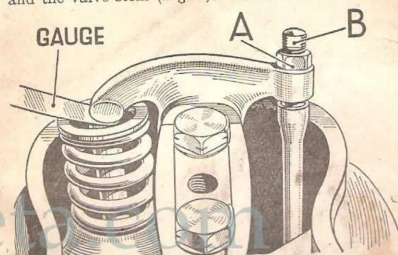


Fig. 6. Checking tappet clearance (O.H.V. model).

for both valves is .003in. when engine is cold. If adjustment is incorrect, slacken locknut A and screw adjusting nut downwards to reduce clearance or upwards to increase clearance. When correct, tighten locknut against rocker, finally check clearance and replace rocker cover.

Clutch. The main clutch adjustment is totally enclosed in the gearbox outer cover, and to reach it it is first necessary to remove the knurled filler plug. With the plug removed it will be seen that just inside the cover there is a nut (A, Fig. 7), which locks the adjusting screw B in position. Loosen the locknut and with the aid of a screwdriver adjust the screw so that there is a little clearance between it and the ball which is located behind it. Then retighten the locknut and replace the filler plug.

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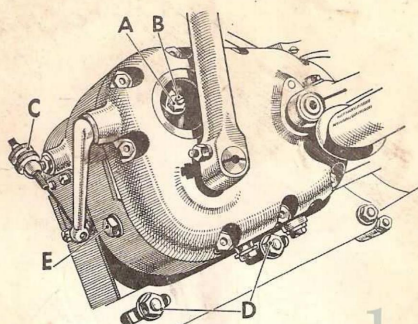


Fig. 7. Clutch and front chain adjustment.

Further adjustment is provided by the knurled thumb nut C, at the side of the gearbox. Remember, however, that some free movement in the control arm is necessary, as if the adjustment is too tight there will be constant pressure on the clutch, with consequent wear and loss of efficiency.

After a considerable mileage it may be desirable to increase the spring pressure a little. First remove the outer half of the primary chaincase, and when this has been done the clutch is exposed. It will be seen that the clutch plates are pressed together by springs (Fig. 8), the tension of which is controlled by the nuts A and B. To increase the spring pressure slacken the locknut A and tighten nut B a few turns. It is important that each of the six adjusting nuts are given an equivalent number of turns to ensure even pressure, otherwise the plates will slide unevenly and clutch drag may result. After adjustment tighten locknuts against adjusting nuts and replace chaincase.

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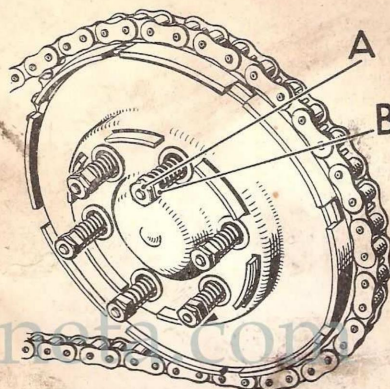


Fig. 8. Clutch spring adjustment.

Chains. The front chain is adjusted by slackening the two large nuts under the gearbox on the right-hand side (D, Fig. 7), and moving the gearbox backwards. Turn the engine slowly and check up and down movement in the centre of chain. This should not exceed half-an-inch at the tightest point. Re-tighten gearbox nuts. Note that after tightening front chain, rear chain will need adjusting.

The rear chain is adjusted by means of cams on the spindle operating against stops on the frame stays (Fig. 3). Loosen the two spindle nuts and the nut holding the brake anchor plate. Then, with a spanner on the flats on the left-hand side of the spindle, turn the spindle. The wheel will slide backwards, tightening the chain. Revolve the

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wheel slowly and check chain tension. There should be three-quarter inch up-and-down movement in the centre at the tightest point. Make sure that the cams are hard against the stops and then tighten spindle nuts—first the left-hand nut and then the right-hand. Now check wheel alignment, either by glancing along the line of both wheels when the front wheel is set straight, or by means of a long straight-edge or the edge of a plank placed along the sides of the wheels. The straight-edge should touch both walls of both tyres.

Note.—On models fitted with telescopic front forks, the speedometer drive unit (D, Fig. 3A) must be released by slackening the nut C before attempting to adjust the chain; otherwise the cable E will be kinked, and unable to function satisfactorily. Before finally re-tightening make certain that the cable lies at the correct angle as shewn.

To adjust the dynamo chain, slack off the clip bolt in the centre of the dynamo immediately above the oil pipes, and turn the dynamo bodily, taking care to keep it pressed hard against the timing case to ensure a proper oil seal. The dynamo is mounted eccentrically and turning the body of the instrument tightens or loosens the chain. Allow half-an-inch up-and-down movement at centre of chain. Finally tighten the clip bolt.

It is a good plan periodically to remove all chains, clean thoroughly in petrol or paraffin and then gently warm in a mixture of grease and graphite. When cool wipe off excess grease, clean sprockets and replace chains. Remember when replacing a chain fitted with detachable connecting link that the spring fastener must always be put on with the closed end facing the forward direction of travel (i.e., on the top run) of the chain.

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OTHER PERIODICAL ADJUSTMENTS.

Brakes. In the case of the rear brake a wing nut on the brake rod effects any adjustment necessary, and a few turns are all that is required to improve braking efficiency. The front brake is adjusted by means of the knurled thumb nut on the cable stop at the lower end of the forks.

Sparking Plug. It is advisable periodically—particularly after the first 1,000 miles or so—to remove the plug for inspection and cleaning. To dismantle the plug hold the lower hexagon in a vice and unscrew the upper hexagon. When this is removed the central electrode can be pulled clear of the body. The electrode should be scraped clean. Scrape the earth points on the body clean with a wire brush. Then re-assemble, taking care to see that the internal copper washer is in position when replacing the central electrode. When plug is re-assembled check the gap between the points. This should be .015–.018in. and if adjustment is necessary, tap or prise the earth points on the body to give required gap—do not bend central electrode.



Fig. 9.
Sparking plug dismantled.

Air Cleaner (if fitted). The air cleaner, being of the oil dip type, needs periodically to be dismantled and cleaned. The filter element should be washed thoroughly in petrol, allowed to dry, and then

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submerged in light engine oil for a few minutes. Then take out, allow the surplus oil to drain off and re-assemble.

Cylinder Head (side-valve model). After the machine has covered its first 250 miles from new or after decarbonising, check the tightness of the cylinder head bolts. If they need to be tightened

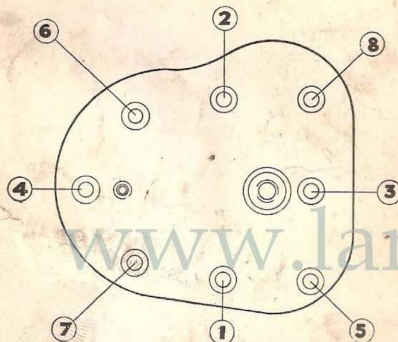


Fig. 10.

Order of tightening cylinder head bolts (S.V.).

work in the order shown in Fig. 10 to ensure that the head is tightened evenly, otherwise distortion may result.

Distributor. The automatic advance and retard mechanism, which is located under the contact breaker base, requires periodical lubrication. First remove the distributor top and then unscrew the two bolts (A, Fig. 11). The complete contact breaker mechanism on its base can now be removed

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and the advance and retard mechanism is revealed. Lubricate with thin engine oil but do not overdo it, and then replace the contact breaker base.

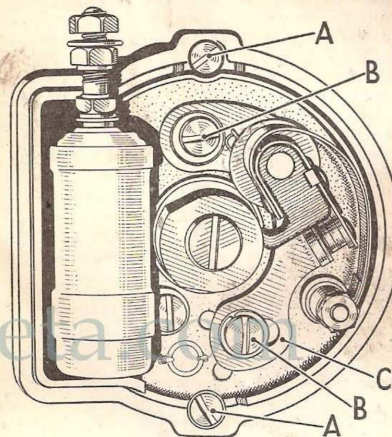


Fig. 11. The distributor.

Ignition Timing. If the distributor is removed for any purpose it will be necessary on replacement to re-time the ignition, and the easiest method is as follows:—Set the piston at the top of the compression stroke (as explained under "Tapet Adjustment," page 22). Insert a piece of wire through the compression plug hole (s.v. model) or sparking plug hole (o.h.v. model) so that it is resting upright on the top of the piston. Now turn the engine backwards until the piston has descended 1/32in

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Remove the distributor cap and turn the centre spindle until there is approximately three-eighth inch between the fibre heel and the opening position of the cam. Insert the distributor into its housing with the flat side towards the rear, and push well down on its seating, noting that as the gear meshes with the driving pinion the distributor shaft turns slightly and the cam takes up a new position. Now rotate the distributor body until the points are just opening and tighten the locking screw located under the distributor body at the front. Next turn the engine until the points are fully open and check the gap. This should be twelve-thousandths of an inch, and if the gap varies considerable from this, the points must be adjusted. This is accomplished by slackening screws *B* (Fig. 11) and moving the contact plate *C* until the correct gap is obtained. Then tighten screws *B*.

Carburettor. The carburettor is adjusted at the factory to give the most economical running consistent with the best engine performance, and generally speaking it is not advisable for the inexperienced rider to try to alter the setting. The slow-running mixture is adjusted by means of the pilot air screw (Fig. 12); screwing inwards richens the mixture, unscrewing weakens it. For slow running the mixture needs to be slightly rich, but if it is set too rich there will be a tendency for the engine to run on "pilot jet," under normal running with consequent high petrol consumption. The running mixture can only be altered by adjusting the height of the needle in the throttle valve or by fitting a main jet of different size.

Valve Timing. If it is desired to withdraw the cam spindle for any reason it is essential that the distributor be removed first, otherwise the distri-

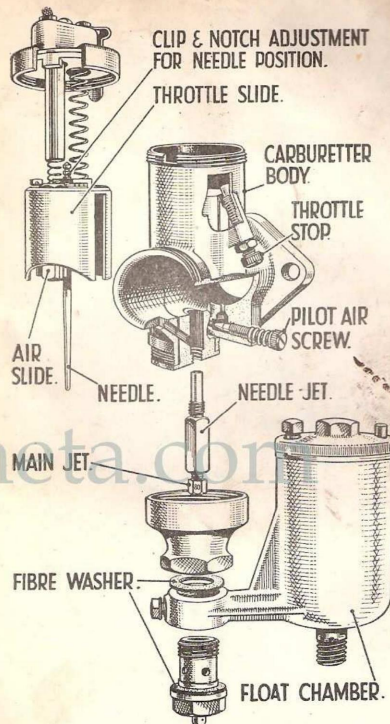


Fig. 12. The carburettor dismantled.

butor driving pinion will be damaged. Slacken the clip bolt under the distributor body at the front

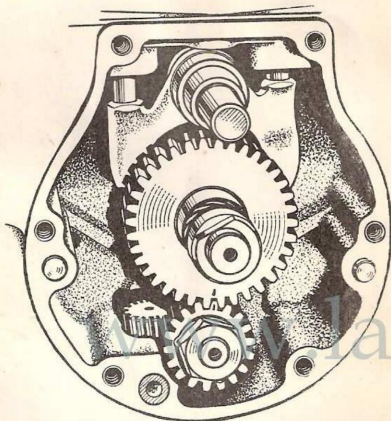


Fig. 13. Valve timing gears.

and raise distributor slightly. Cam spindle can then be drawn out. Once this spindle has been removed it will be necessary on replacement to re-set both valve and ignition timing. The engine shaft pinion and the cam pinion are both marked—the former with a dash on one of the teeth and the latter with a dash between two of the teeth—and it is only necessary to set the engine with the piston at the top of the compression stroke and then fit the two pinions so that the dash marks register (Fig. 13).

DECARBONISING THE ENGINE.

Symptoms which indicate that decarbonising is necessary. Decarbonising and "top overhaul" of an engine is extremely simple, but it should only be carried out when the engine really needs it, which normally should be only at periods over 2,000 miles. The usual symptoms are an increased tendency to "pink" (a metallic knocking when under heavy load) due to the building-up of carbon on the top of the piston and inside of cylinder head; a general falling-off of power noticeable mainly on hills, and the engine inclined to run hotter than usual.

The correct procedure for decarbonising is described stage by stage, firstly for the side-valve model and then for the o.h.v.

Removing Cylinder Head (s.v.). Detach the high-tension lead to the sparking plug and remove plug. Slacken the cylinder head bolts in the reverse order shown in Fig. 10. If when the bolts are removed the head is inclined to stick, a few taps with a wooden mallet low down on the vertical fins will loosen it, but be careful not to crack or break the fins.

With the head removed, the piston and valves are now exposed. Set the piston at the top of its stroke and scrape off all carbon with an old blunt pen-knife or similar tool, taking care not to damage the piston crown. Scrape all carbon from the cylinder head.

Rotate engine so that valves are open and examine valves. If these show a bright unbroken surface all round, leave well alone, but if they show traces of pitting, it is necessary to remove them for grinding-in, and this will be facilitated if the cylinder barrel is removed.

Removing Cylinder Barrel. First detach the exhaust pipe, which is a push fit into the cylinder and can be pulled out when the clip bolts holding it to the frame are slackened. Next detach the petrol pipe below carburetter and unscrew the carburetter flange bolts. By unscrewing the ring nut at the top of the mixing chamber the slides can be pulled right out and the carburetter removed out of the way. Now unscrew the five nuts holding the cylinder to the crankcase. Four of these are external and the fifth is inside the tappet chest between the tappets.

With the nuts removed the cylinder can be eased gently off the crankcase. Lift upwards and forwards as far as it will go, and then gently turn the engine over by means of the kickstarter until the piston emerges from the cylinder. Steady the piston as it comes clear of the cylinder so that it does not fall over and get damaged. Now cover the mouth of the crankcase completely with clean rag so as to prevent dust and dirt falling in.

Removing Valves. Stand the cylinder on a bench with valve heads downwards, and with a screwdriver or similar tool, press hard on the valve spring collars until the springs are compressed sufficiently to clear the cotters. The split cotters can then be freed, and the valves removed from the cylinder. A special spring compressor tool can be purchased from the local B.S.A. Dealer or from the B.S.A. Spares Department if desired.

Scrape all carbon from the valve pockets and exhaust port, but take care not to damage the valve seats.

Removing Cylinder Head (o.h.v.). In the case of o.h.v. models the job of decarbonising will be made much easier if the petrol tank is removed

first. This is attached at the front to the steering head lug and at the rear to the frame top tube. Before removing tank turn off petrol tap and detach petrol pipe. The rubber pads on which the tank is mounted should be marked so that they can be replaced in their original positions.

Detach the high-tension lead and the sparking plug. Next disconnect the petrol pipe at the carburetter and remove carburetter as described for the side valve model, and the exhaust pipe. Take off the rocker box cover by removing the central bolt.

Now unscrew the four nuts holding the cylinder head to the barrel. These are located between the fins at the sides of the barrel.

A gentle tap with a wooden mallet under the exhaust port will free the head, which should be raised just sufficiently at first to enable the push rods to be freed from the rocker ball pins and the push rods withdrawn. Then the head can be lifted right off.

The cylinder barrel can be removed by unscrewing the base nuts and proceeding as in the case of the side valve model.

Removing the Valves. Place a wooden block which will fit inside the cylinder head on a bench and then lay the head on to the block with the valve heads resting on it. Then compress the valve springs and remove collets as described for the side valve model.

Scrape all carbon from the piston and from the cylinder head and ports. The head may be polished with emery cloth, but take care not to damage the valve seats, and to remove all traces of dust before reassembly.

Grinding-in Valves. Valve grinding should only be attempted if pitting is not deep. If deep pit marks appear, return the valve to B.S.A. at Small Heath for re-facing, as attempts at grinding in this case will cause wear of the seats and the valves may become pocketed.

Smear a small quantity of grinding compound—obtainable from any garage or accessory shop—over the face of the valve and return valve to its seat. On the s.v. model a screwdriver can be used to rotate the valve, but on the o.h.v. model the stem of the valve must be gripped by the special tool provided in the kit.

The valve must be rotated backwards and forwards whilst a steady pressure is maintained, and every few strokes the valve should be lifted and turned to a new position. This operation should be continued until the valve face shows a smooth polished surface all round.

It is most important that the valves should be ground in on their correct seat—both valves are marked, one "IN" and the other "EX".

After grinding, remove all traces of compound from both valve face and seat, and before replacing the valves, smear the stems with engine oil.

When replacing the springs make sure that the split collets are located correctly.

Valve Springs. After a period of several thousand miles it may be desirable to fit new valve springs, as these tend to lose their efficiency due to heat. If the springs are renewed whilst decarbonising it will save dismantling specially to do the job at a later date.

Piston Rings. Whilst the engine is dismantled examine and check the piston rings so that replacement can be made if necessary. If the rings

are free in their grooves and uniformly bright all round leave well alone. Piston rings are very brittle and there is considerable risk of breakage in removing them. It may be found more convenient to remove the rings if the piston is detached from the connecting rod.

The gudgeon pin holding the piston is located by a wire circlip at each end, and one of these must be removed before the gudgeon pin can be driven out. A small screwdriver will help in removing the circlip.

Support the piston and tap the gudgeon pin through, using a light hammer and a punch. It may be necessary to warm the piston slightly before the gudgeon pin can be knocked through, and this is easily accomplished by holding a rag, heated by immersion in hot water and wrung out, round the piston for a few moments. When piston is free, mark the inside of the skirt at the back so that it can be replaced the same way round.

If the rings are stuck in the grooves, prise them out very carefully and remove from the piston. Scrape out carbon deposit from the grooves and from the inside edges of the rings. If either of the rings have brown patches on the face replace with a new ring.

It is advisable to check the gap between the ends of the rings, and this is best done by inserting the piston into the cylinder and sliding each ring independently up to the skirt of the piston. The gap between the ends of the ring should be checked with a feeler gauge. In the case of both side valve and o.h.v. models, the gap should not be less than .006in. and should not exceed .010in. If the gap is excessive new rings should be fitted. It is advisable to check the gap of new rings by the same method, and if the gap is less than .006in. the ends of the rings must be carefully filed to the correct limit.

When the rings are refitted, place the piston in position on the connecting rod, smear the gudgeon pin with oil, and replace. Note incidentally, that the piston is replaced the right way round. Now fit the wire circlip, and take care to see that it fits correctly into the groove in the piston, that it fits reasonably tightly, and that the butt ends of the circlip are opposite the vertical slot which enables it to be removed. If the circlip is loose, take it out and expand it slightly so that it springs into position when fitted.

Now smear the piston liberally with clean engine oil, and turn the rings so that the gaps are on opposite sides of the piston.

ASSEMBLY AFTER DECARBONISING

Side Valve Model. Replace the valves and springs in the cylinder barrel, making sure that the valves are assembled in the seats from which they were removed, and take care to see that the split collets are seated correctly in their grooves in the valve stems.

Pour a little oil into the crankcase, and smear the cylinder walls liberally with oil. See that the cylinder base washer is in good condition—if damaged, replace, otherwise oil leaks will develop. Turn the engine until the crankshaft is a little past bottom dead centre, then compressing the top piston ring with the fingers, slide the cylinder barrel over the piston and top ring. Each ring must be compressed in turn as the barrel is refitted, and care is necessary to avoid breaking the rings. It is very advisable to see that the mouth of the crankcase is completely covered with rag before commencing to replace the cylinder, as if it is left

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uncovered, and a ring is broken, the pieces may drop into the crankcase and will be difficult to recover.

Before trying to bolt the cylinder down, make sure that both tappets are in their lowest positions, otherwise the cylinder will not seat properly due to the pressure of the valve springs. Screw up the base nuts lightly at first, and then tighten one quarter turn at a time, working on the outer nuts in diagonal order and then the nut inside the tappet chest.

When cylinder is finally tightened down replace cylinder head gasket—first seeing that it is undamaged. If it is damaged, or shows signs of leakage (indicated by black patches) replace with a new one. Now fit the cylinder head, tightening the bolts one quarter turn at a time in the order shown in Fig. 10. Check these bolts for tightness after 250 miles—particularly if a new head gasket has been fitted.

Replace exhaust pipe, tightening frame clips when in position, and then the carburetter. When replacing carburetter slide take care not to damage the point of the needle. Next fit the petrol pipe.

Before fitting the sparking plug, dismantle and clean it, and when it is replaced, do not forget to connect the high tension lead.

Finally check the tappet clearances and if necessary, adjust. Note that if a new cylinder base washer has been fitted, it is advisable to check the nuts for tightness after 250 miles, and then again to check the tappet clearances.

O.H.V. Model. Replace the cylinder barrel as described for the side valve model, first checking that the base washer is undamaged. Now replace

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the valves and springs in the cylinder head, making sure that they are in the correct seats and that the split collets are positioned correctly.

See that cylinder head gasket is in good condition, replace and then fit cylinder head loosely in position. Before the head is bolted down the push rods must be fitted. It should be noted that these are crossed, and the exhaust must be fitted first, the plain end fitting into the cup formed on the cam rocker (bottom left), and the cupped end fitting over the rocker ball end (top right). Fig. 14 shows a section illustrating how the push rods are fitted

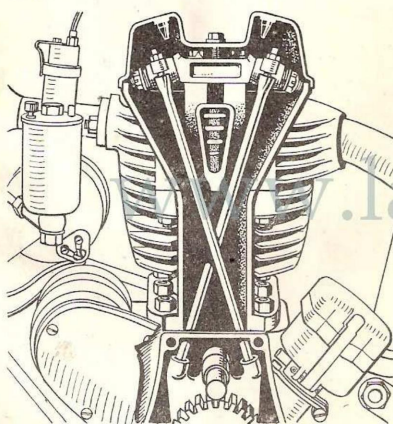


Fig. 14.

Section showing push rods on O.H.V. models.

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With the push rods in position, the cylinder head can be bolted down. Before replacing the rocker box cover, check tappet clearances and adjust if necessary. Note that the tightness of the head should be checked after the first 250 miles, and if the nuts are tightened at this period it will probably be necessary to re-adjust the tappets.

Next replace the carburetter, taking care not to damage the needle when inserting the slide, and see that the flange washer is in good condition. Then fit exhaust pipe. Dismantle and clean the sparking plug before fitting, and finally, replace petrol tank and petrol pipe.

SOME GENERAL HINTS.

A good rider periodically checks all nuts and bolts with a spanner to see that they are tight

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.

It is advisable occasionally to clean the air holes in the petrol tank filler cap, as if these get choked, petrol starvation may cause engine stoppage.

At intervals of several thousand miles, it is advisable—when tank is almost empty—to remove the petrol tap, clean the filter above the tap, and drain the tank and wash 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 ignition

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

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

Check that the points in the distributor are opening and closing correctly, that they are clean and adjusted to the correct gap.

B.S.A. CYCLES LTD., Birmingham, 11.

Directors:

SIR BERNARD DOCKER, K.B.E., J.P. (Chairman)
J. LEEK, C.B.E. W. F. JAMES.

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MC-H-1-5-5-5-5

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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:—

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Bournemouth	Craze Bros.	475, Christchurch Road		
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Carmarthen	W. Edwards & Sons	Towry Garage	682	Edwards Garage Carmarthen.
Chatham	Russells Garages Ltd.	Medway Garage, Medway Street.	3863/4	
Chelmsford	Hadlers Garage	New Street	2227	Hadler, Chelmsford.
Cheltenham	Leslie Paynter	Bath Street	2887	Paynters G'age, Bath St., Cheltenham.
Chester	Davies Bros.	34, Bridge Street	510	
Colchester	S. S. Motor & Cycle Supply Co.	63a, High Street	2532	Central 2532
Coventry	Coventry Motor Mart Ltd.	London Road	2146/7/8	Coventry Motor Mart.
Croydon	Godfrey's Ltd.	228/234, London Road.	3647/2	Croydon Gofrahile, London.
Galwyn Bay	Gilbert Emery	Post Office Chambers, Penrhyn Road.	2813	
Darlington	The Duplex Motor and Cycle Co.	Grange Road	D'ton 2071	Duplex, Darlington
Derby	Ingle's Provincial Garages Ltd.	Wallbrook Road	45289	
Doncaster	Edwards Motors (Doncaster) Ltd.	Station Garage	2431-2	Cars, D'caster.
Dorchester	Tilley's	31, South Street	367	Motors, Dorchester.
Dublin	Huet Bros. Ltd.	7/8, Bachelor's Walk	73144	Huet, Dublin
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"	James Parkes & Son	7, King Street	2889	
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Dunstable	B. G. England	Half Moon Hill, London Road.	207	
Edinburgh	Alexander & Co.	10 & 14, Lothian Road	21176	Motorcycles, Edinburgh.
Enfield	D. J. Shepherd & Co. (Enfield) Ltd.	434-6, Hertford Road, Enfield Highway.	1631	
Evesham	Frank Morrall Ltd.	18-20, Port Street	6054	
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Ipswich	Revetts	Berners Street	2822	
Jersey	Colebrooks	1, New Street	642	
Kirkcaldy	The County Motors	Junction Road	2568	
Keighley	Dick Ratcliffe	Goldshaw Garage, Haworth.	Haworth 3133	
Launceston	J. Wooldridge & Son.	Western Road	21	
Leeds	Watson-Cairns & Co.	Lower Briggate	23379	Watson-Cairns, Briggate, Leeds.
Leicester	E. W. Campion & Son	Welford Place	58054	
Lincoln	Wests (Lincoln) Ltd.	116, High Street	762	
Liverpool	Cundlies	41, Byrom Street	Central Cundlies, 6160	
London, N.W.1	Godfreys Ltd.	Eden Street	Euston 4046/7	Central, 6160. Euston Gofra Bike, London.
"	N.W.1 J. Grose Ltd.	379-381, Euston Road	Euston 5231	
"	W.5 Kays of Ealing	8-10, Bond Street	Ealing 2367	Sparesokay, Ealing, London.
"	S.E.13 F. Parks & Son Ltd.	404 High Street	Leeds 0535	
"	S.E.18 Cleare & Co. Ltd.	1 and 125, High Street	Woolwich 0174	
"	E.7 Lovett's Ltd.	418, Romford Road, Forest Gate.	Grange Wood 1234	Lovemoto, London.

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Redhill	The Redhill Motor and Cycle Works Ltd.	50, Brighton Road	327	
Romford	G. H. Wilson	George Street	2660	
St. Austell	S. H. Kellaway & Sons	South Street	102	
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Stockton-on-Tees	Stan Jones (Automobile Engineers) Ltd.	7a, Bridge Road	66179	
Stoke-on-Trent	J. & N. Bassett	Howards Place, Shelton	2890	
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Sutton-in-Ash	W. Henstock	Forest Street Garage	90	Henstock, 90, Sutton-in-Ash.
Swadlincote	T. H. Wroughton	High Street	7414	Wroughtons Garage, S'cote.
Taunton	W. P. Edwards (Motors) Ltd.	58, East Street	2943	Edwards Motor Cycles, T'nton.
Thetford	W. & G. Lambert Ltd.	Castle Street	2217	
Tunbridge Wells	C. E. Tunbridge	2, Vale Road	416	T'bridge Motor, T'bridge Wells.
Twickenham	C. A. Blay	192, Heath Road	2103 & 1435	
Wainfleet	C. S. Wilkinson	Market Place	238	
Watford	Lloyd Cooper & Co.	61, Queens Road	2125	
Warrington	Jack Frodsham Ltd.	37a, Winnick Street	471	
Westcliff-on-Sea	J. Costin & Sons	233-5-7, London Road	Southend 2215	
Weybridge	W. L. Lewis & Sons	51, Church Street	210	
Weymouth	Tilleys	9, Frederick Place	72	
Winchester	Winchester Cycle and Motor Co.	Jewry Street	2728	
Worcester	W. J. Bladder & Son	52, Sidbury	243	Bladder, S'bury, Worcester.
Wolverh'pton	C. E. Cope & Sons	168-9, Stafford Street	22850	
Worthing	Whestlands	56, Broadwater Street (West)	1224	
Yeovil	The Yeovil Motor Mart	Hendford	267	Motor Mart, Yeovil.
York	C. S. Russell (York) Ltd.	Lawrence Street	3793	Russell, Lawrence Street, York.

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