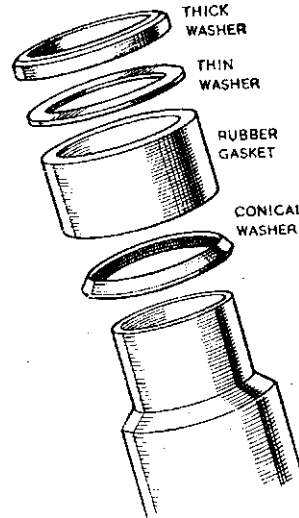


POST-WAR A.J.S. and Matchless ranges are virtually identical and hence can be dealt with together. The makers' instruction books covering maintenance and overhaul are clear and comprehensive. There are only three basic engine types, and the short-stroke scrambles power units introduced for 1956 have much in common with the other singles.

The 347 c.c. and 498 c.c. single-cylinder machines introduced in 1945—shortly after the end of the war in Europe—were based on the successful pre-war models; the most important improvement was fitting of the Teledraulic front fork featured on the W.D. G3/L Matchless. For 1949 came the parallel twins with pivoted-fork rear-wheel springing and the adoption of hairpin valve springs on the singles; the following year the competition mounts were equipped with light-alloy die-cast cylinder heads which became standard on the roadster singles for 1951.

Since then there have been relatively few major changes, though mention must



The four pushrod cover tube sealing components referred to in the text and table

During decarbonization or top overhaul, coil valve springs should be renewed if they have shortened by more than one-eighth of their original length. Original lengths for pre-1948 engines are, inner spring, $1\frac{1}{8}$ in; outer, $2\frac{1}{8}$ in; for the 1948 units the respective figures are 2 in and $2\frac{1}{4}$ in. The hairpin springs are less highly stressed and should stand up for many thousands of miles without closing up appreciably. The nominal distance between the "jaws" measured at the centre of the wire is 2 in and the makers recommend renewal if the measurement is less than $1\frac{1}{8}$ in.

When removing valve guides from light-alloy cylinder heads, or replacing them, heating of the surrounding area of the head is essential. On the singles, inlet guides and the earlier-pattern exhaust guides can be pressed downward and out after first thoroughly cleaning the exposed upper portion and then heating the head evenly and gently. (If a blowlamp is not available a gas oven or electric hot plate are equally satisfactory.) Circlip location of

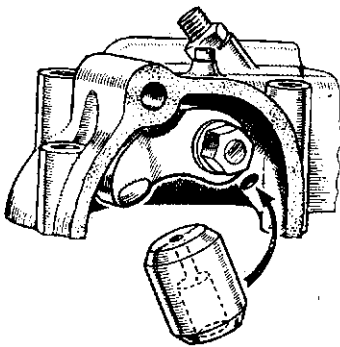
IN THE WORKSHOP WITH

Your A.J.S. or Matchless

PART I—THE ENGINE

Helpful Notes for Owners of Machines in Two Popular Single- and Twin-cylinder Ranges

BY ALAN BAKER



Valve-gear lubrication of pre-1954 singles can be modernized by fitting an additional metering plug in the rocker box

be made of the introduction of automatic ignition control on the five-hundred singles for 1954 and on the three-fifties for 1955. Rear springing was made available on the singles in 1950 and solid-frame models ceased to be listed when the 1956 ranges were announced. Full-width front hubs were a 1954 modification and were improved for last year when a rear hub of similar type was put into production.

Dealing first with the singles, the valves of the coil-spring engines (i.e., 1948 and earlier) were fitted with end caps. The

hairpin-spring engines have heat-treated valve-stem ends without caps, and excessive wear of the end can be remedied by grinding it down farther and fitting a cap. A length reduction of $\frac{3}{16}$ in is necessary to achieve the correct rocker geometry. In no circumstances should the caps be omitted from coil-spring-retained valves; the altered rocker geometry is likely to result in a pushrod damaging and even fracturing the lubrication boss in the rocker box.

The 1948 engines had longer and stronger valve springs than their predecessors, with a valve-spring collar of modified design. Should the later springs be fitted to earlier units it is advisable to install the modified collars at the same time, as otherwise there is a risk that the springs may become coil bound before full lift of the valve. If the later-pattern collars are not fitted the valve motion should be checked visually for binding of the coils (there should be definite clearance—measured by feelers—between the coils at full lift. Any prolonged running of an engine where the springs become coil bound will inevitably result in noisy operation and rapid wear of the cam crests. In fact, should the cams show such wear it is positive indication that coil binding has occurred; in some instances where the trouble has been experienced by owners, "pattern" springs of the incorrect gauge of wire have been found to be responsible.

both guides has always been employed on the twins and was introduced for the exhaust guide of the singles during 1955. After the head has been heated such guides must be pushed upward from within the port sufficiently to permit removal of the circlip. The removal procedure then follows that laid down for the guides without circlips.

The circlip-located exhaust guide (Part No. 022208) can be fitted to the earlier light-alloy heads provided the valve-spring seat is replaced by the latest pattern or the existing seat is recessed on the lower face to clear the circlip.

Cases have come to light of exhaust guides working loose in light-alloy heads and enlarging the hole in the head. To avoid replacing the head—an expensive remedy—a new guide, preferably of the circlip-located type, should be obtained and built up sufficiently on the outside by copper deposition for heating of the head to be necessary before the guide can be pushed in.

Should the valve seats be badly pitted it is a mistake to attempt to clean them up by prolonged grinding-in. The seats should be recut with a 45-degree cutter after new valve guides (if necessary) have been fitted. The seat inserts of the light-alloy heads are not replaceable, so grinding-in and recutting should be kept to the minimum.

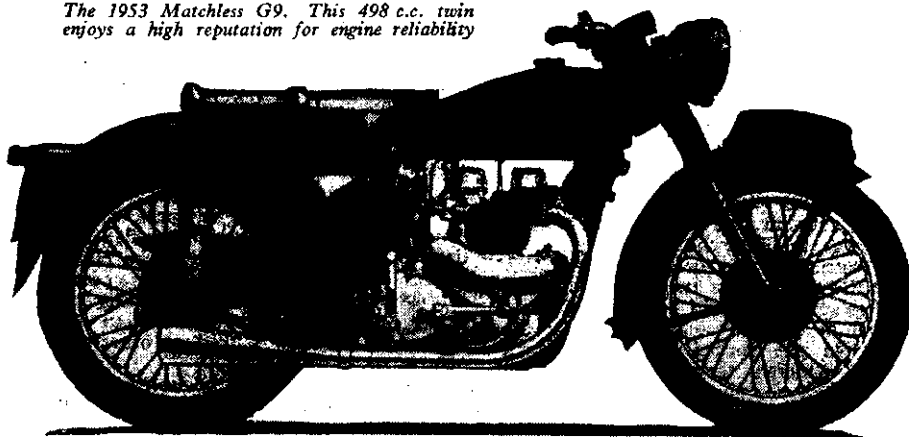
Excessive end-play of the rockers in

their housings can readily be taken up on single-cylinder models. If one rocker is removed from the shaft and the shaft and sleeve removed from the housing, one of the bushes in the housing can then be driven outward slightly from the other end (taking care not to damage the bore or burr the end of the bush) sufficiently to restore a running clearance only.

With the design of exhaust-valve lifter employed from 1949 onward the shaft may occasionally stick in its bore in the rocker box. The remedy is to remove the component, rub down the shaft with fine emery cloth and refit after lubricating with graphite grease.

A worrying clicking noise occasionally develops with hairpin-spring engines. There are two possible sources: a valve spring can have been distorted slightly and be touching the rocker box; alternatively, the rocker arm may be fouling the spring. The remedy in the first case is

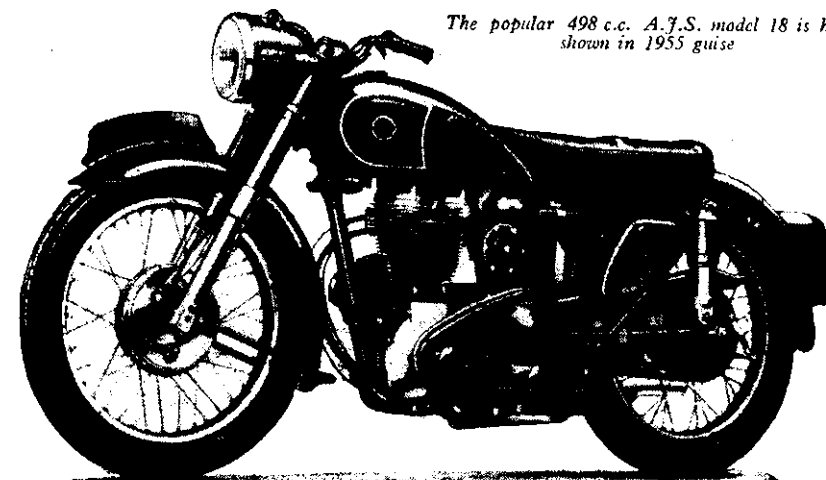
The 1953 Matchless G9. This 498 c.c. twin enjoys a high reputation for engine reliability



replacement of the spring, and in the second case a small amount can be ground off the arm to provide clearance. Another source of mechanical noise—a metallic clack at low engine speeds—is end-play of the exhaust (magneto-driving) camshaft caused by the offsetting of the tappet to distribute wear. Shims are available from the manufacturers in 0.005 and 0.010in thicknesses to take up the play. A new timing pinion will often help to quieten an engine which has covered a considerable mileage.

On the five-hundred singles a compression plate was fitted under the cylinder barrel until 1952; when the plate was discarded the barrel length was increased accordingly. If the plate is fitted and is no longer wanted, it is essential for the ridge at the top of the cylinder barrel to be removed by scraper at the same time or ring breakage is very likely to result. It is also necessary to remove the 1/4in-thick plain washers above the rubber pushrod-sealing sleeves in the head.

There has, in fact, been considerable variation through the years at the upper end of the pushrod cover tubes. Four possible items can be located on each tube: from the top they are a thick (1/2in) washer, a thin (1/4in) washer, a rubber sleeve and a conical washer. These items are designated respectively A, B, C and D in the table herewith, which gives the



The popular 498 c.c. A.J.S. model 18 is here shown in 1955 guise

correct combinations (and assumes that the compression plate is still in position on pre-1952 engines).

Date	350 c.c.	500 c.c.
Pre-1950	B, C	A, B, C
1950 and 1951	B, C, D	A, B, C, D
1952 onward	B, C, D	B, C, D

Pre-1948 singles had a connecting-rod length of 7 1/4in, reduced to 6 3/4in on subsequent units. The wire-wound piston is intended for the shorter rod and cannot be used with the 7 1/4in rod because the gudgeon-pin location is too low.

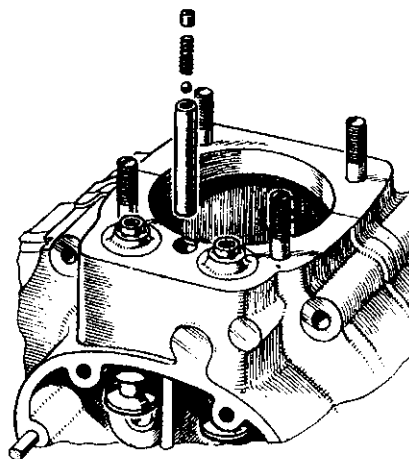
Valve-gear lubrication on the singles is from the pressure side of the pump and the system was modified in 1954 to increase the supply to the inlet spring and valve end, with the object of reducing wear on the spring where it contacts the collar. Hairpin-spring engines built prior to 1954 can be brought up to date in that respect with little difficulty. It is necessary to enlarge to 7/8in the oil hole drilled in the exhaust rocker-spindle boss and to insert a metering plug (Part No. 018890). The plug should be inserted small hole first and tapped home with a

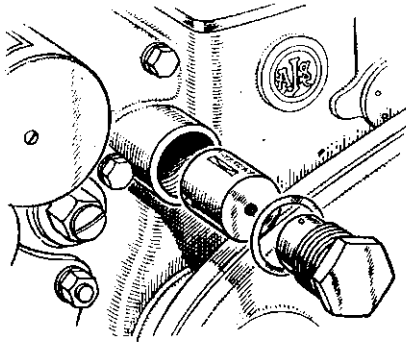
centre punch to bell out the larger bore and thus secure the plug. New inlet and exhaust rockers (valve end only), Part Nos. 021262 and 021263, are then required to complete the job.

On pre-1956 singles there is a ball valve in the crankcase to control the oil feed to the cylinder walls. Operation of the valve can be checked with the cylinder off, and it should not be necessary to remove the brass insert in the crankcase; removal can be effected, however, by screwing into the insert a 3 B.A. screw and levering under the screw head with two screwdrivers.

Minimum end float on the single-cylinder crankshaft assembly is 0.020 to 0.025in; the float can be checked on removing from the mainshaft the shock-absorber assembly which locks up the crankshaft with the drive-side main-bearing inner race. If the crankshaft can be moved axially with the shock-absorber in position the main-bearing outer races are loose in the case, probably owing to jamming caused at some time by dirt picked up by the balls. The engine should not be run in such condition for any longer than is essential. At the factory the bearing housing can be knurled

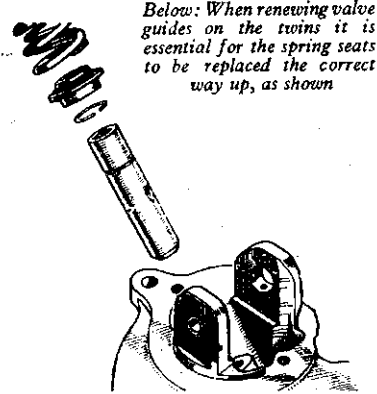
Single-cylinder A.J.S. and Matchless engines made before 1956 have a ball valve controlling cylinder-wall oiling





Above: The crankcase-breather valve of the later twins is in the end of the mainshaft

Left: Obstruction of the hole in the oil-distribution bush of the twins can lead to starvation of the rocker gear



Below: When renewing valve guides on the twins it is essential for the spring seats to be replaced the correct way up, as shown

to make the races a tight fit once more.

The remarks already made regarding valve guides with circlips and about avoidance of excessive valve grinding apply equally to the twin-cylinder engines. After attention to the valves or guides the valve-spring seats must be replaced the right way up, i.e., with the stepped face of the flange upward; incorrect installation will result in the inner springs becoming coil-bound at full lift.

A tendency to smoking of the right-hand cylinder is caused by return oil spilling from the timing case on to the inlet camshaft and being splashed on to the cylinder bore. A special scraper ring with a wider slot can be obtained to cure the smoking. A taper-face, chromium-plated top ring has been used since 1952 and must be replaced as marked or oil consumption will suffer.

If one has purchased a used model it is as well to check the valve-gear lubrication in case the previous owner has interfered with it. Should there be signs of shortage of oil the cause may be obstruction of the hole in the oil distribution bush in the drive-side half of the crankcase, behind the hexagon above and to the rear of the oil filter compartment. On units built in 1954 or earlier the hole diameter is $\frac{1}{8}$ in; 1955 and 1956 models have a $\frac{1}{16}$ in hole in the bush. The bush can be removed with the aid of a 3 B.A. screw inserted in the tapped hole in the outer end.

In the cylinder heads there are brass restrictor plugs for the rocker oil feeds. Before 1953 there were three such plugs

whereas later engines have four (in the earlier system the right-hand exhaust feed was, in effect, the end of the line so no restriction was needed). To check that the oil passages are unobstructed the rocker spindles should be withdrawn and petrol or paraffin squirted through the holes in the rocker posts, whence it should emerge through the metering plugs. (On the singles the oil should be squirted in through the oil inlet union on the rocker box.)

After a big mileage the cylinder heads are sometimes loth to come away from the barrels. At the factory they set the piston at t.d.c. on the compression stroke and hold a 2in cube of hardwood under the thickest part of the exhaust port; a sharp tap on the cube with a hammer overcomes the adhesion.

When replacing the cylinder heads one should always check the inlet manifold with a straightedge for flatness of the flanges. Any appreciable distortion should be rectified by careful rubbing down on a sheet of fine emery, tacked or

glued to a really flat surface. The cylinder-head nuts should be tightened after and not before the manifold nuts.

The twins have a reputation for mechanical quietness. Noisy timing gear may be caused by wear of the bush of the intermediate gear (that between the engine-shaft pinion and the camshaft gears). The bush is easily renewed but will probably need reaming to size after being pressed in.

There is no small-end bush in the light-alloy connecting rods of the twins and no oversize gudgeon pins are available. This feature is sometimes criticized on the grounds that a worn eye means a new rod. The factory service department's reply is that the eyes do not wear; gudgeon-pin wear will occur in time but it is virtually unknown for a rod to be renewed on account of small-end wear.

Oil seepage from the crankcase into the primary chaincase on twins from 1952 onward, is usually the result of a broken or buckled diaphragm in the crankcase pressure-release valve in the end of the crankshaft. The body of the release valve retains the shock-absorber spring. The valve should be removed complete and dismantled by lightly gripping the body in a vice and applying a spanner to the spring-retaining sleeve nut. If the sleeve nut is undone with the body *in situ* there is a risk that the body, which is rather thin, may be collapsed at the thread. The diaphragm must be flat, undamaged and free to rotate in the body. Should oil seepage to the chaincase occur on earlier twins, the first thing to verify is that the rubber tube from the release valve is not kinked or otherwise obstructed.

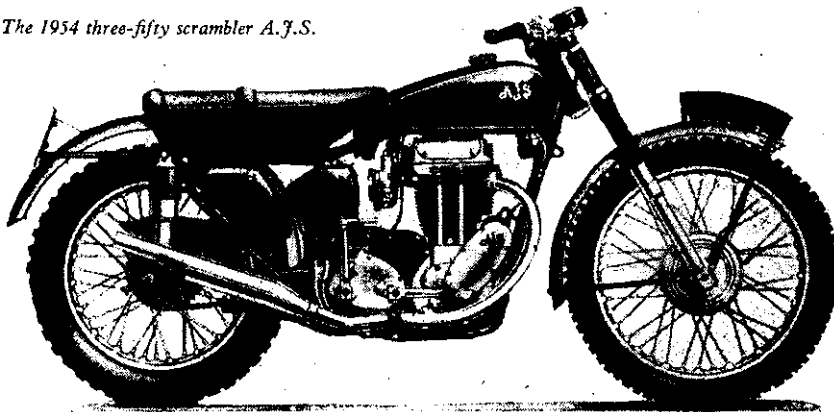
Except in the case of solid-copper gaskets for cylinder-head joints (which can be annealed by heating to cherry red and quenching in colder water), it is false economy to refit gaskets disturbed during a decoke of either twins or singles. Few things are more annoying to the keen motor cyclist than engine oil leaks, and a set of new gaskets is not an expensive item.

Jointing compound should be avoided as a general rule except on metal-to-metal joints; it can, however, be used to stick a paper washer to one joint face (where the other face is on the detachable item) although it is probably safer to use grease. The objections to jointing compound are, of course, that it may obstruct oilways and that faces may be stuck so firmly together that damage may result from separating them.

Replacing the engine in the frame after an overhaul is easier with the twins than the singles in spite of the twins' greater weight. The factory technique is to work the single into the frame from the left diagonally, using a lever to spring the front down tube out of the way. The top rear holding-in stud should be fitted first, followed by the lower front stud. Tapered rods of the same diameter as the studs are helpful for lining up the holes in engine plates and crankcase. A bolt is used at the bottom rear point instead of a stud with nuts; the thin head of the bolt clears the oil unions whereas an ordinary nut would foul them.

(To be concluded)

The 1954 three-fifty scrambler A.J.S.



IN THE WORKSHOP WITH

Your A.J.S. or Matchless

By ALAN BAKER — PART 2

USEFUL POINTS ON THE TRANSMISSION AND FRONT- AND REAR-SUSPENSION SYSTEMS OF POST-WAR MODELS

THE first part of this article dealt with a number of points likely to be encountered in the maintenance and overhaul of post-war A.J.S. and Matchless single- and twin-cylinder engines. It is logical to pass on from the power unit to the transmission.

On the Burman B52 gear box (fitted since 1952) the foot-change mechanism is of simpler design than that on earlier models. The cam barrel which moves the selector forks has on its right-hand face pegs which serve the purpose of the ratchet teeth on earlier designs. In the other end of the barrel are five dimples for gear location. Occasionally the spring-loaded, conical-ended plunger which engages with the dimples sticks in its housing, causing a tendency for gears to disengage under load. To rectify the trouble the gear-box end cover must be removed (the instruction book gives the procedure for this operation) and the plunger extracted and lightly eased down with fine emery cloth until it slides freely in its housing in the box. The plunger should be oiled before reassembly.

Since 1954, Klinger clutch-insert material has been employed which is impervious to oil and so (unless the inserts are really worn out) the clutch will not slip unless the thrust adjustment is incorrect or the springs have weakened. The method of adjusting the B52 clutch-thrust mechanism is given in full in the instruction book; the essential point is that the pressure-plate adjustment must be set before the cable adjustment is taken up. If the clutch still slips after correct adjustment of the thrust-rod clearance and the spring tension (see the instruction book), the springs should be renewed.

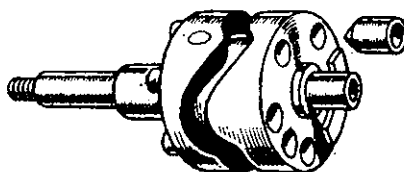
Even though actual slip may not occur the thrust button will wear rapidly if there is no clearance between it and the thrust rod. Such wear will be indicated by a correspondingly rapid increase in lever backlash which should at once be investigated.

Oil leakage from the primary chaincase is a not-uncommon complaint. The A.M.C. service department has found that in many instances it results from distortion of the rim of one or both halves of the case; the sealing ring and band can nullify only a limited amount of such distortion. To check if the two halves mate well the outer half should be offered up without the seal and the edges examined. Any appreciable separation should be rectified by careful bending—careful because too much force

can cause the case to distort somewhere else.

If an owner wishes to attach a sidecar to his machine the overall gear ratios should be lowered by fitting a smaller engine sprocket. The standard solo sprockets are: 498 c.c. and 592 c.c. twins, 20 teeth; 498 c.c. singles, 21 teeth; 347 c.c. singles, 18 teeth. For normal sidecar work the factory recommendation is an 18-tooth sprocket for the twins and for the five-hundred singles, and 16 teeth for the three fifties, but for the singles there is a complete range from 21 to 15 teeth, whereas nothing smaller than the 18-tooth sprocket is available for the twins.

On account of the close fit of the chain-



On the Burman B52 gear box the cam barrel embodies the gear-location dimples which are engaged by a spring-loaded plunger

guard, refitting the rear chain may present some difficulty (unless the chain is being renewed, in which case the old chain can be used to pull the new one round the gear-box sprocket). A very good method is given in later instruction books and is worth describing for owners of earlier models. All that is needed is a 10ft length of thin string. With the machine on the stand, rotate the rear wheel until the connecting link is near the rear sprocket. Then remove the connecting link and pass one end of the string through the rivet hole in the end of the top run of the chain. Draw the ends of the string level and tie them together.

Next, pull the bottom run of the chain rearward while keeping the string taut with the other hand. As the chain runs off the gear-box sprocket the loop of string will lie on each side of the teeth. When the chain is well clear, cut one side of the string about a foot from where it passes through the chain, remove the chain and leave the string *in situ*. To replace the chain, pass the longer end of

the string through one end of the chain and tie the ends of the string as before. Then pull on the far extremity of the string while guiding the chain up on to the sprocket. Continue pulling until the chain engages with the rear-wheel sprocket, then cut the string and fit the connecting link in the normal way.

The simplest single-handed check for slackness in the steering-head bearings is to get the front wheel squarely up against a wall, place a finger or thumb between head lug and upper-bearing cover and alternately thrust forward on the middle of the handlebar and release the pressure. Any relative movement can readily be felt but care must be taken that the thrust does not cause the handlebar to turn at all. Before an attempt is made to adjust the bearings the two socket-head screws clamping the stanchion tubes to the lower yoke must be slackened.

Sidecar-strength springs are available for the front fork and rear shock absorbers. Dismantling procedure for the front fork is given in the instruction manual and it is quite possible to change the springs without removing the fork from the machine. In fact, it is easier to remove the sliders with the fork *in situ* but no attempt should be made either to remove or replace the sliders without applying heat to the upper end—a cloth heated by boiling water and wrapped round the slider is the easiest method. If the stanchion tubes are tight in the top yoke they can be drifted out with a mandrel which is a slack fit in the internal thread and has a chamfered end to centralize on the shoulder below the thread.

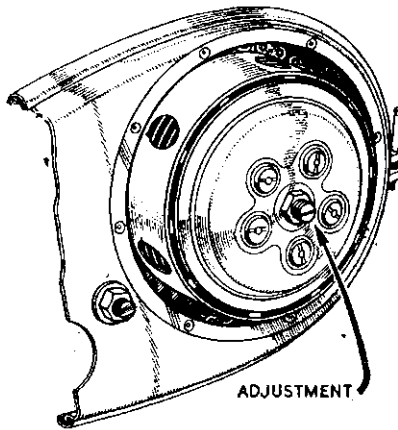
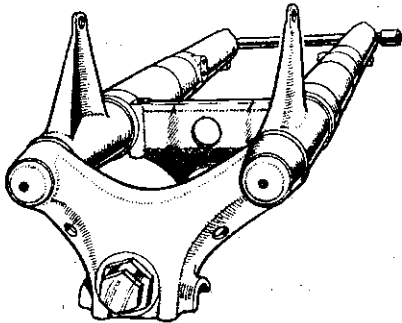
If the fork legs have a tendency to stick and the stanchions are known to have suffered no damage, the cause may be swelling of the Bakelite upper bushes. They should be eased as necessary with glass paper or emery cloth. Should damage to the stanchions be suspected, a ready check when they are stripped down is to hold one against the other, looking towards the light. If any light is visible between the tubes as they are rotated they require straightening—a job which should be entrusted to experts. Incidentally, if a fork is being returned to the factory for repair the service manager requests that it be sent complete with handlebar lug and top covers to simplify rebuilding.

Pre-1955 machines had the older-pattern fork on which the stanchions are of smaller diameter and lighter gauge than those of 1955 and 1956. The stronger fork

complete can be fitted to earlier models if desired.

Upper and lower yokes can readily be tested for truth while the fork is stripped down. The method is to hold the yoke concerned in a vice, assemble the (straight) stanchion tubes to it and look along them. Any appreciable malalignment can be spotted and a distorted yoke should not be used again.

As a final check on the alignment after the fork is reassembled, put a mandrel in the spindle clamps and look down the fork from above. The mandrel and the flat face of the lower yoke should be parallel. If they are not, the socket-head clamp screws should be slackened and the legs levered into line; it is best to lever on the sliders to avoid damage to the covers. Alternatively, the front wheel can be refitted



Above: On the B52 clutch the critical adjustment for operating clearance is on the pressure plate and not the cable

Left: If the fork stanchions are in line, a mandrel in the spindle clamps will lie absolutely parallel to the lower yoke

and the fork then worked briskly several times to align the stanchions.

Suspected distortion of the sub-frame of rear-sprung models can be checked after detaching the assembly from the main frame. Rods of the correct diameter should be put through the top and bottom attachment holes and those for the rear shock absorbers. Any appreciable discrepancy between the distance of one rod from another on each side is an indication of twisting of the sub-frame.

Alignment of the pivoted fork can most conveniently be verified by putting a mandrel or a steel rule through the fork ends. If a second straight-edge is placed to span the fork-arm tubes just behind where they emerge from the pivot lug the second straight edge should be parallel to the first.

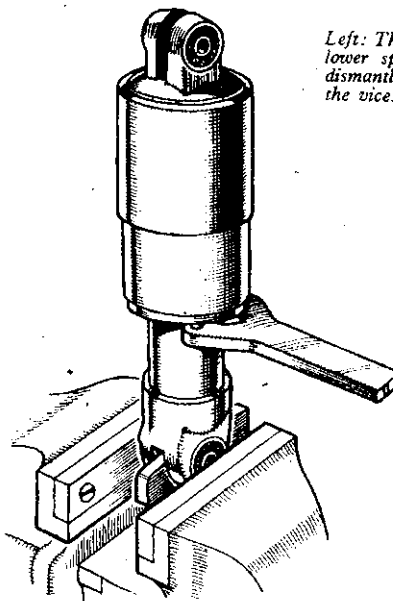
If shortage of fluid in the rear shock absorbers is suspected from loss of damping, the necessary attention is described in the instruction book and is within the scope of the average experienced rider. The bottom anchorage can best be unscrewed with the aid of a bar which fits closely between the ears of the anchorage. There is no particular difficulty, either, in dismantling the "jampot" legs should one wish to change spring strengths.

The legs fitted to 1956 and 1955 models have circlip retention of the bottom spring-abutment collar whereas on the earlier units the collar is screwed on to the outer tube. To dismantle the latest pattern it is necessary to hold the outer tube firmly in a vice with the aid of a split clamp (to avoid damaging the tube). The collar can then be pushed up the tube against spring pressure and the circlip

prised out of its groove and slid down the tube. Inner and outer covers and the spring and buffer can then also be slid downward, revealing the inner tube which should be held in a vice with a split clamp and the top anchorage unscrewed with the type of bar already mentioned. After the anchorage has been unscrewed the top cover and spring can be removed.

On the pre-1955 shock absorbers the spring-abutment collar can be unscrewed with a peg spanner. To enable that to be done, either the outer tube can be held in a split clamp in the vice or the bottom anchorage can be gripped after interposing a close-fitting distance piece between the ears to avoid distorting them. When the collar has been unscrewed the rest of the dismantling is as already detailed.

With the full-width rear hub introduced

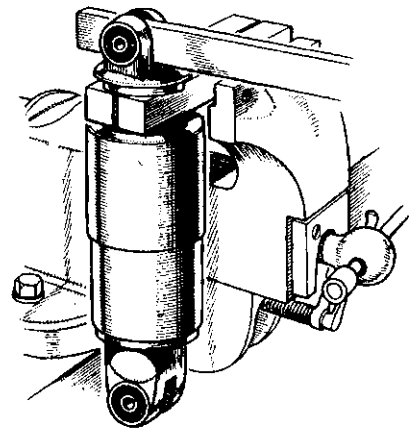


Left: The earlier "jampot" shock absorbers have a screw-on lower spring abutment and a peg spanner is needed for dismantling. Note the distance piece between the ears in the vice. Above is shown the method of holding the inner tube while the top anchorage is unscrewed

for 1955 came quick detachability of the wheel on rear-sprung machines (there are, of course, no solid-frame 1956 models); the drive is transmitted by five pins. Should wear develop between the pins and their housing in the brake drum it is worth knowing that the pins can be renewed. Any such wear can be detected by putting the machine on its centre stand, applying the rear brake and endeavouring to move the wheel rim sideways: there should be no appreciable shake.

The procedure for renewal of the pins is straightforward. Wheel removal is covered in the instruction book though there is an alternative which is practised in the factory. There the rear portion of the mudguard is not detached; the machine—on its centre stand, of course—is leant to the left (towards the operator) after the spindle and distance piece have been withdrawn and the wheel is slipped out to the right.

After removal of the wheel the speedometer gear box must be taken off, then the adjusting ring of the wheel bearings must be unscrewed with a C-spanner, permitting the hub cover plate to be detached; the self-locking nuts retaining the driving pins can then be undone with a box spanner.



Adjustment of the wheel bearings on reassembly is detailed in the manual but it might be emphasized that the hole in the cover plate provides access to a grease nipple and so must be correctly located. (The same applies, incidentally, to the front hub.) Further, wheel replacement is facilitated if the spindle is inserted temporarily without the distance piece; engagement of the driving pins is then rendered much more certain.

Finally, much useful supplementary information is given in the A.J.S. and Matchless books by F. W. Neill, the factory service manager, published by C. Arthur Pearson, Ltd., Tower House, Southampton Street, London, W.C.2, at 10s 6d.

(Concluded)