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The Book of the

A.J.S.

A PRACTICAL GUIDE ON THE HANDLING
AND MAINTENANCE OF ALL 1945-57 O.H.V.
TOURING SINGLES

BY
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EIGHTH EDITION

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PREFACE

MY first practical experience with an A.J.S. was in 1927 when I bought a "big port" O.H.V. 350 c.c. model. Even then A.J.S. performance was very high. Today A.J.S. motor-cycles have a world-wide reputation for high performance, mechanical quietness, reliability, and economical running. Appearance and general finish too are excellent.

It has always been, and still is, the policy of A.J.S. Motor Cycles of Plumstead Road, London, S.E.18, to develop and perfect their machines gradually, and to embody in the standard touring models their experience gained through participation in racing and trials events.

As hitherto, the object of this handbook is to help *you* to obtain the maximum pleasure, mileage, m.p.h., m.p.g., and m.p.£ from your mount, and to reduce depreciation to the minimum.

If you have never before handled an A.J.S., turn direct to Chapter 1 which deals with preliminaries, starting-up, gear changing, running-in, etc. A useful book for novices (and experienced riders) is *The Art of Motor Cycling*, published by Pitman at 5 s. The remaining chapters deal comprehensively with the maintenance and overhaul, of the following fourstroke O.H.V. single-cylinder touring models-

1. The 1945-55 347 c.c. rigid-frame Model 16M.
2. The 1945-55 498 c.c. rigid-frame Model 18.
3. The 1949-57 347 c.c. spring-frame Model 16MS.
4. The 1949-57 498 c.c. spring-frame Model 18S.

Except where otherwise stated, the instructions given apply to 1945-57 inclusive. Machines not covered in this handbook are: the Trials models, the Scrambles models, the overhead-camshaft racing models, and the twin-cylinder O.H.V. touring machines. The competition models, by the way, have engines similar to the touring models dealt with in this handbook, but they have, of course, specialized equipment.

In conclusion I thank A.J.S. Motor Cycles (and various accessory firms) for their kindness in providing technical data, and for according me permission to reproduce many copyright illustrations.

W.C.H.

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CHAPTER I

HANDLING AN A.J.S.

AN A.J.S. O.H.V. single is easy to handle, and even the absolute novice quickly acquires confidence in the saddle. Beware, however, that you do *not indulge in big throttle openings until you have had ample road experience*. Also do not forget to digest the *Highway Code*.

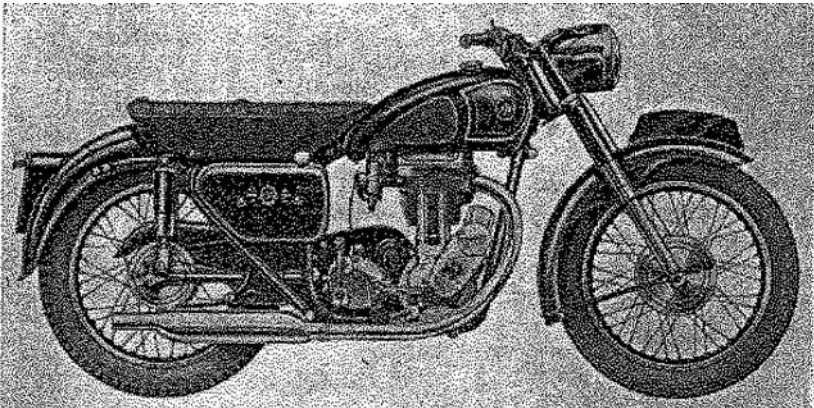


FIG. 1. A FLEXIBLE AND FAST TOURER WITH CLEAN LINES AND MECHANICAL QUIETNESS - THE 1957 MODEL 18S

The 500 c.c. A.J.S. model shown is similar to the 350 c.c. model 16MS. Both models have snappy push rod O.H.V. engines with light-alloy cylinder heads, "Monobloc" carburettors, hairpin valve-springs, and automatic-ignition control. Their specification includes: "Teledraulic" front forks, Girling rear-suspension units, a quickly detachable rear wheel, die-cast light-alloy hubs, a deep secondary-chain guard, a new A.M.C. four-speed gearbox, Lucas headlamp, twin pilot-lights, and other attractive features.

* The A.J.S. engine and frame numbers required on Form R.F. 1/2 will be found on the near-side of the crankcase and the off-side of the saddle lug, or on the off-side of the front down-tube (later models).

Essential Preliminaries. Before you can legally ride on the road -
(1) Insure against all *third-party* risks and obtain the vital "certificate of insurance."

With a new machine you cannot get this until the machine is licensed, and an insurance "cover note" must be obtained. If you have a valuable machine, you are advised to take out full comprehensive insurance.

(2) Obtain the registration licence and registration book (Form R.F.I/2)* or renew the licence (Form R.F. I/A).

(3) Obtain a three-monthly "provisional" or an annual driving licence (Form D.L.I).*

(4) Fit a reliable speedometer if one is not fitted (not *essential* if machine registered prior to 1st Oct., 1937).

(5) If you carry a pillion-passenger, see that he or she sits *astride* a proper pillion seat *securely fixed* to the machine (all "springers" have dualseats), and that the passenger holds a current annual or substantive driving licence for Group G if you are a "learner."

(6) If you are ineligible for an annual or substantive driving licence, attach "L" plates to the front and back of the machine.

(7) If not already provided, fit a red reflector (1½ in. minimum diameter) *vertically* at the rear of the motor-cycle and, on a sidecar outfit, an additional red reflector and rear lamp at the rear of the sidecar and at the same height as those on the motor-cycle.

(8) Use an ignition-suppression type sparking plug or terminal cover if the machine was registered for the first time after 1. st July, 1953.

All the official forms referred to above may be obtained from any money-order post office. See also footnote **, with reference to Forms R.F, 1/A or R.F. 112. You are not eligible for a substantive driving licence for Group G *unless* you are 16 and have complied with one of these conditions-

(a) You have held a licence (other than a provisional or Visitor's licence authorizing the driving of vehicles of the class or description applied for within a period of ten years ending on the date of coming into force of the licence applied for.

(b) You have passed the prescribed driving test (this includes a test passed while serving in H.M. Forces) during the said period of ten years.

* Recent legislation provides for a six-month's provisional licence, and a substantive driving licence valid for three years.

** Models 18S and 16MS are taxed at £3 15s. per annum, with £1 5s. extra duty for a sidecar.

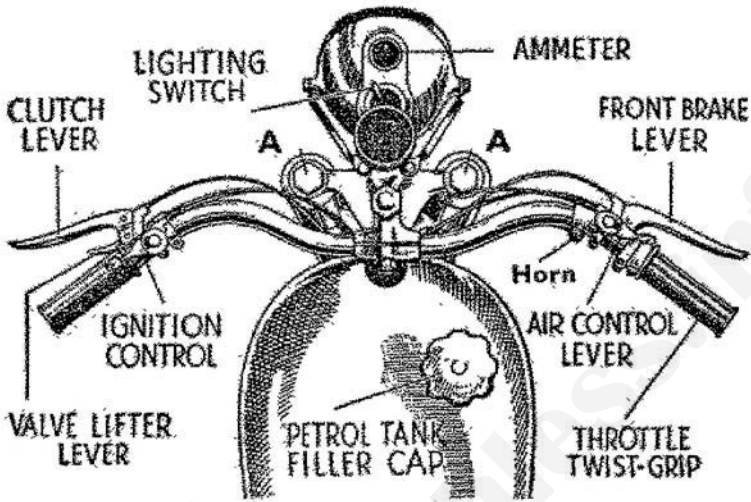


FIG. 2. LAYOUT OF HANDLEBAR CONTROLS (1945-53 MODELS)

This also applies to the 1954 350 C.C. models, which have manual ignition control. All controls operate by inward movement and the handlebar clips are adjustable for angle. A dipping switch (not shown) is mounted close to the ignition control. At A are shown the filler plugs for the front forks.

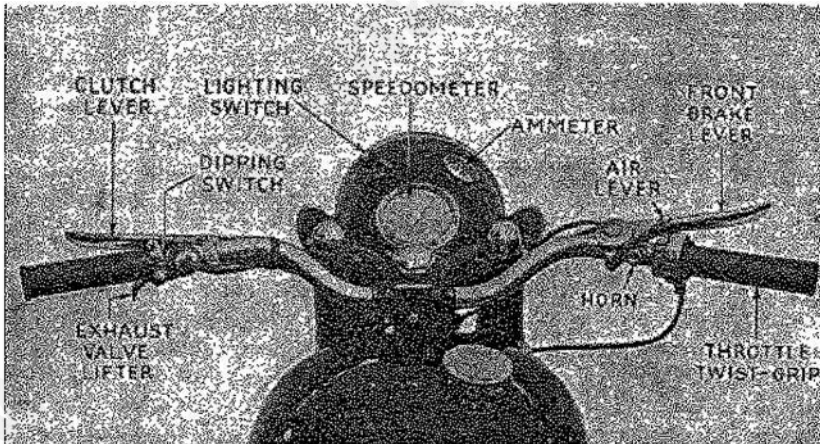


FIG. 3. LAYOUT OF HANDLEBAR CONTROLS (1954 ONWARDS)

Automatic ignition-advance mechanism was not fitted to the 1954 350 c.c. model, and this had manual ignition control as shown in Fig. 2. As hitherto all controls are adjustable for angle and are operated by inward movement. Prior to 1955 the ammeter, lighting switch and speedometer were positioned as shown in Fig. 2. 1956-7 models have a combined dipping-switch and horn push.

STARTING THE ENGINE

First verify that there is sufficient petrol and oil in the tanks. Handlebar controls are shown in Figs. 2, 3; oil tank and gearbox replenishment are dealt with on pages 53 and 60 respectively. Check that the gear-change pedal *is* in neutral (*see* Figs. 5-7).

Adjusting the Controls. If the engine is cold -

- (1) Set the throttle so that it is slightly open by turning the twist-grip *inwards about one-sixth* of its total movement.
- (2) Completely close the air-control lever.
- (3) Fully advance the ignition-control lever (where fitted) by pushing it *outwards to its full extent*, and then retard it by about two-fifths of its total movement by pulling it *inwards*. 1945-52 models: pull *inwards* to advance.

If the engine is already warm, open the throttle about a quarter and the air-control lever half to three-quarters.

The Petrol Tank Filler Cap. Some riders find that the filler cap does not come away instantly. On A.J.S. machines, to release the filler cap quickly, depress it slightly, then turn it fully anti-clockwise and withdraw the cap. It has two locking positions.

Main and Reserve Petrol Taps. Many A.J.S. singles have down-draught type Amal carburettors and on such machines it is important when leaving a machine standing for more than a few minutes always to turn off both the main and reserve-supply petrol taps.

Both taps are of the horizontal-plunger type. To open (1945-54), push *the hexagon* knob marked PUSH-ON towards the tap body. To shut the tap push the *knurled* knob marked PUSH-OFF towards the tap body. As mentioned in a later paragraph, it is advisable normally to run with only the off-side tap open. Refuelling should be undertaken as soon as possible after being forced to draw upon the reserve-fuel supply. The reserve supply tap should then be shut immediately. On 1955 and later models, to close either tap, push the plunger right in; to open it, pull the plunger right out.

If Engine is Cold. If the engine (especially a new one) is stone cold, it is generally advisable to free the piston before attempting to start up. Raise the exhaust-valve lifter and kick the engine over smartly about three times.

Starting Procedure. After setting the controls, depress the float chamber "tickler" momentarily, but do not flood the carburettor so that petrol drips from it. It is assumed that the petrol has been turned on by using *the off-side* tap. Use the other to maintain a reserve supply. Turn the engine over slowly with the kick-starter pedal until the resistance of compression is felt.

Raise the exhaust-valve lifter and allow the piston just to pass the position of full compression. Then allow the kickstarter pedal to return almost to its normal position. Release the exhaust-valve lifter and simultaneously kick the engine over sharply with along swinging kick. If nothing happens, repeat the procedure until it does! When the engine fires, open the air-control lever slowly, advance the ignition and open the throttle slightly to give even running on the pilot jet. Check the oil circulation (*see* page 53).

Avoid Force on Kick-starter Pedal. It is very important not to exert excessive force on the kick-starter pedal (*see* Fig. 4) until the toothed quadrant (A) has moved in the direction of the arrow sufficiently to bridge the gap (C) between the quadrant and the kick-starter ratchet pinion (B).

Until the gap (C) has been bridged and full engagement has been obtained and felt, a slow, gentle operation of the kick-starter is essential to prevent wear and damage. *Never* use excessive force.

Excessive Flooding is Risky. Do not adopt the pernicious habit of swamping the carburettor with petrol before starting up. Such flooding incurs a grave risk of neat petrol entering the cylinder from a downdraught carburettor and destroying the vital oil film between the piston and cylinder.

If Engine Refuses to Start. If the engine refuses to start at the third kick, verify that petrol is reaching the float chamber by depressing the tickler. When you are satisfied on this point, remove and carefully inspect the sparking plug. Clean the plug, check its gap, and replace it (*see* pages 73-5).

Correct Method of Warming Up.

Do not race the engine immediately after starting up from cold, as it takes some time for the oil to circulate properly. Running the engine too fast also generates excessive heat. On the other hand, do not warm up the engine too slowly, or the pump will not work fast enough to circulate the oil properly and the combustion of a rather cold mixture will be incomplete, with the result that condensation on and corrosion of the cylinder walls may occur.

Never allow the engine to idle for long,

especially in hot weather, and do not travel fast until the oil has warmed up.

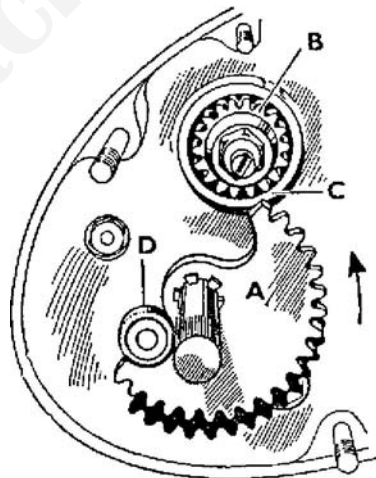


FIG. 4. THE KICK-STARTER (1945-1951)
A, B, C SHOW THE QUADRANT, RATCHET PINION,
AND THE GAP BETWEEN THEM, RESPECTIVELY.
D IS THE QUADRANT STOP.

GEAR CHANGING

Ease the A.J.S. off its stand, with the engine ticking over and the foot gear-change pedal in neutral, sit astride the machine, and disengage the clutch, using the handlebar lever (see Figs. 2, 3).

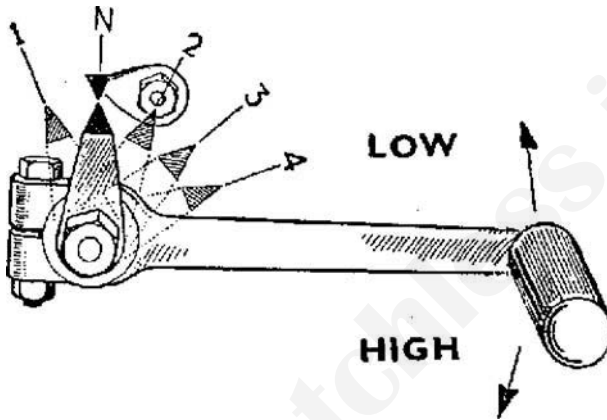


FIG. 5. THE FOOT GEAR-CHANGE INDICATOR (1945-51 MODELS)

All changes up to a higher gear are made by *depressing* the pedal with the toe, and all changes down to a lower gear by *raising* the pedal with the toe. Internal spring' return the pedal to the horizontal position after each gear change is made.

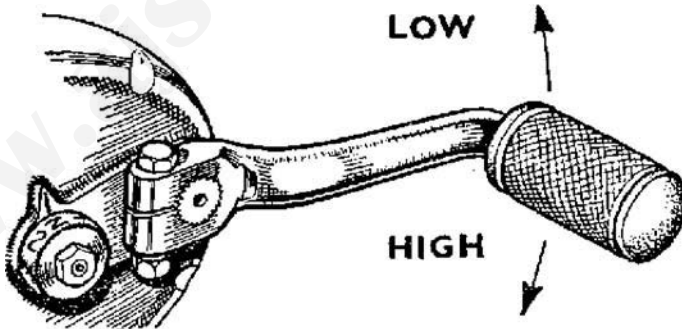


FIG. 6. THE FOOT GEAR-CHANGE INDICATOR (1952-6 MODELS)

The indicator itself comprises a small drum having the gear positions marked as shown. N (neutral) is shown aligned with the dash mark on the gearbox shell.

Engaging First Gear. Raise the foot gear-change pedal fully with the toe of the foot and engage first (bottom) gear (*see* Figs. 5-7). Slight backward or forward movement of the machine often facilitates engagement. As soon as first gear is felt to engage, remove the toe from the pedal. If difficulty is experienced in engaging first gear, wait a few seconds before making another attempt. Initial difficulty in engaging first gear on a *new* machine usually cures itself quite soon, and sticking clutch-plates can be rectified by stopping the engine (by raising the exhaust-valve lifter) and smartly operating the kick-starter several times with the clutch fully disengaged.

To Move Off. Having engaged first gear, move off by slowly releasing the clutch lever. As the machine gathers speed and the engine takes the full load, gradually increase the throttle opening by means of the twist grip, so as to maintain a progressive rise in the speed of the engine and machine.

Changing Up (First to Second). As soon as your A.J.S. has reached a speed of about twelve m.p.h. in first gear, change up into second gear. Once again disengage the clutch, slightly close the throttle, pause a second, and then *depress* the gear-change pedal to *its full extent* with the toe, until second gear is *felt* to engage perfectly. Then engage the clutch and also remove the toe from the pedal to allow the pedal to return to its normal position.

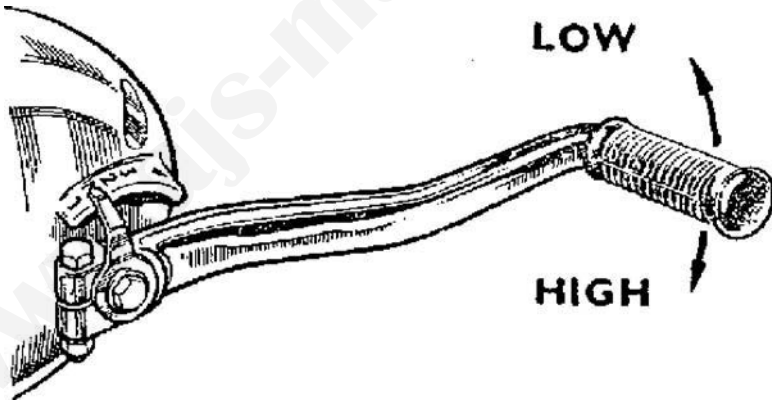


FIG. 7. THE FOOT GEAR-CHANGE INDICATOR (1957 MODELS)

The indicator comprises a pointer on the gear-change lever shaft, and a marked quadrant on the gearbox.

Changing Up (to Third and Fourth). Progressively increase the throttle opening until about twenty m.p.h. is obtained. Now disengage the clutch, throttle down slightly, pause a second, and then smartly, but without *force*, *depress* the gear-change pedal fully until third gear is felt to engage perfectly. Engage the clutch, remove the toe from the pedal, and throttle up to maintain a good road speed without any tendency for the engine to "knock." To change into fourth (i.e. top gear) repeat the procedure at nearly thirty m.p.h.

To Change Down (Fourth to Third). Throttle down to a normal speed for third gear. Disengage the clutch, throttle up slightly, pause a second, *and raise* the gear-change pedal to its *full extent* with the toe of the foot until third gear is *felt* to engage. Immediately afterwards engage the clutch, remove the toe from the pedal, and throttle up to compensate for the increase in the speed of the engine relative to rear-wheel speed.

To Change Down (to Second and First). The required procedure is similar to that just described for changing down from fourth to third gear. With the toe of the foot *raise* the gear-change pedal to its *full extent* during each gear change. Each full movement of the pedal engages the *next* gear in the gear-change sequence as shown by the indicator in Figs. 5-7.

To change from fourth or third gear into first (bottom) gear, it is not *essential* to complete the full gear-changing procedure for each intermediate gear, although this should be done when hill climbing. The method which can be used is to bring the machine to a crawl by means of the throttle and brakes, disengage the clutch, and then raise the gear-change pedal to its *full extent-three* times or twice (in quick succession), according to whether top or third gear was previously engaged. Each time you raise the gear-change pedal "blip" the engine, i.e. throttle up slightly. Then gently re-engage the clutch.

Silence Is Golden. Noisy gear changing is bad for sensitive cars, and worse still for the gearbox! Learn to change gear silently. Here are a few golden rules-

- (1) Make full use of the four gear-ratios provided. The gear-change pedal always returns to the same position, but do not forget where it is.
- (2) Do not "bully" the machine up a steep incline in top gear.
- (3) Change gear *before* your mount gets "hot and bothered."
- (4) Use a nicely coordinated and almost simultaneous movement when operating the clutch, throttle, and gear-change pedal.
- (5) Keep a steady pressure on the gear-change pedal and hold the clutch *out until the gear is felt to engage*. At other times remove the foot.
- (6) Do not race the engine in the lower gears to "impress the lads." They may like it (perhaps) but your engine will hate you!
- (7) Be kind to the gearbox and give it its oil ration occasionally (*see* page 60).

Negotiating Hills. Your A.J.S. will romp up gentle gradients, but maintain the engine r.p.m. high by making full use of the gearbox where necessary and *in good time*. On no account permit the engine to labour. Be liberal with the throttle opening, and do not retard the ignition-control lever (where fitted) unless this is essential (to ward off a "knock"), as this reduces power output.

When descending steep hills, open the air lever wide and close the throttle. This will not only cool the engine, but it will enable engine compression to exert a powerful braking effect.

Use of Brakes. Acquire the habit of using *both* brakes simultaneously, as this gives powerful braking with minimum and even wear of the brake linings and tyres.

Excessive and fierce brake application plays havoc with the tyres and transmission, and for this reason you should learn to *drive on the throttle* and use the brakes as little and as seldom as possible. Make use of engine compression as a brake when descending hills (*see* previous paragraph), but never use the clutch or exhaust-valve lifter for controlling speed. This places a motor-cyclist beyond the pale.

To Stop the Machine. To effect a normal stop on the road, use the following procedure-

- (1) Close the throttle by means of the twist-grip.
- (2) Fully disengage the clutch.
- (3) Apply *both* brakes simultaneously, increasing the hand and foot pressure as the brakes take effect.
- (4) Raise the gear-change pedal fully once or several times (according to which gear is already engaged) until you get into first gear. Then depress the pedal *very slightly* with the toe until "neutral" (*see* Figs. 5-7) is obtained.
- (5) Engage the clutch by gently releasing the lever.

To Stop the Engine. After bringing the motor-cycle to a halt with the throttle closed (as far as the throttle-stop permits*), it is only necessary to raise the exhaust-valve lifter for a few seconds in order to extinguish all signs of life. Before you leave your machine, turn off the petrol tap to prevent accidental "flooding."

* The correct throttle-stop setting is such that when the engine is warmed up and the throttle is closed, the engine ticks over smoothly (*see* page 17).

Running-in New Machine. On covering 1,000 miles it is not harmful to step up the speed of a *new* machine gradually, but refrain from using full throttle until about 2,000 miles have been covered. A new A.J.S. must be properly run-in, or it may be permanently spoiled.

Here is some sound advice-

- (1) Don't exceed one-third full throttle for 1,000 miles.
- (2) Don't "over-rev." the engine when idling or on the road, especially in the lower gears.
- (3) Don't often exceed 30 m.p.h. in top gear.
- (4) Don't permit the engine to labour or "knock." Change down in good time.
- (5) Don't run the engine with the machine stationary for more than a minute or two.
- (6) Don't forget to keep the engine, gearbox, and machine correctly lubricated (*see* Chapter IV).

It is beneficial during the running-in period to mix *one pint* of Acheson's Colloidal Graphite with *each gallon of engine oil*. This benefits the cylinder and bearing surfaces. If the compound (obtainable from most garages) is used after running-in, reduce the amount by one half.

After Covering 400-500 Miles. A certain amount of bedding-down occurs, and it is important to check the adjustment of the following: (a) tappets, (b) contact-breaker points, (c) steering head bearings, (d) primary and secondary chains, and (e) brakes. Steering-head bearing adjustment is very important, as slack bearings will suffer. After the initial bedding-down and necessary adjustments have been made, further adjustment is needed much less frequently.

CHAPTER II

ALL ABOUT CARBURATION

A STANDARD type Amal needle-jet carburettor is fitted to all 1945-54 single-cylinder 350 c.c. and 500 c.c. A.J.S. engines but all 1955 and later engines have the "Monobloc" type Amal needle-jet carburettor fitted.

AMAL STANDARD CARBURETTOR

An understanding of the working of the standard Amal carburettor is desirable before considering its tuning and maintenance. Referring to Fig. 8, showing a sectional view of the Amal semi-automatic carburettor, (A) is the carburettor body or mixing chamber, the upper part of which has a throttle valve (B), with taper needle (C) attached by a needle clip. The throttle valve regulates the quantity of mixture supplied to the engine. Passing through the throttle valve is the air valve (D), independently operated and serving the purpose of obstructing the main air-passage for starting and mixture regulation. Fixed to the underside of the mixing chamber by the union nut (E) is the jet block (F), and interposed between them is a fibre washer to ensure a petrol-tight joint.

On the upper part of the block is the jet-block barrel (H), forming a clean through-way. Integral with the jet block is the pilot jet (J), supplied through the passage (K). The adjustable pilot-air intake (L) communicates with a chamber, from which issues the pilot outlet (M) and the by-pass (N). A throttle stop (see Fig. 9) is provided on the mixing chamber, by which the position of the throttle valve for tick-over is regulated independently of the cable adjustment.

The needle jet (O) is screwed in the underside of the jet block, and carries at its bottom end the main jet (P). Both these jets are removable when the jet plug (Q), which bolts the mixing chamber and the float chamber together, is removed. The float chamber, which has bottom feed, consists of a cup (R) fed with petrol through union (S). It contains the float (7) and the needle valve (U) attached by the clip (V). The float chamber cover (W) has a lock screw (X) for security.

The petrol tap having been turned on, petrol will flow past the needle valve (U) until the quantity of petrol in the chamber (R) is sufficient to raise the float (T), when the needle valve (U) will prevent a further supply entering the float chamber until some in the chamber has already been used up by the engine. The float chamber having filled to its correct level, the fuel passes along the passages through the diagonal holes in the jet plug (Q), when it will be in communication with the main jet (P) and the pilot feedhole (K); the level in the needle and pilot jets being, obviously, the same as that maintained in the float chamber.

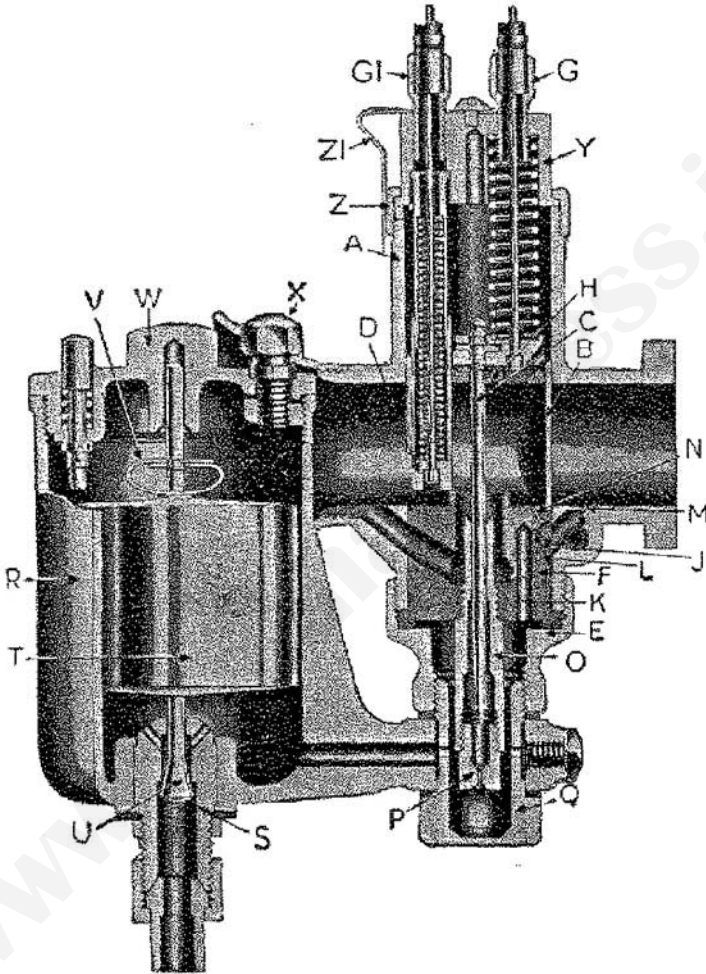


FIG. 8. SECTIONAL VIEW OF AMAL STANDARD NEEDLE-JET CARBURETTOR FITTED TO ALL 1945-54-MODELS

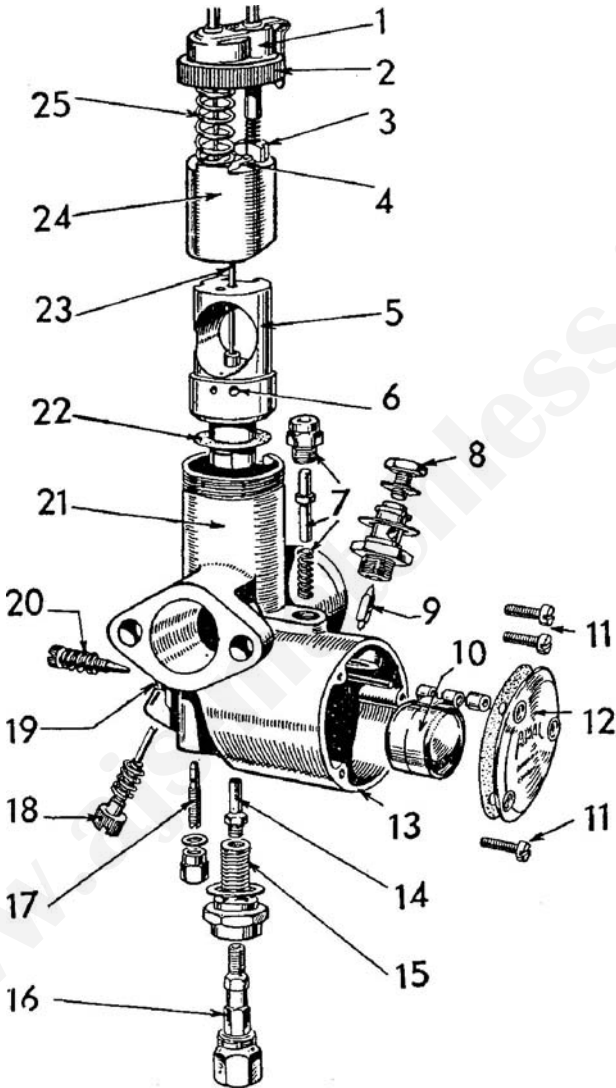


FIG. 10. AMAL "MONOBLOC" CARBURETTOR (1955 ONWARDS)
SHOWN DISMANTLED

The "Monobloc" carburettor, like the standard instrument, operates in four stages. When opening the throttle from the fully closed position to one-eighth open (for tick-over) the mixture is supplied by the pilot jet (17), and the strength of the mixture is determined by the setting of the knurled pilot-air adjusting screw (20) which has a coil locking-spring to facilitate adjustment. As the throttle is opened slightly farther, the main jet system comes into action, the mixture being augmented by the main jet (16) through the pilot by-pass.

The amount of cut-away on the atmospheric side of the throttle valve regulates the petrol-to-air ratio between one-eighth and one-quarter throttle. The needle jet (14) and the jet needle (23) take over the mixture regulation between one-quarter and three-quarter throttle, and the mixture strength is determined by the relative position of the needle in the clip (4) attached to the throttle valve (24). When the throttle is opened beyond three-quarters, the mixture strength is determined only by the size of the main jet. Note that the main jet (16) does not spray petrol direct into the carburettor mixing-chamber, but discharges through the needle jet into the primary air-chamber. From there it enters the main choke through the primary air-choke. The latter has a two-way compensating action in conjunction with the "bleed" holes in the needle jet. Pilot and main jet behaviour are not affected by this two-way compensation which governs only acceleration at normal cruising speed.

TUNING AMAL CARBURETTOR (STANDARD AND "MONOBLOC" TYPES)

The same tuning instructions apply to the standard and "Monobloc" instruments. Normally it is unwise to interfere with the maker's carburettor setting (see Tables I-III) unless there is a very special reason for doing so. However, it is sometimes desirable to make a slow-running adjustment with the pilot adjusting-screw and throttle-stop screw.

KEY TO FIG. 10

- | | |
|---------------------------------|------------------------------------|
| 1. Mixing-chamber cap. | 14. Needle jet. |
| 2. Mixing-chamber cap ring. | 15. Main-jet holder. |
| 3. Air valve | 16. Main jet. |
| 4. Jet-needle clip. | 17. Pilot jet. |
| 5. Jet block. | 18. Throttle-stop adjusting screw. |
| 6. Air passage to pilot jet. | 19. Jet-block locating screw. |
| 7. Tickler assembly. | 20. Pilot-air adjusting screw. |
| 8. Banjo securing-bolt. | 21. Mixing chamber. |
| 9. Float needle. | 22. Fibre seal. |
| 10. Float. | 23. Jet needle. |
| 11. Float-chamber cover screws. | 24. Throttle valve. |
| 12. Float-chamber cover. | 25. Throttle return-spring. |
| 13. Float chamber. | |

TABLE I

AMAL CARBURETTOR SETTINGS FOR 1945-54 SINGLES

| Model | Car- burettor | Main Jet | With Air Filter | Throttle Valve | Needle Position |
|-----------------|------------------|-------------|--------------------|-------------------|--------------------|
| 350 c.c. O.H.V. | 76AE/1AK | 150 | 130 | 6/4 | 3* |
| 500 c.c. O.H.V. | 89B/1AK | 180 | 160 | 29/4 | 2 |

TABLE II

AMAL CARBURETTOR SETTINGS FOR 1955-56 SINGLES

| Model | Carburettor | Main Jet | Pilot Position | Throttle Valve | Needle Jet |
|--------------------------------------|-------------|-------------|-------------------|-------------------|---------------|
| 350 c.c. O.H.V. (no air filter) | 376/5 | 210 | 30 | 376/3 | 3 |
| 350 c.c. O.H.V. (with air filter) | 376/33 | 200 | 30 | 376/3 | 3 |
| 500 c.c. O.H.V. (to engine 27000) | 376/4 | 240 | 30 | 376/3 | 2 |
| 500 c.c. O.H.V. (after No. 27000) | 389/1 | 260 | 30 | 389/3 | 3 |

TABLE III

AMAL CARBURETTOR SETTINGS FOR 1957 SINGLES

| Model (No air filter) | Carburettor | Main Jet | Pilot jet | Throttle Valve | Needle Position |
|--------------------------|-------------|-------------|--------------|-------------------|--------------------|
| 350 c.c. O.H.V. | 376/5 | 220 | 30 | 376/3½ | 3 |
| 500 c.c. O.H.V. | 389/1 | 260 | 30 | 389/3½ | 3 |

* Where an air filter is fitted, the needle position should be No. 2, not No. 3. The type numbers of the 1954 350 c.c. and 500 c.c. Amal carburettors are 76AV/1ED and 89N/1ED respectively.

To vary the strength of the running mixture (rarely necessary), it is necessary to adjust the height of the needle in the throttle valve, or else to fit a larger or smaller size main-jet. The condition of the sparking plug provides an excellent guide to the condition of the mixture (see page 73).

To Make a Slow-Running Adjustment. This should be effected with the engine already warmed up. If the adjustment is appreciably at fault, screw home the pilot-air adjusting screw fully and then unscrew it (usually about two complete turns) until the engine idles at an excessive speed, with the throttle twist-grip closed and the throttle slide abutting the throttle-stop screw. The air lever should be fully open and the ignition lever (where automatic ignition-advance is not provided) should be set to obtain the best slow-running (half to two-thirds advanced).

Loosen the nut (omitted on the "Monobloc" carburettor) securing the throttle-stop screw, and unscrew the latter until the engine slows up and begins to falter. Then screw the pilot-air adjusting screw in or out as required to enable the engine to run regularly and faster. To weaken the mixture, screw the pilot-air adjusting screw outwards.

Slowly lower the throttle-stop screw until the engine again begins to falter. Then lock the throttle-stop screw (standard carburettor) with the lock-nut and reset the pilot-air adjusting screw to obtain the best slowrunning. If after making this second adjustment the engine ticks over too fast, repeat the adjustment a third time.

The combined adjustment sounds complicated but in practice is quite simple. It is important to avoid excessive richness of the slow-running mixture, especially if much riding is done on small throttle openings; if the mixture is too rich, considerable running on the pilot jet will occur while riding, with consequently a high fuel consumption.

Aim at obtaining the best tick-over, preferably on a mixture just bordering on the weak side. The engine should be on the point of spittingback.* When perfect slow-running has been obtained, tighten the locknut (standard carburettor) on the throttle-stop screw without disturbing the position of the screw.

Obstructed Pilot Jet. If the adjustment of the pilot jet does not obtain the desired results and the engine will not idle nicely with the throttle almost closed, the air lever fully open, and the ignition lever (where fitted) half to two-thirds advanced, it is possible that the pilot jet is obstructed. The jet passage (on the standard carburettor a duct drilled in the jet block) is very small and can readily become choked.

* Rev the engine up and down sharply several times (while at rest and while riding) and note whether the exhaust is nice and crisp, with no "flat spots" as the twist-grip is turned. It is essential to combine good tick-over with good acceleration.

To gain access to the pilot jet on the standard carburettor (see Fig. 8), remove the jet plug (Q) and the float chamber (R), and then detach the jet block (F) by pushing or tapping it out of the mixing chamber. The pilot jet (J) can then be cleared by blowing through it, or by means of a very fine strand of wire.

With the "Monobloc" carburettor (see Fig. 10) to remove the pilot jet (1 7), remove the pilot jet cover-nut and then unscrew the jet itself which should be thoroughly cleaned in petrol and then blown through. See that the air passage (6) to the pilot jet, and also the pilot outlet, are quite clear.

Bad Slow-running. If it is found impossible to obtain good slow-running by making the pilot-air adjustment as described on page 17, it is probable that some defect Pd, other than carburation is responsible for preventing the engine running smoothly at low revolutions. Air leaks or badly seating valves may weaken the mixture. Defects in the ignition system may also be responsible for poor tick-over.

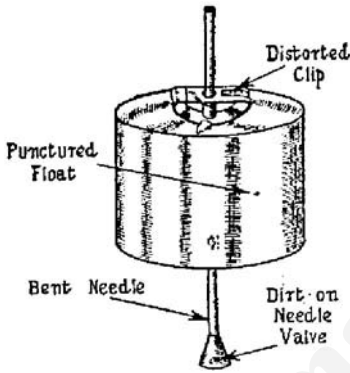


FIG. 11. IF PERSISTENT "FLOODING" OCCURS, LOOK FOR THESE DEFECTS (standard type carburettor.)

The sparking plug may be oily, or the points set too close (see page 73). Possibly the spark is excessively advanced or the contact-breaker needs attention (see page 77). Examine the slip ring for oil and see that the pick-up brush is bedding down and in good condition. Also examine the h.t. cable for signs of shorting.

Excessive Fuel Consumption. If in spite of careful checking on the tuning of the carburettor, high fuel consumption continues, it is likely that one or more of the under-mentioned causes is responsible for wastage of precious fuel. Late ignition timing will eat into your petrol supplies quickly. The same applies to poor engine compression due to badly fitting piston rings or valves. Also take into consideration the question of flooding due to a faulty float, air leakage at the joint between the carburettor and the engine, weak valve springs. See that no wastage is caused by slack petrol pipe union-nuts.

Twist-grip Adjustment. Adjustment should be such that the grip is free and easy to twist, but "stays put." The spring tension on the twist-grip rotating sleeve is regulated by a screw incorporated in one-half of the twist-grip body. To increase the tension, loosen the lock-nut and turn the screw into the body as required.

It is possible to move the complete twist-grip on the handlebars by slackening the two screws which clamp it in position. The best position of the twist-grip is that which gives the cleanest and straightest path to the throttle cable between the handlebars and the under-side of the petrol tank.

On 1945-53 models the throttle cable is initially coated with graphite lubricant which suffices for an indefinite period, but when a new cable is fitted it should be similarly greased. On 1954 and later models a nipple is provided for lubricating the throttle cable, and so ensure smooth throttle operation. If any stiffness or jerkiness occurs, inject a little engine oil through the nipple. When doing this, apply the gun as nearly vertically as possible, with the nozzle downwards.

CARBURETTOR MAINTENANCE

To ensure correct carburation it is advisable occasionally to remove the carburettor from the engine, strip it down completely, and then thoroughly clean it. It is a good plan to do this about every six months as described below.

Dismantling Standard Carburettor. First close both petrol taps and disconnect the twin petrol pipes from the carburettor by undoing the single union-nut at the base of the float chamber. Referring to Fig. 8, loosen the jet plug (Q) and slacken the mixing chamber union-nut (E).

Unscrew the mixing-chamber knurled cap-ring (Z) held by the retaining spring (ZI) at the top of the carburettor, and remove the two nuts securing the carburettor flange to the face of the inlet port. Now remove the body of the carburettor, complete with the float chamber, from the engine.

When removing the carburettor, pull the air valve (D) and the throttle valve (B), together with the jet needle (C), from the mixing chamber (A); temporarily tie up the slides out of the way. It is not necessary to remove the air and throttle slides from the control cables unless it is desired to renew the slides or control cables.

The jet needle (C) can be adjusted for position in, or removed from, the throttle slide by removing the spring clip from the top of the slide. Examine the carburettor-flange washer, and, if damaged, renew it.

With the carburettor removed from the engine, proceed to remove the jet plug (Q) and the float chamber (R). Also remove the main jet (P) and the needle jet (O).

Then completely unscrew the mixing-chamber unionnut (E) and push the jet block (F) right out; if stiff, tap the jet block out gently with a wooden stump. Unscrew the float-chamber cover (W) after loosening the locking screw (X). Then withdraw the float by pinching the clip (V) inwards, and pull gently upwards.

Dismantling "Monobloc" Carburettor. Close both petrol taps and disconnect the twin petrol pipes by undoing the banjo bolt (8) over the float chamber (see Fig. 10). Referring to Fig. 10, unscrew the mixing-chamber knurled cap-ring (2) on top of the carburettor and remove the two nuts securing the carburettor flange to the face of the inlet port. Then remove the body of the carburettor (21), complete with the integral float chamber (13). While removing the carburettor, pull the air valve (3) and the throttle valve (24) from the mixing chamber and tie them up temporarily out of the way. As mentioned in the instructions for the standard type carburettor, it is rarely necessary to disconnect the slides from the cables. Check that the flange washer is sound.

Further dismantling is straightforward. Referring to Fig. 10, to remove the jet needle (23), withdraw the jet-needle clip (4) on top of the throttle valve, and remove the needle. To obtain access to the float (10), remove the three screws (11) securing the float-chamber cover (12). Lift out the hinged float (10) and withdraw the moulded-nylon needle (9). Lay both aside for cleaning. The float-chamber vent, by the way, is embodied in the tickler assembly (7), and the top-feed union houses a filter element of fine gauze which is rapidly accessible for cleaning.

To remove the main jet (14), remove the main-jet cover and unscrew the jet from the jet holder (15), which should also be unscrewed. Remove the jet-block locating screw (19) to the left of and slightly below the pilot air adjusting screw.

Then push or tap out the jet block (5) and fibre seal (22) through the large end of the mixing chamber (21). To remove the pilot jet (17), remove the pilot-jet cover nut and unscrew the jet.

To Clean the Carburettor. Wash all the carburettor components, thoroughly clean with petrol and blow through the various ducts and passages to make sure they are quite clear. Avoid using a fluffy rag for drying purposes. Pay special attention to the small pilot-jet passages in the jet block on both the standard and "Monobloc" type instruments. See that all impurities are removed from inside the float chamber. On the "Monobloc" carburettor do not forget to clean the detachable pilot jet and the filter gauze inside the top-feed union for the float chamber.

Inspecting the Parts. When dismantling the carburettor it is advisable to make a close inspection of the various parts if the carburettor has been in continuous service for a considerable period.

1. **THE FLOAT CHAMBER.** Examine the components very carefully and check that the vent is unobstructed. The float must be in perfect condition. Clean the moulded-nylon needle on the "Monobloc" carburettor very thoroughly, and be careful not to damage it. On a standard carburettor hand-polish the valve part of the float needle by rotating the needle on its seat while pulling it vertically upwards. If a distinct shoulder is visible on the needle where it seats, renew the needle at once. Check for any sign of bending or distortion of the clip.

2. **THE THROTTLE VALVE.** Test this for fit in the mixing chamber. Should excessive play exist, renew the slide forthwith. See that the new slide has the correct amount of cut-away-
3. **THE JET-NEEDLE CLIP.** The spring clip securing the tapered needle to the throttle valve must grip the needle firmly, and free rotation must not occur, as this causes the needle groove to wear. Always be careful to replace the needle with the clip in the correct groove, (see page 16).
4. **THE JET BLOCK.** Before tapping this home in the mixing chamber verify by blowing that the pilot-jet ducts are clear and that the jet-block fibre seal is in good condition.
5. **THE CARBURETTOR FLANGE.** Examine this for truth with a straight edge. Distortion sometimes occurs, and this may cause an air leak. If the flange is slightly concave, file and rub down the face with emery cloth until it is dead flat and smooth.

Assembling Standard Carburettor. Referring to Fig. 8, refit the jet block (F) with the fibre washer on its under-side, and screw on lightly the mixing chamber union nut (E). Screw in the needle jet (O) and the main jet (P). Open the air lever 7/8 in. and the throttle twist-grip half way; grasp the air slide between the thumb and the finger and make sure that the jet needle enters the central hole in the barrel (H). Slightly turn the throttle slide until it enters the barrel guide when, on pushing down the slides, the air valve should enter its guide. If not, slightly move the mixing-chamber cap (Y), when the air valve will slide into position. Screw home the mixing chamber knurled cap-ring (Z). No force is necessary.

Replace the carburettor-flange washer, offer up the carburettor body and secure in position by tightening the two nuts evenly. Replace the float and needle in the float chamber, holding the needle against its seating with a pencil until the float (T) and needle clip (V) are slipped into position. See that the spring clip enters the needle groove. Then screw home the float-chamber cover securely and lock in position by tightening the lock screw (X).

Insert the jet plug (Q) in the union nut (E) and very firmly tighten the union nut with a suitable spanner. Remove the jet plug, fit the float chamber, and secure with the jet plug. Be sure there is a fibre washer above and below the float-chamber lug as shown in Fig. 8. When the float chamber has been correctly positioned, tighten the jet plug firmly. Finally reconnect the twin petrol pipes and tighten the union nut at the base of the float chamber. In the event of the pilot-jet adjustment having been disturbed, re-tune as described on page 17.

Wear of Jet Needle. The needle itself does not wear, though some wear of the groove may occur if the jet-needle clip is not grasping the needle firmly. If the mixture is too rich with the clip in No. 1 groove (nearest the top), it is probable that the needle jet needs to be renewed because of wear. It is assumed that the carburettor is correctly tuned and that no flooding occurs (see page 18).

Assembling "Monobloc" Carburettor. Do this in the reverse order of dismantling. Referring to Fig. 10, screw home the pilot jet (17) and the pilot jet cover-nut, not omitting to replace its washer. Push or tap home the jet block (5) and fibre seal (22) through the large end of the mixing chamber (21). Check that the fibre-seal fitted to the stub of the jet block is in good condition. Then fit the jet-block locating-screw (19). Screw the main-jet holder (15) into the jet block, after checking that the washer for the holder is sound. Next screw the main jet (16) into the jet holder.

Replace the moulded-nylon needle (9) in the float chamber (13), and fit the hinged float (10) with the narrow side of the hinge uppermost. Afterwards fit the float-chamber cover (12) and secure by means of the three screws (11). Verify that the cover and body faces are undamaged and quite clean. Renew the washer. If previously removed, attach the jet needle (23) to the throttle valve (24) and secure with the jet-needle clip (4), making sure that the clip enters the correct groove. (See page 16.)

Position the carburettor-flange washer, and offer up the carburettor to the face of the inlet port after easing the air and throttle valves (3) and (24) down into the mixing chamber (see hints on page 21 concerning the standard carburettor). When easing the throttle valve home, make sure that the tapered jet-needle (23) really enters the hole in the jet block (5). Secure the carburettor flange firmly to the engine by means of the two nuts, and tighten these evenly. Tighten down firmly the mixing-chamber knurled cap-ring (2) and see that the throttle slide works freely when this is tightened down.

Finally reconnect the twin petrol pipes by tightening the banjo bolt (8) over the float chamber (13).

THE AIR FILTER

Maintenance. An air filter of the "oil-wetted" type is fitted as an optional extra to A.J.S. models. In the United Kingdom the roads are excellent and the air comparatively free from dust, and it is questionable whether the fitting of an air filter, except for use abroad in countries where the roads are poor and dusty, will appreciably prolong the life of the cylinder and piston.

Where an air filter is fitted, it is advisable about every 1,000 miles to withdraw the filter element; wash it thoroughly in petrol, paraffin, or other suitable solvent, and allow to dry. Then submerge the element completely for a few minutes in thin oil (SAE 20) of the type recommended on page 65 for the "Teledraulic" front forks. Remove the element, allow all surplus oil to drain off, and afterwards replace in the air-filter case. It is desirable to renew the filter element about every 10,000 miles.

To Remove Filter Element (1956-7 Models). First pull the rubber hose off the air-intake of the "Monobloc" carburettor after releasing the clip (1957). Next remove the frame cover and pull off the hose end from the air filter. Then remove the bolts which secure the air filter to the oil tank and remove the complete filter assembly. Note that the filter element is secured in its cage by bolts, nuts, and locking washers.

After cleaning the filter (see a previous paragraph) replace it. When replacing the hose on the filter, see that it is properly located. The end of the rubber hose is split along the edge of the lip, and it is important to make sure that the neck of the filter assembly enters this groove.²³

CHAPTER III

THE LIGHTING SYSTEM

To ensure maximum illumination from the lamps at all times, a little attention to the equipment is normally necessary and in practice is generally confined to: keeping the lamps clean; renewing dud bulbs; topping up the battery regularly; taking occasional specific-gravity readings; periodically inspecting the dynamo brushes and commutator (particularly important on 1945-51 models where dynamo removal is rather complicated); the keeping of all connexions clean and tight; and the prevention or repair of frayed leads by taping where necessary.

ILLUMINATION

The Switch Positions. The lighting switch (see Figs. 2 and 3) situated on top of 1945-57 headlamps causes the dynamo to charge in all three switch positions, which are as follows-

"OFF" - No lights on.

"L" - Headlamp pilot, rear, and speedometer bulbs on.

"H" - Headlamp main, rear, and speedometer bulbs on.

Headlamp Alignment. Incorrect headlamp alignment and/or an out-of-focus main bulb give reduced road illumination and liability to dazzle other road users. Both faults are simply rectified.

To check the headlamp alignment, take your A.J.S. to a straight, level stretch of road, turn the lighting switch to the "H" position, and operate the dipping switch so that the main driving light is switched on. The beam of light should, if alignment is correct, be straight ahead and slightly below the horizontal. If the headlamp is mounted so that the beam of light is elevated or projects too much on the road, slacken the mounting bolts or nuts which secure the headlamp to its brackets and then tilt the headlamp slightly down or up until correct alignment is obtained. Afterwards secure the headlamp firmly.

Headlamp Focusing. On 1945-50 A.J.S. machines the double-filament main bulb (movable) is focused to give the best illumination. Provided genuine Lucas bulbs of the correct wattage and number are fitted as replacements, subsequent refocusing should be unnecessary. Where a Lucas bulb is not available, or the focusing adjustment has been disturbed, it is necessary to re-focus. At the same time it is desirable to check the headlamp alignment as previously described.

The headlamp is correctly focused when the reflected rays of light are almost parallel and when the beam, projected upon a wall (30-40 ft from the machine) illuminates brightly a circular area of minimum diameter. The filament for the main driving light should be as near as possible to the focal point of the reflector in order to obtain a parallel beam. If the filament is positioned in front of the focal point, a converging beam (with dark centre portion) results. If, on the other hand, the filament is positioned behind the focal point, a diverging beam is obtained.

Both converging and diverging beams are highly undesirable as they illuminate the road poorly and are liable to dazzle other road users. Adjust the focus of the headlamp immediately if its beam is not uniform, is of short range, and has a dark centre. To focus the headlamp it is obviously necessary to move the main bulb backwards or forwards on the reflector axis according to whether the beam is converging or diverging respectively.

THE LAMPS (1945-8 MODELS)

To Focus DU-42 Headlamp (1945-48). You should take your machine to a level stretch of road and focus the headlamp against a wall some distance (say 30-40 ft) from the machine. The lamp front and reflector must first be removed. To do this, release the front fixing-clip (see Fig. 12) which secures the base of the lamp front and pull the latter outwards. As the lamp front and reflector come away together, free the top tag of the lamp front from the body of the lamp by lifting the lamp front slightly upwards.

The double-filament main bulb holder is adjustable in the plate fitted to the back of the reflector, and as may be seen in Fig. 12 there is a clamping clip for focusing adjustment. To focus the bulb, loosen the clamping screw on the clip and push the bulb-holder in or out of the clamping clip as required. Several focusing adjustments may be needed. After making each adjustment, replace the lamp front and reflector and test the beam for focus (see earlier paragraph). When the correct focus is obtained, tighten the screw on the bulb-holder clamping clip firmly.

When fitting the lamp front and reflector, first locate the top tag in the slot of the lamp body and then press home the lamp front towards the body. Finally, fasten the lamp front by means of the spring fixing-clip at the base of the lamp.

Lamp Bulb Renewal (1945-8). If a bulb "goes west," fit a bulb of the correct type. Most large garages and accessory dealers stock genuine Lucas bulbs, which are all specially tested to check that the filament is correctly positioned to give maximum results with Lucas reflectors.

It is advisable not to wait till bulbs actually burn out but to renew them after long service. This avoids the risk of incorrect focusing caused by filaments sagging, which sometimes occurs after extensive use.

Lucas bulbs have their metal caps marked with a number for identification purposes and it is important when renewing a bulb to see that it has the correct number on its cap. The correct headlamp double-filament main bulb is No. 168; and that of the headlamp pilot-bulb and sidecar lamp bulb, 200. The number 168 bulb is 6 V., 24 W., S.B.C. The number 200 bulb is 6 V., 3 W., S.B.C. Fit a No. 205 (6 V., 6 W.) rear-lamp bulb.

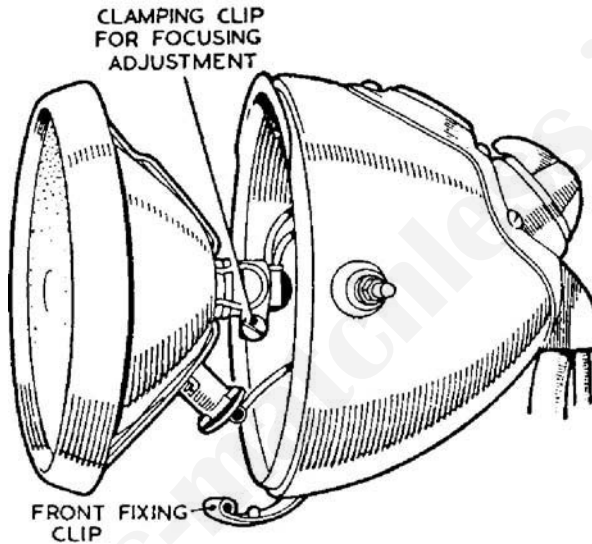


FIG. 12. LUCAS DU-42 HEADLAMP (1945-8 MODELS)

The lamp front and reflector are shown detached from the lamp body to reveal the clamping clip, which must be loosened to enable the bulb-holder to be moved for focusing.

The headlamp main and pilot bulbs are fitted in holders attached to the plate secured to the rear of the reflector by two spring wires. To remove the plate, complete with the two holders and bulbs, it is only necessary to spring the two wires outwards until they are clear of the plate.

To remove the headlamp main bulb or pilot bulb from its holder, it is only necessary to release the bayonet fixing and withdraw the bulb.

It is essential when fitting a new main bulb to see that it is the correct way round, i.e. with the dipped beam filament above the centre filament. The word "Top" is etched on Lucas main bulbs to indicate the correct position in the bulb holder. After fitting a new main bulb it is advisable to check the focus of the headlamp (see page 24).

Removing Reflector (1945-8). Remove the four spring clips that secure the reflector and glass to the headlamp front and detach the reflector, the cork packing strip between the reflector and glass, and the glass itself.

To assemble the reflector and glass, the following procedure is necessary. First position the glass in the lamp front. Next, at the cork packing strip to the reflector edge by pressing it into the pins which are integral with the lamp front. Then place the reflector assembly (complete with bulb holders) on top of the glass. Make sure that the top of the reflector registers with the top of the lamp front. Finally, replace the four spring clips so that they are about equally spaced.

The WT203 Rear Lamp (1945-8).

The lamp body, with bulb holder, is secured to the rear number plate by means of three bolts with appropriate washers and nuts. To detach the portion of the rear lamp housing the red glass, give it a *half-turn* to the left and then pull it outwards, as shown in Fig. 13. When replacing the outer portion of the lamp, engage the slots in the body of the lamp with the two spring-clips on the body of the lamp and push right home to effect full engagement.

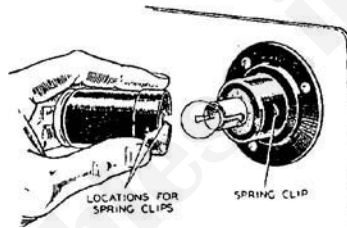


FIG. 13. LUCAS REAR LAMP (TYPE WT203)

The lamp shown is fitted to some 1945-! models, but later machines have the MT211 or 46711 type (page 33)

Cleaning Lucas Lamps. Clean ebony black surfaces with a good type of car polish. Chromium-plated surfaces do not tarnish and should be wiped over with a damp cloth occasionally to remove dirt or dust. Care must be taken when handling a reflector not to scratch it accidentally, and *on no account* must metal polish be used to clean it.

A fine, colourless and transparent covering is provided on the Lucas reflectors for protection purposes, and this covering can readily be cleaned without any risk of damaging the actual surface of the reflector. Polish the reflector covering lightly with a clean, dry, soft cloth or a chamois leather. No other treatment is desirable.

Ammeter Readings. This centre-zero instrument shows a charge on one side and a discharge on the other and is provided to give a reading of the amount of current flowing to or from the battery. For instance, if the dynamo output is 3 amp. at a certain speed, and the pilot bulb and rear lamp are on, thereby absorbing, say, 1 amp., then 2 amp. remain for battery charging, and the ammeter will therefore indicate 2 amp. At very low r.p.m. the ammeter reading is zero because the dynamo armature is not rotating fast enough to generate sufficient current to give a battery charge. (See also page 40).

Ammeter Removal. Should it be necessary for some reason to remove the ammeter on a Model 16M or 18, this can readily be effected. Referring to Figs. 14 and 19, detach the panel from the top of the Lucas headlamp by unscrewing the three retaining screws. Then unscrew the two ammeter terminal screws shown at A and disconnect the wires. Next bend back the four metal tags shown at B. When these have been dealt with, ammeter C can be removed bodily from the panel. Replace the ammeter, in the reverse order of removal. Do not touch switch D.

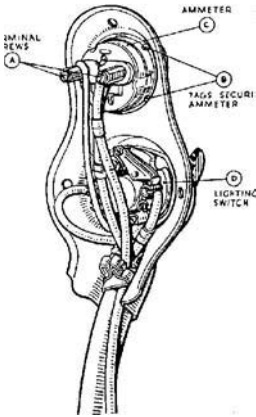


FIG. 14. AMMETER AND SWITCH PANEL

THE LAMPS (1949 ONWARDS)

The headlamp and rear lamps fitted 1949 onwards are different from previous types and the following notes should be studied by owners of 1949 and subsequent models.

Focusing SSU700P Headlamp (1949-50).

Focusing should always be effected on a level stretch of road with the headlamp beam directed against a wall some 30-40 ft distant from the machine. Note the general remarks on page 24 concerning focusing, and see that the headlamp is aligned correctly. On the SSU700P headlamps, the lamp front and the light-unit assembly (reflector and glass) are removed together. To remove the lamp front, loosen the screw on top of the headlamp body, withdraw the rim outward from the top, and as the lamp front emerges raise it a little to free the

lower tag from the shell of the headlamp. The double-filament main bulb is adjustable in its holder and has a clamp tightened by one screw. To focus the main bulb, loosen this screw and push the bulb holder inwards or outwards until the correct focus is obtained. Afterwards firmly retighten the screw which clamps the bulb holder. Next engage the lower tag on the lamp rim with the small slit in the lamp shell and carefully press the top of the rim back into the lamp shell. Finally retighten the screw on the top of the lamp body.

The "Pre-Focus" 1951 SSU700P Headlamp. On the 1951 models the Lucas SSU700P headlamp has a "pre-focus" main bulb, and no focusing adjustment is provided. Details of the bulb holder assembly are shown in Fig. 18. The "pre-focus" bulb filament is in permanent focus relatively to the reflector, and the pilot bulb mounted at the rear of the back shell provides illumination through a transparent window in the reflector.

To obtain access to the main and pilot bulbs, remove the lamp front, with light-unit assembly (see Fig. 16) as previously described for the SSU700P headlamp fitted to 1949-50 models.

The 1952-3 SSU700P/1 Headlamp. This headlamp (see Fig. 16) is identical to the 1951 SSU700P "pre-focus" type headlamp just described except that instead of the pilot bulb being mounted above the "pre-focus" main bulb as shown in Fig. 16, it is mounted in an inverted position in a detachable carrier-plate at the base of the lamp and shines through an underslung pilot lens, not perhaps an ideal arrangement.

If desired, suitable pilot lamps can be substituted (see Fig. 17) for the underslung pilot light. Access to the "pre-focus" main bulb and the pilot bulb is obtained by removing the lamp front (with light-unit assembly) as already described for the 1949-50 SSU700P headlamp.

The 1954-7 Headlamps. These Lucas headlamps are basically similar to the 1952-3 SSU700P/1 "pre-focus" type headlamp, but the pilot-light arrangement is quite different. As may be seen in Fig. 17, two smart torpedo-shaped pilot lamps are secured to the front-fork lamp supports by tubular bolts, through each of which a lead passes to the adjacent pilot lamp. On 1954 headlamps the ammeter and lighting switch are mounted, one behind the other, on a panel on top of the headlamp, but on 1955-7 headlamps the arrangement is as shown in Fig. 17.

On all 1954-7 headlamps, to obtain access to the double filament "pre-focus" main bulb, remove the lamp front (with light-unit assembly) as described on page 28 for the 1949-50 SSU700P headlamp. To get at the bulb in each streamlined pilot bulb, remove the screw at the rear and gently pull forward on the glass rim.

Separating Light Unit from Rim. On all Lucas 1949-50 type headlamps, and 1951 and later models, the front glass and reflector are made as one assembly (the "light-unit") and cannot be separated. The light-unit, however, can be removed from the chromium-plated rim by disengaging the spring clips from the turned-up inner edge of the rim by pressing with the blade of a screwdriver, working away from the edge.

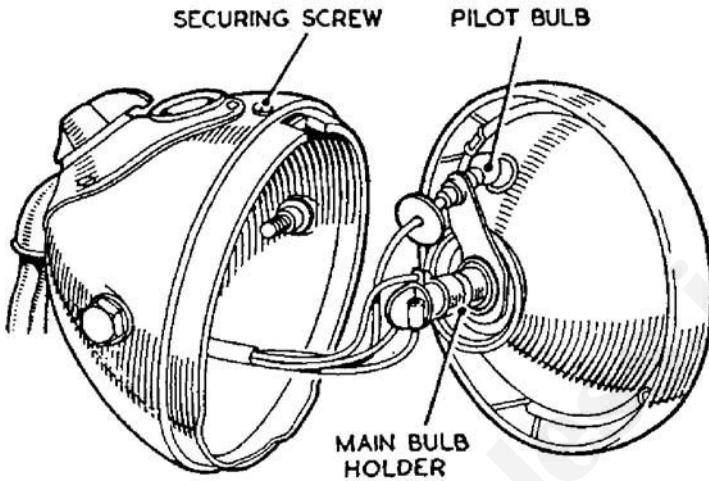


FIG. 15. LUCAS SSU700P HEADLAMP WITH FRONT AND REFLECTOR REMOVED (1949-50 MODELS)

On 1951 A.J.S. machines with 5SU700P headlamp the lamp glass and reflector are not detachable from each other; the two components comprise the "light unit" assembly, secured to the rim by spring clips. A back shell houses the pilot bulb and a pre-focus" main bulb.

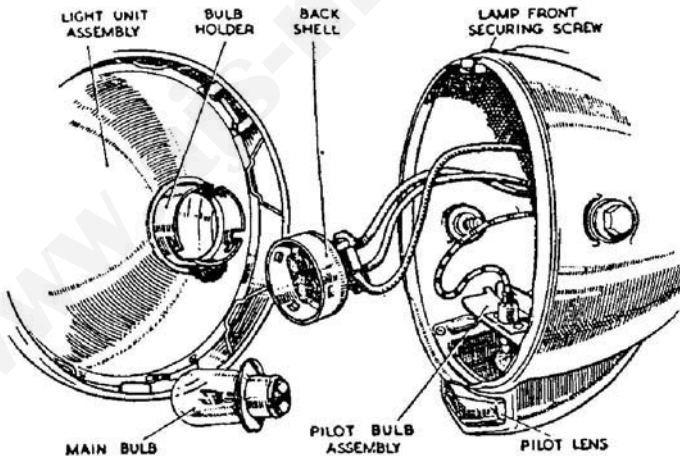


FIG. 16. LUCAS SSU700P/1 "PRE-FOCUS" HEADLAMP WITH FRONT (LIGHT-UNIT ASSEMBLY INCLUDED) AND MAIN BULB WITHDRAWN (1952-3 MODELS)

Note the remarks below Fig. 15 concerning the light-unit.

To fit the light-unit assembly to the rim, lay the unit in the rim so that the location block on the unit engages the forked bracket on the rim, and then spring home the spring clips. See that they are spaced at equal distances around the rim.

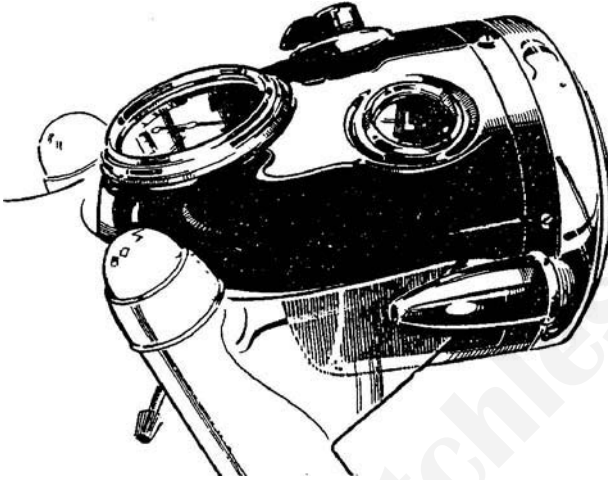


FIG. 17. LUCAS "PRE-FOCUS" HEADLAMP HOUSING AMMETER, LIGHTING SWITCH, AND SPEEDOMETER (1955 ONWARDS)

Streamlined twin pilot-lamps were introduced in 1954 and are made to A.M.C. specification

Headlamp Bulb Renewal. Fit genuine Lucas bulbs if occasion arises to renew them, and do not defer renewal until actual bulb failure occurs (see page 25). To remove the cap (non-"pre-focus" headlamp) which carries the bulbs, depress one of the two spring plungers which secure the cap to the reflector and tilt the cap bodily. When replacing the bulb holder, engage the holder carrier-cap in the position at which the pilot bulb is against the small window in the reflector.

When fitting a non-"pre-focus" main bulb, see that it is fitted with the dipped beam filament above the centre filament. Lucas main bulbs have the word "TOP" etched to indicate the correct position, in the bulb holder. Check the main bulb for focus after renewing it.

When fitting a "pre-focus" bulb (see Fig. 18) turn the back shell anticlockwise and withdraw it. You can then remove the bulb from the back of the reflector. Insert the correct Lucas-type bulb replacement in the bulb holder with its locating flange positioned, engage the projections on the inside of the back shell with the slots in the bulb holder, press on, and secure by turning clockwise.

Correct Bulb Renewals. The 1949-50 Lucas type SSU700P headlamp (with focusing adjustment) takes a 6-volt, 24/24-watt No. 168 S.B.C. double-filament main bulb (bayonet-fixing type), and a 6-volt, 3-watt No. 988 M.C.C. pilot bulb. The 1951-7 headlamps ("pre-focus" type) require a No. 312 (30/24-watt) Lucas double-filament main bulb which has a broad locating flange on the cap. Note that a No. 312 bulb cannot be used in a "focusing" type lamp, nor can a No. 168 bulb be used in a "pre-focus" type

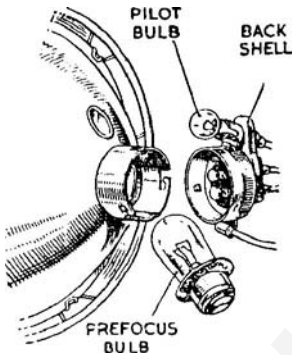


FIG. 18. LUCAS LIGHT-UNIT ASSEMBLY AND BACK SHELL WITH "PRE-FOCUS" MAIN BULB AND PILOT BULB (1951 MODELS)

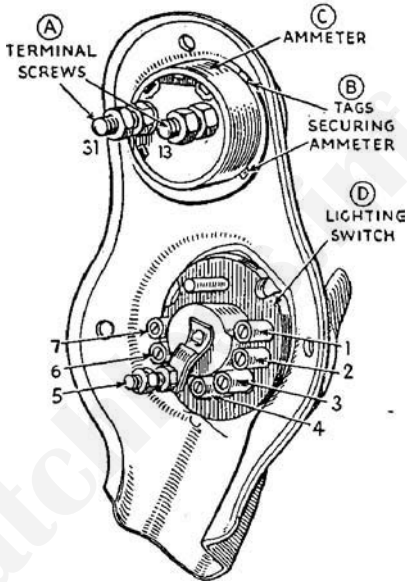


FIG. 19. AMMETER AND SWITCH PANEL REMOVED (1951-4)
The cable harness (see Fig. 14) is not shown.
For location of numbered parts, see wiring diagram (Fig. 29)

headlamp incorporating a Lucas light-unit assembly. All 1951-7 headlamps require a No. 988 pilot bulb. This is not suitable for 1949-52 rear lamps. 1953 and later Lucas stop-tail lamps require a 6-volt, 18/6-watt, No. 384 double-filament bulb. The correct speedometer bulb is a 6-volt, 1.8-watt No. 53205 M.C.C.

The Ammeter. The sketches numbered Figs. 14 and 19 show the back of the panel housing the ammeter and lighting switch on 1949-50 and 1951-4 models respectively, 1955-7 models have the ammeter and lighting switch built into the Lucas headlamp as shown in Fig. 17. Note the remarks on pages 27 and 40 concerning ammeter readings. Do not meddle with the ammeter. If its needle sticks or "flutters," take the motor-cycle to the nearest Lucas service depot.

Cleaning Lucas Lamps. Observe the instructions given on page 27, but note that on 1949 and later "sealed beam" Lucas headlamps (with Lucas light-unit) the reflector cannot be detached for cleaning.

The M1211 Rear Lamp. This rear lamp, of Lucas design, is secured to the rear number plate of some 1948-9 models by means of a three-bolt fixing. To remove the cover carrying the red glass, push in and turn in an anti-clockwise direction. To replace the cover of the lamp, locate the slots in the front portion over the retaining pegs in the lamp body, push inwards, and turn in an anti-clockwise direction.

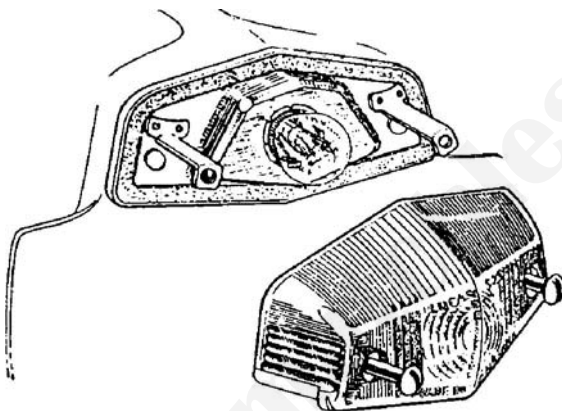


FIG. 20. THE LUCAS STOP-TAIL LAMP
This lamp has a double-filament bulb.

The 467/1 Rear Lamp. The Lucas rear-lamp body, complete with bulb holder, is secured on 1949 models to the rear number-plate by means of two nuts and spring washers. To remove the cover securing the red glass, loosen the captive screw which secures it, and withdraw the cover.

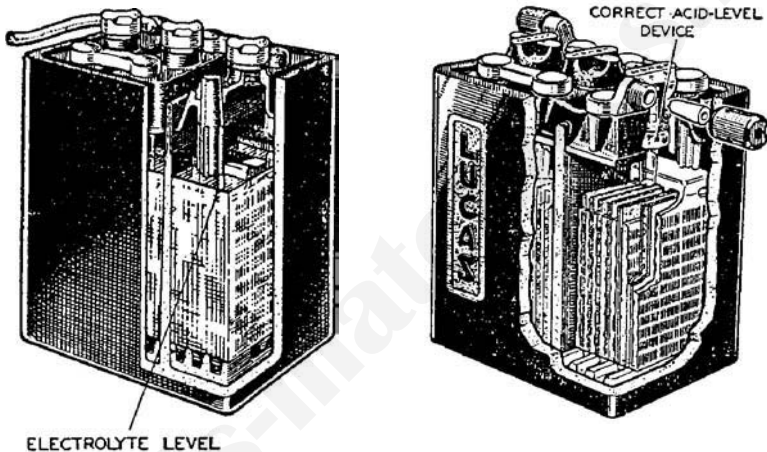
The 467/2 Rear Lamp. On 1950-52 A.J.S. models a Lucas type 467/2 rear lamp is secured to the rear number-plate by two nuts and spring washers. A sleeve nut secures the cover (carrying the red glass) to the body of the lamp. To fit a replacement bulb, remove the sleeve nut and withdraw the cover and glass.

Stop-tail Lamps. 1953 and later A.J.S. machines have Lucas stop-tail lamps of the type shown in Fig. 20. The lamp has a double-filament 6-volt, 18/6-watt bulb; the 6-watt filament serves as the normal rear light and the 18-watt filament is illuminated only when the rear-brake pedal is depressed. To obtain access to the bulb it is only necessary to remove two screws and withdraw the thermoplastic cover. To prevent incorrect fitting of the No. 384 bulb, its securing pins are onset.

MAINTENANCE OF BATTERY (LEAD ACID)

Neglect of the battery quickly brings trouble, and correct attention in regard to its maintenance is vitally important. Upon it depend the lamps and horn.

Topping-up the Battery. Examine the acid level about every four weeks, and even more frequently in tropical climates. Unscrew the battery clamping screw and remove the battery after first disconnecting the battery positive and negative leads. On 1956-7 models the Lucas battery is housed in a front compartment of the tool box as shown in Fig. 23.



FIGS. 21 and 22. KEEP THE ELECTROLYTE LEVEL WITH THE TOPS OF THE PLATE SEPARATORS

Fig. 21 shows the Lucas type PUW-7E-4 battery fitted prior to 1954, and Fig. 22 the later PU7E/9 battery with correct acid-level device.

To remove the battery on 1956 models, first release the rubber strap by grasping the loop attached to its lower end; pull downwards until the strap and loop are freed from the retaining clip at the platform base, and permit the rubber strap to slacken. Then lift the battery out.

To remove the battery on 1957 models, grasp the rubber strap with the fingers between the battery case and rubber strap. Push the strap downwards until it is possible to free the metal toggle from the strap retaining-clip, then carefully take the battery out. Take off the battery lid and remove the three vent plugs. Inspect the hole in each vent plug and make certain that it is not obstructed. A choked vent plug hole will result in an increase of pressure in the cell owing to gassing," and this may cause trouble. Wipe the top of the battery clean with a rag and verify that the washer (where fitted) beneath each vent plug, to prevent leakage, is in position.

After wiping the top of the battery, either destroy the rag or wash it thoroughly, using several changes of water. See that a supply of clean distilled water is to hand. Topping-up is necessary because the distilled water, unlike the acid, is gradually lost through evaporation.

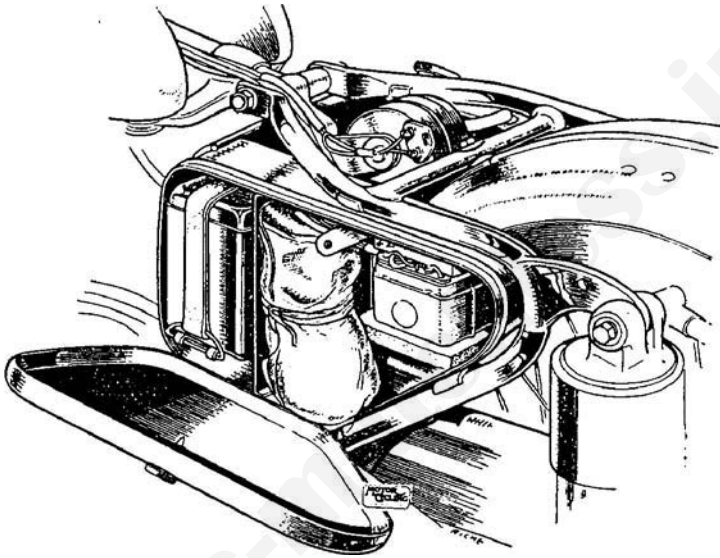


FIG. 23. A 1956-7 REFINEMENT-NEAT ENCLOSURE OF THE BATTERY AND C.V.C. UNIT IN THE TOOL BOX

The compensated-voltage-control unit is housed in a sponge-rubber holder. On 1957 models the tool-box lid is quickly detachable instead of being hinged.

Be careful not to hold a naked light near the vents. If the level is below the tops of the separators, add distilled water as required to bring the level correct (see Figs. 21 and 22). This should be done just before a charge run, as the agitation due to running and the gassing will thoroughly mix the solution. Acid must not be added to the electrolyte unless the solution has been spilled. If the solution has been spilled by accident, add diluted sulphuric acid of specific gravity equal to that in the cells.

Undoubtedly the best way to top-up a PUW-7E-4 type battery is to use a Lucas battery filler. Insert its nozzle into each cell, with the nozzle resting

on the separators. Hold the battery filler in this position until air bubbles cease to rise in the glass container. The electrolyte level should then be correct, but examine it to make sure.

On 1954 and later machines with the PU7E/9 battery, pour distilled water round the flange (not the tube) of the acid-level device (see Fig. 22) until it ceases to drain into the cell. Then lift the tube slightly to enable the small amount of water in the

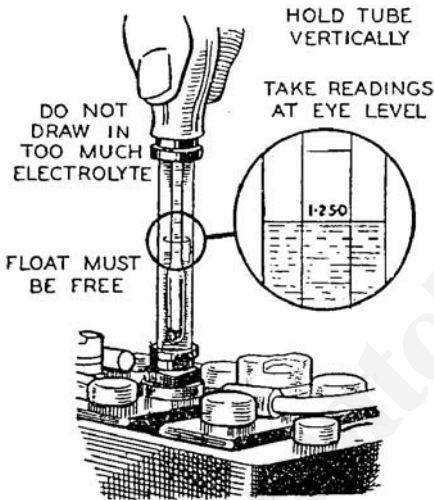


FIG. 24. LUCAS HYDROMETER BEING USED TO CHECK SPECIFIC GRAVITY OF BATTERY ELECTROLYTE

flange to drain into the cell. The electrolyte level should then be correct. Inspect to make certain. If the battery needs to be topped-up very often, it is possible that the C.V.C. unit needs to be adjusted; if one cell requires more frequent topping-up than the others, probably the battery case, or container, is cracked, and battery renewal is called for.

Checking Specific Gravity. Very occasionally, hydrometer readings (specific-gravity values) should be taken of the solution in each of the cells. The method of doing this is shown in Fig. 24. The Lucas hydrometer contains a graduated float which indicates the specific gravity of the battery cell from which a sample of electrolyte is taken.

After a sample has been taken and checked, it must, of course, be returned to the cell. The taking of S.G. readings with a hydrometer is the most efficient way of ascertaining the state of charge of the battery.

The S.G. readings should be approximately the same for all three cells, Should the reading for one cell differ substantially from the readings for the others, probably some acid has been spilled or has leaked from the cell concerned. There is also a possibility of a short circuit between the battery plates. In the latter case it will be necessary to return the battery to a Lucas service depot for attention.

Under no circumstances must the battery be permitted to remain in a discharged condition for long, or serious deterioration will occur. After checking the S.G. readings and topping-up the cells, wipe the top of the battery and remove any spilled electrolyte or water; replace the three vent plugs and the battery lid. Then fit and tighten the battery clamping-screw, or secure with the rubber strap (1956-7 models).

Battery Connexions. Always keep the battery connexions clean, free from corrosion, and tight, otherwise the ammeter readings will not indicate the true state of charge of the battery and proper battery charging may not occur.

Correct Readings. With Lucas batteries fitted to A.J.S. machines, the specific gravity readings at an acid temperature of approximately 60°F. should be: 1.280-1-300, battery fully charged; about 1.210 battery about half discharged; below 1.150 battery fully discharged. If the temperature exceeds 60°F., add 0.002 to the hydrometer reading for each 5 degrees rise in temperature above 60°F. Similarly if the temperature is below 60°F., deduct 0.002 for each 5 degrees decrease in temperature.

Never leave the battery in a discharged state for any appreciable period. A low state of charge often is caused through parking the machine for long periods with the lighting switch in the "L" position, unaccompanied by much daylight running, the remedy is, of course, to undertake more daylight running and to keep the switch in the "Off" position as much as possible until the battery regains its normal state of charge. If overcharging occurs, have the setting of the compensated-voltage-control unit checked.

MAINTENANCE OF DYNAMO

It is not necessary to take any special precautions when merely inspecting the commutator, but on making adjustments to the wiring circuit, it is essential to take steps to prevent accidental "shorting." Disconnect the lead from the lighting switch at the battery positive terminal (negative terminal where the battery positive is carried). Push back the rubber shield and then unscrew the cable connector (where fitted). When doing this be sure that the cable does not make contact with any metal part of the frame, otherwise a "fat" spark will indicate that the battery was well charged! When re-connecting the lead, pull the rubber shield well over the connector.

General Overhaul. It is a good plan every 10,000-15,000 miles to entrust the dynamo to a Lucas service depot for dismantling, cleaning, servicing, and lubrication. Lubrication is referred to on page 59.

The Commutator and Brushgear. The Lucas E3AR and the E3-N dynamos will run satisfactorily for thousands of miles without attention other than occasional inspection of the commutator and brushgear. It is advisable about every 5,000-6,000 miles, to remove the metal cover-band from the dynamo and make a careful inspection.

The Brushes. The brushes must make good electrical contact with the commutator. They must be absolutely clean and able to move freely in their

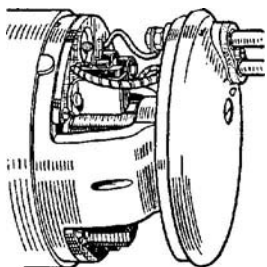


FIG. 25. COMMUTATOR END OF THE LUCAS DYNAMO WITH COVER BAND REMOVED

box-type holders, on holding back the retaining springs and gently pulling the leads and then releasing them. There must also be perfect contact between both the brushes and the copper segments of the commutator; the brush faces in contact with the segments should be uniformly polished. Clean the brushes with a petrol-moistened cloth after removing them. To do this, pull back each brush-retaining spring (see Fig. 25) and remove the brush by pulling on its lead, being careful to see that the brush pressure spring is clear of the brush holder.

Examine the carbon brushes for wear and unevenness, and true then top up if necessary. Generally it is best to renew the brushes before serious wear develops, as this prevents sparking, which causes blackening of the commutator and an unsteady charging current. Always replace brushes in their original positions.

If Lucas brushes become so badly worn that it is necessary to remove them, this can easily be done as follows: Release the eyelet on the brush lead by unscrewing the hexagonal nut or screw at the terminal; then, holding back the spring lever out of the way, withdraw the brush from its holder. Renew with genuine Lucas brushes.

The brush springs should be inspected occasionally to see that they have sufficient tension to keep the brushes firmly pressed against the commutator when the dynamo is running. It is particularly necessary to keep this in mind when the brushes have been in use a long time and are very much worn down.

It is unwise to insert brushes of a grade other than that supplied with the dynamo, or to change the tension springs. The arrangement provided has been made only after many years' experience and will be found to give the best results and the longest life. It is really best when the brushes become so worn that they no longer bed down on the commutator, or their flexible leads are exposed on their running faces, to have new brushes fitted at a Lucas service depot, as this ensures the brushes being properly "bedded."

The Commutator Surface. The surface of the commutator segments should be kept clean and free from oil or brush dust, etc. Should any grease or oil work its way on to the commutator through over-lubrication, it will not only cause sparking, but, in addition, carbon and copper dust will collect in the grooves between the commutator segments.

The best way to clean the commutator is, without disconnecting any leads, to remove from its box-holder one of the main brushes and, inserting a fine dry duster, hold it, with a suitably-shaped piece of wood, against the commutator surface, causing the armature to be rotated by the kickstarter.* If the commutator is very dirty, first moisten the cloth with petrol. The segments should be dark bronze and highly polished.

To Adjust Dynamo Chain. The tension of the dynamo chain which lies behind the primary chain (see Fig. 78) should be checked occasionally, after removing the oil-bath case inspection cap (see page 62). Chain whip with the chain in its tightest position, mid-way between the sprockets, should be approximately 1/4 in. To make an eccentric adjustment for chain tension, first slacken the strap bolt clamping the dynamo in its housing. Then apply (1945-51) the spanner (Part No. 017254) to the flats cast on the dynamo end-plate, on the left-hand side of the dynamo. Now rotate the dynamo anti-clockwise until chain tension is felt to be correct on passing a finger through the inspection-cap opening. Be careful not to confuse the primary chain with the dynamo chain which lies behind the former (see Fig. 78). Afterwards retighten the strap bolt and again check the tension of the dynamo chain. If found to be correct, replace the inspection cap on the oil-bath chain case (see page 63).

Dynamo Removal. Removal of the dynamo on 1945-51 models is a little difficult, but is greatly simplified on 1952 and later models where the magneto is in front of the cylinder instead of over the dynamo. Full instructions for 1945 onwards are given on page 143.

Compensated Voltage Control (C.V.C.). All A.J.S. motor-cycles incorporate compensated voltage control. The C.V.C. unit consists of a cut-out and voltage-regulator unit in a box beneath the saddle, beside the battery carrier, or (1956-7) in the tool box. It is connected between the dynamo and battery and sees to it that the battery is automatically charged the right amount by varying the dynamo output according to the state of charge of the battery and the load imposed on it.

* Slow rotation is assisted by removing the sparking plug.

Current is prevented from flowing back from the battery to the dynamo at low r.p.m. by means of the cut-out which opens. As soon as the r.p.m. rise high enough to enable the dynamo to charge the battery, the cut-out closes and completes the circuit.

In all three lighting-switch positions (see page 24) the dynamo gives a controlled output and thus relieves you of responsibility in regard to charging. The regulator

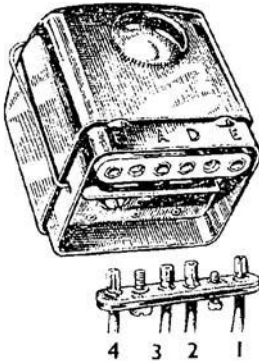


FIG. 20. CONNECTIONS TO COMPENSATED VOLTAGE-CONTROL UNIT

begins to operate when the dynamo voltage reaches about 7.3 volt. During daylight running with the battery well charged and the switch in the "Off" position, the dynamo gives only a trickle charge, and the ammeter reading is unlikely to exceed 1-2 amp. There is no danger of overcharging.

The regulator provides for an increase of dynamo output as soon as the lamps are switched on. The effect of switching the lamps on after a long run with the battery voltage high is often to cause a temporary discharge reading at the ammeter, but fairly soon the voltage falls and the regulator responds, thereby causing the output of the dynamo to balance the load of the lamps. When the battery is in a discharged state, the regulator increases the dynamo output and restores the battery to its normal state of charge in the shortest possible time.

Do Not Tamper with C.V.C. Unit. The unit is sealed by the makers, as it should not need adjustment once it is correctly set. If, however, the battery (in good condition) is persistently under-charged or over-charged, suspect the C.V.C. unit setting and have it checked, preferably at a Lucas service depot. Note that the C.V.C. unit is retained by self-locking nuts, except on 1956-7 models where it is retained in a sponge-rubber holder in a partition at the rear top corner of the tool box (see Fig. 23). To remove the C.V.C. unit on a 1956-7 model, grasp it between the fingers and thumb of one hand, and gently and firmly pull it away from the sponge-rubber holder.

As may be seen in Fig. 26, the four terminals of the C.V.C. unit are clearly marked by the letters F.A.D.E. Leads from the F and D terminals are attached to similarly marked terminals on the dynamo. The terminal marked A is connected to one of the ammeter terminals, and the terminal marked E is earthed.

THE HORN

Careful adjustment of the Lucas horn is made at the works, and subsequent adjustment is rarely called for. Normally the horn should give long service without any attention whatever. The vibrating parts do, however, gradually wear and, after very considerable usage, some roughness and loss of tone may develop. This necessitates an adjustment being made.

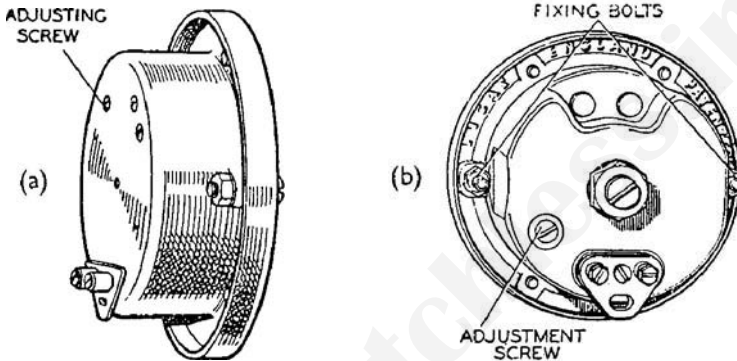


FIG. 27. ADJUSTMENT FOR TONE ON LUCAS HORN FITTED TO 1945-7 MODELS

Showing (left) the adjusting screw on 1945-50 models, and (right) the 1951 and later adjustment.

To Make an Adjustment. Turn the adjusting screw shown in Fig. 27, with a small screwdriver anti-clockwise until the horn just ceases to sound. Then release the horn-push and turn the adjusting screw clockwise for six notches (one-quarter of a turn) to restore the original horn performance. Should further adjustment be called for, turn the adjusting screw clockwise one notch at a time. If results are unsuccessful, do not dismantle the horn but return it to a Lucas service depot.

If Horn Fails Completely or Partially. Do not immediately infer that the horn has broken down or needs adjustment. Possible causes of the trouble are: a loose fixing bolt; vibration of some adjacent part; a discharged battery; a loose connexion; a short circuit in the wiring; or a defective push-switch. The last-mentioned may be occasioned through poor electrical contact with the handlebars.

No Fuse. There is no fuse incorporated in the wiring circuit, which is purposely simplified, and capable of being understood by those with elementary electrical knowledge. If care is taken to keep the various wires correctly connected, and to maintain the connexions clean and firm, there is no risk of an excessive current damaging any of the equipment or wiring.

Inspect the Wiring Occasionally. It is advisable occasionally to make a careful inspection of the wiring, especially of the wires from the battery and the positive lead from the dynamo to the lighting switch. See that the insulation is sound and not chafed and that all connexions are clean and tight. Should the dynamo fail to charge, this may be due to dynamo trouble, a faulty lead, or a faulty C.V.C. unit. Tape up any loose or frayed leads.

As may be seen in Figs. 28-30, the ends of leads can be identified for connexion purposes by means of their coloured sleeves. This greatly facilitates reconnecting the wiring circuit in the event of the wires being disconnected from the various terminals.

The leads connected to the terminals marked D and F on the dynamo and C.V.C. unit must on no account be reversed. To prevent this being done, the screw in the dynamo terminal-block is off-centre, and the screws securing the regulator clamping-plate are of different size.

An Important Precaution. It is extremely important to disconnect one of the battery leads (see page 37) if making any alterations to the wiring or removing the lighting switch from the Lucas headlamp.

The Battery Lead Connexions. On all later ("King of the Road" type) Lucas batteries detachable lead-connectors are provided at the battery terminals. To make a lead connexion, unscrew the knurled terminal nut and withdraw the collet or cone-shaped insert. Note that the inserts for the two terminals are not interchangeable. After baring the lead end for about an inch, thread the bared end through the knurled nut and collet. Then insert the collet and cable into the terminal block after first bending the wire strands over the narrow end of the collet. Tighten the knurled nut firmly to secure the connexion.

On earlier type batteries other than those just referred to, detachable connectors are not provided at the battery terminals. Instead, short lengths of cable are permanently secured to the terminals, one for the earth connexion, and the other for connecting to the lighting-switch cable by means of a screwed-type brass connector (see Fig. 31). This is accessible on pushing back a protective rubber-sleeve. It is vital that this sleeve is always kept pulled well over the connector.

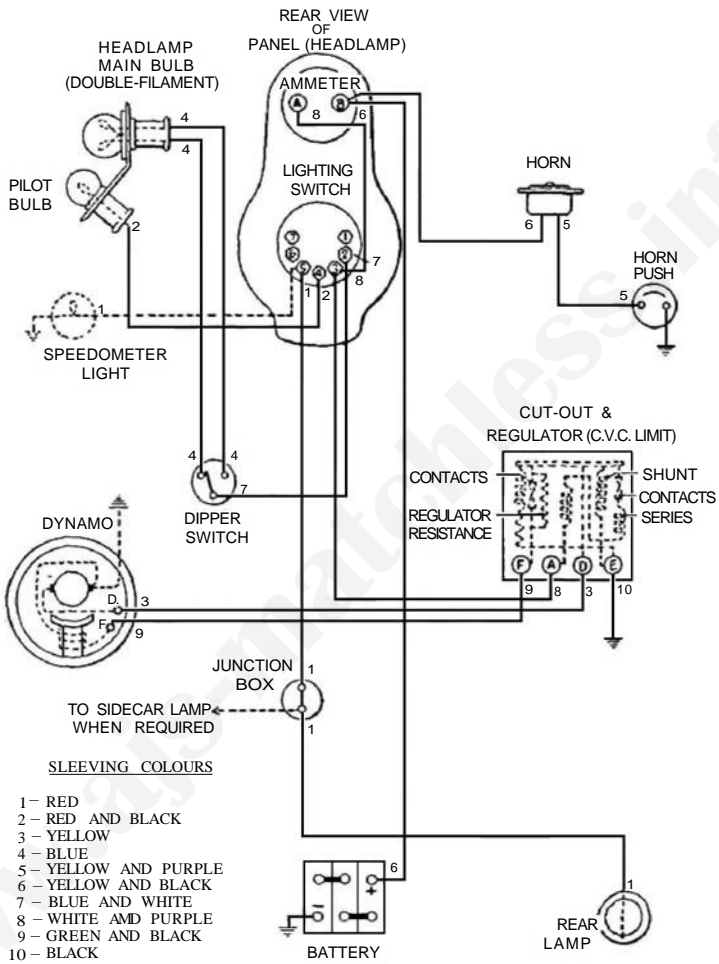
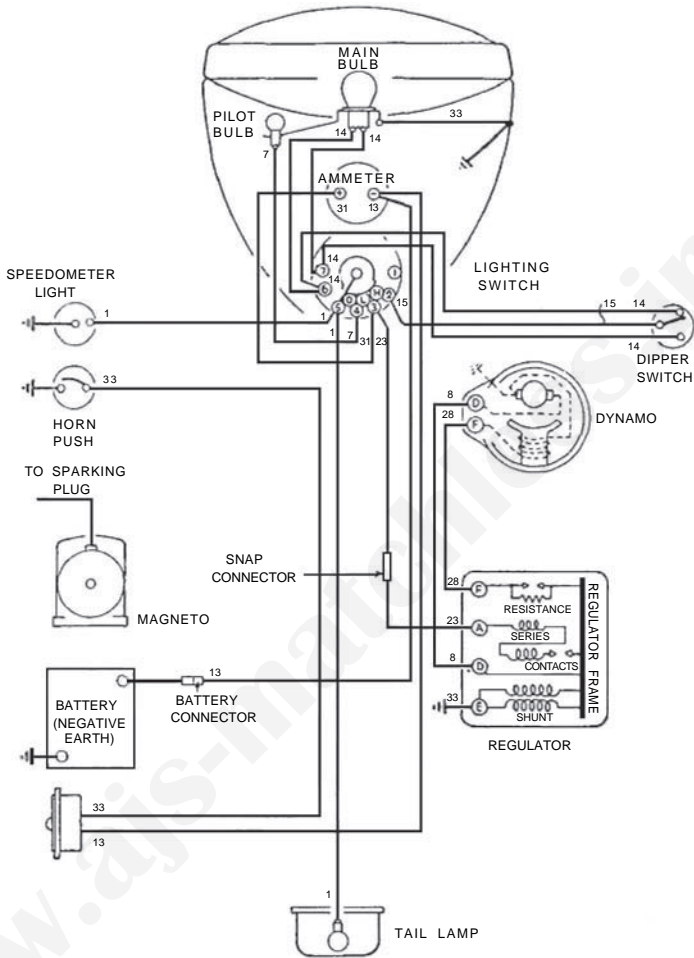


FIG. 28. WIRING DIAGRAM OF LUCAS ELECTRICAL EQUIPMENT FITTED TO ALL 1945-50 MODELS (NEGATIVE EARTH)



KEY TO COLOURED SLEEVES

- | | |
|----------------------|----------------------|
| 1. Red | 15. Blue and white |
| 7. Red and black | 23. White and purple |
| 8. Yellow | 28. Green and black |
| 13. Yellow and black | 31. Purple |
| 14. Blue | 33. Black |

FIG. 29. WIRING DIAGRAM FOR ALL 1951 MODELS (NEGATIVE EARTH)

THE BOOK OF THE A.J.S.

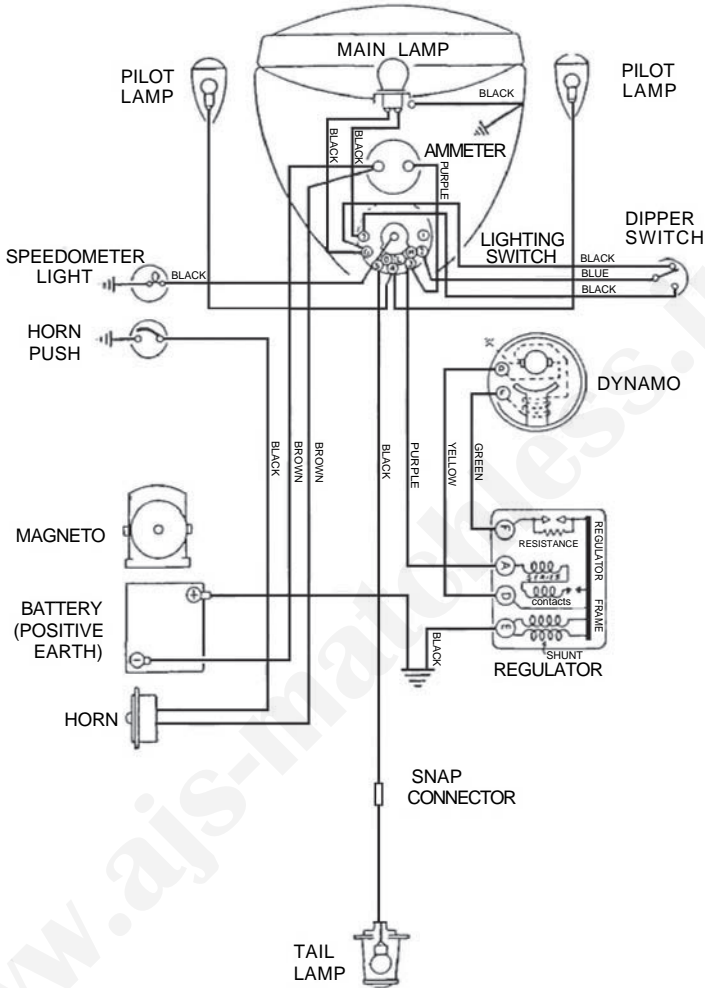


FIG. 30. WIRING DIAGRAM FOR ALL 1954-7 MODELS (POSITIVE EARTH)

This diagram applies also to all 1952-3 models (positive earth) but on these machines a single underslung pilot-bulb (used instead of the twin pilot-lamps shown) has its lead connected to No. 4 switch terminal. See also page 42.

The Dynamo and C.V.C. Unit Connexions. The dynamo and C.V.C. unit connexions (see pages 40-1) are readily connected, but note the warning on page 42 concerning incorrect (reversed) connecting of the dynamo D and F terminals. To make a connexion, slacken the fixing screw on the terminal block and withdraw the clamping plate. Next remove the metal ferrule from each terminal. Pass about 1 in. of the lead through the appropriate hole in the clamping plate and bare the end of the lead for about 3/8 in. Replace the ferrule over the lead, bend back the wire strands over the ferrule, and push the latter well home into its terminal. Afterwards screw down the clamping plate firmly.

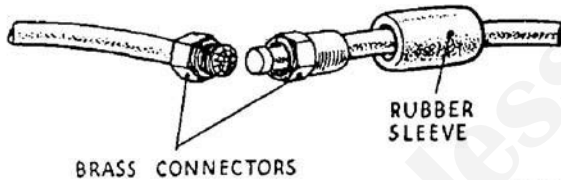


FIG. 31. LUCAS SCREWED-TYPE LEAD CONNECTOR (1945-54)

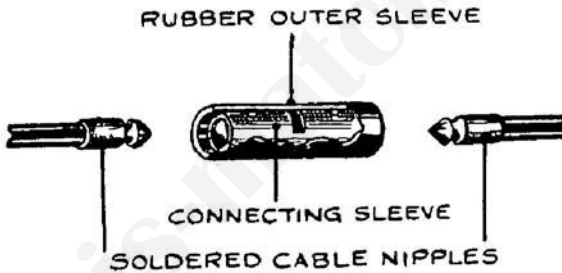


FIG. 32. LUCAS SNAP-TYPE LEAD CONNECTOR (1949 ONWARDS)

The Lighting Switch Connexions. These are inside the Lucas headlamp. Each lead is secured to a metal terminal post by a grub-screw. To make a connexion, bare the end of the lead for about 3/8 in., twist the wire strands together, and turn back about 1/8 in. Remove the grub-screw from the appropriate terminal post, and then push the wire through the slot in the side of the terminal post. Finally replace and tighten the grub screw.

The Earth Leads. Connexions for the two earth leads (and the plug end of the h.t. cable) employ solid sleeve-type terminals, each with an eye at its extreme end. The two (important) earth leads are one from the negative terminal (positive terminal, 1952 onwards) of the battery, and the other from the compensated-voltage-control unit. The terminals of the earth leads are secured to the saddle-lug bolt below the saddle or dualseat by a washer and screw (also a nut, 1955 onwards). See that the earth connexions are kept clean and that their securing screw is kept firmly tightened.

To make a connexion, first bare the end of the lead for about 3/8 in. Then slip the sleeve-type terminal over the protruding wire and lead so that the bared end fully enters the reduced core of the terminal. Now flatten that portion of the terminal enclosing the lead, using a hammer or a vice.

Screwed-type Connectors (1945-54). To assist rear-wheel removal, a Lucas screwed-type lead connector (see Fig. 31) is incorporated on 1945-8 models in the lead to the Lucas rear lamp. It is located just above the rearwheel spindle and comprises: a threaded sleeve, a collet, a gland nut, and a rubber sleeve. On 1950-4 models a similar type of connector is embodied in the lead connecting the battery positive terminal (negative terminal, 1952 onwards) to the input side of the ammeter in the headlamp.

To make a connexion, first bare the end of the leads for about 1/8 in. Then pass the rubber sleeve (see Fig. 31) and the threaded sleeve over one lead, and slip the bared end of this lead through the collet and bend back the wire strands. Next push the bared end of the second lead through the gland nut and similarly bend back the wire strands. Now screw the gland nut into the threaded sleeve and complete the connexion by sliding the rubber sleeve right over the metal parts of the connector. This will insulate the connector from the frame and help to prevent vibration loosening the connexion.

Snap-type Connectors (1949 onwards). On all 1949 and subsequent models a Lucas snap-type lead connector is incorporated in the lead connecting the C.V.C. unit to the output side of the ammeter in the headlamp. Also on 1955-7 models the leads (inside the headlamp) for the two pilot lamps have snap-type connectors. On all 1949 and subsequent models to facilitate removal of the rear wheel, a similar type of connector is embodied in the lead to the rear lamp.

The connector (see Fig. 32) comprises a metal connecting-sleeve, two nipples soldered to the cable ends, and a rubber outer-sleeve to insulate the assembly and help to keep it tight. The connecting sleeve is a split ferrule into which the soldered cable nipples are a push-in snap fit. The method of making a connexion is self-obvious.

CHAPTER IV

CORRECT LUBRICATION

The A.J.S. design dept. have done their best to ensure that correct lubrication involves the minimum attention by the rider. This attention however is absolutely vital and is dealt with in detail in this chapter. A summary of lubrication requirements will be found on page 61.

Neglect to lubricate the engine and machine properly causes excessive friction and heat, accompanied by undue wear of the contacting bearing surfaces. Such neglect can rapidly spoil a good motor-cycle and cause heavy repair bills, besides reducing performance.

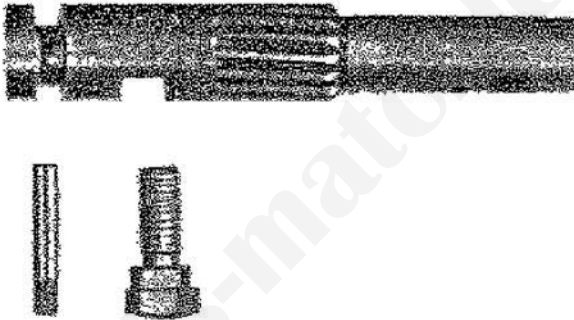


FIG. 33. THE "HEART" OF THE A.J.S. LUBRICATION SYSTEM

The oil pump is positioned on the engine as shown in Fig. 34. Above are shown the pump plunger, the guide screw, and the steel pin which fits inside the hollow guide screw with the relieved end (shown dark) away from the plunger. The plunger and the guide screw should not be disturbed during routine maintenance.

ENGINE LUBRICATION

The engine lubrication system on all A.J.S. O.H.V. models is of the full dry-sump (D.S.) type, where all oil in the engine and oil tank is kept in constant circulation while the engine is running. Its functioning is entirely automatic, but a little regular attention is essential.

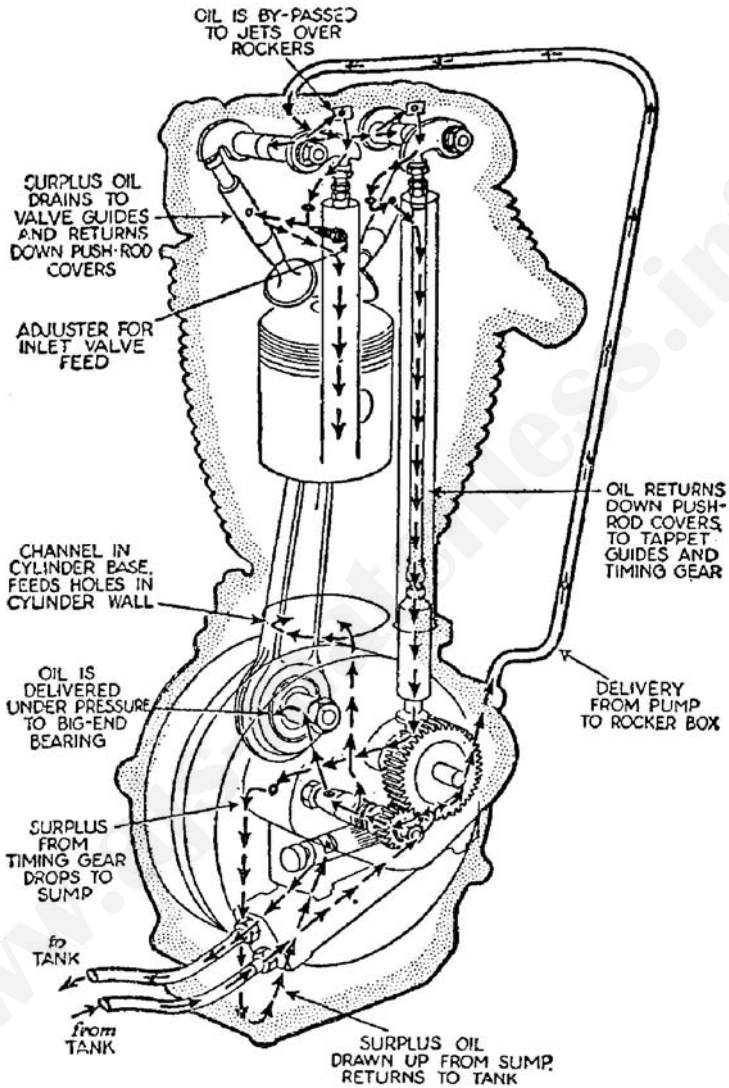


FIG. 34. DIAGRAM SHOWING HOW THE OIL CIRCULATES INSIDE THE A.J.S. O.H.V. ENGINE

The above circulation diagram is applicable to all 1945 and later O.H.V. single cylinder engines. Oil is fed to the overhead-rocker bushes besides being sprayed over the rockers by jets. On 1954 and later engines an oil lead is taken from the rocker bush to each rocker arm. 1956 and 1957 engines have no oil feed to the rear of the cylinder.

The A.J.S. Oil Pump. The oil pump in the crankcase has a horizontal type steel plunger (Fig. 33) which combines rotary motion with reciprocating movement. Rotary motion is imparted to the plunger by a worm on the timing-side engine main-shaft. The reciprocating motion is obtained by the hardened pin in the hollow guide screw (see Fig. 33) engaging the profiled cam-groove cut on the (larger) scavenge end of the plunger.

The profiled cam-groove is designed so that the opening and closing of the two main ports, and a small auxiliary port, are synchronized with the pumping impulses obtained by plunger reciprocation. The scavenge (rear) end of the plunger (which is totally enclosed in its housing by two end-caps) has a greater capacity than the delivery end, and in consequence it keeps the crankcase sump in a "dry" state, all oil being returned to the tank for further circulation.

How the Oil Circulates. Fig. 34 shows at a glance how the oil circulates in the A.J.S. engine with D.S. lubrication. The filtration of the oil in the tank (capacity: 3 pt., 1945-8; 4 pt., 1949-51 ; 4-lz pt., 1952-5; 5 pt., 1956; 4 pt., 1957) is shown (1945-57 tanks) in Figs. 35 and 36.

The delivery (front) end of the plunger shown in Fig. 33 feeds oil under pressure to the timing-side main bearing and connecting-rod big-end bearing through a passage cut in the timing-side main shaft, flywheel, and crankpin. The piston and cylinder bore are lubricated by surplus oil splashed from the big-end bearing. Further provision for lubrication of the cylinder is included on 1945-55 engines. The oil pump forces oil through a passage (equipped with ball-valve control) in the crankcase to a circular channel in the cylinder base. The oil reaches the cylinder bore through a number of small holes drilled in the channel. Surplus oil automatically drains down into the sump of the crankcase.

The A.J.S. plunger pump also feeds a secondary oil supply to the timing gear and rocker-box. The supply to the timing gear is fed through a passage in the timing-gear case. The oil collects in the timing-case until a predetermined level is reached. As may be seen in Fig. 34, an external pipe connected to the front of the oil-pump housing conveys the secondary oil-supply direct to the rocker-box and push-rod ends.

The overhead inlet and exhaust-valve rockers inside the rocker-box are thoroughly lubricated by means of jets above them. In addition, oil is fed to the rocker bushes and (1 954 onwards) each rocker arm. The surplus oil drains to and lubricates both valve guides. The oil supply to the guide for the inlet valve can be regulated by means of a needle-pointed screw adjuster. This oil-supply adjustment is the only one provided on the A.J.S. drysump lubrication system.

Surplus oil from the valve guides passes down the push-rod covers and the tappet guides and enters the timing case. Here all engine oil, beyond that needed to keep the level at the predetermined height, drains down into the sump of the crankcase. The large-capacity scavenge end of the plunger pump sucks up the oil collected in the sump from various parts of the engine and pumps it back via the upper pipe into the oil tank for filtering and further circulation.

The whole of the oil in the tank and the engine is thus kept in constant circulation and the sump remains practically "dry." Up to 1952 an external engine-breather pipe was fitted, but from 1952 onwards the crankcase pressure-release valve has been incorporated in the driving-side main shaft.

The Tank Filters. These keep the oil clean. A cut-away view of the A.J.S. oil tank is shown in Figs. 35 and 36. As may be observed, a metal gauze filter is

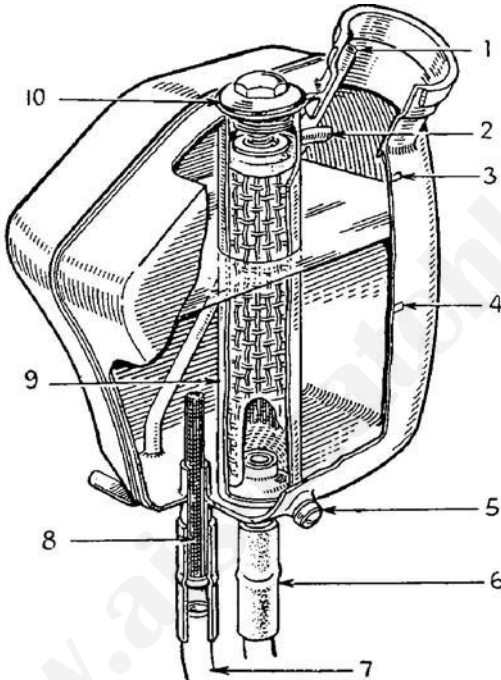


FIG. 35. CUT-AWAY VIEW OF OIL TANK SHOWING THE FILTERS, ETC. (1952-5)

On 1945-51 tanks the smaller gauze-filter was integral with a screwed feed-pipe union (Fig. 37), and the drain plug was at the rear. On 1956-7 models a pamier-type tank (Fig. 36) with a metal-gauze filter is provided. Prior to 1954 the rubber connexion for the oil-return pipe was omitted.

KEY TO FIG. 35

- | | |
|--------------------------------------|---------------------------------|
| 1. Vent pipe (to prevent air locks). | 6. Oil-return pipe. |
| 2. Oil-return pipe orifice. | 7. Oil-feed pipe. |
| 3. Top-level mark. | 8. Gauze filter. |
| 4. Low-level mark. | 9. Tube enclosing felt element. |
| 5. Drain plug. | 10. Cap on main filter. |

incorporated in the delivery or feed-pipe union. It should be noted that the sole object of this filter is to trap any dirt, pieces of fluff, etc., which may get into the oil tank while it is being replenished.

The main filter (1945-55 models) is a detachable fabric-type. It comprises a long felt-element contained within an upright tubular wire-cage. As may be noticed in Fig. 35, all the engine oil returned to the scavenge end of the pump has to percolate through the felt element and wire cage which are supported by a cylindrical housing inside the tank.

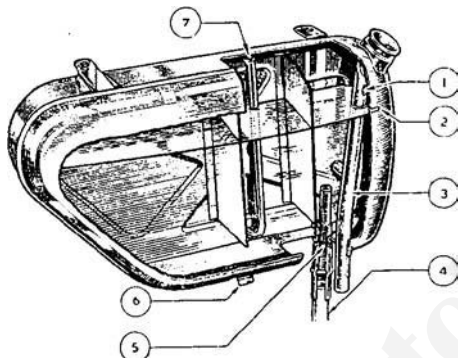


FIG. 36. CUT-AWAY VIEW OF OIL TANK ON 1956 MODELS

The above arrangement applies to 1957 models, except for the addition of two extra holes at the top of the oil-return pipe, and the shrouding within the tank of the (externally located) vent pipe.

KEY TO FIG. 36

- | | |
|-----------------------------|--------------------------|
| 1. Oil-return pipe orifice. | 5. Gauze filter (metal). |
| 2. Top level mark. | 6. Drain plug. |
| 3. Oil-return pipe. | 7. Vent pipe. |
| 4. Oil-feed pipe. | |

Very thorough filtering results. On 1956-7 models a fabric-type filter with felt element is omitted. Instead, a cylindrical filter of fine metal-gauze is secured in the tank end of the feed-pipe union.

Always purchase engine oil in sealed containers or replenish from branded cabinets. Specify clearly the brand and grade which you require, and refuse firmly but politely the "just as good" type.

Suitable Engine Oils. To ensure easy starting, maximum performance and minimum wear, the safest policy is to use one of the brands and grades officially recommended by A.J.S. Motor Cycles. They recommend the use of one of the following engine oils-

- (a) Castrol "Grand Prix" (summer) or "XL" (winter).
- (b) Mobiloil "D" (summer) or "A" (winter).
- (c) Shell X-100 50 (summer) or X-100 30 (winter).
- (d) B.P. Energol SAE 50 (summer) or B.P. Energol SAE 30 (winter).
- (e) Esso 50 (summer) or Esso 30 (winter).

It should be noted that the above recommendations are not tabulated in any priority order. It is for the rider to choose which brand he prefers. All the five mentioned are thoroughly sound.

Oil Level in Tank. Remove the filler cap and inspect the level of oil prior to every ride. Always verify the level very carefully before a long run and top-up with suitable engine oil (see previous paragraph) if necessary. Sufficient oil must be kept circulating to ensure correct lubrication of the engine and its proper cooling.

Never allow the oil level to fall below the low level mark, otherwise the oil in circulation is apt to become hot, dirty, and diluted. As far as possible maintain the oil level at or near the top level mark on the outside of the tank (1952-7), but do not allow the level to rise above this mark; or (1945-51) above 1 in. from the filler-cap orifice. This is important for the following reason.

On stopping the engine, no further pump action occurs, but the oil continues to drain into the sump from various parts of the engine. When the engine is subsequently started there is obviously surplus oil accumulated in the sump and this is immediately pumped back into the tank by the large-capacity scavenge end of the pump plunger. The effect is to cause an excessive rise in the level of oil in the tank, and possibly oil leakage via the tank air-vent (provided to avoid air locks).

Checking Oil Circulation. Verify the oil circulation before every run, immediately after starting up the engine from cold. Remove the oil tank filler-cap and observe the oil flow from the small spout (see Fig. 35) about 2 in. below the filler-cap orifice. If no oil can be seen emerging from the spout, raise the exhaust valve lifter and stop the engine immediately.

The oil flow immediately after starting up the engine from cold should be steady. An erratic or weak flow is abnormal and requires investigation. After a brief period of warming up the engine, the surplus oil in the crankcase sump is disposed of, and thereafter the oil flow from the spout of the return pipe decreases somewhat and may become irregular. Some froth may be noticeable caused by the presence of air bubbles, but this is normal and can be disregarded, once the engine gets into its stride.

If you suddenly accelerate the engine and then close back the throttle, you may observe first a marked decline, or even cessation, of the oil flow and then a considerable increase in the flow.

No Pump Adjustment. The A.J.S. oil pump is capable of delivering the correct volume of oil to the engine at all throttle openings. Consequently there is no adjustment provided for the main oil supply. To ensure correct lubrication of the engine, however, it is essential to keep the two end-caps of the plunger housing quite airtight. Check the securing nuts periodically for tightness with a spanner. (See also page 57.)

Oil Supply to Inlet Valve Stem. The adjuster for the oil supply to the inlet valve stem comprises a needle-pointed screw (Fig. 34) situated on the off-side of the cylinder head. If the engine is mechanically sound, the approximately correct setting of the adjuster screw is one-sixth of a complete turn from the fully closed position. Once the correct setting has been obtained, it should not be necessary to interfere with the adjustment.



FIG. 37. GAUZE
FILTER INTEGRAL
WITH FEED PIPE
UNION
(1945-51 ONLY)

The adjuster screw is secured by a lock-nut, which prevents accidental alteration of the adjustment. To increase or decrease the oil supply to the inlet-valve stem, the adjuster screw must be turned slightly anticlockwise or clockwise respectively, after first loosening the lock-nut.

What symptoms indicate that an adjustment is called for? An excessive oil supply is denoted by blue smoke at the exhaust, high oil consumption, and a tendency for the sparking plug to oil up and become dirty. An insufficient oil supply is indicated by the inlet-valve stem developing a mouse-like squeak.

The Exhaust Valve Stem. No adjustment is provided for the oil supply to the exhaust-valve stem. The stem is automatically lubricated by oil fed through a channel drilled in the cylinder head. Surplus oil from the exhaust-valve stem and from the stem of the inlet valve is by-passed back into the chamber responsible for lubricating the timing gears.

Changing the Oil. With a brand-new A.J.S. it is advisable to empty the oil tank and replenish it with fresh oil after covering 500 miles and again at 1,000 miles. After this, change the oil once every 5,000 miles. If a machine is only used for short runs, renew the oil every three months. Also clean the tank filter(s). Before draining the oil tank, make sure that your A.J.S. is level, with both wheels on the ground or with the stand down. Then to drain the tank, place a suitable receptacle below the drain plug to catch the oil and unscrew the plug from the off- side or rear(1945-51)edge of the tank. Be patient and allow all the oil to drain away. Having drained the oil tank, also remove the drain plug from the bottom of the crankcase sump (on the off-side), and permit any accumulation of oil to drain off. There will not be a large amount, but it is desirable to remove what there is. A powerful magnetic filter is fitted to the crankcase drain-plug on 1956 and later models and it is important to see that the accumulation of any fine metallic particles is completely removed. Finally, make sure that both drain plugs are replaced and firmly tightened.

The Magnetic Crankcase-Filter (1956-7). To obtain access to this filter for cleaning, it is only necessary to unscrew the crankcase drain-plug which embodies the magnetic filter.

Forcibly wipe off with a greased rag all metal particles adhering to the magnetic filter (they adhere strongly). If you place the filter on the bench see that the magnet does not come into contact with large iron or steel objects, such as a vice, otherwise some loss of magnetism may occur. Also avoid placing the magnet close to iron or steel filings, which will be attracted to the magnetic filter and need removing.

The Tank Filters. Thorough and regular cleaning of the two filters in the oil tank (one, 1956-7) is most important and must never be overlooked. It is best to remove and clean the filters when the engine oil is changed. Advice on removing the filters is given in subsequent paragraphs. As regards actual cleaning, this should be done thoroughly with petrol, but do not attempt to remove the felt element of a large cartridge-type filter from its tubular wire-cage, and do not use a flurry rag when cleaning a gauze filter. Allow to dry afterwards. Inspect the cork washer fitted below the hexagon cap of a fabric filter (Fig. 35) and renew the washer if it is not in perfect condition. Also examine the felt element very carefully. Fit a new element if its ends are at all distorted or perforated.

It should be observed that a choked gauze-filter can completely or partially starve the engine of oil, since it is secured to the feed-pipe union and all oil entering the engine has to pass through it.

On the other hand, choking of the above gauze can be caused only through replenishing the tank with impure oil. The whole of the oil returned by the pump from the engine to the tank is effectively cleaned by means of the large fabric or gauze (1956-7) filter, assuming the felt or gauze (1956-7) element is sound. If the felt element of a fabric filter is clogged up with impurities, excessive lubrication can occur owing to resistance offered to the returning oil causing a "build-up" of oil in the sump. Renew the filter element if its condition is poor.

To Remove Felt Element (1945-55). First raise (1945-7) the rear of the saddle after removing the two saddle-spring securing bolts. On 1948 and later machines this is not necessary.

Unscrew and remove the hexagonal cap from the oil tank filler-orifice. Next withdraw the dished washer and the filter spring.

On 1945-53 models insert a finger inside the felt element and gently raise the element until the top end touches the underneath of the saddle. Now encircle the filter with the hand and exert sufficient upward pressure on the flexible saddle-top to enable you to withdraw the filter without distorting it. Take great care not to kink or damage the element when withdrawing it.

On 1954-5 models, after withdrawing the dished washer and filter spring, insert a finger in the exposed open end of the felt element and gently strain inward and backward (rigid-frame models) to avoid fouling the saddle frame, or outward and forward (spring-frame models) to avoid fouling the dualseat. Be most careful not to kink the element when doing this.

The procedure for replacing the filter element is the reverse of that just described. On a 1945-7 model, where the rear of the saddle is assumed to have been raised, replace the saddle in its normal position and fit and securely tighten the two saddle-spring securing bolts.

To Remove Gauze Filter (1945-51). To remove a filter (Fig. 37) for cleaning after draining the oil tank, the following procedure is necessary. Disconnect the oil-feed pipe from the union screwed into the base of the oil tank by unscrewing the union nut from the pipe nearest the rear wheel. Spring the feed pipe away from the union and then unscrew the union and remove this complete with the integral filter. To replace the gauze filter, union, and feed pipe, reverse the above instructions.

To Remove Gauze Filter (1952-7). The small gauze filter on the delivery side is not integral with a detachable union as on the 1945-51 models. Referring to Fig. 36, first drain the oil tank and then (1952-6) free the oilfeed pipe from the rubber connecting-sleeve on the small oil-feed pipe which projects from the base of the tank. If the gauze filter comes away with the rubber connecting-sleeve (1954-6) or feedpipe (1957), do not disturb it. If, however, the filter remains in the small pipe attached to the tank, grasp the ringed open end and pull the filter out of the pipe. Replace the filter in the reverse order of removal. On 1957 models all oil pipes are of the Neophrene push-on type.

Splitting the Crankcase. Should it be necessary for any reason to separate the crankcase halves, it is essential to remove the pump plunger (Fig. 33) first. Failure to take this precaution will almost certainly result in damage being caused.

Removing Pump Plunger. Do not remove the oil-pump plunger unnecessarily. If you must remove it, first drain the oil tank as described on page 54. Also unscrew the union nut securing the bottom end of the oil feed pipe from the pump housing to the rocker-box. Remove both end-caps from the pump housing by undoing the hexagon-headed securing bolts.

Just below the pump housing in front of the rear cap is the all-important guide screw and pin. Remove these together (see Fig. 33), and push out from the front the pump plunger and withdraw it from the rear end of the pump housing.

To Replace the Plunger. First make sure that the inside of the pump housing is clean, and check that the plunger itself is clean internally and externally. Oil the plunger and gently push it into position. Its smaller end must enter the rear of the pump housing, and the guide screw must next be fitted. Before replacing the guide screw, make certain that the steel pin inside the hollow screw is fitted as indicated in Fig. 33, or serious damage may be caused to the teeth of the pump plunger.

After replacing the guide screw, and while slowly tightening it, move the pump plunger backwards and forwards until the end of the guide-screw pin is felt to engage the profiled cam-groove at the rear end of the plunger. When this happens, tighten the guide screw firmly, but on no account tighten before proper engagement is obtained, otherwise stripping of the teeth on the timing-side engine main-shaft and of the teeth on the plunger is liable to take place.

Fit the pump-housing front and rear end-caps and see that airtight joints are obtained. The two paper washers must be in perfect condition. Renew them if they are damaged in the slightest degree. Make certain when fitting the paper washer for the front end-cap that the small oil hole in the cap itself is not obstructed.

The Pump Housing End-caps. It is advisable to apply some liquid jointing compound to one side of each paper washer. This side must be fitted in contact with the end-cap. To ensure an airtight joint at each end-cap, it is essential to see that the securing bolts are tightened down evenly and firmly. Tightening should always be effected in a diagonal order. Also occasionally check the delivery and return-pipe union nuts for tightness.

Magneto Bearings. These are initially packed with grease by the makers during assembly and further greasing should not be necessary for 10,000-15,000 miles. When a general overhaul becomes necessary it is desirable to remove the magneto and return it to Joseph Lucas, Ltd. of Birmingham, 19, or to one of their service depots, for thorough servicing. No grease nipples are fitted, but the contact-breaker requires periodical oiling.

The Contact-breaker (Face-cam Type). The cam and tappet of the face-cam type contact-breaker (Fig. 38) require lubrication approximately every 3,000 miles. To effect such lubrication, remove the complete contact-breaker as described below. First release the spring blade and take off the contact-breaker cover. Now, referring to Figs 38 and 39, remove the screw (E) and the spring washer retaining the spring arm (A) to the body (L) of the contact-breaker, and detach the curved backing spring (D) and the spring arm (A). Next unscrew the screw (B) carrying the lubrication wick, and remove the insulating bush (fibre).

Straighten the tab on the locking plate (J) situated behind the head of the contact-breaker securing screw (H), and with the spanner remove screw (H). Then lever off the contact-breaker body (L) from the armature-shaft extension.

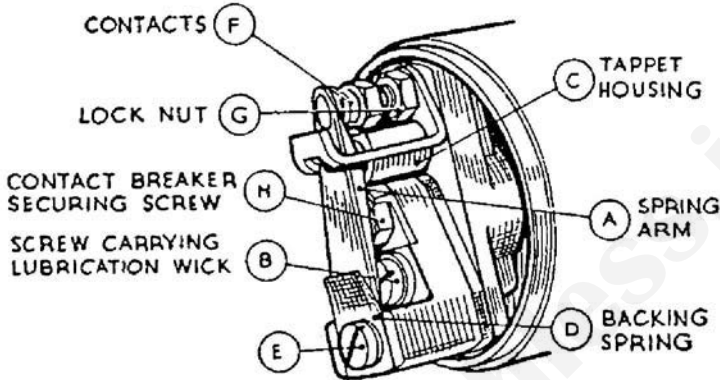


FIG. 38. FACE CAM CONTACT-BREAKER OF LUCAS ROTATING-ARMATURE MAGNETO SHOWN ASSEMBLED

This type of contact-breaker is provided on the magnetos of all 1945-53 machines and 1954 350 c.c. machines with manual ignition-control. The various parts are shown dismantled in Fig. 39. The rotating- magnet magneto (1954 500 c.c. and 1955-7 models) is shown in Fig. 46.)

After completely removing the contact-breaker, saturate the wick, mounted in the core of the carrying screw (8), with a few drops of thin machine oil. Push from the contact-breaker body (L) the tappet (K) and wipe the tappet clean with a soft cloth. Smear a little thin machine-oil on the tappet and replace it in the body.

To assemble the face-cam type contact-breaker, proceed in the reverse order of dismantling. Make sure that the curved backing spring (D) is replaced so that the curved part is on the outside. The foregoing does not apply to rotating-magnet magnetos.

The Contact-breaker (Rotating-magnet Magneto). On 1954 500 c.c. and all later models fitted with a Lucas type SR-1 magneto having automatic ignition-control mechanism on the driving side (behind a bulge on the magneto chain-case cover), about every 3,000 miles undo the three captive screws and remove the moulded end-cover. Loosen the nut securing the contact-breaker spring and lift off the contact-breaker lever (see Fig. 46). The spring is slotted to facilitate removal. Then smear the pivot pin with a little Mobilgrease No. 2 or a similar grease.

The Magneto Chain. The magneto driving-chain (enclosed in a chain case on the off-side of the engine) is not automatically lubricated like the dynamo chain. It is necessary to add some grease about every 1,000 miles. On 1945-51 models inject some Mobilgrease No. 2 or Esso Fluid Grease through the grease nipple provided on the outside of the chain-case cover. On 1952 and all subsequent models, the magneto chain requires occasional replenishment with one of the two above-mentioned greases. Remove the chain-case cover, and apply suitable grease generously to the chain. Also with a thin-metal strip, work some of the grease well into the automatic ignition-control mechanism (1954 onwards).

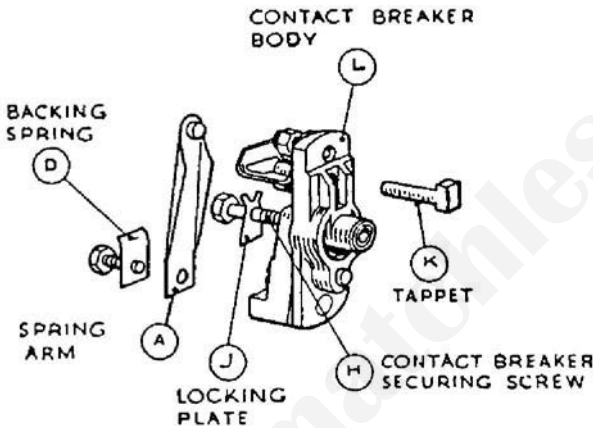


FIG. 39. FACE CAM CONTACT-BREAKER OF LUCAS ROTATING-ARMATURE MAGNETO SHOWN DISMANTLED

The same contact-breaker is shown assembled in Fig. 38.

MOTOR-CYCLE LUBRICATION

The Dynamo Bearings. The armature bearings of the (Lucas type E3 AR, 1945-50; E3-N, 1951 onwards) dynamo, as on the magneto, are packed with grease by the makers on assembly and this should suffice for at least 10,000 miles running, or until it is necessary to make a general overhaul, when the dynamo should be removed and returned to Joseph Lucas, Ltd., or to a Lucas service depot for thorough cleaning, overhaul, and lubrication.

The Dynamo Driving Chain. The separate Lucas dynamo is chain-driven from the engine shaft by a chain which is completely enclosed in the oil-bath chain case containing the primary chain. Therefore, provided the oil-bath chain case is kept properly replenished, no individual attention to the dynamo chain is necessary. The replenishment of the oil-bath is dealt with on page 62.

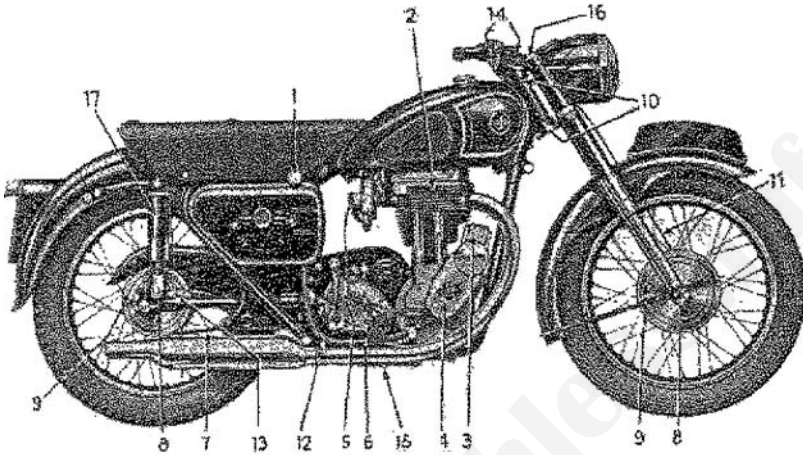


FIG. 40. WHEN AND WHERE TO LUBRICATE (1945 ONWARDS)

The above lubrication chart (showing a 1957 Model 18S) applies to all 1945 and later O.H.V. singles, but note the following points: on 1945-51 models the chain-driven magneto is mounted behind the cylinder and the chain-case has a grease nipple; on 1945-55 models a different type oil tank (see Fig. 35) with fabric-type main filter is specified

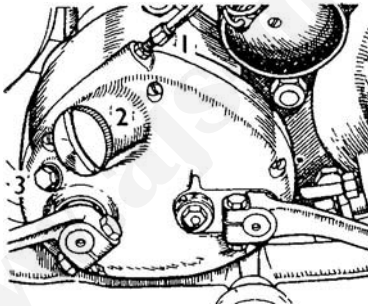


FIG. 41. THE 1952-6 BURMAN GEARBOX

KEY TO FIG. 41

1. Clutch-cable adjuster. 2. Filler cap. 3. Oil-level plug.

Burman Gearbox Lubrication. A.J.S. Motor Cycles advise the use of summer grade engine oil (see page 52) for the four-speed heavyweight Burman gearbox on the 1948-57 models. On 1945-7 machines, however, light grease is recommended for gearbox lubrication. On no account must *thick* grease be used.

THE BOOK OF THE A.J.S.

KEY TO FIG. 40

| Item No. | Description | Lubrication Required ref. | Page |
|----------|---------------------|---|--------|
| 1 | oil tank | Before each run check oil circulation and level. Top-up as required. Every 5,000 miles change the oil and clean the filter(s). Also drain oil sump. | 55, 54 |
| 2 | Inlet-valve stem | If necessary, adjust the oil supply. | 55 |
| 3 | Lucas Magneto | Every 3,000 miles apply a few drops of thin oil to the contact-breaker wick and tappet (face-cam C.B.). or smear a little grease on the lever pivot-pin (rotating-magnet magneto). | 57, 58 |
| 4 | Magneto chain | Every 1,000 miles inject a little grease (1945-51 models) with the grease gun. or occasionally repack the chain with grease (1952 onwards). | 58 |
| 5 | Gearbox | Every 1,000 miles inject 2 fluid ounces of light grease (1945-7). or top-up with summer grade engine oil (1948 onwards) to the correct level. Every 5,000 miles change the lubricant. | 60-62 |
| 6 | Primary chain | Every 500 miles check level in oil-bath and top-up if necessary to filler-cap orifice. | 62 |
| 7 | Secondary chain | Every 500 miles apply some engine oil if dry. In wet weather, remove, clean, and grease every 1,000 miles. | 63 |
| 8 | Front and rear hubs | Every 1,000 miles apply the grease gun to the hub nipples. | 63 |
| 9 | The brakes . | Every 1,000 miles apply the grease gun to the expander-bush nipples. Weekly oil the brake linkage. Also every 3,000 miles grease the rear-brake pedal. | 64 |
| 10 | Steering head | Every 1,000 miles grease both bearings with the grease gun. | 64 |
| 11 | Front-brake cable | Weekly oil the exposed end. | 64 |
| 12 | Rear-brake pedal. | Every 3,000 miles apply the grease gun to the heel nipple. | 64 |
| 13 | Speedometer | Every 3,000 miles inject grease through the nipple on top of the speedometer gearbox. | 64 |
| 14 | Handlebar levers. | Weekly apply a little oil to all moving parts. Inject some oil into the Fables (where nipples are provided). | 64 |
| 15 | Stands | Occasionally oil fulcrum bolts. | 65 |
| 16 | Front forks. | Every 5,000 miles (3,000 miles, 1945-7) check the hydraulic fluid content of both/Tele-draulic legs," and top-up if necessary. | 65-68 |
| 17 | Spring frame | If really necessary, replenish the oil reservoir for the "swinging arm" bearings, and also the rear-suspension units. | 68-69 |

Suitable grease for 1945-7 gearboxes, and for lubricating 1945 and later motor-cycle parts by means of the grease nipples provided, are as follows-

- (1) Castrol Heavy (Medium for 1945-7 gearbox).
- (2) Mobilgrease No. 4 (No. 2 for 1945-7 gearbox).
- (3) Shell Retinax Grease C.D. or A.
- (4) B.P. Energrease C3.
- (5) Esso (pressure gun) Grease.

Do not completely fill up the gearbox with engine oil or light grease. Under normal conditions it is sufficient to top-up the lubricant every 1,000 miles with 2 fluid oz. of light grease or with a little summer-grade engine oil (1948-57 models) via the grease nipple on the kick-starter case or through the filler-cap orifice (see Fig. 41) respectively. Excessive filling will result in leakage.

All 1952-6 Burman gearboxes and the 1957 A.M.C. gearboxes have an oil-level plug (3, Fig. 41) located close to the kick-starter spindle; to top-up the gearbox to the maximum permissible level (content: 1 pt.), it is only necessary to pour in engine oil through the filler-cap orifice until it begins to trickle from the level-plug hole. On the 1952-6 Burman fourspeed gearboxes the filler cap comprises a slotted and threaded circular-cap, but on the 1957 A.M.C. gearboxes the filler cap is replaced by a circular cover secured by two small screws. Removal of the circular cover, incidentally, gives access to the clutch thrust-mechanism.

Changing the Gearbox Oil. After the first 500 miles and thereafter about every 5,000 miles change the lubricant in the gearbox. The light grease or engine oil (1948-57 models) should be drained completely, the Burman gearbox flushed out with a suitable flushing oil and afterwards replenished with 1 lb. 14 oz. of grease (1945-7 boxes), or with 1 pint of engine oil (1948 onwards).

The screwed drain-plug is located low down at the rear of the gearbox shell. Where a non-fluid lubricant (light grease) is used, it may be found somewhat difficult to drain the gearbox thoroughly by removing the drain plug only. The best plan here is to remove the foot-change cover and the kick-starter case. Before replenishing the gearbox make sure that the drain plug is replaced and firmly tightened.

Primary Chain Lubrication. Remove the inspection cap from the oilbath chain case about every 500 miles and observe the level of oil. On no account must the oil level be permitted to fall below 3/16 in. from the bottom edge of the inspection-cap orifice, with the machine standing vertically on level ground. The correct amount of oil is present when its surface is level with the orifice.

If the oil level is too low, some harshness in the primary transmission generally develops, except on 1957 models where a sliding oil-seal in the form of two steel discs surrounds the gearbox mainshaft. Top-up the oilbath chain case as required and when necessary, using one of the brands of the summer-grade oils mentioned on page 52. Lubrication must not be neglected, for the oil-bath is responsible for lubricating: (a) the primary chain, (b) the dynamo chain, and (c) the engine shaft shock-absorber.

The Oil-bath Inspection Cap. To remove the cap, unscrew the knurled screw approximately four turns. Then slide the cap sideways until it is possible to slip the back plate through the orifice and remove the complete cap assembly.

To prevent the risk of the filler cap, or inspection cap, being lost while riding, it is important to centralize the cork washer before firmly tightening the knurled retaining screw. Do not forget this when replacing the inspection cap.

Secondary Chain Lubrication. About every 500 miles examine the condition of the secondary chain. If the chain is in a dry state, turn the rear wheel by hand and apply some engine oil with a brush or oil-can. About every 1,000 miles in wet weather, it is advisable to remove the chain from the sprockets and clean and lubricate it in the following manner-

- (1) Clean the chain thoroughly with paraffin.
- (2) Hang up the chain and allow to dry.
- (3) Immerse the chain for at least ten minutes in a suitable receptacle containing Mobilgrease No. 2, B.P. Energol A.O., Esso Fluid Grease, or Castrol Grease Graphited. The grease should be heated until just fluid and maintained in this state during the period of chain immersion.

Having lubricated the chain, fit it to the gearbox and rear-wheel sprockets. It is permissible to lubricate the chain, using engine oil instead of one of the greases mentioned, but this substitute is not so good. Allow the chain to soak for at least an hour where engine oil is used.

Filling Grease Gun. The grease gun (Part No.017246) provided with the tool kit must be applied periodically to all grease nipples provided on the machine.

Suitable greases to use for various motor-cycle parts are those recommended on page 61. The grease gun must be charged so that the grease is on the top side of the piston. Special grease canisters are available with loose collars provided with holes. To charge the grease gun from one of these canisters, place the barrel of the gun over the hole in the central floating plate and press downwards firmly. Turn the grease gun and at the same time remove it from the floating plate. This should charge the grease gun so that the grease is flush with the top of the barrel. Having charged the grease gun, replace its screwed top-cap. If no grease canister of the type referred to is available, charge the grease gun by hand, using a suitable lath or similar implement.

The Wheel Hubs. On new machines the hubs of both wheels are packed with grease. To prevent mud and water entering the hubs, and to ensure correct lubrication, inject some grease through the nipple (accessible through the hole in the hub disc (1955 onwards)) of each hub about every 1,000 miles. Avoid excessive lubrication, or some of the grease may get on to the brake linings and impair the efficiency of the brakes.

Steering Head Lubrication. Apply the grease gun sparingly to the grease nipple in the head lug of the frame about every 1,000 miles. Also grease the nipple on the right-hand side of the handlebar lug at the same time.

The Front and Rear Brakes. Inject a little grease about every 1,000 miles through a grease nipple provided on each brake cover-plate for the expander bush. About every 3,000 miles apply the grease gun to the nipple in the heel of the rear-brake pedal (shown at (2) in Fig. 62).

Smear a few drops of engine oil weekly on the yoke-end pins at the front and rear ends of the rear-brake rod. Do not forget the threaded portion of the rod to which the hand adjuster is fitted. Also remember the exposed end of the front-brake cable.

The Rear Brake-drum Bearing (1955-7 Spring Frame Models). On the "springers" with full-width light-alloy rear hubs, the ball bearing supporting the brake drum is packed with grease during initial assembly. No further lubrication should be required until it is necessary to undertake a general overhaul. The bearing should then be dismantled and repacked with fresh grease (see pages 61 and 137).

Speedometer-Gearbox Lubrication. To ensure smooth and efficient running, grease the speedometer gearbox every 3,000 miles. The gearbox is attached to the rear-wheel spindle and the grease nipple is located on top of the speedometer gearbox as shown in Figs. 75 and 76. No further lubrication is required beyond the above-mentioned attention.

The Throttle Twist-grip. Stiffness sometimes develops and this spoils sensitive control of the throttle. To rectify stiffness is quite simple, and the following procedure should be adopted.

- (1) Remove both the screws which retain the halves of the twist-grip clip.
- (2) Withdraw the twist-grip from the end of the handlebars.
- (3) Smear some grease on the off-side part of the handlebars over which the twist-grip fits.
- (4) Smear some grease on the friction spring, and also on the drum on which the internal wire is wound.
- (5) Replace the twist-grip on the end of the handlebars.
- (6) Fit the two screws retaining the halves of the twist-grip clip and firmly tighten the screws.

The Handlebar Levers. It is advisable to apply a little engine oil monthly to all the moving parts of the handlebar levers. This will reduce friction and keep the controls responsive and easy to operate.

On 1954 and later models the control cables for the throttle slide and clutch lever have a conveniently situated nipple for the injection of engine oil by means of a grease gun. Some engine oil should be injected at the first indication of jerky or stiff action. When using the gun, hold it as nearly vertical as possible, with the nozzle facing downward.

The Stands. Occasionally lubricate the stand fulcrum-bolts; apply some engine oil to them with an oil can. There are several small parts on the machine where only a little movement occurs. All such parts should be similarly lubricated. This will facilitate free movement and prevent rusting. The main parts of the A.J.S. requiring attention are indicated in the lubrication chart on page 61.

Sidecar Chassis. Do not forget to lubricate the sidecar chassis. Several grease nipples are provided for the purpose.

Hydraulic Fluids for "Teledraulic" FrontForks. The 1945-7 "Teledraulic" front forks and 1948-57 type, modified and simplified internally, require no actual lubrication. It is necessary, however, occasionally to check the hydraulic fluid content of each fork leg (6 1/2 fluid oz. on 1945-7 forks, 10 oz. for 1948-50, 6 1/2 oz. for 1951 onwards); top-up if necessary, as described in later paragraphs of this chapter.

Below are specified suitable types of fluid for the A.J.S. hydraulic dampers-

- (1) Wakefield's "Castrolite."
- (2) Mobiloil "Arctic."
- (3) Shell X-100 20.
- (4) B.P. Energol SAE 20.
- (5) Essolube "20."

Level of Fluid (1945-7 "Teledraulic" Front Forks). It is desirable to check the fluid level every 3,000 miles. Position your A.J.S. so that it is resting on both wheels and is quite vertical. To maintain it in this position, insert packing beneath both footrests. Unscrew the two hexagon plugs shown at (A) in Fig. 2. Pull each plug (A) upwards to its maximum extent and thereby expose the fork damping-rod attached to the plug.

By "pumping" action eject any hydraulic fluid trapped in the tubes above the damper valves. Work each plug and damping rod up and down several times. Pause for two 7minutes to permit ejected fluid to drain down to the main supply of damping fluid.

Remove the two fluid-level plugs and their fibre washers from the fork slides. The plugs are situated just beneath the securing bolts for the front mudguard-bridge. Some hydraulic fluid should just ooze from the holes of the fluid-level plugs if the hydraulic fluid content of the forks is correct. Should no fluid be seen to ooze out from the holes, it is necessary to top-up each fork leg as described below.

Topping-up (1945-7 "Teledraulic" Front Forks). It is assumed that the two fluid-level plugs are still removed. To top-up each leg of the "Teledraulic" front forks, the following procedure is required-

- (1) Pour about two table spoonfuls (equivalent to one fluid ounce) of hydraulic fluid down each fork-leg inner-tube from the top end.
- (2) Work the top plug and attached damper rod up and down several times.
- (3) Wait for two minutes to allow hydraulic fluid to ooze from the fluid level hole.
- (4) If no excess hydraulic fluid oozes from the fluid-level hole, pour another fluid ounce of this medium down the inner tube of the fork leg.
- (5) Having added further fluid, work the top plug and attached damper rod up and down several times, as previously. During all such "pumping" action, use the fingers only and make the upward strokes as sharply as possible.
- (6) If still no fluid oozes from the fluid-level plug hole, investigate the reason carefully and rectify any defect responsible.
- (7) As soon as hydraulic fluid is observed to ooze out of the level-plug hole, this indicates that the fluid content of the fork leg is correct, and the plugs can be replaced as referred to below.
- (8) Replace the fluid-level plug on the inner side of the fork-leg slider. Do not forget to fit the fibre washer before tightening the plug with a screwdriver.
- (9) Fit the plug to the top of the fork-leg inner-tube and firmly tighten with a spanner.

Hydraulic Fluid Content (1948-57 "Teledraulic" Front Forks). It is wise every 5,000 miles to check the hydraulic-fluid content of each front fork-leg. Before beginning this check, it is necessary to see that your A.J.S. is quite vertical, with the front wheel raised clear of the ground (weight on both wheels, 1951-7 models).

Place a suitable box beneath each footrest. Remove the two hexagon-headed plugs, shown at (A) in Fig. 2, from the tops of the fork-leg inner tubes, after levering off (1955) the snap-on dome caps, or removing the rubber grommets (1956-7).

To determine the fluid content of each fork leg, remove the drain plug from the base of the fork-leg slider and permit the hydraulic fluid to drain off into a graduated measuring jug or other vessel having a capacity of at least 10 fluid ounces. Most of the fluid will drain off, but not all of it will do so.

Replace the drain plug in the base of the fork-leg slider, and on 1948-50 models work the forks up and down several times. On 1951-7 front forks the damper rod is attached to the hexagon-headed plug at the top of each fork leg and it is necessary to work each damper rod (instead of the forks) up and down, employing a pumping action. Hold the top plug with the fingers only, and make very sharp upward strokes.

Wait two minutes and then remove the drain plug a second time and catch any further hydraulic fluid which may drain off into the graduated vessel already containing most of the fluid. It may be necessary to repeat the draining procedure (including working the forks or top plugs up and down) several times to ensure that the maximum quantity of hydraulic fluid is drained off into the graduated vessel. Note the total amount of fluid extracted. It is not possible to extract in this manner the whole content of each leg (10 fluid ounces, 1948-50; 6 1/2 fluid ounces, 1951-7), but the amount drained off and measured should total 9½ fluid ounces or 6 fluid ounces respectively.

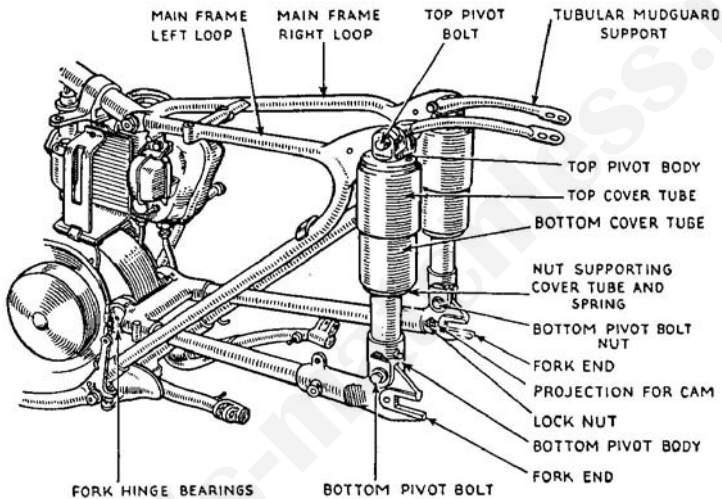


FIG. 42. SHOWING DETAILS OF THE A.J.S. SPRING FRAME

"Swinging arm" type rear-suspension was first introduced in 1949 and is specified on Models 16MS and 18S. The rear-suspension units rarely need any attention.

Topping-up (1948-57 "Teledraulic" Front Forks). The checking of the hydraulic-fluid content and the topping-up of each fork leg should be effected in one continuous operation. Deal with each fork leg individually. It is assumed that the fluid content of the leg has already been determined.

Then top-up as follows-

(1) If the total amount of hydraulic fluid extracted from the fork leg measures exactly 9 1/2 fluid ounces (1948-50) or 6 fluid ounces (1951-7), no topping-up is necessary. If the amount is less than the appropriate quantity just stated, add hydraulic fluid (of the type already in use) to the graduated vessel until the total amount of fluid measures exactly 9 1/2 fluid ounces or 6 fluid ounces, as the case may be.

(2) Replace the drain plug in the base of the fork slider.

(3) Pour the 9 1/2 or 6 fluid ounces contained in the graduated vessel into the top of the fork inner-tube.

(4) On 1948-50 models, verify that the fork leg is fully extended.

(5) Replace the hexagon-headed top plug (and rubber washer), and firmly tighten the plug. Also replace the snap-on dome cap (1955) or rubber grommet (1956-7). It is important to note that where 1948-57 "Teledraulic" front forks have been completely stripped down (necessarily incurring the removal of all hydraulic fluid), it is essential after assembly to top-up each fork leg with the full 10 fluid ounces (1948-50) or 6 1/2 fluid ounces (1951-7), not the quantities (1/2 fluid ounce less) just quoted for topping-up.

The "Swinging Arm." The "swinging arm" assembly in whose rear end the rear wheel is mounted is hinged just behind the gearbox, and the "swinging arm" fork-hinge plain bearings (see Fig. 42) are automatically lubricated from a reservoir containing 1 1/2 fluid ounces (42.6 c.c.) of engine oil.* This should suffice to lubricate the bearings for an almost indefinite period. Slight oil leakage may occur on a new machine (or where the reservoir has been replenished) but this is of no significance and stops after a few hundred miles have been covered. If replenishment should ever become necessary, remove the small screw from the off-side hinge bearingcap and top-up the oil reservoir with engine oil (see page 52) to the level of the screw orifice.

* Heavy gear oil (SAE 140) is recommended by the makers for 1952 and later models.

"Teledraulic" Rear-Suspension Units (1949-56). The rear-suspension units have hydraulic damping springs of almost identical design to that used for the "Teledraulic" front forks. But only if leakage of hydraulic fluid occurs (most unlikely) is it necessary to replenish the fork legs with the correct amount of fluid. Should the leg action become excessively lively, it is possible that some loss of damping fluid is responsible, but unless you are in serious doubt as to the correct functioning of the spring frame, you are advised to leave well alone.

The hydraulic fluid (oil) content of each "Teledraulic" rear leg can be checked in accordance with the instructions given in the maker's instruction book. The correct fluids to use are those specified on page 65. For the spring frame on all 1949-50 models each fork leg should contain exactly 1 3/4 fluid ounces (50 c.c.), but on the 1951 and later spring frames the recommended quantity is 85 c.c. or a little below 3 fluid ounces. On no account must the oil content exceed 90 c.c.

Girling Rear-Suspension Units (1957). These proprietary units are sealed by the makers and do not require to be topped-up. During initial assembly their springs are lubricated and sufficient hydraulic fluid inserted in the damper units to last until the Girling units require to be renewed.

Occasionally clean and grease the cam-ring adjusters provided to give three different spring tensions. If the movement of the telescopic legs is accompanied by a rubbing noise or squeaking, remove the two half circlips securing each top cover-tube, remove the tube, and apply some grease to the outside diameter of the spring.

CHAPTER V

GENERAL MAINTENANCE

This chapter contains full maintenance instructions for all 1945-57 touring singles. Some instructions, however, have already been included in Chapters II-IV. Appropriate cross-references to these earlier chapters are therefore also included.

A.J.S. Repairs and Spares. When you have occasion to forward or deliver parts to the manufacturers* (either for repair or as patterns) always attach to each part a label on which is written clearly your full name and address. To ensure quick attention, all correspondence concerning spares and technical advice should be written on separate sheets, each bearing your name and address.

Always quote the complete engine number or frame number, according to the nature of the part involved. The frame number will be found marked on the off-side of the saddle lug (see page 1). The engine number (with letter prefix) will be found on the near-side of the crankcase.

There are numerous firms in the United Kingdom who can supply A.J.S. spares over the counter, and many who specialize in the repair of engines and gearboxes. Useful addresses may be found in the advertisement pages of *The Motor Cycle* and *Motor Cycling*. If taking a machine to Plumstead, first make an appointment.

Some London Accessory Firms. Among reputable London firms (some of which have provincial branches) handling motor-cycle accessories, equipment spares, tools, clothing, etc. may be mentioned: Whitbys of Acton, Ltd.; Claude Rye, Ltd.; E.S. Motors; The Halford Cycle Co., Ltd.; Turner's Stores; James Grose, Ltd.; Marble Arch Motor Supplies, Ltd.; Pride & Clarke, Ltd.; and George Grose, Ltd.

ENGINE MAINTENANCE

Items for Maintenance. For engine maintenance there are certain items which you must have handy in the lock-up or garage. These include: a can of paraffin for cleaning purposes; a stiff brush for scouring dirt off the crankcase; a tin of suitable engine oil (see page 52); a canister of grease;

The A.J.S. Service and Repair Dept. is in Burrage Grove, Plumstead, London, S.E.18.

a small oil-can containing some engine oil; a receptacle for oil when draining the oil tank and oil sump; a pair or some jars for washing engine parts in; some non-fluffy rags; valve-grinding paste such as Richford's (coarse and fine); some fine emery cloth; a set of engine gaskets (see illustrated Spares List); some jointing compound; a pair of new gudgeon-pin circlips; and some good hand cleanser, such as "Gresolvent."

Tools Required. The A.J.S. tool kit is adequate for any normal stripping down and assembly job and should prove sufficient for routine maintenance and overhaul. It is also necessary for maintenance to obtain a suitable feeler gauge for checking the sparking plug gap (see page 73), an A.J.S. valve-spring compressor (for 1949 and subsequent engines with hairpin valve springs), and a valve holder for grinding in the valves. It is also desirable to obtain a wire-brush for cleaning sparking plugs. Should you decide to undertake as much repair work as possible in addition to routine maintenance, stripping-down, and assembly, it is desirable to rig up a suitable bench, complete with vice, and to purchase some extra tools (various A.J.S. service tools are available).

To begin, it is a good plan to buy a medium-weight hammer, a hand-drill and an assortment of twist-drills, a hacksaw, some large and small (smooth and rough) files, and a good soldering outfit for the repair of control cables. Repair work is beyond the scope of this handbook, and you are not advised to tackle such work unless you have fair technical knowledge and skill in handling tools.

Engine Lubrication. Detailed instructions on lubricating the A.J.S. engine are given in Chapter IV. Attend to lubrication points 1 to 4 indicated in the Lubrication Chart on page 60.

The Amal Carburettor. For comprehensive advice on how to maintain correct carburation, refer to the instructions given in Chapter II.

Keep your Engine Clean. Keep your engine clean externally as well as internally. By so doing you enhance pride of ownership and obtain other advantages. Dirt is apt to mask defects and can accidentally enter the engine when it is being stripped down. It will also make rusting more likely. Rusted cylinder and cylinder head fins, besides being an eyesore, are detrimental to efficient dispersion of heat by radiation. They should be clean and black. On the A.J.S. they are stove enamelled black (except 1951-7 light-alloy cylinder heads).

To clean the cylinder and cylinder-head fins, use a stiff brush dipped in paraffin. If the stove-enamelling has worn away, paint the fins with a good proprietary cylinder black. Clean the aluminium alloy and bright surfaces with rags and paraffin, assisted by brushes where necessary, and scour off the filth from the lower part of the crankcase by means of stiff brushes and paraffin. Thorough cleaning may take some time, but it is well worth while.

Check Nuts for Tightness Occasionally. On a new A.J.S. where some initial bedding-down occurs, it is advisable to check all external nuts and bolts for tightness fairly frequently. After the running-in period is completed it is a good habit to check the external nuts regularly every 3,000 miles. Pay special attention to the cylinder nuts, the nuts on the engine plates, and the union nuts for the pipe connexions.

THE IGNITION SYSTEM

The ignition system comprises a 14 mm. sparking plug and a Lucas rotating-armature type magneto (1945-53 models) or a Lucas rotatingmagnet type magneto (1954 onwards). The magneto on all 1952 and later models is mounted in front of the cylinder to facilitate removal of the dynamo. Manual ignition-control is provided except on 1954 and subsequent models having a Lucas type SR-1 rotating-magnet magneto (see page 79) with automatic ignition-control mechanism on the driving side. On all machines the magneto is chain-driven.

Suitable Sparking Plugs. To obtain maximum engine performance throughout the throttle range, plus easy starting, it is essential always to run on a suitable type of sparking plug. Three reliable makes of sparking plugs are the K.L.G., the Lodge, and the Champion. Suitable types are
K.L.G. - Fit a three-point, detachable type F80, or FE80 (1951 onwards), or else the appropriate watertight version (see page 73).

LODGE - Fit a three-point, detachable type H14 or a type HLN on all 1951 and later models.

CHAMPION - Fit a non-detachable type L-10 (1945-6 350 c.c), L-10S (1945-6 500 c.c, all 1947-9 models), or type NA-8 (all 1950 and later models).

"Ignition Suppression" Plugs. To meet special legislation concerning sparking plugs fitted to new machines (see page 2), various plugs incorporating a resistor are available. A good example is the K.L.G. Special plugs of this make have the letter "R" after the type number (e.g. F80R). Champion plugs of the built-in suppressor type have the prefix "X" (e.g. XL-10, XNA-8, etc.). While it is not compulsory to fit a "suppressor" type plug to a machine registered prior to 2nd July, 1953, it is recommended that this be done, as "suppressor" plugs besides causing no annoyance to "viewers" and "listeners," also have longer-wearing electrodes. An alternative to fitting a plug with a built-in ignition suppressor is to fit to the existing plug a terminal cover (e.g. the Lodge type M90X, the K.L.G. type PS or SS, or the Champion) embodying a resistor.

Weatherproof Sparking Plugs. All-weather riders usually find it advantageous to fit a weatherproof plug terminal-cover or (in the event of plug renewal being required) to fit a watertight sparking plug such as the K.L.G. type. Two reliable and reasonably priced weatherproof sparking plug terminal covers are the Lodge and the K.L.G.

K.L.G. watertight sparking plugs have the prefix "W" (e.g. WF8, WFE80), and they are not expensive.

The Sparking Plug Gap. It is advisable to check the gap between the electrodes of the sparking plug about every 3,000 miles. The correct gap is 0.018-0.022 in., and it is advisable to re-gap the plug if burning of the points has increased the gap to over 0.022 in. When re-gapping a plug it is desirable for obvious reasons to set its gap at or near the bottom limit.

Check the gap with a suitable feeler gauge (a wire gauge if the points are not very accessible). The gauge should be a nice sliding fit. When adjusting the gap,

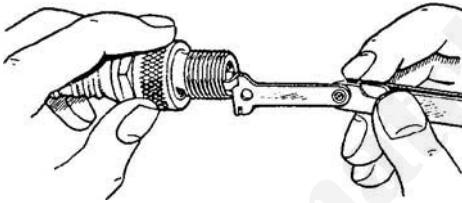


FIG. 43. THE BEST WAY TO RE-GAP A PLUG

never attempt to bend or tap the centre electrode. Use a plug re-gapping tool (see Fig. 43), a small pair of snipe-nose pliers, or a small screwdriver to bend the outside (earth) electrode(s). Tapping the outer electrode(s) inwards to reduce the gap is permissible, if the plug is held in a vice and a light hammer and copper drift are used. When the plug has to be thoroughly cleaned, this should be done as described below, and the plug re-gapped afterwards.

Cleaning the Sparking Plug. If carburation is correct (see page 15) and excessive oil is not entering the combustion chamber, it should not be necessary to dismantle and clean the sparking plug thoroughly more often than once about every 3,000 miles. When running-in a new or rebored engine, however, it is advisable to remove and check the plug for cleanliness at intervals of about 500 miles.

Quick cleaning of a plug can be done by brushing the points and lightly rubbing their firing sides with some smooth emery-cloth. Thorough cleaning (internal and external), however, is not possible without dismantling the plug (see below).

To Clean K.L.G. and Lodge Plugs. Fig. 44 shows a typical detachable type (K.L.G.) sparking plug dismantled for thorough cleaning. To dismantle a detachable-type plug, grip the smaller hexagon on the gland nut (B) in a vice, with the plug upside down. Be most careful not to exert any pressure on the hexagon faces. Then with the plug box-spanner, or a suitable ring spanner, unscrew the large hexagon (E) on the plug body. Alternatively use two spanners to unscrew the gland nut from the plug body. The centre electrode (F) with its insulation, comprising the insulated electrode assembly (A), can now be detached from the gland nut. Take care not to lose the internal sealing washer (H).

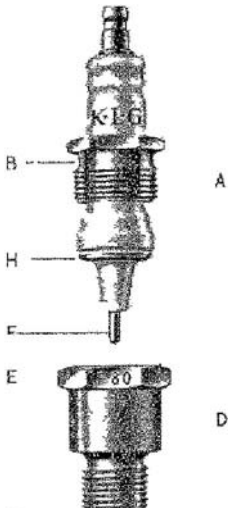


FIG. 44. DETACHABLE TYPE SPARKING PLUG (K.L.G.)
The gland nut B and the internal washer H are shown still in position on the insulation.

To clean the insulation, wipe it clean with a cloth soaked in petrol or paraffin. If the insulation is coated with hard carbon deposits, remove these with some fairly coarse glass-paper and wash again, but make no attempt to scrape off the deposits. The internal sealing washer (H) and the surfaces on the insulator, and in the metal body on which this washer rests, are very important as they prevent gas-leakage through the plug. Therefore wipe them only with a rag soaked in petrol or paraffin. Any damage caused while dismantling will render the plug unserviceable.

To clean the metal parts (plug body and gland nut), wipe them clean with petrol, or, if necessary, scrape off the deposits with a small knife, or use a wire brush. Afterwards rinse the parts in petrol. The gland nut seldom gets very fouled, but the inside of the plug body may be very dirty, and the same may apply to the internal threads of the plug. Clean and polish the points (see Fig. 44) of the centre and outside (earth) electrodes (F) and (G) with some fine emery-cloth.

See that there is no dirt or grit lodged between the body of the plug and the insulation, and particularly on the internal sealing-washer and all contacting faces. Smear a little thin oil on the internal washer and make sure that it seats properly. When assembling the sparking plug, see that the centre electrode and insulation are positioned centrally in the body bore. If not, remove, re-position by rotating the centre a quarter of a turn, and re-assemble. Do not attempt to force into position or bend. Tighten the gland nut into the plug body just sufficiently to give a gastight joint. Do not use an open-ended spanner. Finally verify that the plug gap is correct.

To Clean Champion Plugs. A Champion non-detachable plug such as the L-10S cannot be dismantled and cleaned like the detachable-type Lodge and K.L.G. plugs. Quick cleaning is, of course, done in the same manner (see page 73). The best method of cleaning a Champion plug thoroughly is to take it to a nearby garage having an "air-blast" unit. In a matter of a few minutes the plug can be thoroughly cleaned of all deposits, washed, and tested for sparking at a pressure exceeding 100 lb. per sq. in.

If the above method of cleaning is not available, remove the plug from the engine, pour some petrol down between the insulated centre electrode and the plug body, and set fire to the plug. Alternatively, burn the plug clean with some oily rag.

To assist cleaning, use a small wire brush. Wipe the tip and outside of the insulation thoroughly clean. After removing all carbon, polish the electrodes with some fine emery-cloth. Finally, check the plug gap (0.018 in. -0.022 in.).

Fitting a Plug. Before replacing the plug, renew the copper washer if it is worn or flattened, and clean the plug threads. It is a good plan to coat the threads with some graphite paste before replacing the plug. Screw the plug home by hand as far as possible, and always use the plug spanner in the tool kit for final tightening. The use of excessive force is undesirable and can cause distortion.

To Check Contact-breaker Gap (1945-53 Models). Normally it should be sufficient to check the gap between the contacts of the contact-breaker about every 2,500 miles. Where the magneto or the contact-breaker is brand-new, however, some bedding-down occurs, and it is advisable to check the gap after covering approximately 500 miles. An incorrect magneto gap will adversely affect the functioning of the ignition system, and too large a gap will also advance the ignition timing. Always maintain the gap at 0.010 in.-0.012 in. The procedure for checking and adjusting the gap is as follows-

- (1) Remove the contact-breaker cover and rotate the engine slowly forwards until the contacts of the contact-breaker are wide open.
- (2) Insert the blade of the feeler gauge (attached to the magneto spanner) between the contacts.
- (3) If the feeler gauge just slides in without friction, the gap is correct and no adjustment is needed. If the gauge is a slack fit or the contacts have to be sprung to enable it to enter, adjust the gap as below.
- (4) With the magneto spanner loosen the nut which secures the inner-contact screw (see Fig. 45) and then adjust this screw by means of its hexagon head until the correct gap is obtained between the fixed (outer) and adjustable (inner) contacts.
- (5) Retighten the contact screw lock-nut and again check the gap. If correct, replace the contact-breaker cover.

From the foregoing it will be observed that checking the contact-breaker gap does not necessitate complete removal of the contact-breaker from the magneto. The same applies where cleaning is concerned.

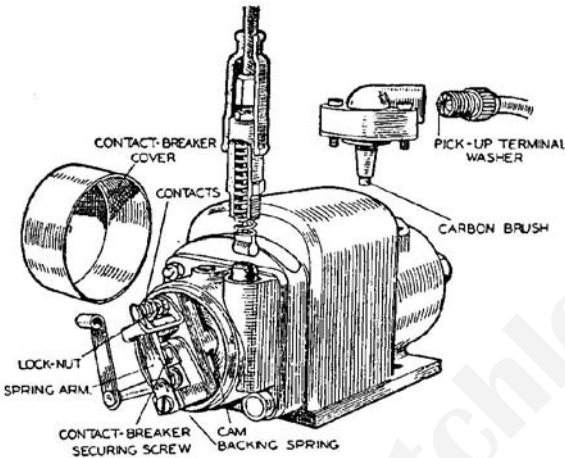


FIG. 45. SHOWING DETAILS OF LUCAS ROTATING ARMATURE TYPE MAGNETO (1945-53)
 In Fig. 39 is shown a view of the contact-breaker dismantled.

To Check Contact-breaker Gap (1954-7 Models). On 1954 500 c.c. and all 1955 and subsequent models it is advisable after the first 500 miles to remove the moulded cover from the Lucas type S.R.-1 rotating-magnet magneto and check the gap between the contacts of the contact-breaker. It is subsequently sufficient to check the gap at intervals of about 2,500 miles. Actual adjustment is seldom needed. The correct contact-breaker gap is the same as for the rotating-armature type magneto, namely 0.010 in.-0.012 in.

The correct procedure for checking the contact-breaker gap is as described for the magneto on 1945-53 models, described in sub-paragraph (1) to (3) on page 75. Should an adjustment of the contact-breaker gap be necessary, slacken the two securing screws (see Fig. 46) holding the fixed contact plate and move the plate as required until the gap is correct. Having made the required adjustment, firmly tighten the two securing-screws, again check the gap, and finally replace the moulded cover. Tighten its three fixing-screws firmly.

Cleaning the Contact-breaker. The contact-breaker, especially the contacts themselves, must never be permitted to get dirty or oily, otherwise ignition trouble will inevitably ensue, and the contacts will become burned and pitted. When checking the gap of the contact-breaker, always inspect the contacts closely and, if they need cleaning, do this before finally adjusting the gap.

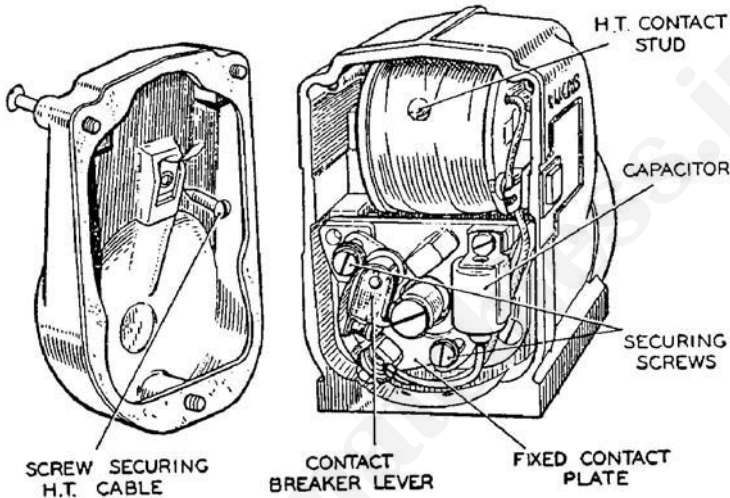


FIG. 46. CONTACT-BREAKER END OF LUCAS ROTATING-MAGNET MAGNETO (1954 ONWARDS)

This magneto (not fitted to 1954 350 c.c. models) has automatic ignition-control mechanism on the driving side.

If the contacts have a grey, frosted appearance, it can be reasonably assumed that they are fairly healthy. Should they be only slightly discoloured, clean both contacts with a cloth moistened with petrol. Where the contacts are pitted or blackened, they must be thoroughly cleaned with a fine carborundum stone or, if one is not available, very fine emery-cloth. Afterwards all metallic dust and dirt must be completely removed with a petrol-moistened cloth.

When cleaning and dressing the contacts, it is essential to, remove the minimum amount of contact metal necessary to ensure: (a) brightness of the contacts, (b) parallelism of the contacts, (c) perfect smoothness and truth of contact faces.

To ensure this, remove the spring arm, or contact-breaker lever (see Figs. 45 and 46) carrying the moving contact, by withdrawing (1945-53) the fixing screw and spring washer, or (1954 onwards) the nut securing the end of the contact-breaker spring. When replacing the spring arm on the rotating-armature magneto (1945-53), be sure to fit the small backing spring (see Fig. 45) correctly. The curved portion must face outwards. Remove any rust from the spring.

To Renew Ignition-Control Cable (1945-53). As may be seen in Fig. 45 slackness in the cable for advancing and retarding the spark can be rectified by means of the cable stop after pushing the rubber protector upwards and slackening the lock-nut. If, however, the cable frays, breaks or stretches unduly, it is necessary to renew the cable in the following manner.

Do not attempt to remove the cam itself from its housing. Remove the cable casing at the magneto by unscrewing the hexagon nut at its base. Draw fully upwards the control cable and the attached plunger. This will cause the nipple into which the cable-end is soldered to rise above the top of the boss on the cam-cage housing. Slip the nipple sideways out of the hole in the plunger and completely detach the cable. Now thread the new cable through the casing and solder the nipple on to its end. Then slip the nipple sideways into the hole in the plunger and screw the casing home. Finally, make the necessary adjustment by means of the cable stop.

Cleaning the Slip-ring (1945-53 Models). Misfiring and some difficult starting are sometimes caused by moisture, oil, or dirt collecting on the slip-ring. About every 2,5W-3,000 miles remove the h.t. pick-up (see Fig. 45) from the magneto and thoroughly clean the track and flanges of the slip-ring. The best way of doing this is to cover a pencil with a soft cloth and press this against the slip ring while slowly rotating the engine.

The h.t. Pick-up (1945-53 Models). When cleaning the magneto slipring, also wipe the pick-up moulding and polish it with a fine, dry, cloth. Inspect the moulding for cracks and examine the carbon brush (see Fig. 45) and spring, but be careful not to stretch the spring. If the carbon brush is badly worn, renew it. Before replacing the h.t. pick-up on the magneto, see that the carbon brush moves freely in its holder and beds down properly on the slip-ring. Good electrical contact is important.

To Renew h.t. Cable (1945-53 Models). Always use 7 mm. rubber covered ignition cable. Referring to Fig. 45, bare the end of the cable for about 1/4 in. and thread the cable through the moulded terminal. Pass the wire through the bronze washer and then bend back the cable strands as illustrated. Finally, screw the moulded terminal into the magneto pick-up.

To Renew h.t. Cable (1954 Onwards). Where a Lucas rotating-magnet type SR-1 magneto is fitted, 7 mm. rubber-covered ignition cable is also required for renewal purposes. To connect to the magneto, first remove the moulded cover from the contact-breaker side, and unscrew the pointed screw (see Fig. 46) from the back of the cover. Pull out the old ignition cable and push the new cable right home. Then secure the cable by tightening the pointed screw. Its point will penetrate the insulation and ensure good electrical contact with the core of the cable.

Testing the h.t. Cable. If the engine is running well, obviously the cable is sound but, if the engine refuses to start, it is desirable to ascertain whether the h.t. current is reaching the plug end of the cable. Place the the steel blade of a wooden-handled screwdriver in contact with the plug terminal and almost in contact with one of the cylinder fins. Kick the engine over smartly and note whether a "fat" spark occurs. If it does, the cable is sound, - but if it does not the cable or magneto is at fault.

To Re-tension Magneto Chain (1945-56 Models). About every 3,000 miles remove the cover from the magneto chain-case and inspect the chain for tension. Some stretching occurs, especially on a new chain, and where this is excessive it may spoil the exact ignition-timing and accelerate wear of the chain and sprockets. Press the magneto chain-run up and down (in its tautest position) midway between the magneto and camshaft sprockets. If the tension is correct, the total deflection should not exceed approximately 1/4 in. If it is appreciably more or less, re-tension the chain as described below. Over-tensioning may damage the magneto.

- (1) Loosen the nuts on both bolts (nut on rear bolt only, 1954-7) which support and secure the adjustable magneto-platform.
- (2) Insert the blade of a screwdriver beneath the front (rear, 1954 onwards) end of the magneto platform and rise it upwards until the correct chain tension is obtained.
- (3) Tighten firmly both nuts on the magneto-platform securing bolts. On 1954 and later models tighten the single nut on the rear bolt.
- (4) Again check the tension of the driving chain.
- (5) Grease the chain if necessary (see page 58) and fit the cover to the chain-case. Do not use jointing compound. Tighten the various cover securing-screws evenly.

Automatic Ignition-control Mechanism. The control mechanism on the driving side of the Lucas type SR-1 rotating magnet magneto (1954 onwards) requires no adjustment, but the mechanism should be greased (see page 59) when greasing the magneto chain.

The Correct Magneto-timing. Incorrect magneto-timing can have a most detrimental effect on the engine, besides reducing its performance. A late timing will result in a "woolly" engine and a hot and noisy exhaust, with considerable overheating and inability to develop full power. An early timing, on the other hand, may result in the engine being powerful on the larger throttle openings, but it will have a nasty tendency to kickback when being started and it will "knock" readily under slight provocation. Worst of all, the engine will be subjected to some fuel detonation and stresses for which it is not designed.

Never attempt to improve on the maker's timing, which is such that the contact-breaker contacts begin to open with the piston $\frac{7}{16}$ in. before T.D.C. ($\frac{1}{2}$ in. 1949-57) on the compression stroke. Sometimes it is necessary for some reason to remove the magneto or its driving chain. Where this is done, the magneto must be retimed. For this purpose it is desirable to have available the following two items -

- (a) A stout screwdriver, or an old-type tyre lever with the end turned up.
- (b) A small rod or stout wheel spoke about $5 \frac{1}{2}$ in. long.

1. Timing the Magneto-Preliminaries. Remove the covers from (a) the contact-breaker, (b) the off-side of the rocker-box, and (c) the magneto chain-case. Also remove the plug. Check that the gap at the contactbreaker is correct (0.010 in.-0.012 in.) as described on pages 75 and 76. It is also advisable to check that the magneto chain is correctly tensioned. The contact-breaker gap must be correct, as this affects the timing appreciably.

Loosen by several turns the nut which secures the magneto-driving sprocket to the camshaft, but do not take the nut right off. Then, with the stout screwdriver or the tyre lever referred to above, placed behind the sprocket, lever the latter off the taper on the camshaft. Rotate the engine forwards slowly until the piston is at true T.D.C. with both valves closed, as described below.

2. Finding the Exact Piston Position. Slip the $5 \frac{1}{2}$ in. length of rod through the hole for the sparking plug. Rotate the engine forwards slowly until it is felt that the piston is exactly at the top of its stroke. In this position no movement is imparted to the rod. Without moving the piston, mark the rod flush with the top face of the sparking-plug hole. Remove the rod and scratch another mark $\frac{7}{16}$ in. ($\frac{1}{2}$ in., 1949-57) above the first. Again insert the rod through the sparking-plug hole and slowly turn the engine backwards by means of the rear wheel (with top gear engaged) until the upper of the two marks on the rod is flush with the top of the sparking-plug hole. $\frac{7}{16}$ in. and $\frac{1}{2}$ in. equal 36 deg. and 39 deg. respectively before T.D.C.

3. **Timing the Contact "Break."** With the piston still at 7/16 in. or 1/2 in. before T.D.C., advance the ignition-control lever (all 1945-53, and 1954 350 c.c. models with manual control) on the handlebars fully by pushing it outwards to its maximum extent. Where automatic ignition-control is provided (on 1954 500 c.c. and all 1955 and later models) turn (with the finger and thumb) to the maximum extent possible the front plate of the automatic ignition-control mechanism. This is its fully advanced position. Lock the control in this position by inserting a small wooden wedge. Without moving the piston, rotate the sprocket secured to the magneto armature-shaft (and the driving chain) anti-clockwise, viewed from the driving side, until the contacts of the contact-breaker are just beginning to open.

To determine the exact moment of the "break," insert a thin cellophane slip between the contacts and exert a gentle pull on the paper when the magneto sprocket is being slowly turned.

When the exact position of the "break" has been found, secure the sprocket to the camshaft, being most careful not to permit the camshaft and/or armature to move while tightening the camshaft nut.

Finally check over the magneto timing again, verify the chain tension, grease the chain (see page 58) if necessary, and replace the covers for the contact-breaker, rocker-box and magneto chain-case. Before replacing the magneto chain-case cover do not forget to remove the wooden wedge previously used to lock the automatic ignition-control mechanism in the fully advanced position. Fit the sparking plug and you should be "all set."

DIAGNOSING IGNITION FAULTS

Diagnosis is facilitated by noting the behaviour of the engine just before its failure, the onset of which may be gradual or sudden, and partial or complete. A complete failure is generally easier to diagnose than a partial one, because there must be something radically wrong. When checking the ignition system, use the following sequence-

- (1) Test the h.t. lead at the sparking-plug end.
- (2) If a "fat" spark occurs at the plug end of the lead, test the plug itself.
- (3) If a weak spark, or no spark, occurs at the plug, inspect the sparking plug carefully.
- (4) Where the plug appears to be all right, examine the magneto contact-breaker (see pages 75-7).
- (5) Should the contact-breaker be clean and correctly adjusted, remove the h.t. pick-up from the magneto and inspect the pick-up, carbon brush, and slip-ring (See page 78).
- (6) If the cause of the trouble still eludes you, check the timing of the magneto (see page 80).
- (7) In the event of the magneto timing being dead right, reconsider the possibility

of a carburation defect or the more remote possibility of a faulty magneto condenser, insulation, or loss of magnetism. Also take into account the mechanical condition of the engine. It is assumed that you have checked and if necessary adjusted the tappet clearances.

TAPPET ADJUSTMENT

Check and, if necessary, rectify the tappet adjustment every 3,000 miles. It is generally necessary to adjust both tappets after every 5,000 miles. The adjustment must always be checked after decarbonizing the engine and grinding-in the valves. The need for tappet adjustment more frequently than about once every 5,000 miles is generally due to some fault which should be investigated. It is of vital importance to keep the adjustment correct to prevent damage to the valves and to maintain high engine performance.

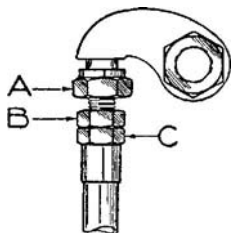


FIG. 47. TAPPET ADJUSTMENT ON 350 c.c. 500 c.c. O.H.V. ENGINES (see also Fig. 48)

The Clearance. On 350 c.c. 500 c.c. models the correct tappet clearance is nil with both valves closed and the engine cold (warm, not hot, on all 1953-7 models). A clearance of nil implies that the push-rods are free to rotate without any appreciable up-and-down play.

Detach the cover from the off-side of the rocker-box after removing the three retaining nuts and fibre washers. This exposes the inlet and exhaust tappet adjustment. As may be seen in Figs. 47 and 48, each push-rod has an adjustable head A secured by a lock-nut B to the push-rod sleeve C*

1. **Compression Plate Omitted (1949 onwards).** Turn the engine (350c.c. or 500 c.c.) over slowly until the piston is at T.D.C. on the compression stroke, with both valves closed. See that the exhaust-valve lifter is not preventing the exhaust valve from seating fully. Then check the tappet clearance for both tappets (see above). Referring to Fig. 47, if an adjustment of either or both tappets is required, hold the push-rod sleeve C with one spanner, and with another loosen the lock-nut B. Then screw the adjustable head A up or down until a tappet clearance of nil is obtained.

Afterwards tighten the lock-nut (B) (without moving head (A) and again check the clearance.

* Note that a new sleeve cannot be fitted to an existing light-alloy push-rod, the sleeve and the rod being simultaneously threaded (internally) for the adjustable head, during manufacture.

2. **Compression Plate Fitted.** On 1945-8 500 c.c. engines having a compression plate, to adjust the tappet clearance, first rotate the engine until the exhaust valve lifts off its seat. Referring to Fig. 47, first slacken the lock-nut (B) on the exhaust push-rod (C). Next rotate the engine until the inlet valve is lifted off its seat. Loosen the lock-nut (B) on the inlet pushrod (C). Now screw the adjustable head (A) of the exhaust push-rod up or down as required to obtain a clearance of nil. Further rotate the engine until the exhaust valve is lifted off its seat. Now tighten the lock-nut (B) on the exhaust push-rod. Afterwards screw up or down as required the adjustable head (A) on the inlet push-rod (C) until tappet clearance is nil. Again rotate the engine until the inlet valve is raised, and tighten the lock nut on the inlet push-rod.

3. **After Tappet Adjustment.** Turn the engine over until both valves are closed. Check that the push-rods are free to rotate without appreciable up-and-down movement. Fit the cover to the off-side of the rocker-box and replace the three retaining nuts. Make sure that the three fibre washers are also replaced beneath the nuts. When tightening the nuts avoid using excessive pressure on the spanner. Such pressure is quite unnecessary, because a rubber fillet is incorporated at the rocker-box cover joint. Moderate pressure with the spanner will suffice to prevent oil leakage. Tighten the three nuts evenly.

DECARBONIZING AND VALVE GRINDING

The exact time at which the removal of carbon deposits becomes necessary depends to some extent on (a) quality of the fuel used and (b) the driving conditions. Under normal circumstances it is advisable to remove the cylinder head, decarbonize and, if necessary, grind-in the valves when the performance declines. If the engine develops a tendency to "knock" when accelerating quickly or hill-climbing, this confirms that the time for decarbonizing is due.

Do not remove the cylinder barrel unless you have good reason to inspect the piston and rings, and perhaps the bore of the cylinder. Remove the barrel, however, if any stiffness of the piston occurs, or if loss of compression (not caused by bad valve seating) develops. Decarbonizing and grinding-in the valves is quite simple if you follow the correct procedure (Sections 1-23).

1. **Remove Petrol Tank.** It is necessary to remove the petrol tank before detaching the rocker-box and cylinder head prior to decarbonizing, also when undertaking any major engine overhaul work. To remove the tank, turn both petrol

taps to the "Off" position. Disconnect the petrol pipe from both taps, using two spanners (hold the taps when unscrewing the union nuts or cap nuts (1955-7).

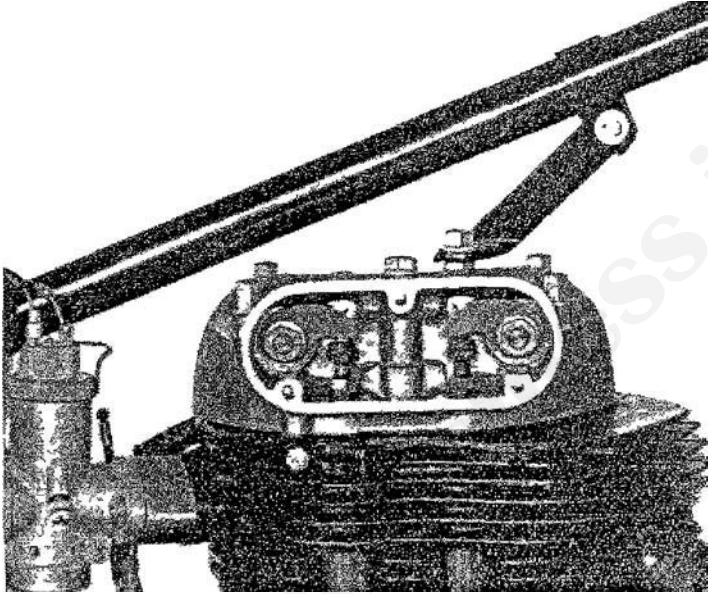


FIG. 48. PREPARING FOR ROCKER-BOX REMOVAL

The petrol tank, the oil-feed pipe to the rocker-box, and the rocker box cover have been removed. The next operation is to remove the engine-steady bracket connecting the rocker-box to the frame top-tube, and then remove the rocker-box securing bolts.

Then sever the locking wires securing the four tank-fixing bolts (see Figs. 53-55). Now unscrew the four fixing bolts and ease the tank clear of the frame.

NOTE: The makers advise removal of the dualseat on 1954 "springer" models before attempting to remove the petrol tank. On 1953 "springer" models they recommend removing the handlebars (secured by three Allen screws) and resting the bars on the handlebar In- forward of the steering head adjuster-nut.

2. **Remove Rocker-box (1945-57).** After tank removal, the next step towards cylinder-head removal is to take off the rocker-box and push-rods. First remove the three nuts retaining the cover to the off-side of the rockerbox. Also remove the three fibre washers beneath the nuts. Then take off the rocker-box end-cover as shown

in Fig. 48. Disconnect the upper union of the oil-feed pipe from the pump to the rocker-box. Now rotate the engine slowly until both inlet and exhaust valves are closed. On 1945-53 500 c.c. and all later engines, detach the engine-steady bracket (see Fig. 48) between the rocker-box and frame top-tube. To do this, remove the nuts and washers from the rocker-box bolt extensions and also the bolt from the frame clip.

With a spanner, remove the seven bolts (nine, 1949-57) securing the rocker-box to the cylinder head. Disconnect the exhaust valve-lifter cable. Grip the rocker-box, tilt up its right-hand side and withdraw both pushrods. These should not be interchanged, and for this reason should be marked or placed so that they can subsequently be identified. Now carefully lift the rocker-box clear of the cylinder head. On 1945-8 engines raise the front end of the rocker-box, so as to clear the exhaust-valve assembly, and swing it round anti-clockwise to clear the frame tube. The rocker-box may now be lifted clear of the inlet-valve assembly and removed from the engine. Be careful not to lose the hardened-steel caps on the ends of the valve stems (1945-8 engines). These caps are most important.

3. Remove Cylinder Head. Having removed the fuel tank and rockerbox as previously described, unscrew the sparking plug.* Then proceed to remove, or partially remove, the exhaust system. Before this can be done (1945-6 350 c.c. engines) remove the right-hand side of the footrest rod. Remove the nut and washer on the right-hand side of the footrest rod and partially withdraw the footrest rod from the left-hand side. Now prise off the right-hand side footrest-arm.

To remove the exhaust system, first remove the nuts and washers which secure the exhaust pipe and silencer to their stays. Then pull the exhaust pipe and silencer away from the stays, and pull the pipe downwards from the port in the cylinder head. Remove the Amal carburettor by unscrewing the venturi air-intake (1945-8 models) and the two nuts securing the carburettor flange to the cylinder head. The carburettor may be allowed to rest on the saddle or on the platform above the dynamo as shown in Fig. 51; it is not necessary to remove the throttle and air slides from the carburettor.

Next remove the four bolts which retain the cylinder head to the cylinder barrel. If these are stiff, brush paraffin round their heads and allow to penetrate before again using the spanner. Lift the cylinder head from the cylinder barrel and simultaneously remove the push-rod cover tubes which come away with the cylinder head.

* Should the sparking plug be difficult to unscrew, do not apply excessive force with the box spanner. Brush some paraffin round the plug body and allow to soak prior to further use of the spanner.

4. **To Remove Cylinder Barrel.** Rotate the engine so that the piston is near B.D.C. Next remove the four nuts which secure the cylinder barrel to the crankcase, and then gently draw the barrel off the piston. Steady the latter with one hand as the barrel is withdrawn, and take great care not to allow the piston to fall sharply against the connecting rod. After removing the cylinder barrel, cover the mouth of the crankcase with a clean rag.

5. **Piston Removal.** To remove the fully-floating gudgeon-pin, it is only necessary to extract one circlip with the snipe-nosed pliers provided in the tool kit. Push the gudgeon-pin out from the opposite side and remove the piston. The gudgeon-pin is an easy sliding fit in the piston bosses and the small-end bush. If the piston is not of the split-skirt type, scratch an "F" on the inside to indicate which is the front.

Condition of Piston. A piston will run well for very many thousands of miles; but eventually loss of compression and/or piston slap occurs due to wear of the piston, rings, and cylinder bore, especially the last-mentioned. Examine the cylinder bore occasionally for longitudinal scores and circumferential ridges. Also inspect the piston for blackening of the skirt, scores, smearing, and other possible damage, particularly near the ring lands. The normal front to rear clearance for standard size 1953 and later pistons (new) is 0.001 in. plus or minus 0.0005 in.

Cylinder Rebore. After a very considerable mileage (when wear at the top of the bore reaches 0.008 in.) it is usually essential to have a rebore and fit an oversize piston and rings to restore the compression and performance of the engine to normal. The makers provide for rebore 0.020 in. and 0.040 oversize, and can supply 0.020 in. and 0.040 in. oversize pistons and rings to suit. Running-in is, of course, necessary after a rebore.

6. **Removing Piston Rings.** The piston rings should not be disturbed more frequently than once every alternate decarbonizing, provided that engine compression remains good. The rings can be removed by "peeling off" with a small knife, but it is preferable to remove them with the aid of three strips of thin sheet-metal (about 1/4 in. wide) inserted beneath each ring as shown in Fig. 49. The rings, being made of cast iron, cannot safely be sprung out wider than the piston-crown diameter. If the rings are stuck with carbon, apply some paraffin. If this fails, use a proprietary ring removal tool.

7. **Examining Piston Rings.** Inspect the two compression rings and the scraper ring very carefully. To ensure good engine compression the piston rings must have good springiness, be free, but not slack in their grooves, have a polished surface all round, and have their gaps equally spaced and of the correct size.

If inspection reveals that the ring surfaces are bright all round, they are obviously making good circumferential contact with the cylinder bore and can be regarded as serviceable. If, on the other hand, the surfaces are discoloured or scorched at some points, contact is poor and it is desirable to reject the rings and fit new ones. The same applies where the rings are vertically slack in their grooves.

Clean the rings thoroughly on their inside faces, also the ends of the rings, and the slots in the scraper ring (see Fig. 49). Piston rings are made to very precise dimensions, and it is not generally practicable to fit oversize rings unless the piston is renewed also. Always fit genuine A.J.S. rings which are dimensionally correct. To reduce cylinder-bore wear, a chromium-plated top compression ring is fitted to 1953 and later engines.

8. Piston Ring Dimensions. The widths of the compression rings and the slotted scraper-ring on all engines are 1/16 in. and 1/8 in. respectively. The normal ring gap is 0.006 in. to 0.008 in. and rings should be renewed when the gap exceeds 0.030 in. The normal clearance of each ring in its groove is 0.003 in. (0.002 in. on 1950-7 engines).

After a considerable mileage, or if loss of compression occurs with the valves in good condition, check the gap of each piston ring. The best method of checking the gap is to push the ring squarely into the bore of the cylinder barrel with the aid of the piston and

then check the gap between the ends of the ring with a feeler gauge. If the gap proves excessive, fit new A.J.S. rings (already "gapped"); if the gap is insufficient, remove some metal from one end of the ring to increase the gap to 0.006 in.

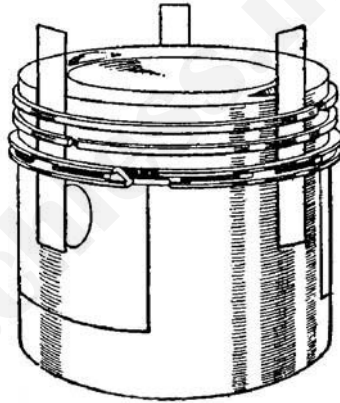


FIG.49. THE SAFEST METHOD OF REMOVING AND FITTING PISTON RINGS.

9. To Remove Valves (1945-8). A valve-spring compressor is not essential. Lay the removed cylinder head on the bench or table and rest each valve head in turn on a small wooden block. Then compress the duplex valve-springs by exerting pressure on the outer collar until the split collet can be removed from the valve stem. It may be necessary to tap each collar sharply to free the split collet, as the latter is a taper fit in the collar. On the 500 c.c. engine the inlet and exhaust valves are of identical size, unlike those on the 350 c.c. engine, but valves must not be interchanged.

To Remove Valves (1949-51). Hairpin springs are fitted to all 1949 and later 350 c.c. and 500 c.c. O.H.V. single-cylinder engines, and to remove the valves it is necessary to use the special A.J.S. valve-spring compressor illustrated in Fig. 50. This tool is not included in the tool kit, but is obtainable for a small sum from an A.J.S. dealer or the manufacturers.

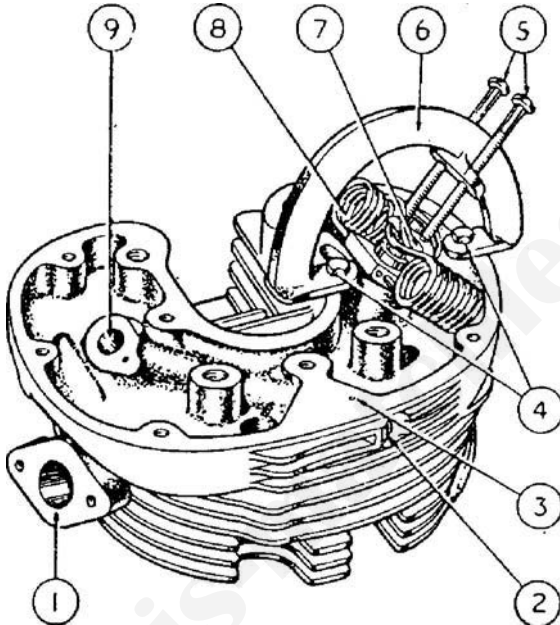


FIG. 50. VALVE-SPRING COMPRESSOR (PART No. 014605) FOR ENGINES WITH HAIRSPRING VALVE-SPRINGS (1949-51)

KEY TO FIG. 50

- | | |
|---|-------------------------------|
| 1. Inlet port. | 5. Long (operating) bolts. |
| 2. Hole for screw controlling oil feed to the Inlet-valve stem. | 6. Compressor body. |
| 3. Oil duct from rocker-box to valve guide. | 7. Valve-spring collar. |
| 4. Compressor-attachment bolts (Part No. 010795). | 8. Hairpin valve-springs. |
| | 9. Hole for inlet-valve guide |

After removing the cylinder head (see page 85) attach the flat ends of the A.J.S. valve spring compressor to the cylinder head by means of the two short attachment bolts as shown in Fig. 50. Then compress the hairpin valve-springs provided for each valve by screwing in evenly the two long bolts of the compressor. The countersunk depressions on the valve spring top-cap engage the reduced-diameter ends of the two long bolts.

When the hairpin valve springs are sufficiently compressed, withdraw the split collet from the valve stem which has no detachable valve-stem end cap. Then withdraw the valve from the combustion chamber. When the valve has been withdrawn, remove the valve-spring compressor from the cylinder head by slackening each of the two long bolts evenly and gradually until these two bolts are clear of the valve-spring top cap. Afterwards remove the complete hairpin valve-spring assembly. Deal with each valve and spring assembly in the manner described above. Remember that the valves are not interchangeable. It is advisable to put each valve assembly into separate boxes after dismantling to avoid any possibility of error when reassembling.

To Remove Valves (1952 Onwards). On all 1952 and later engines a modified and improved hairpin valve-spring assembly renders it unnecessary to employ a valve-spring compressor to remove the valves, though a compressor (see Fig. 52) is needed for replacing them. To remove each hairpin valve-spring, insert a finger in the spring coil and pull the coil sharply upward. You can then take off the valve-spring collar and split collet, and withdraw the valve. If the tapered split collet is stuck, deliver a sharp tap on the collar to free it.

Note that the modified seat for the valve-spring has a raised impression on its under side; this registers with a hole drilled in the valve-guide boss to ensure proper location. Note also that, as hitherto, the valves are not interchangeable and must be identified for correct replacement (see notes on page 91).

10. Removing Carbon Deposits. The best tool to use for scraping off the carbon deposits is an old (blunted) screwdriver, or a proprietary scraper (obtainable from most accessory dealers). For cleaning piston-ring grooves a suitable scraper can be made up by fitting a handle to a piece of broken piston-ring, or better still a proprietary tool can be obtained for the purpose. It is worth while decarbonizing thoroughly, as carbon deposits form less rapidly on smooth surfaces. Where deposits are found to be very hard, the application of paraffin will facilitate their removal.

If the cylinder barrel has not been removed, scrape off all carbon from the piston crown, but on no account use any abrasive. Should this get between the piston and cylinder (as it probably would) your A.J.S. would rapidly go into a decline! Be very careful not to make any deep scratch marks on the comparatively soft surface of the light-alloy piston. Scrape off all carbon from the inside of the combustion chamber. Do not forget to chip off and completely remove all carbon from the valve ports,* the vicinity of the valves, the valve heads and the sparking-plug hole. It is permissible to use some fine emery-cloth to polish up the combustion chamber surface, but if this is done the cylinder head must afterwards be very thoroughly cleaned and all trace of abrasive particles removed. Use a rag damped with paraffin. Do not touch the cylinder bore.

* If close inspection reveals any roughness of the metal surfaces inside the inlet or exhaust port, it is beneficial to smooth out such irregularities with a curved rifler.

If the cylinder barrel and piston have been removed, it may be advisable to scrape carbon off the inside of the piston but, unless the deposits are thick, this should not be done. Remove all carbon from the piston crown, but do not touch the skirt. Any attempt to scrape the piston skirt may have disastrous results. The piston-ring grooves, however, need attention. Clean these up thoroughly, but be very careful not to damage the actual metal comprising the sides of the grooves. Make sure that the holes in the groove for the scraper ring (see Fig. 49) are unobstructed.

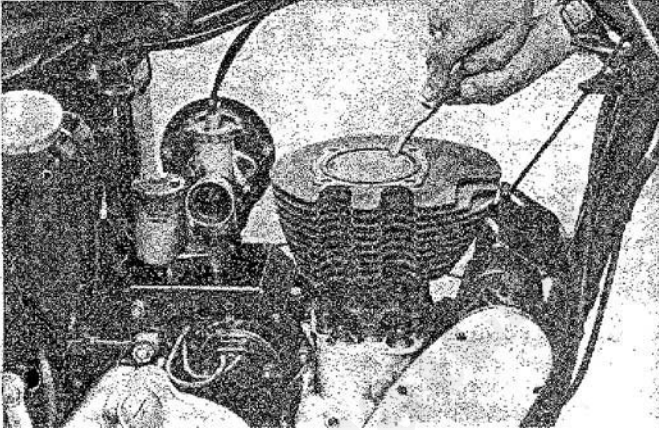


FIG. 51. SCRAPING THE CARBON OFF THE PISTON WITH A BLUNT SCREWDRIVER

The piston should first be positioned at T.D.C. When chipping off the carbon, hold the screwdriver in the manner shown. Note the carburettor laid beside the electric born for convenience.

The cleaning of piston rings is referred to on page 87. After decarbonizing is complete, clean all parts thoroughly with suitable clean rags and paraffin.

11. Grinding-in the Valves. Although the engine manufacturers recommend that the valves be inspected every time the engine is decarbonized, it should be understood that excessive valve grinding is not advisable as this is liable to cause the valves to become "pocketed," with a resultant loss of engine efficiency. If the valves are seating perfectly, leave them alone; otherwise grind in both valves.

After removing the valves for grinding-in, clean both valve heads thoroughly and polish the valve stems with some worn fine emery-cloth, using an up-and-down motion with the emery-cloth held between the forefinger and thumb. Then proceed to grind-in each valve as described below, using a good grinding paste such as Richford's (tins contain two grades, coarse and fine).

To grind-in a valve, first smear the bevelled face of the valve with a thin layer of grinding paste. If the valve face and seat are only slightly pitted, it should be sufficient to use a fine grade of paste only. Serious pitting may necessitate the preliminary application of a coarse grade and, if the pitting is very severe, it may be necessary to have the valve seats refaced at a garage with a cutter having a cutting angle of 45 degrees.

Insert the valve in its seat and oscillate the valve about a quarter of a turn backwards and forwards by means of a suitable valve holder. Maintain a slight pressure between the valve and its seat and lift the valve occasionally (when the abrasive ceases to bite) and turn it to a new position. Continue to grind-in the valve until a continuous matt ring is present on both the valve seat and the valve.

Generally one application of grinding paste is sufficient for the inlet valve, but the exhaust valve may require several applications to obtain good results. The part number of the A.J.S. valve holder is 11520A for 1945-50 engines, or 017482 for 1951 and all subsequent engines. The later type valve-holder (a suction-rubber type) will, however, suit the valve stems of all engines.

12. After Grinding-in. See that every trace of grinding paste is eradicated by cleaning the valves and the two seats with petrol and a clean rag. To ensure that the valve guides are free from damaging abrasive, it is advisable to draw a piece of clean rag through both guides.

13. To Check Valve Spring Length (1945-8). After much use the hardpressed valve springs may weaken under the influence of heat, and thereby spoil the quick and positive action of the valves, which is so vital to high engine efficiency. The condition of the valve springs is reflected in their free length, which should be checked very occasionally with a small rule. On 1945-7 350 c.c. and 500 c.c. O.H.V. engines, the free length of inner and outer valve springs is 1 13/16 in. and 2 1/16 in respectively.* Renew immediately any valve springs whose free length is found to be more than about 7/32 in. below the free-length dimensions quoted above.

14. To Replace Valves (1945-8). Clean the insides of both valve guides, smear some engine oil on the valve stems. Then fit the inlet and exhaust valves in their respective guides. On the 350 c.c. engine the inlet valve can immediately be recognized, as it has a head of larger diameter than the exhaust valve. On the 500 c.c. engine, however, the dimensions of both valves are identical, though the material differs. In this case, before fitting the valves, note the markings "IN" and "EX" on top of the inlet and exhaust valve stems respectively, above the grooves for the split collets.

* On 1948 engines the free length of the inner and outer valve springs is 2 in. and 2 13/64. in. respectively. 1949-57 engines have hairpin valve-springs.

Rest each valve head in turn on a small wooden block, and fit the duplex valve springs and collars. Compress the valve springs and then fit the split collet. A distance sleeve must be fitted next to the cylinder head under the lower collar for the exhaust-valve springs, but this does not apply to the inlet valve. Make quite sure that both split collets are properly located. The two grooves machined in the bore of each split collet must both register with the corresponding rings on the valve stem, otherwise damage may result. Finally replace the hardened caps on the ends of the valve stems. Under no circumstances must these caps be omitted. Failure to replace them will cause wear and possibly actual damage through fouling of the oil lug on the rocker-box by the tappet adjuster-head.

To Replace Valves (1949-51). With engines fitted with hairpin-type springs, clean both valve-guide bores with a clean rag and smear some engine oil on each valve stem. Next replace both valves in their guides. Note the remarks (see page 91) regarding their correct identification. Place some packing beneath each valve head with the cylinder head resting upright on the bench.

Replace each hairpin valve-spring assembly. See that the dowel pin on the valve-spring block (to which the prong ends of the hairpin valvesprings are attached) beds into the hole in the valve-guide boss.

If for some reason the valve springs are detached from their fixing block, it is essential to make sure that on assembly the spring with the narrow spaced prongs is entered into the block from the chamfered end.

Compress the hairpin valve-springs by fitting the A.J.S. spring compressor tool as shown in Fig. 50 and then tightening the two long bolts evenly. Now replace each split collet on the valve stem. Be sure that it is correctly located. The split collet has two grooves machined in the bore and these must register with the two rings on the valve stem. Damage will probably be caused if the split collet is fitted so that only one groove engages one valve-stem ring. Finally remove the valve-spring compressor by loosening the two long bolts and lifting it off the cylinder head.

To Replace Valves (1952 Onwards). Thoroughly clean the bores of both valve guides and smear a film of engine oil on the stems of the valves. Replace the latter in their correct guides. On 350 c.c. engines wrong replacement is impossible, but on 500 c.c. engines the inlet and exhaust valves must be identified (see page 91). Insert suitable packing beneath each valve head and place the cylinder head in its normal position on the bench. Then fit each hairpin valve-spring as described below.

Fit the valve-spring top collar and the split collet.* Then position the hairpin valve-springs and proceed to compress each spring with the special A.J.S. valve-spring compressor shown in Fig. 52.

* Make quite sure that the two machined grooves on the bore of the split collet register with the corresponding rings on the valve stem.

The standard tool kit does not include this compressor, but it can be obtained from the makers or an A.J.S. dealer. To use the compressor, apply the upper end of the valve-spring to the groove in the top cap; insert a short rod (e.g. a rocker-box securing bolt) through the holes in the compressor (and the valve-spring coils) and pull upward and outward until the ends of the spring prong can be rested on the scat. Then with the fingers, press down.

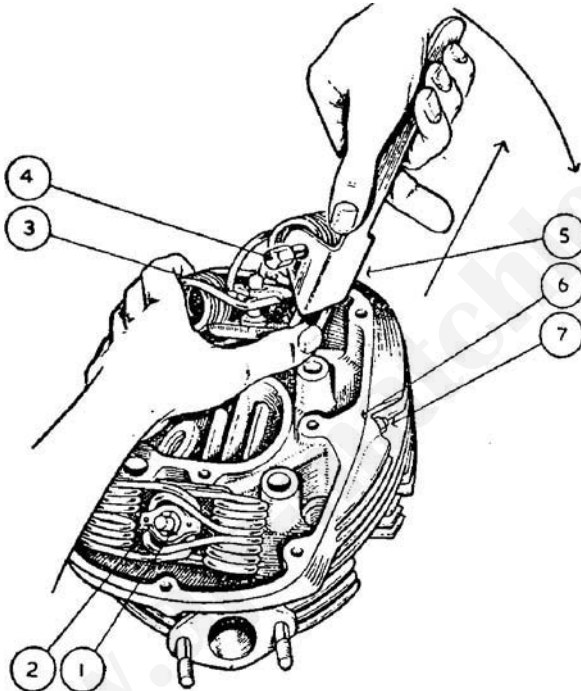


FIG. 52. VALVE-SPRING COMPRESSOR (PART No. 018276) FOR ENGINES WITH HAIRPIN VALVE-SPRINGS (1952 ONWARDS)

KEY TO FIG. 52

- | | |
|-----------------------------|--|
| 1. Split collet. | 6. Oil duct from rocker-box to inlet-valve guide. |
| 2. Valve-spring collar. | 7. Screw controlling oil feed to inlet-valve stem. |
| 3. Valve-spring collar. | |
| 4. Rocker-box bolt. | |
| 5. Valve-spring compressor. | |

Remove the rod (or rocker-box bolt) as soon as the compressor lies against the cylinder head, but maintain finger pressure until you have removed the rod (or bolt) and the compressor tool. Finally push the spring down until it locates properly. Its prong ends must lie flat on the seat.

15. Fitting Piston Rings. If these have been removed, fit them in their grooves, which should first be oiled. The safest method of fitting the piston rings is to use three strips of thin sheet-metal, as illustrated in Fig. 49. Fit the (bottom) scraper ring first, and then the two compression rings. Space the ring gaps evenly, that is, at 120 degrees to each other. It is assumed that the ring gaps are within the permissible limits (see page 87). If new rings are fitted, these are correctly "gapped" by the makers and are ready for immediate use.

On 1951-2 500 c.c. and all subsequent engines the top compression ring is chromium plated and one edge is marked Top. See that this ring is replaced accordingly. Note that after a considerable mileage the word TOP may become unreadable, but for a very considerable period the correct assembly position for the chromium-plated ring can be determined by the extra brightness of the edge which makes contact with the cylinder bore. The bright edge must be at the bottom. When eventually the ring becomes bright over its full width (indicating full contact with the bore), it is permissible to replace the top compression ring either way round.

16. Replacing Piston. It is assumed that all parts are thoroughly clean and that the piston rings have been refitted. Smear some engine oil on the gudgeon-pin and then offer up the piston to the small-end of the connectingrod. The piston must be replaced in exactly the same position as before. If it is of the split-skirt type, the split itself must face to the front of the machine. This is essential.

Next insert the gudgeon-pin from the side from which the circlip has been removed. Centralize the gudgeon-pin, and with the small snipe-nose pliers in the tool kit replace the circlip using a rotary movement to ensure that it beds snugly into its groove. Perfect fitting of the circlip is essential to prevent damage. If the Condition of the old circlip is suspect, renew the circlip immediately.

17. To Replace Cylinder Barrel. A new washer must be fitted to the cylinder base*, and its cylinder barrel side should be coated with liquid jointing-compound. Make sure that none of the compound chokes any of the oil holes and that the holes register properly. Now smear some engine oil on the piston and cylinder bore, and then turn the engine so that the piston is at or near B.D.C. Verify that the piston-ring gaps are spaced at 120 degrees and remove the rag from the mouth of the crankcase.

Ease the cylinder barrel carefully over the piston-compressing each ring as it enters the bore mouth, to enable the barrel to slide over the piston without friction. Finally replace the four cylinder-barrel retaining nuts. Tighten the four nuts, first finger-tight, and then firmly in a diagonal order, turning each nut about one-quarter of a turn at a time.

* On a 1945-8 500 c.c. engine with a compression plate, a paper washer should be fitted on each side of it.

18. Fit the Cylinder Head. Wipe the bottom face of the cylinder head and the top edge of the cylinder barrel absolutely clean. Then fit the pushrod cover tubes to the cylinder head. See that the rubber gaskets are in good condition, and fitted between the top ends of the cover tubes and cylinder head. If the push-rod cover tubes were pulled away from the cylinder head during stripping down, it would probably be found that the rubber gaskets have remained located in the cylinder head. Also check that the metal washers are interposed between the top edges of the rubber gaskets and the recesses in the cylinder head (see Section 19).

Fit the cylinder head gasket on the top edge of the cylinder barrel. If the gasket is not in perfect condition, renew it. Whether you fit a new gasket or use the old one, it is advisable to anneal it just before placing it on the cylinder barrel. To anneal the gasket, heat it to a "blood red" colour and plunge into cold clean water.

Place the two rubber glands round the inlet and exhaust tappet guides. Then replace the cylinder head on the barrel, complete with push-rod cover tubes, and fit the four cylinder head retaining bolts. Each bolt must be fitted with a plain steel-washer. Tighten each bolt a few turns and then gradually tighten all four, using a diagonal sequence to ensure an even pressure being exerted on the cylinder head.

19. Fit Correct Washers to Push-rod Cover Tube. It is essential that the correct metal washers are fitted to each push-rod cover tube. A compression plate is not fitted to 1945-8 350 c.c. and all 1949-57 engines; on these, two metal washers (not interchangeable) must be fitted to each push-rod cover tube. Fit one of these metal washers below the top rubber-gasket, and the other one above the top rubber-gasket.

A 1/8 in. thick compression plate is fitted to all 1945-8 500 c.c. engines, and on these two metal washers must also be fitted to each push-rod cover tube. Fit one metal washer (Part No. 01 1087) 3/64 in. thick below the top rubber-gasket, and a second metal washer (Part No. 014603) 1/8 in. thick above the top rubber-gasket.

Should you for any purpose desire to increase the compression ratio on a 1945-8 500 c.c. engine from 6.00 : 1 to 7.24 : 1 by removing the 1/8 in. thick compression plate, you must substitute a 3/64 in. thick washer for the 1/8 in. thick washer fitted above the top rubber-gasket on each push-rod cover tube.

20. Fit the Rocker-box (1945-8). Wipe the lower face of the box and the upper face of the cylinder head absolutely clean. Verify that the hardened-steel caps are fitted to the ends of the inlet and exhaust-valve stems. Then rotate the engine so that the piston is at or near T.D.C. on the compression stroke, with both tappets right down.

Place the special-composition washer on the cylinder-head face for the rocker-box, but before doing this inspect it carefully. Renew this washer if there is the slightest sign of damage. When fitting the composition washer make sure that its small lip is concentric with the small hole in the cylinder head through which oil is fed to the stem of the inlet valve.

Now place the rear end of the rocker-box over the inlet-valve assembly and swing it clockwise over the exhaust-valve assembly until it is in the normal position. Next raise the offside of the rocker-box slightly and insert the two push-rods down the push-rod covers, being careful not to interchange the inlet and exhaust rods. Make certain that the push-rod ends engage the tops of the flat-base tappets and the overhead rocker-arm ends.

Push the rocker-box right home and fit the seven rocker-box retaining bolts and plain steel-washers. See that the bolt having a short head is fitted in the centre, right-hand position. On the 500 c.c. engine (Model 18) be careful to replace the bolt with the threaded extension (for the engine steady-stay) in its correct position. Tighten all seven bolts lightly and then, using a diagonal sequence starting near the centre, firmly tighten them all, turning each nut a little at a time.

Connect the engine steady-stay (500 c.c. only) to the rocker-box bolt with threaded extension, and fit the washer and nut. Bolt the other end of the steady to the clip on the frame down-tube. Rotate the engine a few turns to enable all parts to bed home. Then with the appropriate spanner, check that all rocker-box retaining bolts are firmly tightened. Having done this, reconnect the exhaust-valve lifter cable, and check the tappet clearances and adjust, if necessary (see page 82).

Fit the Rocker-box (1949 Onwards). Clean the lower face of the rockerbox and the upper face of the cylinder head. Next slowly turn the engine until the piston is at T.D.C. with both tappets right down. Inspect the cylinder-head composition washer (renew if not perfect), and lay the washer on the cylinder head.

Position the rocker-box and then raise slightly the off-side of the box to permit the two long push-rods to be inserted in their original positions. Now fit the nine rocker-box securing bolts. Note that the bolt with the short head goes in the centre right-hand position, while on 1949-53 500 c.c. and all later engines the bolts having the threaded extensions go one on each side of the central short-headed bolt. Tighten in a diagonal order and evenly all nine rocker-box securing bolts.

On 1949-53 500 c.c. and all later engines fit the engine steady-stay and then rotate the engine a few times so as to be sure that the various parts bed right down. Now reconnect the exhaust-valve lifter control and check the tappet clearances (see page 82).

21. Fit Oil Pipe and Rocker-box Cover. Reconnect the oil-feed pipe from the pump to the rocker-box. Use two spanners when tightening the upper union, to prevent the union (screwed into the rocker-box) from turning.

Fit a new rubber fillet to the rocker-box side cover if examination of the fillet shows deterioration. Then fit the rocker-box side cover to the rocker-box, and replace the three fibre washers and securing nuts. Tighten these nuts evenly, but not too tightly. The provision of a rubber fillet renders excessive tightening quite unnecessary.

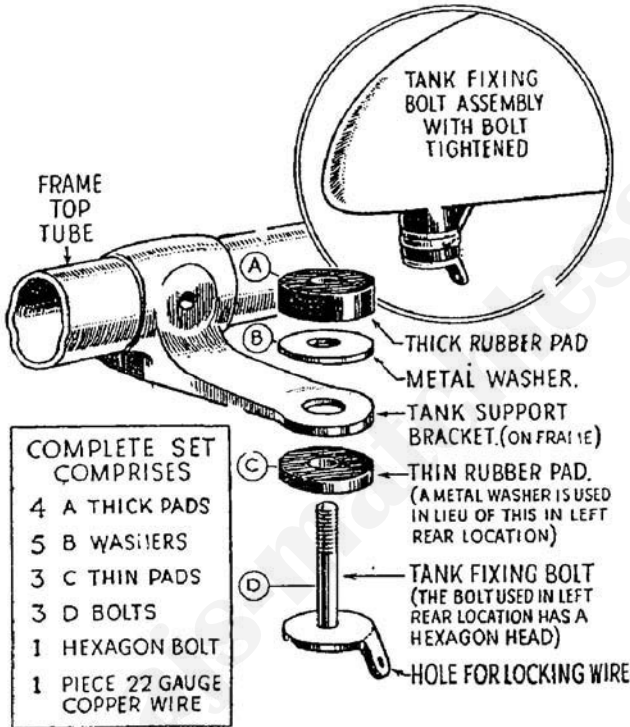


FIG. 53. PETROL-TANK MOUNTING (1945-8)

The fixing bolt at the rear of the tank on the near-side has a hexagon head, and a metal washer is used instead of a thin rubber pad.

22. Final Engine Assembly. Final reassembly, after decarbonizing, is completed by replacing the Amal carburettor, the sparking plug, exhaust system, and footrests (1945-6). When fitting the Amal carburettor, it is important to obtain an absolutely air-tight joint at the attachment flange.

Renew the washer if not perfect, also the copper washer for the sparking plug. Smear some graphite paste on the plug threads.

23. Replace Petrol Tank (1945-8). The petrol tank is secured by its four fixing-bolts and a number of rubber pads and metal washers. Details of a fixing-bolt

assembly are shown in Fig. 53, and the correct assembly order should be carefully noted.

To replace the tank, first lay a metal washer on each of the four tank support-brackets. Next place a thick rubber pad on top of each metal washer and position the fuel tank. It will be noted that one of the four fixing-bolts has a hexagon head. Fit a metal washer to this bolt and screw the latter into the rear tank-location on the

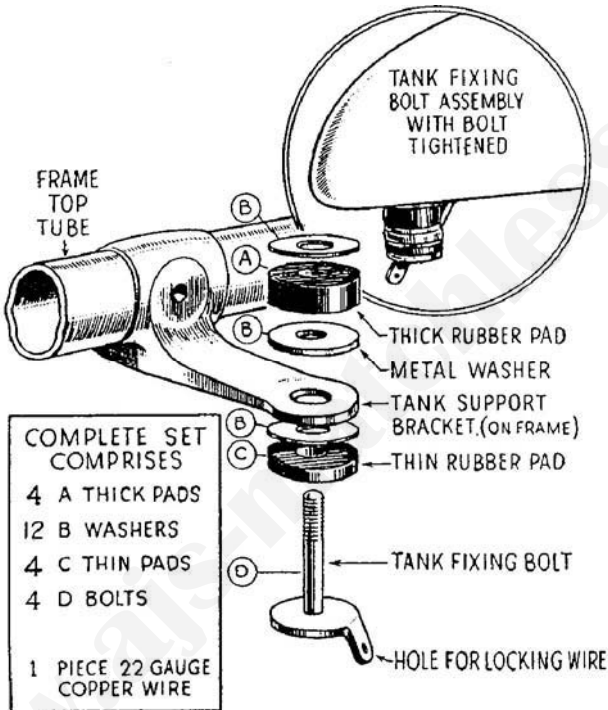


FIG. 54. PETROL-TANK MOUNTING (1949)

Note that you must fit a metal washer above and below each tank support-bracket. and also between each thick rubber-pad and the base of the tank.

left-hand side. Fit thin rubber pads over the other three fixing-bolts and fit the bolts. Having fitted all four fixing-bolts, screw the bolts home evenly until the rubber pads are slightly compressed. Do not screw the bolts right home, otherwise the tank will not be effectively insulated. Finally wire-lock the fixing bolts in pairs with 22 gauge wire, and replace the fuel pipe. When tightening the union nuts at the upper end of this pipe, hold the body of each tap with the adjustable spanner provided in the tool kit.

Replace Petrol Tank (1949). On 1949 models the arrangement of the fixing-bolt washers (see Fig. 54) is somewhat different from the arrangement employed on 1945-8 machines which is illustrated in Fig. 53. Referring to Fig. 54, to replace the

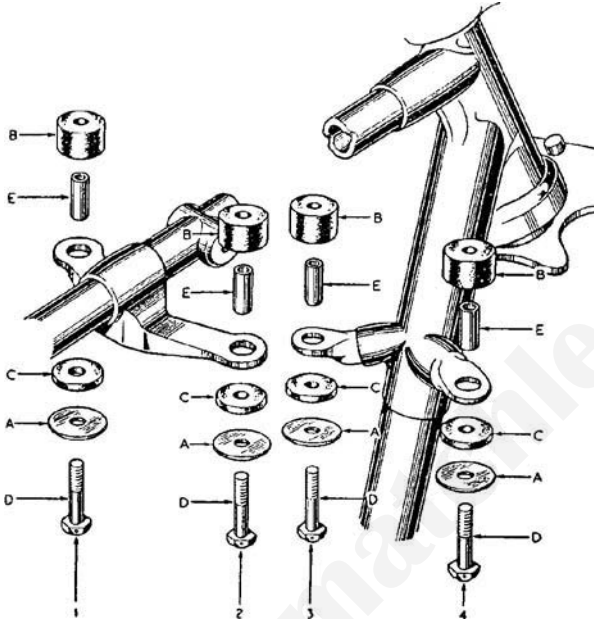


FIG. 55. PETROL-TANK MOUNTING (1950 ONWARDS)

With the arrangement shown, which includes four sleeves, the tank-fixing bolts can and must be fully tightened on assembly.

KEY TO FIG. 55

- A. Metal washer.
- B. Thick rubber-pad.
- C. Thin rubber pad.

- D. Petrol tank fixing-bolt.
- E. Metal sleeve for fixing bolt

petrol tank, use the following procedure-

- (1) Lay one of the twelve metal washers (B) on the end of each fuel tank support-bracket.
- (2) Lay one of the four thick rubber pads (A) on top of each metal washer.
- (3) Place a metal washer (B) on top of each thick rubber pad.
- (4) Carefully position the fuel tank.
- (5) Slip one of the four thin rubber pads (C) over each of the four tank-fixing bolts (D). Then slip a metal washer (B) over each bolt.
- (6) Insert all four tank-fixing bolts, complete with thin rubber pads and metal washers.

- (7) Tighten evenly all four tank-fixing bolts until the rubber pads are just slightly compressed. Do not fully tighten the bolts.
- (8) Wire-lock the four tank-fixing bolts. It is convenient to interlace them in pairs, using 22 gauge copper-wire.
- (9) Reconnect the petrol pipes, and use two spanners when tightening the union nuts.

Replace Petrol Tank (1950 Onwards). The arrangement of the tankfixing bolts and washers on 1950-7 models is shown in Fig. 55. As may be seen, an identical arrangement is provided for each of the four mounting brackets. Metal sleeves (shown at (E)) are included to enable the fixing bolts to be fully tightened without over compressing the rubber pads. To replace the petrol tank, proceed as follows-

- (1) Insert one of the four sleeves (E) in each of the four thick rubber pads (B), so that the top of the sleeve is flush with the top of the pad.
- (2) Lay the four thick rubber pads (B) on the ends of the four petroltank support-brackets, complete with sleeves (E) protruding through the bracket holes.
- (3) Correctly position the petrol tank.
- (4) Slide one of the four-metal washers (A) over each of the four tank-fixing bolts (D). Afterwards slip a thin rubber pad (C) over each tank-fixing bolt.
- (5) Insert all four tank-fixing bolts, complete with rubber pads and metal washers.
- (6) Tighten firmly the four tank-fixing bolts.
- (7) Interlace the four tank-fixing bolts in pairs, using 22 gauge copper wire.
- (8) Reconnect both petrol pipes, and with a spanner hold the taps when firmly tightening the union nuts or cap-nuts (1955 onwards).

VALVE TIMING

The valve timing used on A.J.S. engines is the result of most careful calculation, experiment and design. Foolish indeed is the motor-cyclist who imagines that he can improve on this setting, which is shown in degrees of crankshaft rotation in Figs. 56, 57.

After dismantling the timing gears it is necessary to re-time the valves, but this does not require actual checking of the timing by attaching a degree disc to the crankshaft and measuring in degrees of crankshaft rotation the exact periods when the inlet valve opens and the exhaust valve closes. To avoid the necessity for doing this, the timing gears have a line or dot system of identification which makes correct replacement of the timing gears a simple operation.

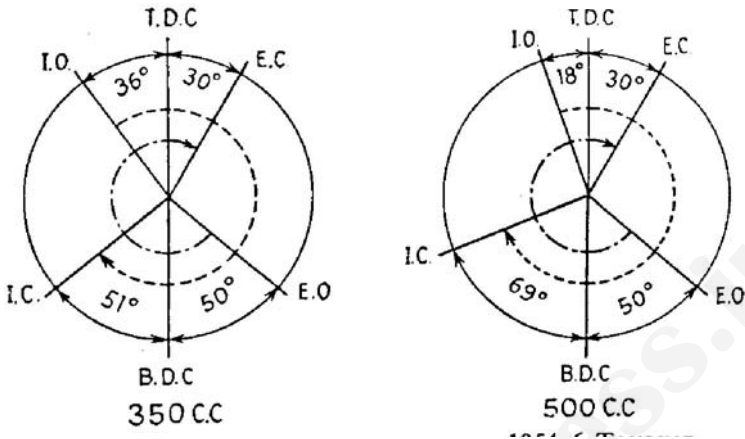
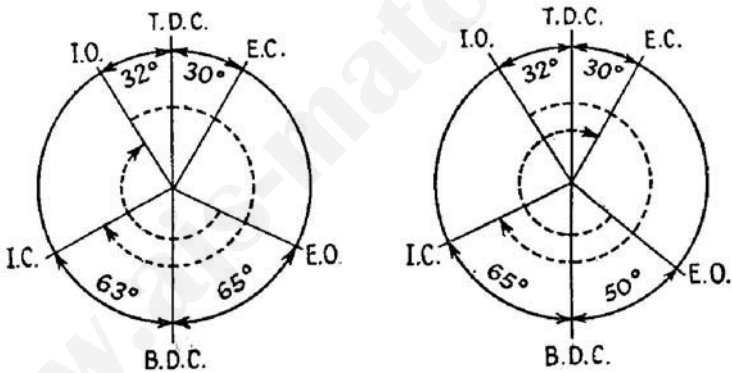


FIG. 56. VALVE TIMING DIAGRAM FOR 1954-6 TOURING-TYPE ENGINES



The above timings assume the valves to be 0.001 in. off their seats.

FIG. 57. VALVE TIMING DIAGRAMS FOR (LEFT) 1945-53, AND (RIGHT) 1957 TOURING-TYPE ENGINES

Both diagrams apply to 350 c.c. and 500 c.c. engines, and the above timings assume the valves to be 0.001 in. off their seats. When checking the valve timing on all 1945-57 engines, set both tappet clearances at 0.016 in. to ensure that the tappets are well clear of the cam quietening curves.

To Dismantle the Timing Gears. First remove the foot gear-change pedal to render accessible the timing-case. Then remove the cover from the magneto chain-case by unscrewing the six securing-screws. Also remove the rocker-box cover after removing the three fixing-nuts and fibre washers. Slacken the magneto driving-chain if it is tight.

Unscrew the nut (R.H. thread) that secures the sprocket to the magneto armature-spindle and remove this nut and the washer behind it. With a suitable tool, lever the sprocket off the spindle taper. Should the sprocket be stiff, use a suitable sprocket-drawer. Remove the magneto driving chain and withdraw the sprocket from the camshaft in the same manner employed to withdraw the other sprocket. The securing nut for this sprocket also has a R.H. thread. Next turn the engine so that both valves are closed.

With a screwdriver, remove the five screws that secure the combined magneto chain-case and timing cover to the timing-case. The timing gear is then exposed.

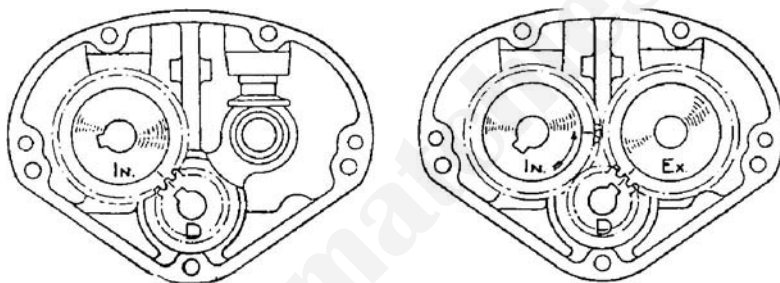


FIG. 58. HOW TO ALIGN THE TIMING GEAR MARKS (1945-9)

Fit the inlet camwheel as shown in the left-hand sketch. Then turn engine forwards, and then fit the exhaust camwheel as shown in this right-hand sketch.

Before completely removing the timing-case cover, hold the two camwheels in position in case they should come adrift when the cover is lifted clear. The two camwheels may then be removed by pulling the camshafts from their bearings.

Generally it is unnecessary to remove the small engine pinion, but if for some reason you decide to extract the pinion, you should undo the nut (L.H. thread) and with a suitable extractor pull the pinion off the crankshaft taper to which it is keyed (one key). To assemble the timing gears, use the procedure for dismantling in the reverse order.

Retiming the Valves (1945-9). To ensure that the valve timing is correct, it is necessary to use the following procedure when assembling the timing gears-

- (1) Turn the engine slowly until the line mark on the small engine pinion (shown at (D) in Fig. 58) is in line with the centre of the bush for the inlet camshaft. The bush concerned is the rear one.
 - (2) Fit the inlet camshaft so that the line mark on the camwheel registers with the line mark on the small engine pinion (D) as shown in the lefthand illustration.
 - (3) Turn the engine slowly forward until the line mark on the small engine pinion (D) is in line with the centre of the bush for the exhaust camshaft (the front bush).
 - (4) Fit the exhaust camshaft so that the line mark on the camwheel registers with the line mark on the engine pinion as shown in the right-hand illustration.
- If both camwheels are aligned in accordance with the above procedure, the valve

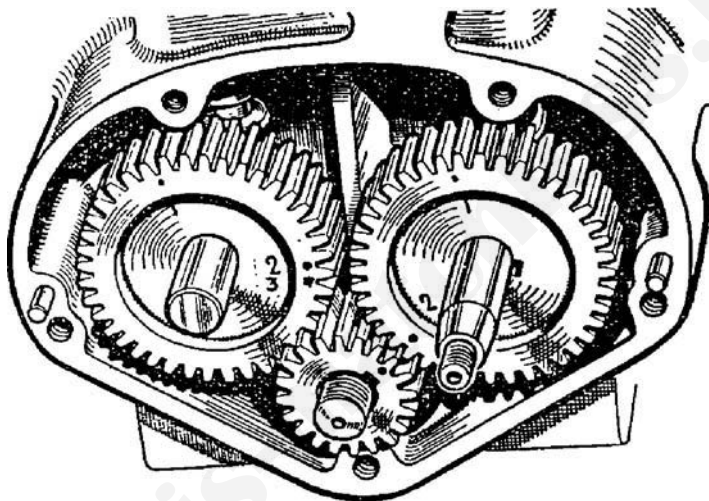


FIG. 59. THE (1950-7) TWIN CAMWHEEL TIMING GEAR WITH DOT SYSTEM OF TIMING MARKS

Note that on 1950-3 engines the inlet and exhaust camwheels each have dot marks 1 and 2. On the 1954-5 engines the inlet camwheel has an additional dot mark 3, and on 1956-7 engines both camwheels have dots marked 1, 2, 3.

timing must be correct, provided the timing-gear teeth have not become excessively worn, in which case it is time that the engine and machine are completely verhauled. It is advisable after assembling the timing gears to check that the tappet adjustment (see page 82) is correct, as this affects the valve timing to a small extent. Also check the magneto-chain tension (see page 79).

On 1950-51 Engines. The 1945-9 procedure applies, but it is important to note that each camwheel has two timing marks (dots), marked 1 and 2. Always use the No. 1 marks and disregard the No. 2 marks for timing purposes.

On 1952-3 Engines. The procedure just described also applies, and as on the 1950-51 engines each camwheel has two tinting dots marked 1 and 2.

Disregard the dots marked 1 and always use those marked 2 for aligning with the single dot on the engine pinion.

On 1954-7 Engines. For these engines also the procedure previously outlined for the 1945-9 engines applies. But note that the inlet camwheel has three timing dots marked 1, 2, 3; the exhaust camwheel (1954-5) has two dots marked 1 and 2.

On 350 c.c. touring engines align the dot marked 3 on the inlet camwheel with the single dot on the engine pinion. On 500 c.c. touring engines align the timing dot marked 2 on the inlet camwheel with the dot on the engine pinion. The dot marked 2 must also always be used for the exhaust camwheel on all 1954-5 350 c.c. and 500 c.c. engines. On the corresponding 1956-7 engines use the dot marked 1 on the exhaust camwheel.

Checking Timing by Degree Method. If for any reason you make an actual check on the valve timing by attaching a degree disc to the crankshaft, it is essential before starting to check the timing to adjust both tappet clearances to 0.016 in. with the piston at T.D.C. on the compression stroke.

A Rough Check on the Tuning (1945-53). Note from the valve timing diagram (see Fig. 57) that the inlet valve opens 32 deg. before T.D.C. and the exhaust valve closes 30 deg. after T.D.C. There are, in fact, only 2 deg. difference between the I.O. and the C.C. Accordingly a rough check on the valve timing can be made by "rocking" the engine about the T.D.C. position an equal amount either side. It should be noticed that as one valve opens the other closes, and vice versa. This does not apply to 1954 and later engines.

COMPLETE ENGINE OVERHAUL

After a very big mileage has been covered and the engine begins to show signs of wear and tear, indicated by falling off in performance and some mechanical noise, it is advisable to submit the engine to a complete overhaul. This can best be undertaken by the makers or, if you are sufficiently skilled, by yourself as far as the stripping down and removal of certain parts are concerned.

Some repair jobs must be undertaken by the makers or by skilled mechanics with good equipment. The engine should be removed from the frame, completely stripped down, and all parts inspected, and renewals or repairs effected where called for.

Important Points. During the complete overhaul and inspection, clean all parts thoroughly as they are removed. The magneto and carburettor must be closely examined. As regards the engine itself, if air leaks or poor compression exist, look for the causes.

All bearings, especially the small- and big-end bearings, must be inspected for slackness and damage, and an inspection must be made of the cylinder bore, light-alloy piston, piston rings, gudgeon-pin, valves, valve seats, valve guides, split collets, valve springs, valve collars, overhead rockers, tappets, end caps, push-rods, tappet guides, timing gears, cams, oil pump, magneto drive, pipes, tank filters, etc. To sum up, everything should be examined, including the engine controls.

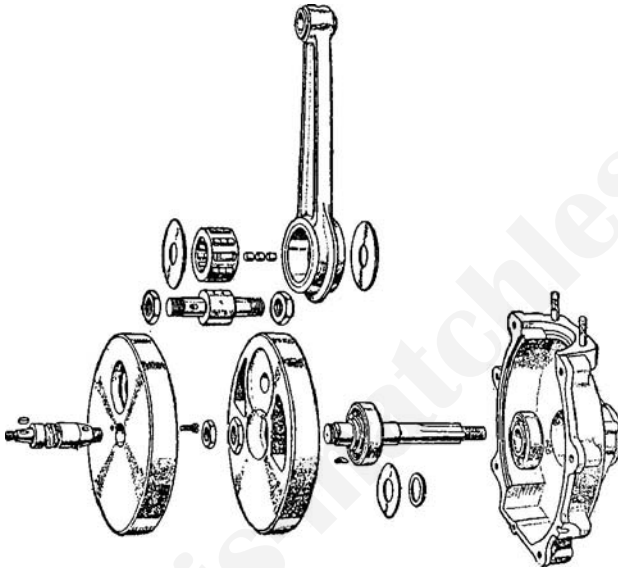


FIG. 60. THE FLYWHEEL AND CONNECTING-ROD ASSEMBLY

Splitting Crankcase. On no account forget to remove the oil pump plunger first (see page 56), otherwise damage will probably occur.

Flywheel and Connecting-rod Assembly. The overhaul of this assembly is best undertaken by A.J.S. Motor Cycles at Plumstead, unless you are a skilled mechanic and have adequate tools for the job. Aligning the flywheels is a skilled operation and necessitates a jig or a dial indicator. You can perhaps renew the small-end bush, but as the bush contracts when pressed into the connecting-rod, a reaming operation is therefore required to obtain a good fit for the gudgeon-pin. Actual repair work is very different from ordinary maintenance with which this book is concerned.

Oversize Rollers for Crankpin. Crankpin rollers 0.001 in. oversize are obtainable, but must be fitted by skilled mechanics only, as it is usually necessary to "lap" the big-end journals and liners to obtain a precision fit.

MOTOR-CYCLE MAINTENANCE

Although engine maintenance is vital, do not neglect the tyres and the lighting system, and pay due regard to the correct lubrication and adjustment of the motor-cycle parts.

Items Necessary for Maintenance. It is desirable to have the following items available: a can of paraffin, a stiff brush, a tin of summergrade engine oil, a canister of light grease (see pages 52 and 61), a tin of hydraulic fluid and a flask graduated in fluid oz. (see pages 65-6), a tyre-pressure gauge, a Lucas hydrometer and battery filler, a tyre repair outfit, and a receptacle for draining the gearbox.

For cleaning purposes the following are also needed: some jars or a pail, some non-fluffy rags, two chamois leathers, a sponge and pail (if no hose is available), some soft dusters, and a tin of wax or other polish for the enamelled parts.

Tools Required. The A.J.S. tool kit is sufficient for all routine maintenance, stripping down and assembly, but it is desirable to buy a chain-rivet extractor and a box of spare chain-links. If you are in the mood to tackle repair work as well as maintenance, consider the extra tools suggested on page 71.

The Lighting System. Keep the lights bright by attending to lamp, battery, and dynamo maintenance as described in Chapter III.

Lubrication of Motor-cycle. This is fully explained in Chapter IV. Attend to the lubrication points indicated at 5 to 17 in the Lubrication Chart on page 60.

Keeping Machine Clean. If the enamelled and chromium-plated parts are neglected, the machine will soon become shabby-looking, and serious rusting may occur. On no account leave your A.J.S. soaking wet overnight. If you have not time for thorough cleaning in wet weather, grease the machine all over before using it. When cleaning the machine, use a stiff brush and paraffin for removing filth from the lower part of the gearbox.

The Enamelled Parts. Never try to remove caked mud by attempting to brush or rub it off when dry. Instead, carefully soak it off by means of a hose. When doing this, be careful not to direct the stream of water on to vital and vulnerable components such as the carburettor, dynamo, and magneto. If no hose is available, soak off the mud with a pail of water and a sponge. After removing all mud and dirt, dry the enamelled parts with a chamois leather, and afterwards polish the surfaces with soft dusters and a proprietary wax or other polish.

Cleaning Chromium. On no account use ordinary liquid metal-polish or paste to clean any of the chromium-plated parts. Such cleaners generally contain oleic acid which attacks the chromium. It is permissible, however, to clean the surfaces occasionally with some special chromium-cleaning compound. To remove tarnish (salt deposits), it is advisable to clean the surfaces regularly with a damp chamois leather and afterwards polish them with a soft duster.

To Reduce Tarnishing in Winter. It is a good plan to apply with a soft cloth to all chromium-plated surfaces one or other of the preparations on the market that help to render chromium-plate impervious to moisture - and so reduce tarnishing.

A.J.S. Motor Cycles recommend using "Tekall," a product of 20th Century Finishes, Ltd., of 175-177 Kirkgate, Wakefield. This effective preparation is obtainable in ½ pt. and 1 pt. tins at most garages. A soft rag soaked in "Tekall" should be wiped over the chromium-plated parts. This will leave an almost invisible film which is impervious to moisture.

Nuts and Bolts. Occasionally (say, once a month) check over all external nuts and bolts for tightness (see page 72). Pay special attention to all drain plugs, the nuts securing the exhaust system, all control-lever clip bolts, the wheel-spindle nuts, the nuts at the base of the fork sliders, the brakecam spindle nuts, the footrest-hanger nuts, the nuts or screws (1955 onwards) securing the handlebars, the mudguard-securing nuts, the batterystrap securing bolt (pre-1946), and the small screw securing the headlamp front (1949 onwards). Also keep a watchful eye on the rear chain springlink, and the caps for the tyre-inflation valves.

Tyre Inflation Pressures. Even the best quality rubber is not entirely impervious to air leakage, and tyre-inflation pressures slowly but surely decline in spite of the fact that the tyres and valves are in perfect condition. Therefore check the inflation pressures of both tyres weekly, not by "thumbing" the covers or kicking them, but by using a suitable pressure gauge such as the Dunlop pencil-type No. 6, the Schrader No. 7750, the Romac, or the Holdtite. By maintaining the inflation pressures correct, tyre deflection is reduced to the minimum, and maximum comfort, tyre life ' and freedom from skidding are assured. Avoid fierce braking and excessive acceleration. Also keep oil off the treads, and maintain the wheels in true alignment.

Correct Pressures. If you ride solo and are of normal weight, you should maintain the inflation pressures of the front and rear tyres at 18 lb. per sq. in. and 22 lb. per sq in., respectively. If you are not of normal weight, carry heavy equipment,

MINIMUM TYRE INFLATION PRESSURES
(Showing load per tyre and recommended pressure
in lb. per sq. in.)

| Load | Pressure | Load | Pressure |
|---------|----------|---------|----------|
| 200 lb. | 16 lb. | 350 lb. | 24 lb. |
| 240 lb. | 18 lb. | 400 lb. | 28 lb. |
| 280 lb. | 20 lb. | 440 lb. | 32 lb. |

or a pillion passenger, it is necessary to adjust the inflation pressures accordingly. Above are tabulated the correct minimum inflation pressures for specified loads per tyre.

The most satisfactory method of determining the correct inflation pressures required is to ride or take the machine to the nearest weighbridge and check individually the fully-laden weight on the front and rear tyres. Then consult the above table for the front and rear correct minimum inflation-pressures. A suitable weighbridge is to be found at most large railway stations and other transport depots. The rider and pillion rider (if carried) must, of course, be seated.

Wheel Alignment (Solo). To check the alignment on a solo A.J.S., a straight-edge or a plain board (with one edge planed perfectly straight and square) about 5 ft. long is required. Alternatively use a taut piece of string tied to an anchorage post.

Jack up the A.J.S. on its stand, with the front and rear wheels parallel to each other. Then check the wheel alignment by holding the straightedge, board, or string in contact with both tyres (about 4 in. above the ground and parallel with it). It should contact the front and rear of each tyre if the wheels are correctly aligned. This applies, of course, only to models having identical-section front and rear tyres. Where a front tyre of smaller section is fitted, check that the gaps between the straight-edge (or string) and the tyre sides are equal, front and rear. If the wheels are out of alignment, rectify matters by means of the adjusters screwed into the rear-fork ends (see page 119). Always check the wheel alignment (except on 1949-54 spring-frame models) after adjusting the secondary chain (see pages 119-21) or altering the position of the rear wheel.

Wheel Alignment (Sidecar). Two plain boards about 5 ft. long are required. Each board must have one true edge. In addition, a third board of similar type, but about 4 ft. long, is needed.

Before checking the wheel alignment of a sidecar outfit, place the outfit on a smooth floor, preferably a concrete surface. Referring to Fig. 61, to check that all three wheels of the A.J.S. are running in track, place one of the long boards alongside the front and rear tyres of the motor-cycle and verify that the board contacts the front and rear of each tyre, as when checking alignment on a solo

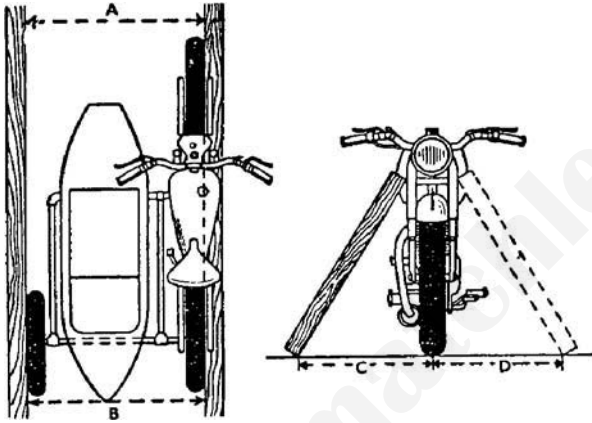


FIG. 61. CHECKING WHEEL ALIGNMENT ON A SIDECAR OUTFIT
if alignment is correct, dimension A is about $\frac{3}{8}$ in. less than dimension B and dimension D nearly equals dimension C.

machine. Move the handlebars until the best contact is obtained.

Without disturbing the board placed alongside the motor-cycle tyres place the second longboard so that its true edge contacts the sidecar tyre, as illustrated in Fig. 61. Then, with a steel measuring-tape ' check dimensions (A) and (B), with the tape as close to the tyres as practicable. To obtain the best results, dimension (A) should be about $\frac{3}{4}$ in. less than dimension (B). If the motor-cycle and sidecar wheels are dead parallel, there is a tendency for the sidecar outfit to pull towards the left.

Having checked the three wheels for alignment, verify that the motorcycle itself is quite vertical Referring to Fig. 61, take the 4 ft. board and rest it at a given point against the upper part of the "Teledraulic" front forks. Mark the floor where the edge of the board touches it. Then rest the board on the opposite side of the forks with its upper end in exactly the corresponding position and again mark the floor where the lower edge of the board touches. With the steel measuring-tape, check dimensions (C) and (D). If the machine is truly vertical, these two dimensions are

quite equal. If you have good binocular vision you should be able to verify when the machine is vertical by visual inspection, but it is safer to make a dimensional check. Most riders prefer the motor-cycle leaning slightly outwards. Follow exactly the sidecar maker's advice.

The sidecar chassis fittings on a new A.J.S. outfit sometimes take a permanent "set", causing the motor-cycle to lean slightly towards the sidecar. This must be rectified by adjusting the attachment arms.

Tyre Treads. It is a good plan occasionally to jack-up both wheels and carefully inspect the tyre treads for small stones or flints which should be removed.

BRAKES

Three Brake Adjustments. On A.J.S. models it is easy to keep the brakes highly efficient, because three types of adjustment are provided. It is possible to

- (1) Adjust the position of the rear-brake pedal to suit individual requirements.
- (2) Make a minor hand-adjustment of both brakes.
- (3) Effect a major adjustment of both brakes by means of the brake shoes.

To Adjust Brake Pedal Position (1945-55). If the existing position of the rear-brake pedal on your A.J.S. does not suit you it is possible to vary the pedal position within narrow limits (see Fig. 62) by means of the adjuster bolt (4) screwed into the heel of the pedal and secured by the lock-nut (5).

If it is desired to raise somewhat the rear-brake pedal (1), unscrew the adjuster bolt (4) after first loosening the lock-nut (5). The best adjustment for normal purposes is to set the adjuster bolt so that, with the foot clear of the pedal, the arm of the brake pedal just clears the underside of the footrest arm.

Altering the position of the brake pedal necessarily moves the rear-brake rod (3) and therefore makes it necessary to check and if necessary alter the adjustment of the rear brake as described on page 112.

To Adjust Brake Pedal (1956-7). On the 1956-7 models the rear-brake pedal is located by a spring-loaded sprag which is positioned between the stop on the pedal and the leg of the spring which is of the hairpin type and fitted to the inner side of the pedal boss (see Fig. 63).

To adjust the position of the brake pedal, first loosen the nut on the off-side of the pedal spindle. Then move the pedal to the best position (normally such that the pedal just clears the footrest rubber when the brake is off). Afterwards retighten securely the nut on the off-side of the spindle, and check the adjustment of the rear brake.

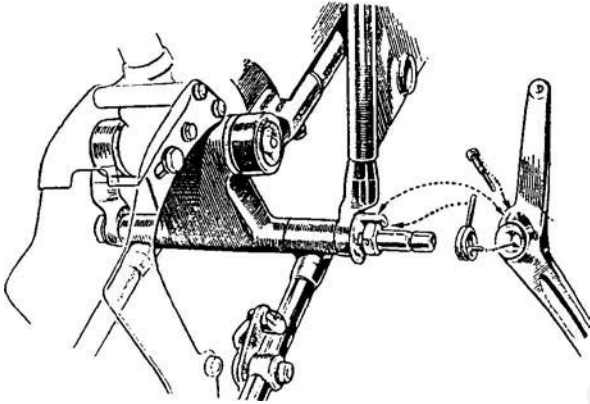
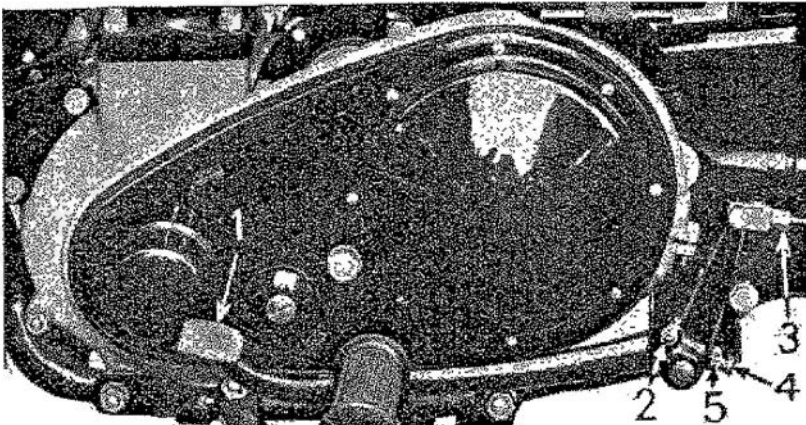


FIG. 62. ADJUSTMENT FOR REAR-BRAKE PEDAL (1945-55)
On 1945-54 models the adjuster bolt (4) on the heel of the pedal is located almost vertically. Note the detachable dorned clutch-cover fitted to 1954 and later models. See Fig. 69 for brake adjustment.

- KEY TO FIG. 62
- | | |
|-------------------------------|-------------------------|
| 1. Rear-brake pedal. | 4. Pedal adjuster-bolt. |
| 2. Grease nipple. | 5. Lock-nut for item 4. |
| 3. Rod to shoe expander-lever | |

FIG. 63. ADJUSTMENT FOR REAR-BRAKE PEDAL (1956-7)



Adjustment of Rear Brake. It is advisable to check the rear brake adjustment occasionally. Unless considerable wear of the brake-shoe linings has taken place, it is generally found that only a minor brake adjustment is called for. The adjustment is correct when the brake-shoe linings are almost in contact with the rear-brake drum when the pedal is in the "Off position.

To make a minor rear-brake adjustment, jack the A.J.S. up on its rear or centre stand. Then on 1945-55 models to eliminate "lost motion," screw the hand adjuster (2) at the rear of the brake rod (see Fig. 69) farther on to the rod until slight friction is felt between the brake linings and the brake drum when the rear wheel is spun

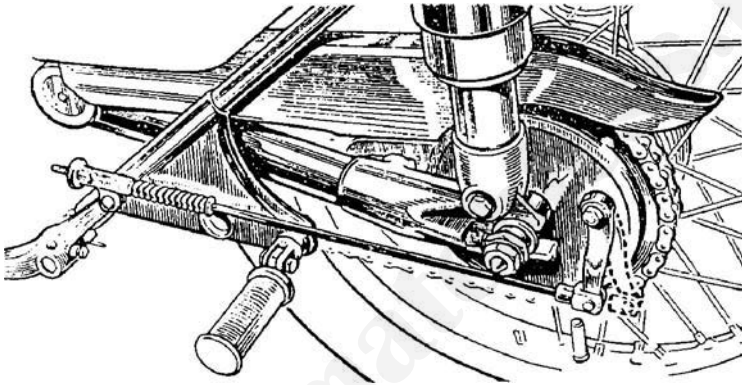


FIG. 64. REAR BRAKE ADJUSTMENT ON "SWINGING ARM" MODELS (1956 ONWARDS)
Where the brake-rod adjustment is exhausted as shown, a brake-shoe adjustment is needed.

with the gear-change lever in "neutral." Having obtained contact between the linings and drum, unscrew the self-locking adjuster nut two complete turns.

On 1956-7 "swinging arm" models the rear-brake adjustment is similar to that just described for the 1945-55 models, but on the later models the hand-type adjuster is on the front end of the brake rod (see Fig. 64). It is advisable after tightening the adjuster so that the brake linings just contact the drum, to unscrew the self-locking adjuster nut three complete turns.

Where it is not possible to adjust the rear brake by means of the hand adjustment, owing to a poor angle between the brake expander lever and rod, recourse must be had to a major adjustment (by means of the brake shoes) as described on pages 113-14.

Adjustment of Front Brake. This adjustment, like that of the rear brake, should be checked occasionally. It is satisfactory when the brake-shoe linings are nearly

in contact with the front-brake drum when the handlebar lever is not operated. Unless considerable wear of the brake linings, or of the cable control (or of both) develops, a minor hand-adjustment should be sufficient. This is effected in the following manner-

The adjustment for the front brake is provided on the near-side of the telescopic-fork assembly. First jack up the A.J.S. on both its stands. Then slacken the knurled lock-nut. Now take up "lost motion" by unscrewing the knurled cable-adjuster nut until the brake-shoe linings just contact the brake drum when the front wheel is spun by hand. Finally, screw down the knurled adjuster two complete turns and tighten the lock-nut securely.

If hand adjustment of the front brake is no longer possible owing to the poor angle between the brake expander-lever and the cable, a major adjustment must be made by means of the brake shoes.

Brake Shoe Adjustment (1945-7 Models). To rectify loss of braking efficiency which cannot be rectified by the hand-type adjuster it is necessary to effect a major adjustment of the thrust collar fitted to the tongue of each brake shoe. The adjustment is the same for the front and rear brakes, and details of the adjustable thrust-collar are shown in Fig. 65. As may be seen, each thrust collar (7) has machined slots (5), (6), (8), of different depth.

Referring to Fig. 65, to effect a major brake-adjustment it is necessary to remove each thrust collar from the tongue of its shoe and turn the collar so that the slot next less in depth engages the brake shoe (3) on replacing the shoe. Where the brake linings are badly worn, the two shallow slots (5) are suitable. If no wear of the brake linings has occurred, use the two deep slots (6). If only moderate wear of the linings is present, it is advisable to make use of the two medium-depth slots (8). It should be noted that the tongue (4) enters the centre of the thrust collar (7).

Both brake shoes belonging to the same pair must be matched and it is essential to use the same depth slot when fitting each collar to the tongue of the shoe before fitting the shoes to the front or rear brake cover-plate.

Having effected a major brake-adjustment (to offset loss of leverage or because further hand adjustment is impossible), slacken off the hand adjuster and make a minor brake-adjustment as described on page 112.

Brake Shoe Adjustment (1948-57 Models). Fig. 66 shows the improved deep-section brake shoe provided for the front and rear brakes on 1948-57 models. It will be observed that the thrust collar formerly provided has been replaced by a hardened thrust pin. This renders a major brake adjustment very simple. It is effected in the following manner.

Referring to Fig. 66, it is necessary only to remove the thrust pin (1) from the brake shoe (S) and then fit a shim washer (2) beneath the hardened thrust-pin. Eight shim washers (Part No. 000174) are contained in the tool kit of each new A.J.S. to permit of adjustment if and when necessary.

Having effected a major brake-adjustment, slacken off the hand adjuster and make a minor brake-adjustment as described on page 112. See that the adjustment is not too close. The wheel must be able to turn without any friction.

Brake Shoe Interchangeability. Although it is permissible to fit the rear brake shoes and associated parts to the front-brake cover plate, this is not desirable

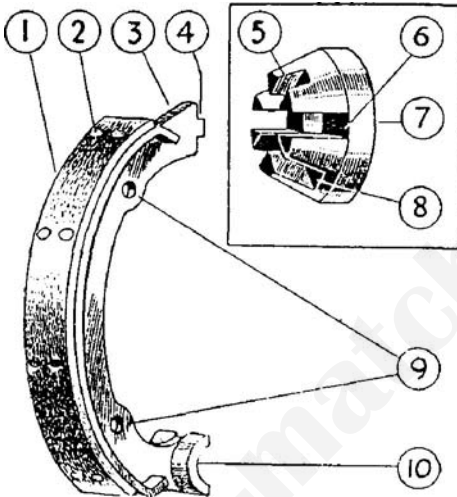


FIG. 65. SHOWING 1945-7 BRAKE SHOE WITH THRUST-COLLAR ADJUSTMENT

KEY TO FIG. 65

- | | |
|---|-----------------------------------|
| 1. Brake-shoe lining | 6. One of two deep slots. |
| 2. Rivet (8 per set) for securing lining. | 7. Adjustable thrust-collar. |
| 3. Brake shoe. | 8. One of two medium-depth slots. |
| 4. Brake-shoe tongue. | 9. Holes for shoe springs. |
| 5. One of two shallow slots. | 10. Heel of brake shoe. |

without good reason. The brake shoes on the main cover-plate are not interchangeable.

Positioning of Front-Brake Cover Plate. The front-brake cover plate is secured to the front-wheel spindle with an internal and external nut. A locating washer is fitted between the cover plate and the internal nut (1945-54 models). If the front wheel has been removed (see page 130), it is important, before replacing it in the "Teledraulic" front forks, to position the internal nut correctly.

When the locating washer is fitted adjacent to it, the locating washer outer face (1945-53 models) must stand proud of the outer edge of the brake drum to the extent of 1/16 in. A dimensional check should be made. Place a suitable straight-edge across the outer edge of the brake drum and then measure vertically the distance between the edge and the outer face of the locating washer. If the distance is less or greater than 1/16 in., adjust the internal nut accordingly.

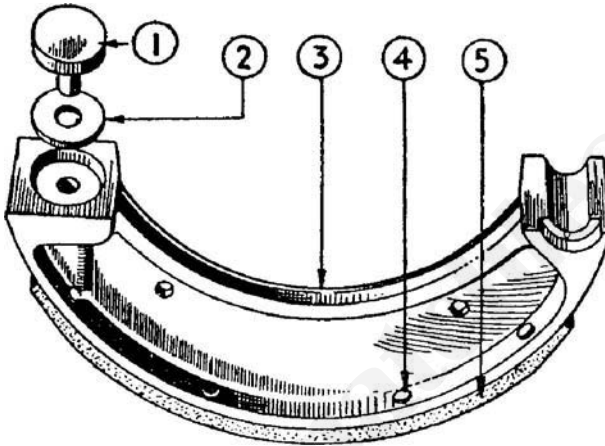


FIG. 66. SHOWING 1948-57 BRAKE SHOE WITH THRUST-PIN ADJUSTMENT

KEY TO FIG. 66

- | | |
|------------------------|---|
| 1 Hardened thrust-pin. | 4. Rivet (8 per set) for securing lining. |
| 2 Shim washer. | 5. Brake-shoe lining. |
| 3 Brake shoe. | |

On 1954-7 models position the internal nut so that, when the locating washer (1954 models) is fitted next to it, and the cover plate is applied, the outer face of the plate is flush with the edge of the wheel-hub shell.

Fit the external nut so that its hexagonal side abuts the front-brake cover-plate.

Centralizing Brake Shoes. Where a front- or rear-brake cover-plate has been removed and the shoe assembly dismantled or disturbed, it is advisable to centralize the two shoes in the brake drum during assembly. This ensures that equal pressure is exerted on the drum by both linings. Lack of centralizing is often accompanied by an irritating squeak occurring during brake application.

Centralize the brake shoes before replacing the front wheel, or, where the rear wheel is concerned, after replacing the rear wheel.

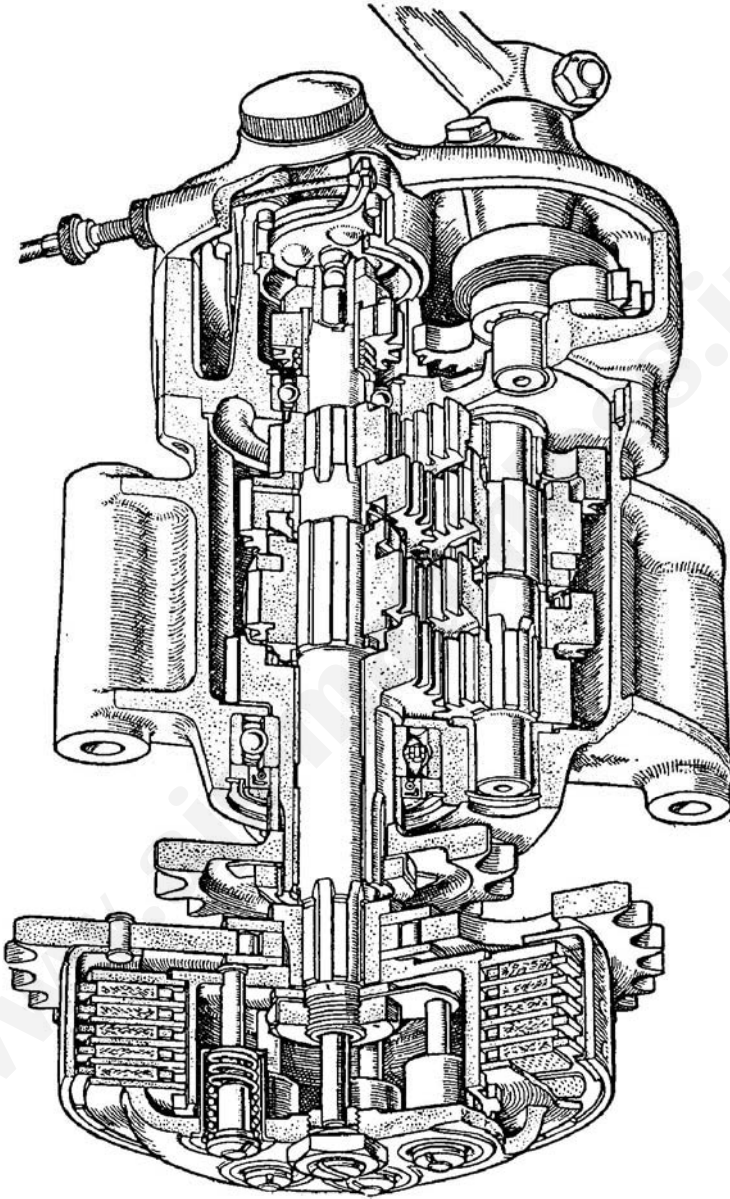


FIG. 67. SECTIONAL VIEW OF BURMAN FOUR-SPEED GEARBOX AND CLUTCH (1952-6 MODELS)
(By courtesy of "The Motor Cycle"—London)

To effect centralizing, first loosen the nut securing the brake cover-plate to the spindle of the wheel. Also (on 1953 and subsequent models) loosen slightly the nut on the fulcrum stud for the front wheel. Next increase the leverage of the shoe expander operating-lever by slipping a box spanner over the lever. Exert pressure on the spanner to expand the shoes to their full extent and simultaneously tighten the nut on the spindle so as to secure the brake cover-plate to the spindle. Also tighten (1953 onwards) the nut on the fulcrum stud for the front wheel.

The Rear-Brake Drum. Transmission harshness, and even wheel-spoke fracture, may result from slackness of the nuts and bolts securing the brake drum and integral rear-wheel sprocket to the hub of the wheel.

Removal of the rear-brake drum and sprocket is seldom necessary, but when occasion is had to remove and dismantle a rear wheel, the securing bolts and nuts should be checked for tightness. On 1945-50 models the rear-brake drum and integral sprocket are secured to the wheel hub by six bolts, nuts, and tab-washers.

On 1951-6 models five bolt, nuts, and tab-washers are fitted, but on 1955-7 machines with spring frames and quickly-detachable rear wheels, bolts and nuts are not used, the back face of the brake drum engaging five studs projecting from the hub face. It is most important that all tab-washers (where fitted) are sound and properly locked.

The Front-Brake Drum. On all 1945-7 A.J.S. machines the front-brake drum is secured to the wheel hub by means of eight countersunk screws. On 1948-53 models ten countersunk screws are provided. During the assembly of a wheel, check that these screws are done up firmly. On 1954 and later machines the brake drum of the front wheel is a shrunk-in fit in the shell of the hub. Five screws provide additional security.

THE TRANSMISSION

The Four-speed Gearbox. Apart from attending to lubrication as described on page 60 in Chapter IV, the gearbox itself needs no attention for thousands of miles.

After a very big mileage it may need stripping down and thoroughly overhauling. The gearbox is best returned to the makers or an authorized repairer for this work.

All 1945-56 A.J.S. models have a four-speed Burman gearbox and multiplate clutch. The general arrangement of the gear train, etc., is similar on the two types of Burman gearboxes used. Details of the later type (1952-6) gearbox are clearly shown in Fig. 67. On 1957 A.J.S. models a new gearbox, designed and made by Associated Motor Cycles, Ltd., is fitted. This compact unit incorporates some well-proved Norton features, and the clutch centre embodies a transmission shock-absorber of the rubber-block and vane type.

To Adjust Handlebars. The handlebars on all 1945-57 models are adjustable for angle to suit individual requirements. On 1945-7 models, loosen the two nuts which secure the handlebars to the "Teledraulic" front forks and then adjust the handlebars as required. On 1948-53 models loosen the four nuts on the studs of the box-type clamp provided at the rear of the aluminium-alloy head lug, and then adjust the bars for angle. After making the adjustment, be sure to retighten firmly the two or four securing nuts. Three securing screws are used on 1954-7 models.

Checking Tension of Primary Chain (1945-57). The tension of the primary chain (see Fig. 78) should be checked occasionally and, then if necessary, adjusted. Adjustment of the primary chain must always be effected before that of the secondary chain, as it alters the tension of the secondary chain automatically.

To check the adjustment, place the machine on the rear or the centre stand and remove the inspection cap from the oil-bath chain case (see page 62). Then with the fingers check the chain whip (total up-and-down movement) mid-way between the two sprockets, with the chain in its tightest position. The whip should be approximately 3/8 in.

Adjusting Primary Chain (1945-55). If an adjustment is needed, slacken the nut on the right-hand side of the gearbox upper fixing-bolt, and (1945-51) the nut on the right-hand side of the gearbox lower fixing-bolt. Also loosen a few (2-3) turns the front nut on the gearbox adjuster eyebolt. Then screw up the rear nut on the adjuster eye-bolt until the chain is felt to be quite taut, as checked with the fingers inserted through the inspection-cap orifice. Now loosen the rear nut on the adjuster eye-bolt and carefully tighten the front nut until the chain tension is found to be correct. Tighten the rear nut to lock the assembly. Afterwards tighten the nut on the gearbox top fixing-bolt and (1945-51) that on the gearbox bottom fixing-bolt. Replace the inspection cap on the oil-bath chain case, and check the tension of the secondary chain.

Primary Chain Adjustment (1956-7). On all 1956-7 models a snap-on cover between the rear engine-plates gives instant access to a redesigned adjustment. Referring to Fig. 68, if a primary chain adjustment is called for, first loosen the nut on bolt (5) and slacken lock-nut (3). Now screw the adjuster bolt (1) into the crosshead (2) to take up primary-chain slackness. Then pull on the secondary chain to move the Burman gearbox and tighten the primary chain until it is correctly tensioned (1/8 in. whip), as checked with the fingers through the inspection-cap hole on the oil-bath chain case. If the chain is over tightened, screw the adjuster bolt (1) out of the crosshead.

After correctly retensioning the primary chain, retighten lock-nut (3) and also the nut on bolt (5). Finally replace the inspection cap on the oil-bath chain case, replace the snap-on cover over the engine plates, and check the tension of the secondary chain.

To Adjust Secondary Chain (Rigid-frame Models). Check and, if necessary, adjust the tension of the secondary chain occasionally, but, before making a chain adjustment, attend to the primary chain as previously described. It should be noted that secondary-chain adjustment, involving sliding the rear wheel bodily in the slotted-fork-ends, generally necessitates an adjustment of the rear brake being made, and care must be taken not to upset wheel alignment. Chain adjustment is correct when the chain, in its most taut position, has a total whip of $3/8$ in. to $1/2$ in. at the centre of the bottom chain-run.

To tighten the secondary chain, first jack up the machine on the stand. Then loosen both the nuts on the rear-wheel spindle. Loosen the nearside nut first.

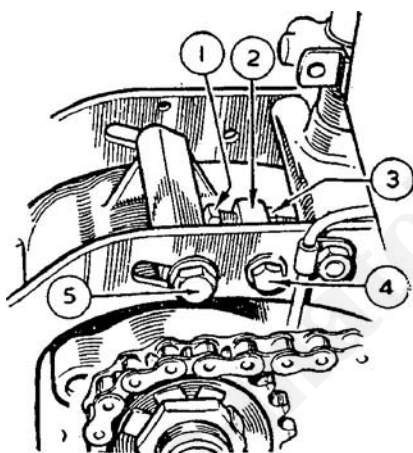


FIG. 68. PRIMARY CHAIN ADJUSTMENT ON 1956-7 MODELS

The snap-on cover has been removed to show the adjustment.

Also slacken 2-3 turns the nuts on the two chain adjuster-bolts which are screwed into the front of the fork ends. Then progressively and uniformly screw both adjuster bolts farther into the fork ends until the tension of the chain is correct. It is vitally important to screw both adjuster bolts into the fork ends exactly the same amount, otherwise wheel alignment (see page 109) will be spoiled; this will necessitate a further adjustment being made. Having obtained the correct chain tension without upsetting wheel alignment, tighten the nuts on the rear-wheel spindle and again verify the chain tension. Finally tighten the lock-nuts on the chain adjusters and ascertain whether the rear brake is in need of adjustment (see page 112).

To Adjust Secondary Chain (1949-54 Spring-frame Models). Check the secondary chain tension occasionally. If an adjustment is called for, first verify that the tension of the primary chain is correct, because an adjustment of this chain necessarily alters the tension of the secondary chain. The secondary chain is correctly tensioned when the chain, in its tightest position, has a total up-and- down movement (obtained by finger pressure) of 1 1/8 in. in the centre of the bottom chain-run.

Note that the total whip of 1/2 in. is reduced to about 1/2 in. (the normal running adjustment) when the machine is off its centre stand and you are astride the saddle.

Secondary-chain adjustment (as on rigid-frame models) entails moving the rear wheel bodily in the rear-fork ends which are open-ended and slotted. Two cams are attached to the rear-wheel spindle, and these cams (which turn together) are in contact with two projections in the slotted ends of the rear forks. The projection on the off-side fork end is set by the makers, and its position is locked by a lock-nut. This ensures the maintenance of perfect and permanent front- and rear-wheel alignment.

To re-tension the secondary chain, with the machine on its centre stand, loosen the nut to the right of the speedometer gearbox, and slacken the external nut on the near-side end of the rear-wheel spindle. Now push the rear wheel forward so that both the rear-wheel spindle cams contact the Projections on the rear fork ends. Then with an adjustable spanner applied to the hexagon body of the near-side cam (and while keeping a forward pressure of the rear wheel), turn the near-side cam until a total 1 1/8 in is obtained. Hold the rear wheel in this position, firmly retighten the external nut on the near-side end of the rear-wheel spindle. Finally retighten firmly the nut to the right of the speedometer gearbox after first making sure that the gearbox is positioned so that no stress is imposed on its driving cable.

To Adjust Secondary Chain (1955-7 Spring-frame Models). Occasionally check that the tension of the secondary chain is correct. With the machine on its centres stand there should be 1 1/8 in. total up-and-down movement at the centre of the lower chain-run, with the chain in its tightest position. As on 1949-54 spring-frame models, this whip is reduced to about 1/2 in. when the rider is seated and the wheels are resting on the ground.

Before making an adjustment of the secondary chain, always check and if necessary adjust the tension of the primary chain (see page 118). After adjusting the secondary chain always check the rear-brake adjustment (see page 112).

On 1955 and later models an adjuster screw and lock-nut (see Fig. 69) are provided on the front side of each rear fork-end. To make a secondary chain adjustment (with the machine on its centre stand), loosen the spindle-end nut (3) on the near side; slacken the adjacent lock-nut (4) for the brake cover-plate. Now loosen the lock-nut (6), on each side of the hub, and screw out the chain adjuster- screw (5) as required to tighten the chain correctly. Note that it is essential to unscrew both chain adjuster-screws the same amount, and before tightening the lock-nuts and spindle-end nut it is desirable to check the alignment of the wheels (see page 108).

Removing Secondary Chain (1955-7). On 1955 and later spring-frame models the guard for the secondary chain shrouds the chain very closely and the procedure outlined below is recommended if you wish to remove the chain without first removing the chain guard.

Position the motor-cycle on its centre stand and rotate the rear wheel until the connecting-link on the chain is close to the rear-wheel sprocket.

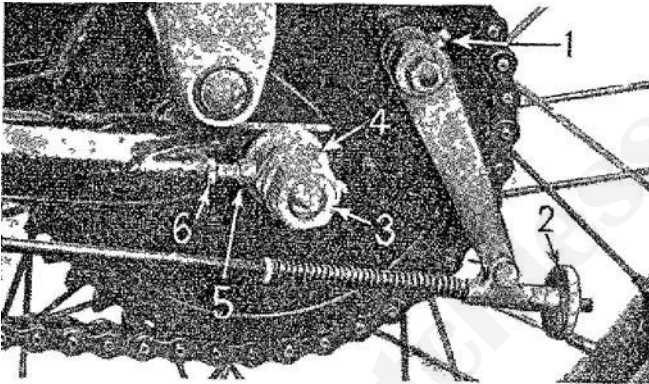


FIG. 69. REAR BRAKE ADJUSTMENT (1945-55) AND SECONDARY CHAIN ADJUSTMENT (1955-7) ON SPRING-FRAME MODELS

KEY TO FIG. 69

- | | |
|---|----------------------------------|
| 1. Grease nipple for brake expander bush. | 3. Spindle-end nut. |
| 2. Hand adjuster for rear brake (see also fig. 64). | 4. Lock-nut (brake cover-plate). |
| | 5. Chain adjuster-screw. |
| | 6. Lock-nut for screw 5. |

Remove the link. Now pass a piece of string (about 10 ft. long) through the centre hole of the end link of the top run. Draw both ends of the string together and tie them together. Keeping the string taut at the rear end with one hand, with the other hand pull the bottom run of the chain backwards. When the end of the top run of the chain leaves the gearbox sprocket the string will be left attached, one strand lying on each side of the sprocket teeth. When the chain is finally clear, cut the string on one side at a position approximately 1 ft. from where it is looped through the chain link. Pending the replacement of the secondary chain, leave the string in position.

Replacing Secondary Chain (1955-7). Push the longer cut-end of the above-mentioned string through the hole in the centre of the chain endlink and tie both the lower ends of the string together. Pull the string from the rear end, while guiding the chain up on to the gearbox sprocket teeth. Keep pulling until the chain encircles the rear-wheel sprocket. Afterwards remove the string and replace the chain connecting link. Be careful when doing this to fit the spring link correctly (see Fig. 79).

The Dynamo Chain. The tension of the chain which drives the dynamo (see Fig. 78) should be checked monthly and adjusted if necessary in accordance with the instructions given on page 39 of Chapter III. It is not necessary to remove the oil-bath chain case cover as shown in Fig. 78.

Harsh Transmission (1945-56). If harshness in the transmission develops, immediately check the level of oil in the oil-bath chain case. Provided the oil level is maintained correctly, proper lubrication of the faces of the two cams of the shock absorber (see Fig. 78) fitted to the engine shaft is ensured. Top-up the oil level, using engine oil, as required (see page 52). If harshness continues, remove the outer half of the oil-bath chain case and dismantle and lubricate the components of the shock-absorber.

The Engine Shaft Shock-absorber (1945-56). When assembling the engine shaft shock-absorber, fit the components in this order: (a) the spacing collar, which is a sliding fit on the driving-side flywheel main-shaft and lies between the bearing of this shaft and the engine sprocket; (b) the engine sprocket, which is integral with the dynamo driving-sprocket; (c) the shock absorber cam which overrides the engine sprocket cam under the influence of the engine impulses; (d) the shock-absorber spring; (e) the cap washer, which retains the shock-absorber spring; (f) the sleeve lock-nut, which must be firmly tightened against the driving-side flywheel main-shaft.

The Clutch Shock-absorber (1957 Models). The 1957 350 c.c, 500 c.c. engines do not incorporate an engine shaft shock-absorber, but instead a transmission shock absorber embodied in the clutch centre. As may be seen in Fig. 70, the clutch shock-absorber has six rubber blocks. After a very considerable mileage it may become necessary to remove and renew these.

To remove the six rubber blocks, first remove the domed clutch-cover (see Fig. 62) from the oil-bath chain case. Also remove the clutch spring pressure-plate (see Fig. 71), the springs, and the spring cups. Next remove the three securing-screws and prise off the steel cover-plate from the clutch shock-absorber compartment. Then remove the rubber blocks.

To compress the thick rubbers while extracting the thinner ones, a useful tool is a "C"-shaped spanner (engaging two slots in the clutch centre), having an extension handle welded to it. To use this tool, engage fourth gear, apply the rear brake, position the tool, and pull the handle upwards (opposite to the direction of clutch rotation). Then with a short piece of hub spoke (pointed at the end), prise out the thin rubber blocks, followed by the thicker ones. Fit new rubber blocks in the reverse order of removal. Note that, where the clutch centre is removed, it is necessary to use a tool such as a gearbox main-shaft to hold the clutch centre while extracting the rubber blocks.

Clutch Slip. This must be avoided at all costs, as it causes damage and overheating, and spoils performance. Sometimes it is due to incorrect adjustment of the clutch springs (see page 127), but generally it is due to insufficient free movement in the clutch operating-mechanism, which can be felt at the handlebar clutch-lever. A method of testing for clutch slip is to place the machine on its stand, start up the engine, engage top gear, and then apply the rear brake. It should be possible to pull up the engine, even on full throttle, without the occurrence

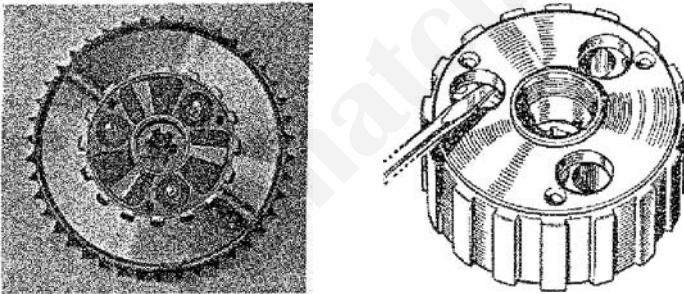


FIG. 70. SHOWING (LEFT) VIEW INSIDE THE CLUTCH SHOCK-ABSORBER COMPARTMENT AFTER REMOVING THREE SCREWS AND PRISING OFF THE STEEL COVER-PLATE AS SHOWN (RIGHT)

of clutch slip. Note that on some models excessive filling of the oil-bath chain case can cause slip.

1945-51 Burman Clutch (Minor Adjustment). If wear of the inserts is such that only a minor adjustment is called for, loosen the locking nut on the control-cable adjuster, which is screwed into the rear of the kickstarter housing. Then unscrew or screw up a few turns the cable adjuster, according to whether it is desired to decrease or increase respectively the effective length of the control cable. Decreasing the effective length of the cable does, of course, reduce the clearance (see Fig. 72) between the short steel plunger (B) and the nose of the operating lever (C). After making the required adjustment, retighten the locking nut on the cable adjuster.

1945-51 Burman Clutch (Major Adjustment). If wear of the Burman clutch inserts is such that it is impossible to obtain correct adjustment of the clutch operating-mechanism by means of the minor (cable) adjustment just described, a major adjustment is called for. This entails altering the effective position of the fulcrum pin (for the clutch-operating lever) in the kick-starter case. Referring to Fig. 72, to effect a major adjustment, first remove the two screws (H) with a suitable

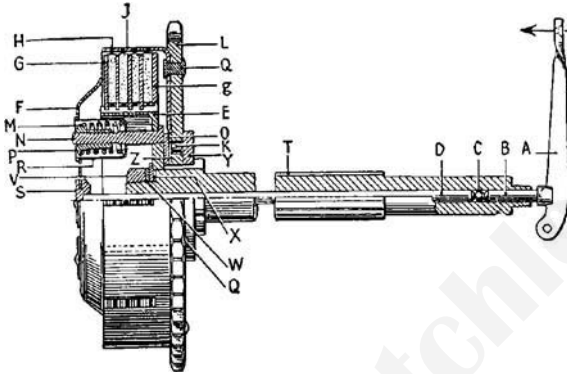


FIG. 71. DETAILS OF BURMAN MULTI-PLATE CLUTCH AND OPERATING MECHANISM (1945-51 MODELS)

KEY TO FIG. 71

- | | |
|-------------------------------------|--|
| A. Clutch operating-lever. | N. Stud for spring-adjustment nut. |
| B. Short steel-plunger. | O. Washer (thin) retaining roller-bearing. |
| C. Steel ball. | P. Spring-adjustment nut. |
| D. Long thrust-rod. | Q. Rivet. |
| F. Clutch centre. | R. Spring cup (one of four). |
| F. Spring pressure-plate. | S. Pressure-plate boss. |
| G. Steel plain-plates. | T. Gearbox mainshaft. |
| H. Friction plates (five. 500 c.c.) | V. Nut retaining clutch-centre. |
| J. Clutch case. | W. Locking plate. |
| K. Roller-bearing rollers (24). | X. Plain washer. |
| L. Clutch sprocket. | Y. Washer (thick) retaining roller-bearing |
| M. Clutch spring (four or five). | Z. Roller-bearing ring. |

screwdriver, and detach the cap (G). Then proceed to adjust the sleeve nut (F) with an open-ended spanner until there is a clearance of about 1/32 in. between the short steel-plunger (B) and the nose of the operating lever (C). To increase or decrease the clearance, turn the sleeve nut (F) clockwise or anti-clockwise respectively. Normally a sleeve nut adjustment of one or two turns suffices to obtain the correct clearance. Finally, lock the sleeve nut by replacing the cap (G) and the two securing screws (H).

1952-6 Burman Clutch Adjustment. The clutch adjustment on the Burman type B52 four-speed gearbox fitted to 1952-6 models differs from that provided on the 1945-51 models. Details of the gearbox and multiplate clutch are clearly shown in Fig. 67. With the clutch correctly adjusted there should be 1/8 in.- 3/16 in. free movement of the clutch operating cable. To check this free movement, lift the outer easing of the cable at the point where it enters the adjuster screw on the kick-starter casing cover, and see if you can move the casing freely with the fingers up-and-down the aboveamount. Also check the backlash at the handlebar lever.

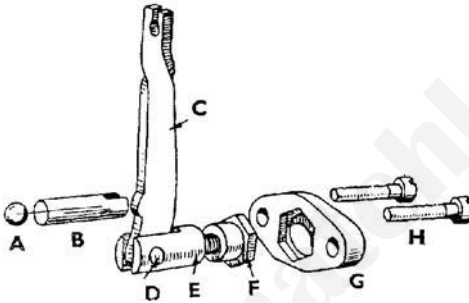


FIG. 72. CLUTCH OPERATING-LEVER ADJUSTMENT (1945-51 MODELS)

The operating-lever fork (E) slides in the kick-starter cover case, and its position is determined by the sleeve nut (F) locked by the cap (G) secured to the outside, by two screws (H).

KEY TO FIG. 72

- | | |
|------------------------|-----------------------------|
| A Steel ball. | E Fork for operating lever. |
| B Short steel-plunger. | F Sleeve nut. |
| C Operating lever. | G Cap for sleeve nut. |
| D Fulcrum pin. | H Cap securing-screws. |

Should there be excessive free movement of the clutch control-cable (resulting in clutch drag and noisy gear changing), adjust the clutch control, in the following manner. First slacken the lock-nut on the clutch cable adjuster-screw ((1), Fig. 41) and screw in the adjuster screw (by turning its hexagon) as far as possible to ensure that the internal operating-lever is in its normal position. Next remove the domed clutch-cover (see Fig. 62) which is secured by eight screws. Now with the plug-spanner, slacken the large central lock-nut, and with a screwdriver gently screw in the thrust cup to which the lock-nut is fitted, until contact with the thrust rod (inside the gearbox mainshaft) can be felt. Then unscrew the thrust cup exactly one-half turn. Afterwards firmly re-tighten the central lock-nut. When doing this be careful not to allow the thrust cup to turn.

Replace the domed clutch-cover and effect the final clutch adjustment by unscrewing the external cable adjuster-screw until the correct amount of free movement of the clutch cable-casing (see above) is obtained. Finally secure the adjuster screw by tightening the lock-nut.

If insufficient free movement of the clutch cable (caused by wear of the friction inserts) is present, clutch slip results and an immediate adjustment must be made. Slacken off the external cable-adjuster, remove the domed clutch-cover, loosen the large central lock-nut, and then unscrew the thrust cup (to which the nut is fitted) a turn or two. Afterwards screw in the thrust cup until, as previously mentioned, the cup makes contact with the thrust rod inside the gearbox mainshaft. Then unscrew the thrust cup exactly one-half turn, and re-tighten the lock-nut. Finally replace the domed clutch-cover and make a control-cable adjustment by means of the external adjuster screw and lock-nut until the required free movement of 1/8 in. - 3/16 in. is obtained.

1957 A.M.C. Clutch Adjustment. All 1957 A.J.S. models have a four-speed gearbox and multi-plate clutch made by Associated Motor Cycles, Ltd. (see page 116). Details of the clutch and the clutch operating-mechanism are shown in Fig. 73. To avoid clutch slip or drag (caused by insufficient or excessive free movement of the cable), it is essential to maintain 1/8 in. - 3/16 in. free movement of the clutch operating-cable.

To check for the correct free movement of the clutch operating-cable, lift the outer casing where it enters the adjustable cable-stop on the cover of the kick-starter casing. Total up-and-down movement should be as stated in the previous paragraph. To rectify insufficient free movement of the operating cable (caused by wear of the friction inserts causing the plates to close up), first loosen the lock-nut and slacken off the adjustable cable-stop on the cover of the kickstarter casing. Next remove the domed cover (secured by eight screws) from the oil-bath chain case (Fig. 62) and, referring to Fig. 73, with the sparking-plug spanner provided in the tool kit, loosen the lock-nut (2). Then with a screwdriver unscrew the thrust cup (3) a turn or two, and afterwards carefully screw it in until you feel it contacts the end of the long thrust-rod (1). Having done this, unscrew the thrust cup (3) exactly one-half turn, re-tighten the lock-nut (2)*, and screw home firmly the domed clutch-cover. Finally adjust the cable stop until the required free movement (1/8 in 3/16 in.) of the operating cable is obtained, and re-tighten the cable stop lock-nut. Check for backlash at the clutch lever on the handlebars.

To rectify excessive free movement of the clutch operating-cable, loosen the lock-nut on the adjustable cable-stop and, referring to Fig. 73, screw in the stop as far as possible to ensure that the operating lever (9) is in its normal position. Next remove the domed clutch-cover from the oil-bath chain case and slacken the lock-nut (2).

* See note on page 127.

With a screwdriver gently screw in the thrust cup (3) until you feel that it contacts the end of the long thrust rod (1). Then unscrew the thrust cup exactly one-half turn and finally re-tighten the lock-nut (2)*. Refit the domed clutch-cover on the oil-bath chain case, and make the final adjustment by means of the adjustable cable-stop. When this is found correct, re-tighten the cable stop lock-nut.

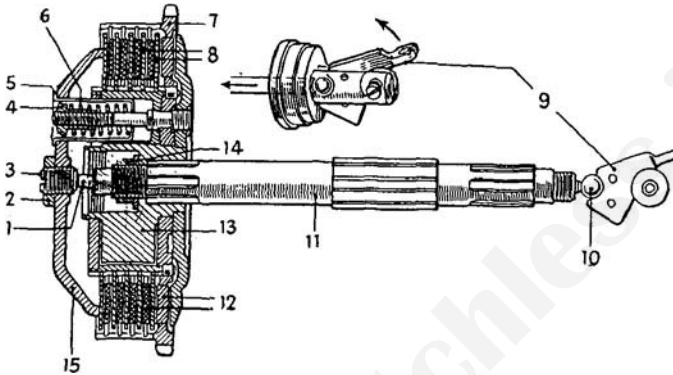


FIG. 73. DETAILS OF A.M.C. MULTI-PLATE CLUTCH AND OPERATING MECHANISM (1957 MODELS)

KEY TO FIG. 73

- | | |
|--------------------------|-----------------------------|
| 1 Long thrust-rod. | 9. Clutch operating-lever |
| 2 Lock-nut for 3. | 10. Steel ball. |
| 3 Thrust cup. | 11. Gearbox mainshaft. |
| 4 Spring adjustment-nut. | 12. Friction-insert plates. |
| 5 Clutch-spring cup. | 13. Nut securing 14. |
| 6 Clutch spring (three). | 14. Clutch centre. |
| 7 Clutch sprocket. | 15. Spring pressure-plate. |
| 8 Steel plain-plates. | |

To Adjust Clutch Springs. Clutch slip which persists in spite of the operating mechanism and control cable being in correct adjustment and condition may occur because of the clutch springs being in need of adjustment. Before you can make an adjustment it is necessary on all 1945-53 models to remove the outer half of the oil-bath chain case, as described on page 137. On 1954 and later models it is only necessary to remove the domed clutch-cover (see Fig. 62).

To make a clutch-spring adjustment, screw home half a complete turn each of the adjustment nuts (shown in Figs. 70 and 72). Then make a test (see page 123) to ascertain whether the clutch still slips.

* When re-tightening this lock-nut, be very careful not to allow the thrust cup (3) to turn.

If it does, screw home a further half turn each adjustment nut, being most careful to adjust each nut exactly the same amount. Note that the standard adjustment for spring tension (1945-56 clutches) is to tighten fully all the adjustment nuts and then slacken back each nut four complete turns. The standard adjustment on 1957 clutches is to screw home the three adjuster nuts until they are just flush with the clutch-spring cups (see Fig. 73). A very suitable tool for tightening the clutch-spring adjustment nuts is an old and broad screwdriver, slotted on the engaging edge. For 1952 and later models a slotted screwdriver is provided on one of the thin spanners in the tool kit.

Should it be necessary to tighten the spring-adjustment nuts more than one complete turn, this may render the clutch lever on the handlebars somewhat stiff to operate. Also it generally indicates that the clutch springs have weakened and/or the clutch inserts in the friction plates are excessively worn and require to be renewed. Should oil on the plates be the cause of clutch slip, soak the plates in petrol and afterwards allow to dry. Roughen glazed inserts with some sand-paper.

Clutch Cable Removal. Should complete removal of the clutch cable be necessary, first remove the oil filler-cap from the cover of the kick-starter case. Next screw fully home the clutch-cable adjuster on the back of the case (on top of the case, 1952 onwards). Now disconnect the clutch cable from the operating lever (see Figs. 71 and 73). This can be done through the oil filler-cap orifice. Then unscrew completely the clutch-cable adjuster and disconnect the cable from the handlebar lever. The cable is now free to be removed from the machine. Pull it away by the lower end and carefully ease it through the various frame attachment-clips.

To Replace Clutch Cable. Proceed in the reverse order of removal, and finally check and, if necessary, adjust the clutch operation as described on pages 123-6.

THE FRAME

The Saddle Adjustment. On pre-1949 models an adjustment is incorporated at the bottom ends of the saddle-mounting springs. It is worth experimenting with the nut adjustment until the most comfortable saddle position is obtained.

On the later rigid, spring-frame A.J.S. singles an adjustment for the saddle is provided at the rear and front. You are advised to experiment until you obtain the best adjustment to suit your own particular physique.

To make an adjustment at the rear of the saddle, alter the position of the lower spring fixing-nuts on the screwed studs to which the springs are attached. To make an adjustment at the front, remove the fuel tank and experiment with the three evenly-spaced positions for the hinge bolt. Where a dual seat is fitted there is no adjustment.

The Stands. Be careful when tightening the hinge bolt which screws into the jaw of the prop-stand leg, and is locked by a nut and split-pin. Avoid excessive tightening. And after tightening the lock-nut, check that the stand operates freely. Before replacing the hinge bolt, smear some engine oil on it.

Note that no stops are provided for the front stand, and pulling the motor-cycle backwards with the stands in use is liable to fracture the lugs on the fork sliders to which the front stand is attached. The front stand must be used only as a support. During the removal and replacement of the centre stand (spring-frame models) keep the stand horizontal so as to release the tension of the return spring. To remove the stand, take off the nut and push the centre bolt through the frame.

Where a rear stand is fitted (rigid-frame models), be careful when fitting the stand to replace a plain steel-washer beneath the head of each of the two bolts which secure the stand to the rear fork-ends.

The Steering Head Bearings (1945-57). On a new machine some initial bedding occurs during the first 100 miles running, and the adjustment of the steering head should be checked when this mileage has been completed. Subsequently it is only necessary to check the steering-head adjustment about every 3,000 miles.

The ball-bearing races of the steering head have spherical seats and are of the self-aligning type. Thus they are not designed to fit tightly in the steering-head lug.

Checking Steering Head Adjustment. Jack up the front of the machine by placing a box beneath each footrest to take all the weight off the front wheel. Then exert hand pressure upwards from the extreme ends of the handlebars. There should be no appreciable shake present and the steering head must be quite free to turn. If some shake is detected, adjust the steering head forthwith as described below.

To Adjust the Steering Head. The following is the correct procedure for adjusting the steering head. It is assumed that the front wheel is quite clear of the ground. Loosen the two pinch-screws located in the fork crown. On 1948-52 models slacken the nuts on the fork-crown studs (slacken pinch-bolts, 1945-7). Next slacken the domed lock-nut at the top of the steering column. Having slackened the lock-nut, screw down very gradually the lower adjusting nut for the steering head. This adjusting nut is located immediately below the lock-nut.

While tightening the lower adjusting nut, test for steering-head slackness by placing the fingers over the gap between the frame top-lug and the handlebar lug, while simultaneously exerting upward pressure on the front edge of the front mudguard. Tighten the adjusting nut until the steering head is free to turn without

perceptible up-and-down play. Afterwards tighten the domed lock-nut and the two pinch-screws in the fork crown (tighten stud nuts on 1948-52 models). Finally withdraw the boxes or other packing from beneath the footrests.

The "Teledraulic" Front Forks (1945-57). Apart from checking the level of the hydraulic fluid occasionally (pages 65-6) and topping-up if necessary, no attention is called for. No adjustment is necessary and all working parts are automatically lubricated by means of the hydraulic damping fluid. Unless damage has been accidentally sustained, the Teledraulic" front forks should normally not require to be dismantled. However, after a very big mileage (say 30,000 miles) the oil seals and washers may require attention.

Having regard to the negligible attention normally required in respect of the "Teledraulic" front forks, the author has not included in this handbook detailed instructions for their stripping down and subsequent assembly. Those who on rare occasions require such information should refer to the appropriate instructions given in the instruction book issued with each new A.J.S. machine, or else contact the manufacturers.

"Swinging-Arm" Rear Suspension. As regards lubrication (see page 68), no attention should normally be required, except perhaps very occasionally on 1945-56 models with A.J.S. "Teledraulic" rear-suspension units, and then only if the telescopic legs become excessively lively.

On 1957 models (with Girling rear-suspension units) in the event of the legs becoming noisy in action, grease the outside of each spring as described on page 69. The springs on the Girling units are adjustable for loading. If you are above average weight, carry a pillion passenger, or regularly negotiate rough terrain, raise the base of each spring as required by turning with a "C" spanner clockwise the cam ring provided at the base of each telescopic lower member. Three positions are obtainable, and the highest gives the maximum stiffness of springing. The application of a little thin oil to the cam ring facilitates an adjustment. Should you fit a sidecar to your machine, it is advisable to change the suspension-unit springs, as stronger springs are generally desirable.

WHEELS

Removing Front Wheel (1945 Onwards). Jack the machine up on both the stands.* Disconnect the yoke end of the front-brake cable from the brake-expander

* Never attempt to use the front stand without first supporting the machine on the rear stand (rigid-frame models) or the centre stand (spring-frame models). On 1945-50 spring-frame models (16MS, ISS) the makers advise the insertion of a wood batten (7/8 in. thick) beneath the centre stand to avoid lack of balance when applying pressure to the front wheel during removal.

lever by removing the split pin and retaining pin. Slacken (1945-7), but do not remove, the nut which secures the front brake coverplate to the left-hand fork slider. The split pin securing the nut need not be disturbed. On 1948-9 models, slacken both anchorage bolts instead. On 1950-7 models remove the bolt securing the brake anchor-stay to the brake cover-plate. Next loosen the nut on the left-hand side of the frontwheel spindle.

Remove the four nuts which clamp the fork slider caps to the "Teledraulic" fork sliders. Detach both caps and place them aside separately, so that they may later be replaced exactly as before removal. These caps must not be interchanged. Then disengage the front brake cover-plate from the anchorage stud fitted to the left-hand fork slider on 1945-7 models. Apply pressure to the front wheel so as to reduce the effective height of the wheel spindle, and withdraw the wheel towards the front.

To Replace Front Wheel (1945 Onwards). Hold the left-hand forkslider cap under the location on the front-wheel spindle, and offer lip the front wheel assembly and cap so as to engage the cap with its two retaining studs.

Simultaneously engage the slot in the front brake cover-plate with the anchorage stud in the left-hand fork slider (1945-7). On 1948-9 models engage with two anchorage bolts. On 1950-7 models bolt lightly the brake anchor-stay to the cover plate. When replacing the front wheel remember to flatten the tyre so as to get the wheel spindle between the forward studs securing the slider caps. Fit the two nuts securing the lefthand fork-slider cap (and wheel spindle) and tighten the nuts lightly. Then fit the right-hand fork-slider cap and tighten lightly the cap securing-nuts. Make sure that the caps have not been interchanged and are fitted exactly as before. Tighten lightly the nut on the left-hand side of the front-wheel spindle. Then firmly and evenly tighten the two nuts which secure the near-side fork-slider cap (and wheel spindle). Verify that the gaps, fore and aft, between the cap and the end of the fork slider are exactly equal., Ensuring that these gaps are equal is most important. Now firmly tighten the nut on the left-hand side of the front-wheel spindle, also the nuts securing the offside slider cap. Finally replace and tighten the nut on the brake anchorage stud (1945-7), and split-pin the nut. On 1948-9 models tighten firmly the two anchorage bolts (the bolt securing the anchor stay on 1950-7 models). Replace the yoke-end pin.

After Fitting Front Wheel (1945 Onwards). If any stiffness in the action of the telescopic front-forks is noticed after replacing the front wheel, slacken the nuts securing the off-side slider cap, operate the forks sharply up and down, and re-tighten the slider cap securing-nuts. This should cure the stiffness.

Removing Rear Wheel (Rigid-frame, 1945-55). Put the machine on the rear stand. Disconnect the lead for the rear lamp at the connexion Close to the rear-wheel spindle. Next unscrew the gland nut on the speedometer driving-cable.

Also detach the spring link on the secondary chain, separate the ends and allow the chain to hang clear of the rear-wheel sprocket, but engaging with the small sprocket on the gearbox mainshaft. Remove the knurled adjusting nut from the rear-brake rod. Next detach the rear portion of the rear mudguard. To do this, first remove the two nuts (bolts, 1953 onwards) which secure the rear portion to the front portion. Also loosen the nut and washer from the bolt securing the mudguard side-bridge and tool-box stay to the tubular stay. Next slacken about four turns the two nuts which secure the rear mudguard side-stays to their studs. Then remove the rear portion of the rear mudguard, complete with stays. To disengage the top fixing-bolt, it is advisable to spring the tool-box outwards (on 1945-8 models) as required.

Now slacken the nuts on both sides of the rear-wheel solid spindle and carefully remove the rear-wheel assembly from the fork ends. To enable the assembly to clear the brake cover-plate anchor bolt, tilt the wheel slightly and then withdraw to the rear.

To Replace Rear Wheel (Rigid-frame Models). Replace the rear wheel assembly, using the reverse order employed for removal. Note that it is important, before finally tightening the nuts on the ends of the wheel spindle, to position the speedometer gearbox correctly. Positioning must be such as to permit the gearbox driving-cable being properly fitted.

The replacement of the rear wheel is facilitated thus: position the wheel in the fork ends (with the brake cover-plate hanging free); then, while holding the wheel on its nearside as far forward in the fork end as is possible, swing the offside backwards; lift up the free cover-plate so that its slot engages the square-headed anchor bolt, and then swing the offside end of the spindle forward until engagement is completed.

After replacing the rear wheel, make sure that the slotted end of the brake cover-plate is correctly located on its anchoring bolt (see Fig. 74). Finally check the adjustment of the secondary chain (see page 119), the alignment of the wheels (see page 108), and the adjustment of the rear brake (see page 112).

Removing Rear Wheel (1949-54 Spring-frame Models). Jack the machine up on its centre stand, with (1949-50 models) a piece of wood 7/8 in. thick interposed between the centre stand and the ground. Disconnect the Lucas snap connector (Fig. 32) in the lead of the rear lamp. Also disconnect the rear-brake expander lever. To do this, remove the split pin and the yoke-end pin. On 1951-4 models it is only necessary to remove the adjuster nut from the rear-brake rod. Loosen the four securing-bolts on 1953-4 models and remove the detachable rear portion of the rear mudguard. On 1949-52 models raise the hinged portion of the mudguard.

Detach the spring link from the secondary chain and partially remove the chain in such a manner that it is completely off the rear-wheel sprocket, but hanging on the gearbox sprocket. Engage a gear to keep the sprocket stationary.

Unscrew the cable gland-nut and disconnect the speedometer cable from the speedometer gearbox. Loosen the nut (on the rear-wheel spindle) which positions the speedometer gearbox. Also loosen three complete turns the two exterior nuts on the rear-wheel spindle.

With an adjustable spanner applied to the hexagon on the spindle nearside cam (Fig. 75), turn the cam until the wheel is as far forward as possible when pushed

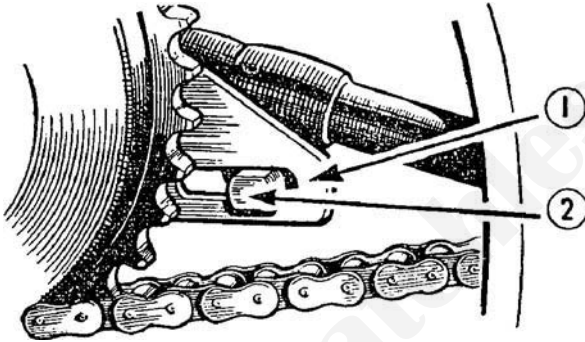


FIG. 74. SHOWING CORRECT REAR BRAKE COVER-PLATE ANCHORAGE (ALL 1945-54 MODELS)

1. Rear brake cover-plate.
2. Bolt anchoring cover-plate to frame.

to front. Press the nearside of the wheel firmly forward against the cam stop and pull the offside of the wheel backward until the brake cover-plate disengages the square-headed anchor bolt. Finally withdraw the rear wheel from the fork ends.

To Replace Rear Wheel (1949-54 Spring-frame Models). Reverse the previously described procedure for removal. Check that the speedometer drive dogs are engaged but do not tighten the nut which locates the speedometer gearbox until after you have reconnected the speedometer cable and tightened the external spindle nuts. Note that replacement of the rear wheel in the fork ends is facilitated by using the following procedure.

While allowing the brake anchor-plate to hang free, hold the wheel on its nearside as far forward as possible in the fork end, swing the offside backward, raise the free cover-plate so that its slot engages the square-headed anchor bolt, and then swing the offside end of the spindle forward until engagement is complete. Having replaced the rear wheel, check the secondary-chain adjustment (page 119), also the rear-brake adjustment (page 112). Also check that the brake cover-plate anchorage is correct (see Fig. 74).

Removing Quickly-detachable Rear Wheel (1955-7 Spring-frame Models).

First place the motor-cycle on its centre stand. Slacken the bolt located at

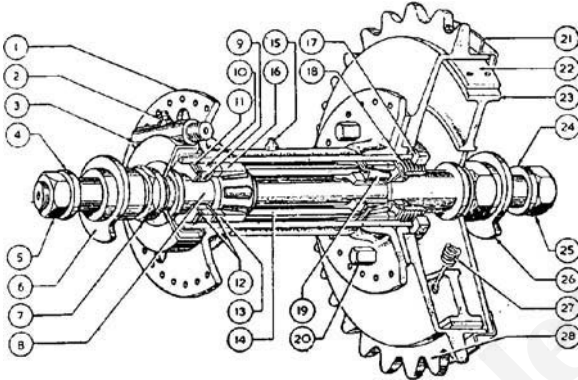


FIG. 75. DETAILS OF REAR-HUB ASSEMBLY ON 1949-54 SPRING-FRAME MODELS

KEY TO FIG. 75

- | | |
|---|---|
| 1. Offside hub-flange. | 14. Spacer between the roller bearings. |
| 2. Speedometer-gearbox grease nipple. | 15. Hub grease nipple. |
| 3. Speedometer gearbox. | 16. Roller-bearing outer race. |
| 4. Spigot bush for offside fork-end. | 17. Lock-nut (bearing adjusting ring). |
| 5. Nut on solid spindle. | 18. Bearing adjusting ring. |
| 6. Offside cam. | 19. Taper roller. |
| 7. Nut locking speedometer gearbox in position. | 20. Bolt securing brake drum and sprocket to hub. |
| 8. Spacer between speedometer Rear-box and offside bearing. | 21. Rear brake cover-plate. |
| 9. Oil seal. | 22. Brake lining. |
| 10. Collar encircling oil seal. | 23. Brake shoe. |
| 11. Circlip locating roller bearing. | 24. Spigot bush for nearside fork-end. |
| 12. Washer retaining oil seal (one each side of seal). | 25. Nut on solid spindle. |
| 13. Spacer between oil-seal inner washer and bearing. | 26. Nearside cam. |
| | 27. Brake-shoe spring. |
| | 28. Brake drum and sprocket. |

the rear on each tubular member to which the detachable rear-portion of the mudguard is attached. Also loosen the two bolts holding the two portions of the mudguard together. Disconnect the snap connector port provided in the lead to the stop-tail lamp. Now remove the detachable rear-portion of the rear mudguard.

Referring to Fig. 76, disconnect the speedometer drive by unscrewing the cable gland-nut (5) and withdrawing the end of the driving cable from the speedometer-drive gearbox (4). Next remove the nut (11) and washer (12) from the near-side of the hub spindle (7). Do not disturb the nut (10) which secures the brake cover-plate. Withdraw the hub spindle (7), by means of its short tommy,-bar,

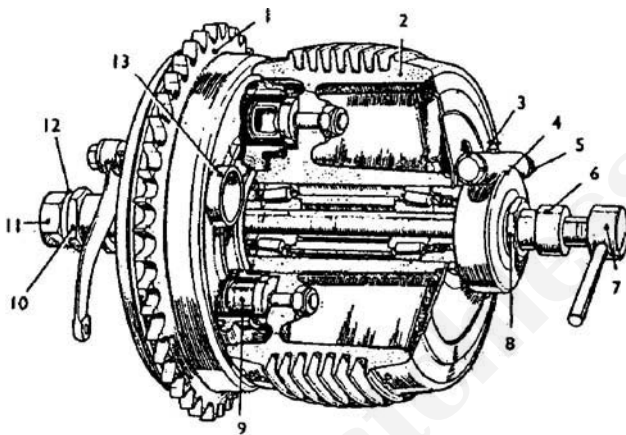


FIG. 76. DETAILS OF LIGHT-ALLOY HUB ASSEMBLY USED ON 1955-7 SPRING-FRAME MODELS WITH QUICKLY-DETACHABLE REAR WHEEL

On 1955-6 models the brake-drum wall has drilled holes instead of the tubular bosses shown; these bosses engage rubber-sleeved pins on the light-alloy hub.

KEY TO FIG. 76

- | | |
|---|--------------------------------------|
| 1. Brake drum and sprocket. | 7. Hub spindle. |
| 2. Full-width light-alloy hub. | 8. Nut locating 4. |
| 3. Grease nipple for 4. | 9. Rubber-sleeved driving pins on 2. |
| 4. Speedometer-drive gearbox. | 10. Nut securing brake cover-plate. |
| 5. Gland nut for speedometer-drive cable. | 11. Nut on spindle end. |
| 6. Distance collar. | 12. Washer for 1 1. |
| | 13. Tubular bosses to engage pins 9. |

together with the distance collar (6), which will fall away as the spindle is withdrawn. Then ease the hub sideways from the drilled holes on the brake-drum wall (1955-6 models), or ease the rubber-sleeved pins on the hub from the tubular bosses on the brake-drumwall (1957 models). The rear wheel is then free to be withdrawn from the machine.

To Replace Quickly-detachable Rear Wheel (1955-7 Spring-frame Models).

Follow the removal procedure in reverse. Referring to Fig. 76, offer up the quickly-detachable wheel, insert the hub spindle (7) without the distance collar (6); engage the holes or tubular bosses in the brake-drum wall, with the hub driving-pins;

hold the wheel in its normal position; withdraw the hub spindle. Then insert the distance collar and replace the hub spindle. When tightening the nut on the nearside of the spindle, make sure that the opposite end of the spindle contacts the secondary chain adjuster-screw, to ensure correct wheel alignment. This should be correct if the chain adjuster-screws have not been disturbed. If in any doubt, check the wheel

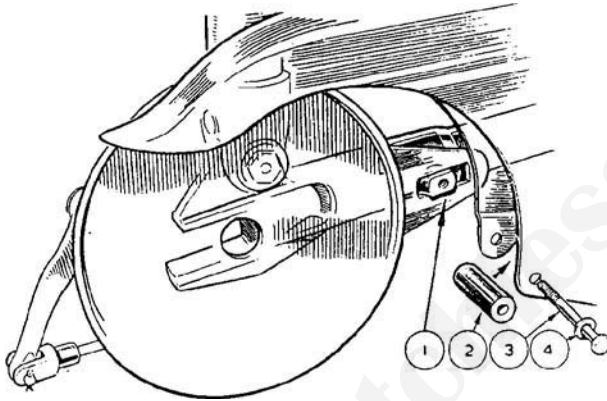


FIG. 77. THE REAR BRAKE COVER-PLATE ANCHORAGE (1955-7, SPRING-FRAME MODELS)

KEY TO FIG. 77

1. Brake-anchorage boss. 3. Anchorage bolt. 2. Distance sleeve. 4. Washer.

alignment (see page 108); also check the adjustment of the rear brake; (see page 112). When replacing the rear wheel, make sure that the speedometer-drive dogs engage properly before tightening the cable gland-nut (5). Defer tightening the nut (8) locating the speedometer-drive gearbox (4) until the driving cable has been connected up, and the hub-spindle nut (11) has been tightened. Also make sure that the brake cover-plate anchorage is correct (See Fig. 77).

Wheel Bearing Adjustment. It is advisable very occasionally to check the adjustment of the wheel bearings and rectify it if necessary. The roller bearings of both wheels should be adjusted so that a slight amount of end play (approximately 0.002 in.) can be felt. Should no end play be present, there is an appreciable risk of the roller bearings becoming damaged during running. 0.002 in. bearing end-play represents a just perceptible end-play as felt at the rim. See that there is not more than 1/64 in. rock.

Adjusting the Roller Bearings. To adjust the rear-wheel bearings, it is necessary to remove the wheel from the machine (see pages 130-5), but with a 1945-54 front wheel its removal is not necessary. Bearing adjustment (1945-54) is on the nearside or offside, according to whether the wheel concerned is rear or front respectively. On 1955-7 models the adjustment of both wheels is on the offside.

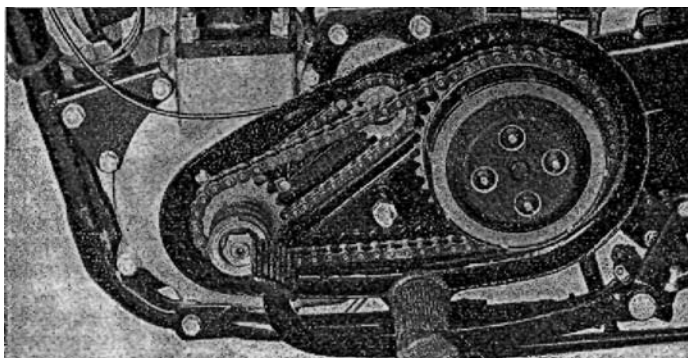


FIG. 78. THE OIL-BATH CHAIN CASE WITH OUTER-HALF REMOVED

This view shows the engine shaft shock-absorber (omitted on 1957 models), the primary chain, the clutch, and the dynamo driving-chain.

To adjust the roller bearings of a front or rear wheel, loosen the lock-nut for the bearing adjusting-ring. Next tighten the bearing adjusting-ring until all play has been eliminated. Then slacken off the adjusting-ring exactly one-half turn. This should give about 0.002 in. end play. Finally re-tighten the lock-nut, taking care to see that the adjusting-ring does not move in the process, and see that the hub cover-plate (1955-7) is positioned to allow the grease gun to be applied to the grease nipple.

MISCELLANEOUS

- 1. Removal of Outer Half of Oil-bath Chain Case (1945-57).** Place a suitable drip-tray beneath the chain case to receive the oil as it runs out. Next disconnect the front connexion of the rear-brake rod. Also unscrew the battery clamping-screw and remove the battery from its carrier. This applies to 1945-9 models. On 1950 and subsequent models it is not necessary to disturb the battery or rear-brake rod. Remove the nearside footrest arm.

The next step is to remove the screw which binds the metal band at the rear of the oil-bath chain case, and detach the band. Take off the endless rubber band, and remove the nut and plain washer from the bolt projecting from the centre of the chain case. Finally withdraw the outer half of the chain case. This exposes the primary chain, the clutch, the dynamo chain, and (pre-1957) the engine shaft shock- absorber as shown in Fig. 78.

2A. To Remove Primary Chain and Clutch Assembly (1945-56). Referring to Fig. 71, remove by unscrewing uniformly (with end of spanner Part No. 017254) the four spring adjustment-nuts (P) and withdraw the clutch spring pressure-plate (F), complete with the four springs (M) and spring cups (R). Now remove the spring link from the primary chain and take the chain off the sprockets.

With top gear engaged, apply the rear brake and, after flattening the turned up part of the locking plate (W) located beneath the large central nut, unscrew the nut (V) retaining the clutch centre (E) to the sleeve on the gearbox mainshaft (T). Remove the locking plate (W) and the plain washer (X) situated on the mainshaft behind the retaining nut. The entire clutch assembly may now be removed.

Withdraw the clutch assembly bodily by pulling it away from the gearbox mainshaft. The use of an extractor is generally quite unnecessary, as the clutch centre is a sliding fit on the mainshaft, but avoid losing any of the twenty-four clutch-bearing rollers which become free to move endwise when the clutch centre and sprocket assembly (including the roller bearing retaining-washers) is withdrawn from the mainshaft.

2B. To Remove Primary Chain and Clutch Assembly (1957). Referring to Fig. 73, remove by unscrewing uniformly (with the end of spanner Part No. 017254) the spring adjustment-nuts (4), and take away the spring pressure-plate (15), complete with the three clutch springs (6) and the clutch-spring cups (5). Disconnect the primary chain by removing the spring link, and remove the chain. Engage fourth gear and apply the rear brake. Then with a suitable box spanner unscrew the nut (13) which secures the clutch centre (14) to the gearbox mainshaft (11). Now pull away the complete clutch assembly from the mainshaft. An extractor is available if required.

3. Removal of Dynamo Chain and Back Half of Chain Case (1945-57). First remove the nut retaining the engine sprocket. This, on 1945-56 models, is facilitated by engaging top gear and applying the rear brake'; withdraw the shock-absorber spring, cupped washer, and cam. Remove the spring locking-ring from the nut retaining the sprocket on the dynamo armature. Also detach the locking washer which surrounds the nut. With the appropriate spanner (Part No. 017254) applied to the two flats on the back of the dynamo sprocket, hold the sprocket and unscrew the

dynamo sprocket retaining-nut. With a suitable extractor tool release the dynamo sprocket from the armature. Now remove in one operation the dynamo sprocket, "endless" dynamo chain, and the engine sprocket assembly.

To remove the back half of the oil-bath chain case, straighten the tabs (1945-56) on the locking washers beneath the three bolts which retain the back half of the chain case to the crankcase boss. Then remove the three bolts. Also (on 1945-55 models) remove the bolt beneath the battery carrier. This bolt has a long head and secures the rear chain guard to the oil-bath chain case. Finally remove the wide nut from the centre fixingbolt, also the spacer behind it, and take off the back half of the oil-bath chain case.

4. To Replace Back Half of Chain Case (1945-57). On 1945-56 models smear some liquid jointing compound on the crankcase boss face and on the back face of the chain case. On 1957 models smear some grease on the crankcase boss to locate the cork gasket. Verify that the spacer (between the left-hand engine plate and the oil-bath chain case) is fitted to the centre fixing bolt. Now replace the back half of the chain case.

On 1945-55 models fit beneath the battery carrier the bolt with the long head. Tighten this bolt, which secures the rear-chain guard, lightly. Now fit the three locking washers and bolts securing the oil-bath chain case half to the crankcase boss. Tighten these three bolts firmly and lock their tabwashers (1945-56) by turning up the tabs. Next fit the 7/8 in. long spacer (provided inside the chain case) to the centre fixing-bolt and replace the fixing bolt nut (spacer nut, 1954 onwards). Tighten this nut fully; also (on 1945-55 models) the long-headed bolt which secures the rear-chain guard to the oil-bath chain case.

5. Replacing Dynamo Sprocket, Chain, and Engine Sprocket (1945-7).

Check that the key for the dynamo sprocket is in position on the armature location. Also verify that the spacing collar (between the crankcase ballbearing and the back of the engine sprocket) is replaced on the engine driving-side mainshaft. Next engage the dynamo driving-chain with the teeth of the dynamo driving-sprocket (the smaller sprocket of the enginesprocket assembly) and the sprocket which fits on the dynamo armature. In one simultaneous operation replace the two sprockets (and chain) on the engine mainshaft and dynamo armature. Then replace the plain washer and sprocket retaining-nut on the dynamo armature. Tighten the nut finger-tight only.

While preventing the dynamo armature from turning by applying the appropriate spanner (Part No. 017254) to the flats on the back of the sprocket, tighten the dynamo sprocket retaining-nut firmly. Replace the locking washer for the retaining nut, also the locking ring. Make sure that the latter beds down properly in the nut groove.

On 1945-56 models replace the engine sprocket, the cam of the engine shaft shock-absorber, its spring, cap washer, and retaining nut. At this stage the retaining nut should not be fully tightened (see section 7).

On 1957 models, replace the engine sprocket, the locking washer, and the retaining nut. Tighten this nut firmly.

6A. Replacing Clutch Centre, Clutch Sprocket, and Primary Chain (1945-56)

Referring to Fig. 71, fit the roller bearing retaining-washer (Y) on the gearbox mainshaft splined-sleeve. This is the thicker of the two retaining washers. Next replace the roller-bearing ring (Z) on the splined sleeve of the mainshaft and with thick grease position the twenty-four rollers (K) on the bearing ring. Replace the clutch sprocket (L) over the rollers.

Next fit to the gearbox mainshaft splined-sleeve the washer (O) retaining the roller bearing. This is the thinner of the two retaining washers. Then

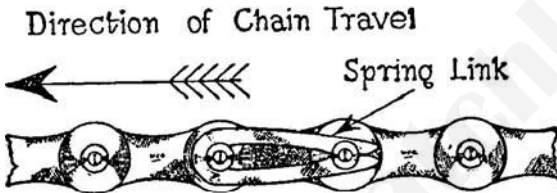


FIG. 79. BE CAREFUL TO REPLACE A CHAIN SPRING-LINK CORRECTLY
The closed end must always face the direction of chain movement.

fit the clutch centre (E) to the splined sleeve of the mainshaft and push home. Afterwards replace in this order: the plain washer (X); the locking plate (W), and the nut (V) retaining the clutch centre. This nut cannot be fully tightened until the primary chain is fitted.

Replace the primary chain on the two sprockets, being careful that the spring link is correctly fitted (see Fig. 79). Now tighten very firmly the nut (V) which retains the clutch centre (E) to the mainshaft splined-sleeve. When tightening this nut, engage fourth gear and apply the rear brake to prevent the mainshaft turning. Turn up the edge of the locking plate (W) against a flat on the nut (V) retaining the clutch centre (E).

6B. Replacing Clutch Centre, Clutch Assembly, and Primary Chain (1957).

Referring to Fig. 73, apply a little anti-centrifuge grease to the clutch-sprocket bearing, and position the complete clutch-assembly* over the bearing rollers. Then fit the spring washer and the nut (13) securing the clutch centre (14) to the gearbox mainshaft (11). Tighten this nut lightly.

* Note that if the clutch assembly has been removed from the clutch centre, fit first the clutch sprocket, and then alternately steel plain-plates and friction insert plates.

Replace the primary chain, being careful to see that its spring link is correctly fitted (see Fig. 79). Engage fourth gear, apply the rear brake, and then tighten firmly the nut (13) securing the clutch centre (14), to the mainshaft. Position the spring pressure-plate (15) and fit in this order: the clutch-spring cups (5), the three clutch springs (6), and the spring adjustment-nuts (4). With the end of the appropriate spanner (Part No. 017254), screw home the adjustment-nuts until they are just flush with the spring cups.

Engage fourth gear, apply the rear brake, and check that the engine sprocket nut is fully tightened, and lock it. Finally check the primary chain adjustment (see page 118), the dynamo chain adjustment (see page 39), and the clutch adjustment (see page 123-7).

7. Fitting Clutch Plates and Springs (1945-56). Referring to Fig. 71, slide into position in the clutch case (J) attached to the clutch sprocket (L) a steel plain-plate (g) (on 1945-51 models the thickest of the steel plain plates). Make certain that the recessed part of this steel plate faces towards the clutch centre (E) and overhangs its flange (350 c.c. models).

Next slide into position one of the clutch friction-insert plates (H). Then fit a steel plain-plate, followed by another friction-insert plate, and so on, alternately, until the complete set of plates has been fitted. It should be noted that Models 16M, 16MS have five steel plain-plates and four friction-insert plates, whereas on Models 18, 18S the number is six and five respectively.

Now insert the four spring cups (R) into the spring pressure-plate (F) and offer up the pressure plate to the assembly. Fit the clutch springs (M) and retain the springs in place by screwing the four adjustment nuts (P) on to the studs (N). Tighten each nut a few turns as fitted, and then fully tighten in a uniform manner all four nuts. Afterwards slacken back each adjustment nut four complete turns. This is the standard spring-adjustment (see page 127).

Fully tighten the engine shaft shock-absorber retaining nut. When doing this, engage fourth gear and apply the rear brake to prevent the engine from turning. Finally check the adjustment of the primary and dynamo chains as described on pages 118 and 39 respectively. Also verify that there is sufficient free movement in the clutch control (see pages 123-7).

8A. Replacing Outer Half of Oil-bath Chain Case (1945-50). First make quite sure that the faces of both halves of the chain case are quite clean and undamaged. The face of the outer half must be smeared with some liquid jointing-compound. Remove the knurled adjusting-nut from the rear-brake rod and depress the pedal to its full extent. Then replace the outer half of the chain case.

Replace the plain washer and nut on the centre fixing-bolt and tighten the nut with a suitable spanner. Make quite sure that both halves of the chain case exactly

register before the nut is firmly tightened. Check that the metal and rubber bands are undamaged and quite clean. Then apply some liquid jointing-compound to the edge of the oil-bath chain case.

Press the rubber band in place so that the free ends abut at the rear of the chain case. Now replace the metal band. Begin at the front end of the chain case and draw the two free ends together by hand and replace the binding screw. Tighten this screw firmly, and then replace those parts previously removed to facilitate dismantling.

Permit the jointing compound to set for one hour, and afterwards remove the inspection cap from the chain case and replenish with engine oil (see page 52) to the correct level (see page 62). Finally replace the inspection cap.

8B. Replacing Outer Half of Oil-bath Chain Case (1951-2). First check that the faces of both halves of the chain case are clean. Remove the knurled adjusting nut from the rear-brake rod. Verify that the rubber and metal bands are undamaged and clean. Note that the "T" section rubber band is not symmetrical and its wider edge must be outwards. Fit the rubber band by placing its narrow edge on the rear portion of the chain case, such that the join in the band is positioned just to the rear of the battery carrier. Apply the rubber band first to the extreme forward edge of the chain case.

Depress the rear-brake pedal fully and then position the outer half of the chain case. Move it as required to ensure that its outer edges snap under the exposed portion of the rubber band. Then fit the plain washer and nut to the centre fixing-bolt. Tighten the nut firmly. Replace the metal band; start at the forward end of the chain case and draw together the two free ends of the band with one hand, while replacing the binding screw with the other. Firmly re-tighten the binding screw and fit the footrest arm. Finally remove the inspection cap from the chain case, pour in engine oil (see page 52) to the proper level (page 62), and replace the inspection cap.

8C. Replacing Outer Half of Oil-bath Chain Case (1953-7). Check that the faces of both halves of the chain case are clean and that the rubber and metal bands are both clean and undamaged. The rubber band is of the endless type and of larger section than the earlier version. Position the outer half of the chain case so that its exterior edge coincides exactly with that of the back half, and then fit the endless rubber band. Next fit the metal band. Begin at the front end of the chain case and draw together the two free ends of the band with one hand, while inserting the binding screw with the other hand. When tightening the binding screw, apply light blows (with a small rubber mallet) all round the exterior of the band. This will cause the metal band to creep on the rubber band and ensure an even pressure all round. Replace the nut and washer on the centre fixingbolt, replace the footrest arm, and finally remove the inspection cap from the oil-bath chain case, pour in engine oil (page 52) to the correct level (page 62), and replace the inspection cap.

9. **Leakage from Oil-bath.** Should oil leakage be detected after replacing and replenishing the oil-bath chain case, this may be due to one or both faces of the case being damaged or distorted. Both faces should fit closely to a surface plate and, if there is any suspicion of distortion due to accidental impact prior to assembly, a check with a surface plate should be made. Another possible cause of oil leakage is imperfect registering of the two joint faces during assembly. Great care must be taken to ensure exact registering of the halves, without which an oil-tight oil-bath is unobtainable. It is also essential to see that the rubber band is correctly positioned, and that the contacting faces are scrupulously clean.

Removing Secondary Chain Guard (Rigid Frame). First remove the rear portion of the rear mudguard (except on 1945-8 models where it is necessary to remove the rear wheel and chain-sprocket assembly). Next remove the bolt which secures the front, top end of the secondary-chain guard to the oil-bath chain case. Now remove the bolt which secures the front, bottom end of the secondary-chain guard to the frame, also the bolt securing the rear, top end of the chain guard to the frame. Then withdraw the secondary-chain guard.

Removing Secondary Chain Guard (Spring-frame Models). First remove the rear wheel (see pages 132-6). Remove the bolt which secures the front end of the secondary-chain guard to the rear fork. Also remove the bolt which retains the rear end of the chain guard to the rear fork. Note that this bolt has a spacer located between the two sides of the guard. On 1949-54 models an additional spacer is fitted between the guard and the head of the fixing bolt. Now carefully withdraw the secondary-chain guard.

To Remove the Dynamo (1945 Onwards). As the magneto is positioned in front of the engine (see Fig. 5 1), dynamo removal is very straightforward, and no retaining is involved.

First remove the nearside-footrest arm. Lay a drip-tray beneath the oil-bath chain case to receive the oil, and remove the outer portion of the oil-bath chain case as already described on page 137. Next remove the spring circlip, the locking plate, and the nut securing the dynamo sprocket, and with a suitable tool withdraw the sprocket. While slackening the sprocket-retaining nut, hold the sprocket with the appropriate spanner (cart No. 017254). This prevents any bending stress being imposed on the spindle of the dynamo.

Disconnect the dynamo leads and slacken the dynamo clamping-bolt fully. Now twist the dynamo by hand until the locating strip on its body is in line with the key-way cutaway in the rear engine-plate housing the dynamo. With the dynamo in this position, withdraw it, tilting it upwards to clear the gearbox.

To Replace the Dynamo (1945 Onwards). Observe the removal instructions in reverse. Be careful to locate the dynamo-sprocket key accurately when fitting the dynamo sprocket. Also check that the dynamo chain is correctly tensioned (see page 122); follow the instructions previously given (pages 141-3) for replacing the outer half of the oil-bath chain case. Before fitting this outer half, make sure that the dynamo sprocket securing nut is firmly tightened before fitting the locking plate and the retaining circlip.

Removing Oil Tank and Battery Carrier (1945-55). Before removing the oil tank and battery carrier, drain the oil tank (see page 54) and disconnect the positive and negative leads from the battery. Also unscrew the battery clamping-screw and remove the battery from its carrier.

Unscrew and withdraw the countersunk-headed screw holding the bottom of the battery carrier to the stay for the front-chain case. Next disconnect from the bottom of the oil tank the oil-delivery pipe, also the oil-return pipe. Take off (1945-8) the venturi air-intake from carburettor and remove the securing bolt on the right-hand side of the oil tank. On 1949-55 models disconnect the vent pipe from the rear of the oil tank, and disconnect the compensated-voltage-control unit from the battery carrier (secured by two bolts on 1949-53 models). Do not disconnect any leads.

Remove the bolt which secures the oil tank stay to the rear mudguard (the frame, 1955). Be careful not to lose the spacer and washer on this bolt. Now remove the two nuts and washers securing the oil tank and battery carrier (battery carrier only, 1955) to the two studs. The battery carrier and oil tank (with supporting studs, 1955) should then be detached. To facilitate their removal (pre-1955), give each a circular motion to disengage the frame studs.

To replace the battery carrier and oil tank, proceed in the reverse order of dismantling. If the two oil pipes have been completely removed, reconnect the pipes to the crankcase unions before connecting the other ends.

Removing Oil Tank (1956-7). First remove the dualseat and the frame shield which is held by two large slotted and knurled screws. Next remove the drain plug (see Fig. 36) from the oil tank and allow the oil to drain off into a suitable receptacle. Now disconnect the oil feed and return pipes from the base of the oil tank (by sliding the rubber connectors down the pipes, on 1956 models). Four brackets and four nuts and bolts secure the oil tank in position; there are two bolts at the top, one at the front, and one at the rear or centre (1957 models). Remove all four nuts, bolts and washers, and then raise the tank away from the frame a few inches. Disconnect the tank vent-pipe (shown at 7 in Fig. 36), and the tank is then quite free and can be lifted clear. To replace the oil tank, reverse the above removal procedure.

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