

4. *Replace the drain plugs.*
5. *Add 5 fl. oz. of oil to each leg (see lubrication chart). The filling orifice is at A (Fig. 19).*

6. *Replace the caps at A.* These must be screwed down tightly since they anchor the fork tube to the top yoke.

Note.—A quantity slightly in excess of the above amount will not be harmful, but on no account must the fork legs be filled right up to the top, or they will be unable to function.

Note.—Some early models were not fitted with drain plugs. In this case the oil level should be 20-22ins. below the plug A (Fig. 19). The measurement should be made with a rod when the distance from the bottom of the outer shroud to the line at the lower end of the inner shroud is 3in.

Steering Head

Adjustment to be carried out in the sequence given below :—

1. *Raise the front wheel clear of the ground.* Stand astride the front wheel and lift it while an assistant places a box underneath the crankcase.
2. *Remove the steering head locknut B (Fig. 19).*
3. *Slacken pinch bolt C.*
4. *Release the fork yoke pinch bolts.* These are located close to the point where the fork legs pass through the lower steering yoke and must be freed so that during adjustment of the steering column, the yoke can take up a new position on the fork legs.

5. *Turn the adjusting sleeve D until all slackness (i.e., up-and-down play) has been taken up.*

6. *Check the adjustment.* Make sure that sleeve D is not too tight, otherwise the steering will be stiff and the ballrace may be damaged.

7. *Tighten all three pinch bolts and the steering head locknut B.*

It is advisable to re-check the adjustment at this stage.

FRONT FORKS AND STEERING HEAD GIRDER FORK MODEL

Forks

First release the shock absorber to give the fork completely free movement. Check that no side play has developed in the links and that the fork moves freely up and down.

If adjustment is necessary release the locknuts at both ends of the fork links (A, Fig. 21). Now with a spanner engaging the flats at the end of the spindle (B), screw in to take up end play or loosen 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.

Steering Head

Lift the machine and place a box under the crankcase so that the front wheel is clear of the ground. Test for play in the steering head by

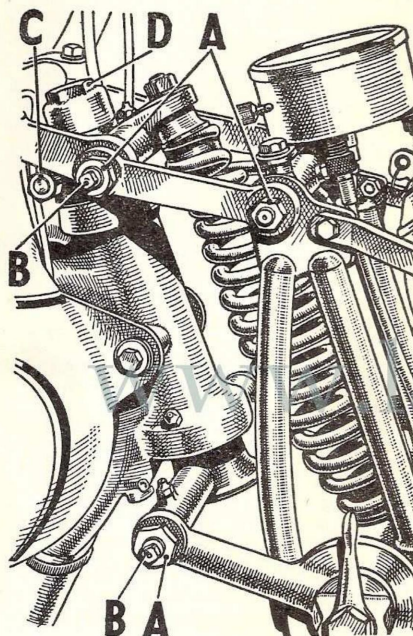


Fig. 21.

Adjustment of forks and steering head.

trying up-and-down movement. Check also that the steering is free. If necessary adjust as follows :

Loosen the clip bolt (C, Fig. 21), then gently tighten the adjusting nut (D, Fig. 21) 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.

Rear Suspension

Under normal running conditions the rear suspension should not need any attention other than that of lubrication. If however, it is decided to dismantle the assembly for any reason, this should be removed in the following sequence :—

1. *The rear wheel.* Instructions for removing this are given on page 38.
2. *Pinch-bolts.* These are located at the top and bottom of the suspension unit as shown at A and B (Fig. 22 and Fig. 14).
3. *The centre columns.* Tap them upwards by means of a hammer and soft punch and take out through the top lugs.
4. *The spring units.* Each unit will slide sideways from between the top and bottom lugs, and can be completely dismantled on the bench. If necessary, the wheel spindle brackets can be detached from the bearing sleeves after removal of the pinch bolts C.
5. *Re-assembly nuts.* The pinch bolts at A, B and C engage with notches in their respective sleeves and particular attention must be paid to their correct positioning.

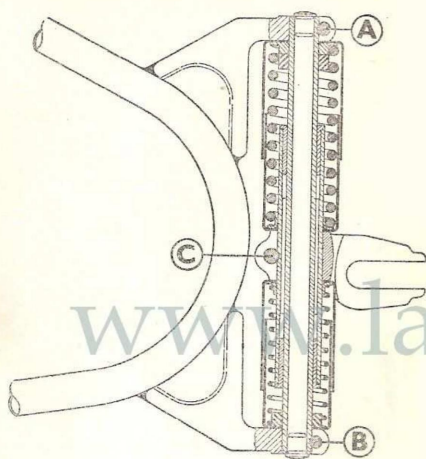


Fig. 22. The rear suspension.

5. BRAKES

It is vitally important that the brakes are kept in good condition. For this reason do not over-lubricate the wheel bearings and oil must not be used instead of grease in any circumstances. When washing the machine down, avoid playing the hose direct on to the brakes, otherwise they will be ineffective until dried out.

Front Brake Adjustment

The length of the brake cable can be altered at its lower end by means of a knurled thumb nut on the cable stop.

Rear Brake Adjustment

Finger adjustment is provided at the end of the brake rod.

Do not set the brakes too closely, since, particularly in the case of the front brake its action may be too powerful. Any friction between lining and drum will obviously impair the machine's performance. In addition, if carried to extremes, the heat may melt the grease in the hubs and this may find its way to the brake linings.

Brake Cam Spindles

These are lubricated with oil as shown on page 45. Discretion must be exercised when lubricating, to ensure that oil does not reach the brake lining. Neglecting to lubricate the spindles may make the brake stiff to operate.

6. CARBURATION

The Carburetter

So long as the engine continues to perform satisfactorily, the carburetter is best left alone, particularly by the inexperienced rider. The only adjustment in which the owner is likely to be interested is the pilot air screw (Fig. 23) which controls the slow running mixture. This is set before the machine leaves the Works, but the best setting may vary slightly to suit riders' requirements, or different localities. Turning the pilot air screw inwards enriches the mixture, and unscrewing weakens it. A richer mixture gives a slower and more reliable tick-over, but it is naturally undesirable to have the mixture too rich, even with the throttle practically closed which is, of course, the throttle position for

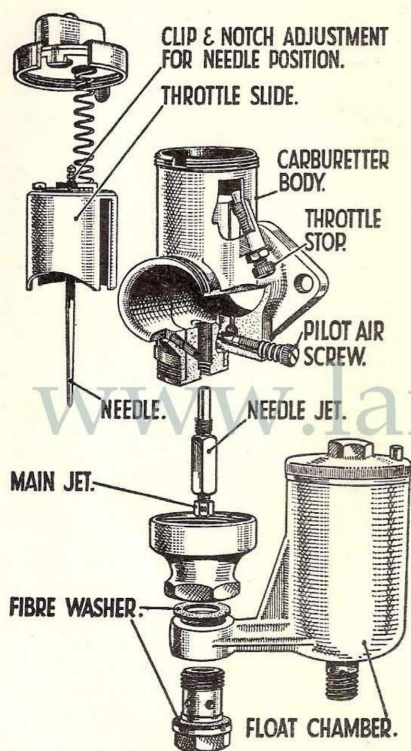


Fig. 23. The carburettor dismantled.

tick-over, so the best way to set the pilot air screw is to screw it in until the mixture is obviously too rich, and then unscrew it until the setting is just right, and further unscrewing increases the tick-over speed unduly. This may seem complicated, but the effect of altering the setting is very noticeable and the rider will easily detect the symptoms.

It is doubly important to avoid over-richness of the tick-over setting if much riding is done on small throttle openings for this is what is known as running on the pilot, and if the pilot is too rich the general petrol consumption will be adversely affected.

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. Such alterations should not be made except for very special purposes, as dictated by abnormal requirements, and only then on expert advice.

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

7. DECARBONISING THE ENGINE

Decarbonising should only be carried out when the engine really needs it. 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 the cylinder head, a general falling-off of power, noticeable mainly on hills, and a tendency for the engine to run hotter than usual.

Preliminary Work (C11)

Remove in the following order :—

1. *Petrol tank.* First turn off the petrol tap and detach the petrol pipe. The petrol tank itself is attached at the front to the steering head lug and at the rear to the frame top tube, the latter fixing points being rubber mounted. Where the oil tank is part of the petrol tank, the oil pipes must be disconnected before the tank can be removed.

Note the correct sequence of assembly for replacement purposes afterwards.

2. *The sparking plug.*
3. *The carburetter.* Take off the carburetter by removing the flange bolts. By unscrewing the ring nut at the top of the carburetter mixing chamber, the slides can be pulled right out and tied up to the top tube out of the way, while the main body of the instrument can be completely removed.
4. *The exhaust system.* The exhaust pipe is a push fit into the cylinder head and can be withdrawn when the bolts holding the exhaust system to the frame are released.

Dismantling for Top Overhaul (C11)

Dismantle in the following order :—

1. *The rocker cover.* It is only necessary to remove the central bolt in order to take off the rocker box. Examine the gasket, and should there be any signs of oil leakage it should be replaced by a new one when re-assembling.

2. *Set the piston at T.D.C. on the compression stroke.* In this position, both valves will be closed and there will not therefore be any pressure on the rocker gear due to the valve springs, during subsequent operations.

3. *Push rods.* These cannot be removed until the cylinder head is freed from the barrel. Raise the head sufficiently to enable the push rods to be removed from the rocker ball pins, and the push rods themselves can then be taken out.

4. *Cylinder head.* The nuts should be slackened in the reverse order to that shown in Fig. 8. They are located between the fins at the sides of the barrel. If it shows a tendency to stick, a few light taps with a wooden mallet under the exhaust port will loosen it.

5. *Cylinder head gasket.* Examine this carefully for defects. If it is not sound and bright but has black stained patches, these may indicate leakage of gas and a new gasket should be obtained.

6. *Valves.* Place a wooden block which will fit inside the cylinder head, on the bench, and lay the head over the block with the valve heads resting on it; compress the valve springs until the split collets can be removed. When the collets are out the valve springs and top collar can be lifted out. Alternatively, a valve removal tool can be employed and this is obtainable at any accessory shop or from the B.S.A. Motor Cycles Ltd., Spares Dept., Montgomery Street, Sparkbrook, Birmingham, 11.

7. *Decarbonising.* Rotate the engine by means of the kickstarter until the piston is at the top of its stroke and scrape off the carbon deposit with an old pen-knife or similar tool, taking care not to damage the piston crown. All traces of carbon must also be cleaned from the combustion chamber, the valve heads and the ports.

Top Overall (C10)

Dismantle in the following order :—

1. *The sparking plug.*
2. *The cylinder head.* The bolts should be slackened in the reverse order to that shown in Fig. 9. If after removing the bolts the head is inclined to stick, a few taps with a wooden mallet on the lower part of the vertical fins will loosen it. Take care not to strike too heavily otherwise the fins may be broken.
3. *The cylinder head gasket.* Examine this carefully for defects. If it is not sound and bright, but has black-stained patches, this may indicate blow or leakage of gas and a new gasket should be obtained.
4. *Decarbonising.* Rotate the engine by means of the kickstarter until the piston is at the top of its stroke, and scrape off the carbon deposit with an old pen-knife or similar tool, taking care not to damage the piston crown. Scrape all carbon from the valves and cylinder head, taking care not to damage the comparatively soft surface of the aluminium alloy.

5. *Valves.* Rotate the engine so that the valves are opened in turn. If upon examination they 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, and this will be facilitated if the cylinder barrel is removed.

Removing Cylinder Barrel (C10)

Before the cylinder barrel can be removed it is necessary to dismantle various other items and this should be done in the following order :—

1. *The exhaust system.* The exhaust pipe is a push fit into the cylinder and can be withdrawn when the bolts holding the exhaust system to the frame are released.
2. *The petrol pipe.* Make sure that the petrol supply is turned off and that the tap is left in position in the tank when the pipe unions are unscrewed.
3. *The carburettor.* By unscrewing the ring nut at the top of the mixing chamber the slides can be pulled right out and tied up to the top tube right out of the way, while the main body of the instrument can be completely removed after taking off the flange bolts.
4. *Tappet cover.* Four screws hold the cover in position. When removing the cover examine the paper washer to ensure that it is intact. Should it be damaged in any way it should be replaced by a new one.
5. *Cylinder base nuts.* There are five of these which hold the barrel to the crankcase. Four of the nuts are visible round the flange of the barrel, but the fifth is inside the tappet chest between the tappets (see Fig. 8).

6. *Raise the barrel.* Set the piston at the bottom of its stroke and lift the barrel upwards and forwards as far as it will go, when the piston will emerge from the bottom of the cylinder. Steady the piston as it is withdrawn from the cylinder so that it does not fall over and damage the skirt.

Cover the mouth of the crankcase completely with a clean cloth to prevent the ingress of dirt.

7. *Valves.* Lay the cylinder barrel on a bench with the valve heads downwards, and compress the valve springs until the split collets can be removed. When the collets are out, the valve springs and top collar can be lifted off. Alternatively, a valve removal tool can be employed and this is obtainable from any accessory shop or from the B.S.A. Motor Cycles Ltd., Spares Dept., Montgomery Street, Sparkbrook, Birmingham, 11.

Removing Cylinder Barrel (C11)

In the case of this model all extraneous fittings have already been removed, and it is only necessary to remove the nuts holding the barrel to the crankcase. The barrel itself is then removed in a similar manner to that for the Model C10.

Examination of Valves

An examination of the seating of a valve will quickly reveal whether or not it requires re-grinding. The same applies to the seating in the cylinder head or barrel, as the case may be, although this tends to deteriorate much more slowly than that on the

valve, and it is seldom that a valve requires grinding-in merely in order to restore the cylinder head (or barrel) seating.

When the valves were ground-in originally, the seatings on the valve and in the cylinder head (or barrel, according to model), were smooth, and continuous, and of uniform width all round their circumferences. The probability is that even after very considerable mileages, the inlet valves will have suffered very little, and may indeed still be smooth and continuous. If this is so, they can be restored to their original condition with a very slight amount of grinding, using fine grade paste.

The exhaust valve, on the other hand, may require more attention. If the seating is merely discoloured, a little attention with grinding paste will soon rectify it, and this is all that should be necessary if the engine has been properly looked after, and the valve is examined at reasonable intervals. If, however, the exhaust valve has become scaled or pitted a considerable amount of grinding-in may be necessary, and in extreme cases, this operation may fail to restore the seating. A valve is not likely to deteriorate to this extent unless it has been abused by such things as continuous running without sufficient tappet clearance or with an incorrect mixture from the carburettor or late ignition timing. (See pages 16, 51 or 20 for these respective items) or it may be the result of neglect in failing to re-grind at reasonable intervals. If the exhaust valve is found to be in this condition, do not attempt to grind it in, but take it to your local dealer for refacing. Similarly, if the seating in the cylinder head (or barrel) is badly pitted, the latter components should be taken to the dealer for the seat to be recut. The importance of having proper factory treatment

in the event of excessive pitting or scaling is emphasized for any attempt to rectify these by the use of grinding paste alone will only result in the removal of too much metal from the seat in the head (or barrel) with consequent pocketing and its attendant adverse effect on performance.

Valve Grinding

Smear a small quantity of grinding compound (obtainable from any garage or accessory shop) over the face of the valve, and return the valve to its seat. On model C11 hold the valve head with the special suction tool provided in the toolkit, moistening it first to ensure adhesion and rotate the valve backwards and forwards whilst maintaining a light pressure. In the case of Model C10 rotate the valve backwards and forwards with the aid of a screwdriver, at the same time maintaining a light pressure. Note that a light spring inserted under the valve head greatly facilitates the grinding-in operation, allowing the valve to lift and be rotated to a new position periodically. The valve should be raised and turned to a new position after every few strokes. Grinding should be continued until the valve seat and face show a uniformly matt metallic surface all round. Grinding paste is often supplied in two grades, coarse and fine. For valves in good condition a small amount of grinding with the fine grade should be sufficient. If the valves are in poor condition, however, but not bad enough to require refacing, start with the coarse grade and finish off with the fine, being careful to remove all traces of the former before changing to the latter.

Thoroughly clean the valves, seatings and stems, and wipe out the ports before re-assembly. It is a

good idea also to smear the valve stems lightly with engine oil before inserting them in their guides.

Valve Springs

After a considerable mileage it may be desirable to renew the valve springs, as these tend to lose their efficiency due to heat and other causes. This is more likely to occur in the case of the exhaust valve spring, as it runs at a higher temperature, and a useful test when the springs are dismantled is to compare them for length. If they are of different lengths the shorter one should be replaced. If the springs are examined in this manner while decarbonising, and replaced if necessary, it will save dismantling specially for this purpose at a later date.

Valve Rockers (C11)

To remove the rockers, if this should be required for any reason, it is merely a case of withdrawing the split pins and unscrewing the nuts which locate the rockers in position.

Careful note should be kept of the rocker assembly for replacement purposes, as the various washers must obviously be inserted in the correct order.

Pistons and Rings

In the ordinary course of events it should rarely be necessary to remove the cylinder barrel, since top overhaul, already described, usually suffices to keep the machine in first-class working condition. Unless the condition of the engine indicates that the piston rings or cylinder bore require attention,

the owner will be well advised not to disturb the barrel.

Symptoms indicating faulty piston rings might include heavy oil consumption, poor compression (but only if the valves are in good order; otherwise they are much more likely to be the cause) and excessive piston slap when warm. This latter may be due to worn bores which could be checked without removing the barrel, if the piston is moved to B.D.C., thus exposing the bores for examination and measurement.

In order to examine the piston, etc., the assembly should be dismantled in the following order :—

1. *Gudgeon pin circlips.* There is one at each end of the gudgeon pin, but it is only necessary to take out one circlip. Insert a pointed instrument such as a screw-driver, or the tang of a file into the slot specially provided for the purpose and lever the circlip out of its groove.
2. *Gudgeon pin.* This is a tight fit in the piston and it may be necessary to warm the latter, using a cloth which has been immersed in hot water, wrung out and wrapped around the piston. Support the piston on the side from which the circlip has been removed (to avoid strain on the connecting rod) and tap out the gudgeon pin from the opposite side using a light hammer and a punch of suitable diameter.
3. *The piston.* This will now be free and the inside should be marked to enable it to be replaced the correct way round. Cover the crankcase mouth with a cloth to prevent foreign matter falling into the case.

4. *Piston rings.* If these are stuck in their grooves they must be prised free and removed from the piston. This needs care as the rings are brittle. All carbon deposit should be carefully scraped from the grooves and the inside edges of the rings. Any rings showing brown patches on the surface in contact with the cylinder should be replaced.

5. *Check the piston ring gap.* Insert each ring in turn into the cylinder followed by the piston. The latter is pushed against each ring to make sure it is true in the bore. Withdraw the piston and check the gap which should be .008in. to .012in. Fit new rings if the gap greatly exceeds the figures stated. It is advisable to check the gap of new rings in a similar manner before fitting, and if the gap is less than specified the ends of the ring should be carefully filed to the correct limit.

Refitting the Valves

Replace the valves into their respective ports, place the springs over the stems with the collar in position, and with the valve heads resting on a wooden block (C11) or the bench (C10) as before, compress the springs until the split collets can be inserted. A dab of grease on the inside of the collets will serve to hold them in position until the spring is released. Make quite sure that the collets are correctly located.

Reassembling the Engine

Before assembly all components should be thoroughly washed in petrol and dried, and a supply of clean engine oil should be available. It is advisable

to have a set of paper joint washers to hand, together with some jointing compound, and as previously mentioned new cylinder head, gasket (and rocker box gasket also in the case of the C11) should be obtained if considered necessary. Re-assembly should not present any difficulty if the following routine is observed.

1. *The piston.* When the rings are re-fitted, warm the piston and replace on the connecting rod making sure that it is fitted the correct way round.
2. *The gudgeon pin.* Smear this with engine oil and tap into position while the piston is still warm, supporting the latter from the opposite side.
3. *The gudgeon pin circlips.* These must not on any account be omitted.
4. *Cylinder base washer.* Fit a new paper washer to the crankcase face, lightly smearing with jointing compound before doing so.
5. *The cylinder barrel.* Coat the bore with engine oil and smear the piston similarly. Turn the piston rings so that the gaps are on the opposite sides of the piston. Rotate the engine until the crankshaft is a little past bottom dead centre, and 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 re-fitted and care is necessary to avoid breaking the rings. Alternatively, the rings may be compressed into their grooves by means of a piston ring compressor (obtainable from accessory suppliers) so that as soon as the piston enters the bore the clip will be automatically pushed off.

Before bolting the cylinder barrel to the crankcase, make sure that both tappets are in their lowest position, otherwise the barrel may not seat properly due to the pressure of the valve springs. Screw up the base nuts lightly at first, and then tighten a quarter of a turn at a time, working in diagonal order.

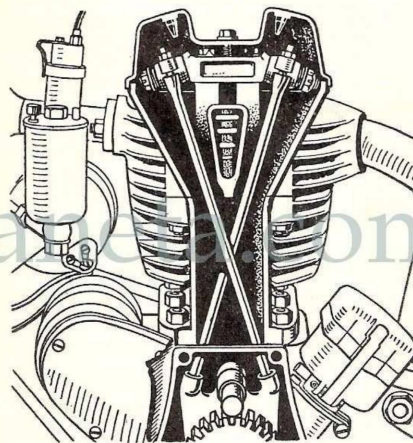


Fig. 24.

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

In the case of Model C10 there is a nut to be tightened which is located inside the tappet chest (Fig. 6).

6. *Cylinder head gasket.* This should be replaced if there is any suspicion that it has been "blowing" (see page 56).
7. *The cylinder head.* In the case of model C10 there are eight bolts which must be tightened in the order shown in Fig. 9 to prevent risk of distortion. On the model C11 the cylinder head nuts should be tightened in accordance with Fig. 8 after the push rods have been fitted in position.
Re-check the tightness of these nuts and bolts after 250 miles have been covered—particularly if a new head gasket has been fitted.
8. *The push rods (C11).* Before the head is bolted down, the push rods should be inserted down their appropriate apertures. It should be noted that the rods are crossed and that the exhaust rod must be fitted first, the plain end fitting into the cup formed on the rocker in the timing case, and the cupped end fitting over the rocker ball end (Fig. 24), shows a section illustrating how the push rods are fitted.
9. *Tappet clearances.* These should now be carefully set and the method of adjustment is given on page 17 for the model C10, and page 16 for model C11.
10. *The rocker cover (C11).* When this is replaced examine the gasket to make sure that it is in order, otherwise there may be oil leakage at this point.
11. *Tappet cover (C10).*
12. *The sparking plug.* Clean and adjust as described on page 26 and replace. Connect the H.T. lead.

13. *The carburettor.* The needle and slide must be inserted correctly in position before the ring nut is screwed down. Note that the flange washer must be in good condition as otherwise there may be air leakage past it which may cause difficult starting and poor engine performance.
14. *Petrol pipe, petrol tank (C11), exhaust system, etc.*

GEAR CHANGE DISMANTLING (3-speed Gearbox)

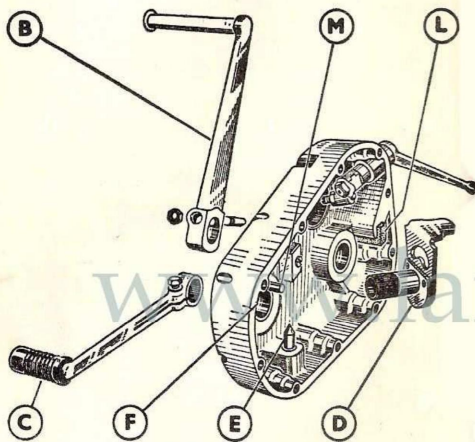
Where it is found necessary to remove the gearbox outer cover, as when replacing a broken foot change return spring, the following points should be observed, otherwise difficulty may be experienced when assembling.

1. Drain oil by removing drain plug *A*, (Fig. 25).
2. Disconnect clutch cable.
3. Remove kickstarter crank *B*.
4. Remove foot change lever *C*.
5. Unscrew gear control plunger *E*.
6. Remove securing nuts and screws; remove the cover and pawl operating and carrier plates *D* and *G*.

Whilst there is no need to disturb the quadrant (*H*) when fitting the spring, it is advisable to set the gear level in the neutral position.

Should the quadrant be removed for any reason, care must be taken to ensure that this is refitted correctly by marrying up the "dot" and "dash"

thereon with identical marks on the gear control shaft *N*. It being observed that the second notch from the bottom left of the quadrant is engaged by the quadrant plunger *O*.



GEAR CHANGE REASSEMBLY

1. With the aid of a screwdriver, fit the spring to the pawl carrier plate, with the end of the right-hand coil to the left of the stud, and the end of the left-hand coil to the right.
2. Place the carrier plate, with the spring facing outwards, over the quadrant. The pawls *J* should be in the "up" position.
3. Fit the pawl operating plate into position (with the large lip between the pawls) over

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the carrier plate, centralizing the assembly in the vertical position. The spring pressure, tends to force the whole assembly off the shaft when hand pressure is released to re-

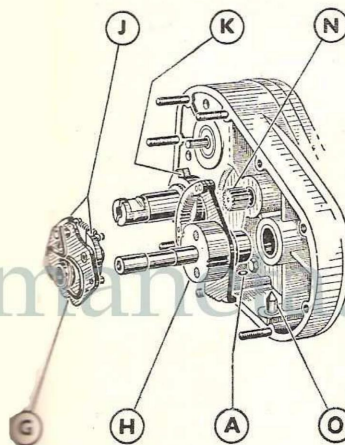


Fig. 25.

Foot gear change mechanism.

4. Refit the cover, pushing it on until there is about $\frac{1}{8}$ in. to go and ensuring that the peg *M* is in line with the slot in the pawl operating plate *D* so that when the cover is finally pressed home the peg will pass through the slot. Holding the cover with the right hand

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insert a large screwdriver into the slot in the end of the kickstarter quadrant shaft, and turn in an anti-clockwise direction until the stop plates *K* slide under the rubber buffer *L* in the outer cover. The cover can then be pushed right home, and held in position with the left hand until one of the screws, preferably one for the extreme right of the cover is screwed in.

5. **SPECIAL NOTE.** If the spring pressure forces the assembly off the shaft before the cover can be replaced, obtain a piece of tubing approximately 4in. long with internal and external dimensions of about 17/32in. and 11/16in. respectively, and insert in the quadrant bearing hole, pressing against the pawl operating plate and retaining the spring assembly. With the other end of the tube held in position by the knee or body, both hands will be free to carry out the instructions in paragraph 4.
6. Screw the gear control plunger *E* in position then replace drain plug *A*, refill the gearbox with oil to correct level, and re-connect the clutch cable.

GEAR-CHANGE DISMANTLING (4-speed Gearbox)

Gearbox

The four-speed gearbox fitted to this model is of the constant-mesh sliding pinion type with internal dog engagement. The sliding pinions incorporating the gear engagement dogs are mounted one pair *A* and *B*, (Fig. 26) on the mainshaft, and one pair *C* and *D* on the layshaft, and each pair is operated by a separate sliding fork *E* and *F* specially

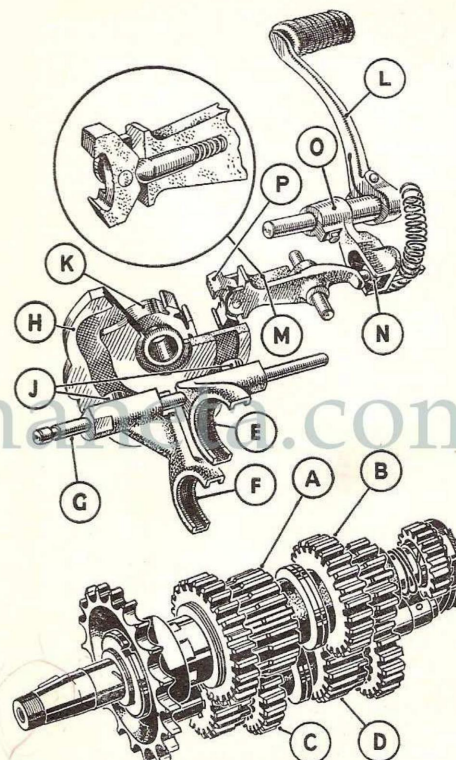


Fig. 26. Gear change mechanism and gear cluster (4-speed gearbox).

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designed to couple together the individual members of each pair. These forks slide on a common axis, provided by a horizontal rod *G*, and their respective motions, by which the various gear engagements are secured, are determined by the rotation of a cam plate *H* in which are machined two special cam grooves, one for each fork, and in which the operating pegs *J* formed on the forks engage.

Foot Gear-change

The cam plate, which operates the sliding forks, is caused to rotate by the foot gear-change mechanism through the intermediary of a sleeve *K* to which the plate is fixed, and on which double-acting ratchet teeth are formed. When the foot gear-change pedal *L* is raised or depressed the rocking lever *M* is rocked on its fulcrum (mounted in the gearbox partition which is not illustrated) by means of a ball-end *N* engaging in the slotted lever *O*, coupled to the pedal, and the spring-loaded ratchet pawl *P* at the other end of the rocking lever imparts the appropriate movement to the sleeve *K*.

Dismantling

This is a job which is only undertaken by the experienced owner as a rule, and one which in the ordinary course of events should never be necessary. Before carrying out this work the clutch must first be taken off bodily by removing the six locknuts *A* (Fig. 15), the spring nuts *B*, and then the spring plate, whereupon the central fixing nut can be unscrewed and the clutch withdrawn from the taper on the gearbox mainshaft. This will require the use of extractor Part No. 61-3362. Then disconnect the speedometer drive under the outer cover at the front.

Move the gears to the neutral position, and then remove the gearbox outer cover, which will come

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away with the kickstarter and gear-change pedals and the clutch lever (first release the clutch cable) still in position. Note that as the cover is withdrawn the spring pressure on the kickstarter pedal is released. This point must be watched when re-assembling.

Pull out the clutch operating rod which passes through the centre of the mainshaft, and then release the nut on the mainshaft which holds the kickstarter ratchet pinion and spring, laying these latter aside. The gearbox partition can then be removed, together with the foot gear-change rocking lever *M*.

The rod *G* is pressed into the gearbox shell at the clutch end and secured by a grub screw which is accessible under the gearbox. Release this grub screw and then pull out the rod. It should then be possible to withdraw the entire gear cluster complete with shafts and the two sliding forks bodily from the gearbox, although, if preferred, the components may be withdrawn separately. This may call for a certain amount of manoeuvring, but the experienced owner will have no difficulty.

Reassembly

This is carried out in precisely the reverse order, first making certain that the cam plate is in the neutral position as described above.

INSTRUCTIONS FOR THE MAINTENANCE OF LUCAS ELECTRICAL EQUIPMENT fitted to B.S.A. "C" Group Motor Cycles

The electrical equipment is designed and manufactured to give long periods of service without any need for adjustment or cleaning. The small amount

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of attention which is required is described below and we advise riders to carry out the procedure outlined in order to ensure that the best service is obtained.

BATTERY

About once a month take off the battery lid, remove the filler plugs from each of the cells and examine the level of the electrolyte in each cell. If necessary, add sufficient distilled water to bring the electrolyte level with the top of the separators. Do not use tap water and do not use a naked light when examining the condition of the cells.

The condition of the battery should occasionally be checked by taking hydrometer readings of the specific gravity of the electrolyte. Readings should be taken after the motor cycle has been out for a run when the electrolyte is thoroughly mixed. The specific gravity readings and their indications are as follows:—

- 1.280–1.300 Battery fully charged.
- About 1.210 Battery about half discharged.
- Below 1.150 Battery fully discharged.

The readings for each of the three cells should be approximately the same. If one cell gives a reading very different from the others it may be that electrolyte has been spilled or has leaked from this particular cell or there may be a short circuit between the plates. In this case the battery must be examined by a Lucas Service Depot or Agent.

Finally, never leave the battery in a discharged condition for any length of time, wipe away all moisture and dirt from the top of the battery and keep the terminals clean and smeared with petroleum jelly to prevent corrosion.

Special Note. As from 1951 a self-coloured cable harness with a positive to earth system

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(Fig. 27) is employed in place of the coloured identification sleeves on the cable ends used with the earlier negative earth system (Fig. 28). Make sure that the battery is always connected up correctly.

DYNAMO

Output Control

The dynamo is of the compensated voltage control type and is arranged to work in conjunction with a regulator unit which is fitted alongside the cutout. The regulator causes the dynamo to give an output which varies according to the load on the battery and its state of charge. The dynamo also gives an increase of output to balance the current taken by the lamps whenever they are switched on. It will be noted that during daytime running when the battery is in good condition the dynamo gives only a trickle charge so that ammeter readings will seldom be more than one or two amperes. A discharge reading may be observed immediately after switching on the headlamp, but after a short time the battery voltage will fall and the regulator will respond causing the dynamo output to balance the lamp load.

Maintenance

About every 10,000 miles, take off the cover band and check the brushes and commutator. See that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and clean its sides with a petrol moistened cloth. Be careful to replace brushes in their original positions in order to retain bedding.

The commutator should be clean, free from oil or dirt and should have a polished appearance. If

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it is dirty, clean with a dry duster while the engine is slowly turned over. If the commutator is very dirty, moisten the cloth with petrol.

Lubrication

No lubrication is required to the dynamo as ball bearings are fitted to both the "Commutator and Driving End Brackets." These bearings are packed with grease during assembly and will last until the machine is taken down for a general overhaul.

Electric Horn

If the horn becomes uncertain in action, giving only a choking sound, or does not vibrate, it does not follow that it has broken down. First ascertain that the trouble is not due to some outside source such as a discharged battery, or a loose connection or short circuit in the wiring. If none of the above are at fault, the horn may be re-adjusted as follows:—

On the back of the horn there is a small adjusting screw, turn this screw in or out while depressing the horn button until the best note is obtained.

If the horn still gives trouble it should be removed and taken to a garage or Lucas Service Station.

COIL IGNITION EQUIPMENT

Cleaning (every 6,000 miles)

Remove the moulded cover and examine the contact breaker; it is important that the contacts are kept clean and free from oil or grease. If they are burned or blackened, clean with fine cabotundum stone, or if this is not available fine emery cloth may be used; afterwards wipe with a cloth moistened with petrol. If the contacts have been allowed to get into bad condition remove the arm carrying the moving contact. To do this, unscrew the nut

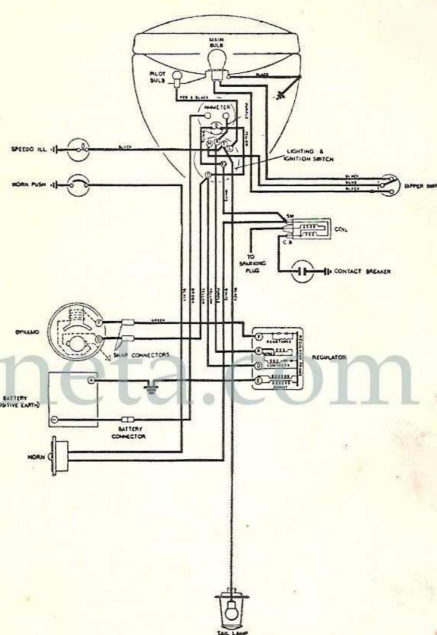


Fig. 27. Wiring diagram (positive earth).

securing the end of the contact breaker spring, and remove the nut together with the spring washer. Remove the metal brush and lift the contact breaker lever off its bearing. After cleaning, check the contact breaker gap setting.

Adjustment (see Fig. 29)

The contact breaker gap is carefully set to .010in.-.012in. before leaving the works and will need adjustment only at very long intervals. To

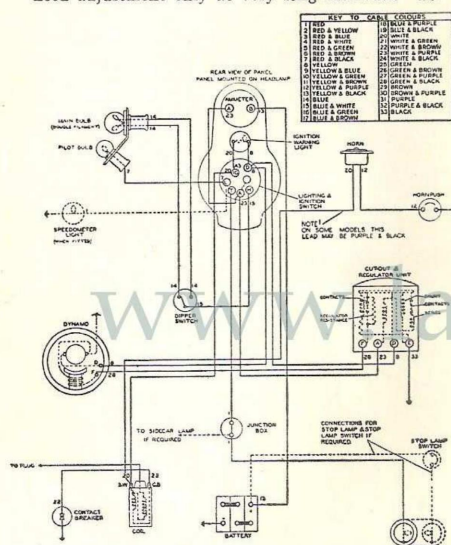


Fig. 28. Wiring diagram (negative earth).

test the contact breaker gap, slowly turn the engine over until the contacts are seen to be fully opened. Now insert the gauge; if it is correct the gauge should be a sliding fit. It is not advisable to alter the setting unless the gap varies considerably from

the gauge. If adjustment is necessary, proceed as follows:—

When the contacts are fully opened, slacken the locking screws *B* so that the plate *C* carrying the stationary contact can just be moved. Adjust the

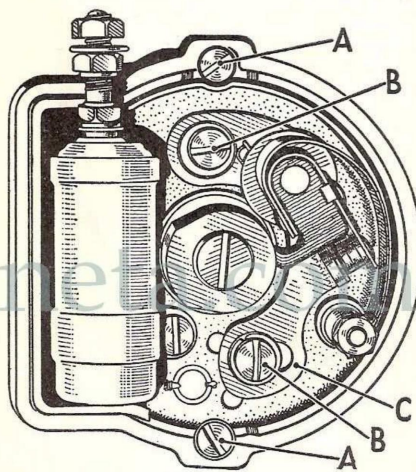


Fig. 29. The contact-breaker.

position of the plate until the gap is set to the thickness of the gauge. Tighten the locking screws and re-check the gap.

Lubrication (every 3,000 miles)

Lightly smear the surface of the cam with grease or, if this is not available, clean engine oil may be used.

Remove the contact breaker lever and lightly smear the pivot with grease or clean engine oil.

Automatic Timing Control

Remove the contact breaker cover and add a few drops of clean engine oil through the hole in the contact breaker base through which the cam passes. Do not allow any oil to get on or near the contacts.

Shaft

Add a few drops of thin machine oil to the lubricator on the contact breaker shank (early models only).

If it should be necessary to examine the advance and retard mechanism, remove the moulded cover and then unscrew the two screws (*A*, Fig. 28).

Renewing the High Tension Cable

When the high tension cable shows signs of perishing or cracking it must be replaced by 7mm. rubber covered ignition cable. To connect the cable, thread the knurled moulded nut over the lead, bare the end of the cable for about quarter inch, thread the wire through the metal washer provided and bend back the strands. Finally, screw the nut into its terminal.

LAMPS

Headlamp—removing lamp front and reflector

Press back the fixing clip at the bottom of the lamp and remove the lamp front. The reflector is secured to the lamp body by means of a rubber bead. When refitting the rubber bead, locate its thinner lip between the reflector rim and the edge of the lamp body. To replace the front locate the metal

tongue in the slot at the top of the lamp, press the front on and secure by means of the fixing catch.

The headlamp must be set so that the main driving light beam is parallel with the road surface. If necessary adjust the headlamp by slackening the two fixing bolts.

The driving light filament of the main bulb must also be correctly focused in the reflector. To focus remove the lamp front and reflector and slacken the clamping clip which secures the bulb holder and move the bulb holder backwards or forwards until the best results are achieved. Finally tighten the clamping screw.

Tail Lamp

The portion of the lamp carrying the red glass can be removed by pushing in and turning to the left. When refitting, engage the bayonet fixing, push in, and turn to the right to secure the body in position.

Replacement Bulbs

	Lucas No.	Watts
Headlamp (main) ...	169	30/30
Headlamp (pilot and tail lamp)...	200	3
Stop tail lamp (when fitted) ...	384	6/18
		(index)

SOME GENERAL HINTS

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 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 and carburetter.

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

The engine and gearbox are best cleaned with a brush and paraffin, and then dried off with clean rag.

General

Periodically check 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 the 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 the ignition system, and in the event of these troubles arising, the following checks will enable the cause to be located.

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

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

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

TEL-HYDRAULIC FORK MODELS

USEFUL DATA

	C10	C11
Petrol tank capacity (galls.) ...	2½	2
Oil tank capacity ...	4 pints	4 pints
Gearbox capacity (3-speed) ...	½ pint	½ pint
(4-speed) ...	1 pint	1 pint
*Front forks capacity ...	5 fl. oz.	5 fl. oz.
*Chaincase capacity (approx.) ...	7 fl. oz.	7 fl. oz.
Bore (mm.) ...	63	63
Stroke (mm.) ...	80	80
Capacity (c.c.) ...	249	249
Compression ratio ...	5/1	6.5/1
Piston ring gap—maximum ...	.012in.	.012in.
minimum ...	.008in.	.008in.
Ignition timing—piston distance before t.d.c. with points just opening (fully retarded) ...	½in.	½in.
Contact breaker points gap ...	.012in.	.012in.
Spark plug (Iron head) ...	L10	L10S
(Alloy head) ...	N8B	—
Plug points gap ...	.018-.020in.	.018-.020in.
Gear ratios (3-speed box)—third ...	6.6	6.6
second ...	9.8	9.8
first ...	14.5	14.5
(4-speed box)—fourth ...	6.65	6.65
third ...	8.06	8.06
second ...	11.7	11.7
first ...	17.15	17.15
Tyre sizes—front ...	3.00-19	3.00-19
rear ...	3.00-19	3.00-19
†Tyre pressures (p.s.i.)—front ...	18	18
rear ...	24	24
Chain sizes—front and rear ...	½ × .305in.	½ × .305in.
Engine sprocket ...	16T	16T
Standard carburetter jet ...	90	80
Needle position ...	2	3
Air cleaner ...	Export only	Export only

GIRDER FORK MODELS

USEFUL DATA

	C10	C11	C12
Petrol tank capacity (galls.) ...	2	2	2
Oil tank capacity (pints) ...	4	4	4
Chaincase capacity (fl. ozs.) ...	7	7	7
Bore (mm.) ...	63	63	71
Stroke (mm.) ...	80	80	88
Capacity (c.c.) ...	249	249	348
Spark plug ...	L10	L10S	L10
Compression ratio ...	5/1	6.5/1	5/1
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) ...	20 lbs.	20 lbs.	20 lbs.
Rear (per square inch) ...	28 lbs.	28 lbs.	28 lbs.
Piston ring gap—			
Minimum ...	.006in.	.006in.	.010in.
Maximum ...	.010in.	.010in.	.014in.
Engine sprocket ...	16T	16T	17T
Gear ratio—			
Third ...	6.6	6.6	6.25
Second ...	9.8	9.8	9.2
First ...	14.5	14.5	13.6
Ignition setting piston distance from T.D.C. with C.B. points just opening) ...	½in.	½in.	½in.
Standard jet ...	90	80	150
Needle position ...	2	3	3
Valve ...	4/4	4/4	6/3
Chain sizes—			
Front ...	½in. × .305	½in. × .305	½in. × .305
Rear ...	½in. × .305	½in. × .305	½in. × .305

ALL MODELS USEFUL DATA

Original Cam				
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°
Tappet clearances (cold)				
inlet	...	.004in.	} S.V. Models	
exhaust	...	.006in.		
inlet	...	.003in.	} O.H.V. Model	
exhaust	...	.003in.		
Replacement Ramp Cam				
Valve timing—inlet	...	...	Opens before t.d.c.	34°
			Closes after b.d.c.	78°
exhaust	...	...	Opens before b.d.c.	74°
			Closes after t.d.c.	38°
Tappet clearances (cold)				
inlet	...	.012in.	} S.V. Models	
exhaust	...	.015in.		
inlet	...	.010in.	} O.H.V. Model	
exhaust	...	.012in.		

Note.—WMI-20 wheel rims on C11 model, replaced in 1952 by WMI-19 wheel rims.

* $\frac{1}{4}$ -pint=5 fl. oz.=8 tablespoons.

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

Front tyre : Add one lb. per sq. in. for every 28-lb. increase above 140-lb.

Rear tyre : Add one lb. per sq. in. for every 14-lb. increase above 140-lb. If additional load is carried in the form of a pillion passenger or luggage the actual load bearing upon each tyre should be determined and the pressures increased in accordance with the Dunlop load and pressure schedule.

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PROPRIETARY INSTRUMENTS FITTINGS AND ACCESSORIES

Tyres : Messrs. Dunlop Rubber Co. Ltd., Fort Dunlop, Birmingham.

Electrical Equipment : Messrs. Joseph Lucas Ltd. Birmingham.

Saddles : Messrs. Herbert Terry & Sons Ltd., 210 Corporation Street, Birmingham.

Speedometers : Messrs. Smiths Motor Accessories Ltd., Cricklewood, London.

Carburettors : Messrs. Amalgamated Carburetors Ltd., Perry Barr, Birmingham.

Grease Guns : Messrs. Tecalemit Ltd., Great West Road, Brentford, Middlesex.