NOTES ON REPAIRS TO A.J.S. MOTOR-CYCLES

By W. Stevens (*A. J. Stevens Ltd.*)

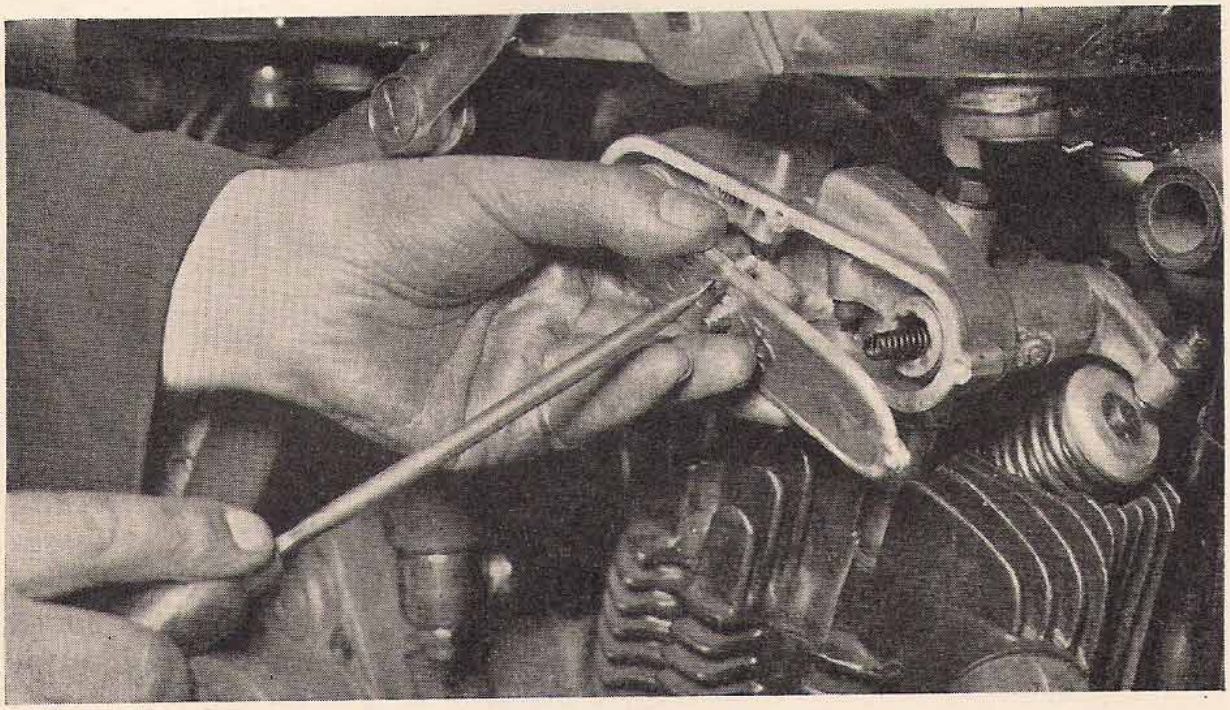

Fig. 1.—Removing Rocker-box Cover.

Showing an o.h.v. engine with the push rods removed. *It will be noticed that two* springs are fitted behind the cover to prevent side movement of the rockers. Whilst taking out the last pin from the rocker box, press on the cover to relieve the pressure of the springs on the latter.

ENGINE

VARIOUS changes in design have been made from time to time, embodying detachable cylinder heads ; plain, roller and ball main bearings ; plain and roller big-end bearings ; semi-automatic, mechanical, dry and wet sump lubrication systems.

Cylinder Heads

On engines up to 1927 both cylinder and head were held down by means of a bridge piece across the cylinder head and two long bolts attached to the crankcase ; or, in the case of the o.h.v. models, with a stirrup strap for the head, and left- and right-hand thread sleeve nuts between the former and studs in the crankcase.

In these cases, when removing or tightening down the head ease or tighten the nuts evenly, and do not screw the head down too tightly, only sufficient to make compression tight.

On later models the cylinder barrel was held down from the foot by means of four studs and nuts on the crankcase, and the head on the cylinder barrel by four or more pins screwed into the latter.

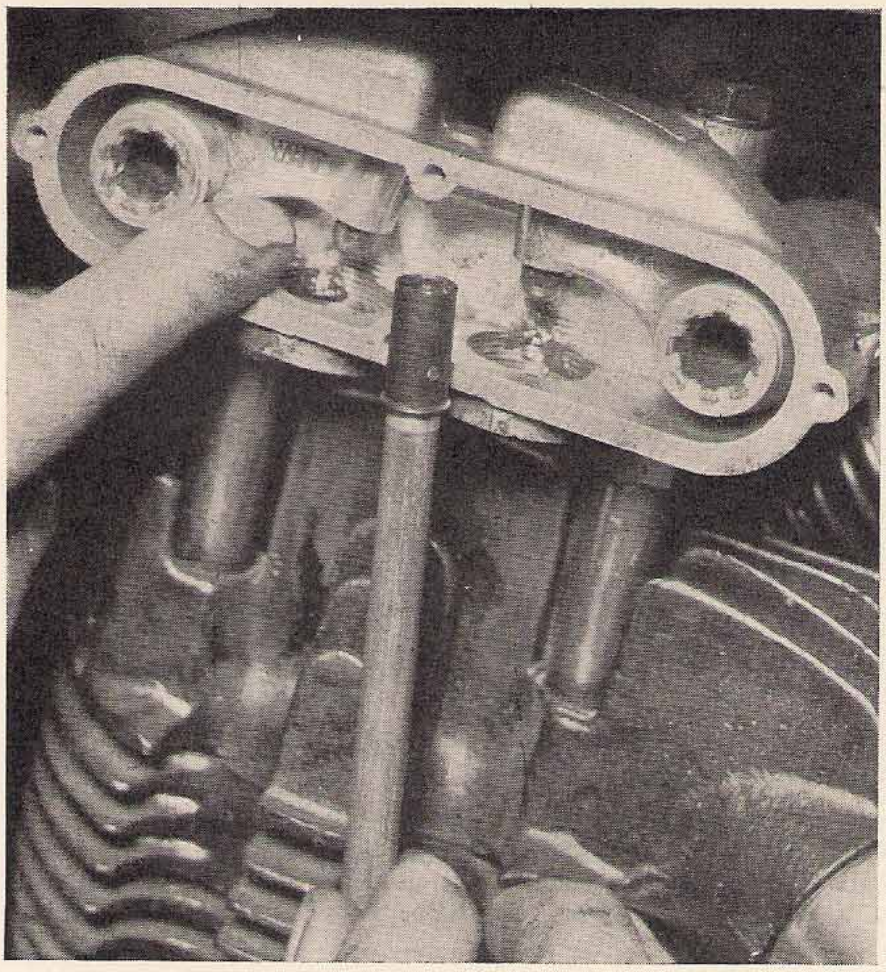

Fig. 2.—Rocker-box Cover removed for Inspection of Rocker Studs and Push-rod Ends.

Removing Cylinder Head

The simplest method of removing a detachable head, after the holding-down attachments, etc., have been removed, is to insert a screwdriver or similar tool between the top cylinder fin and the head, prising the latter carefully off the cylinder from both sides—prising upwards, not downwards, or the radiating fins may be broken (Fig. 3).

O.H.C. Models—Most Important

In the case of overhead camshaft engines, when the cylinder or head only is removed, it is important that the camshaft sprocket and driving chain should be supported and not allowed to drop in the chain cover while the engine is being revolved. A piece of wire to prevent this happening can be hooked through the sprocket and fastened to one of the sprocket-cap pins screwed into the top of the chain cover (Fig. 5).

In removing the cylinder or head on these engines, it is first necessary, after taking away the exhaust pipe, carburetter, oil pipe to cambox, etc., to remove the cap secured to the top of the chain cover by four pins. Take out the split cotter from the nut on the camshaft, remove the nut and washer, and after removing the four pins holding the cambox on to

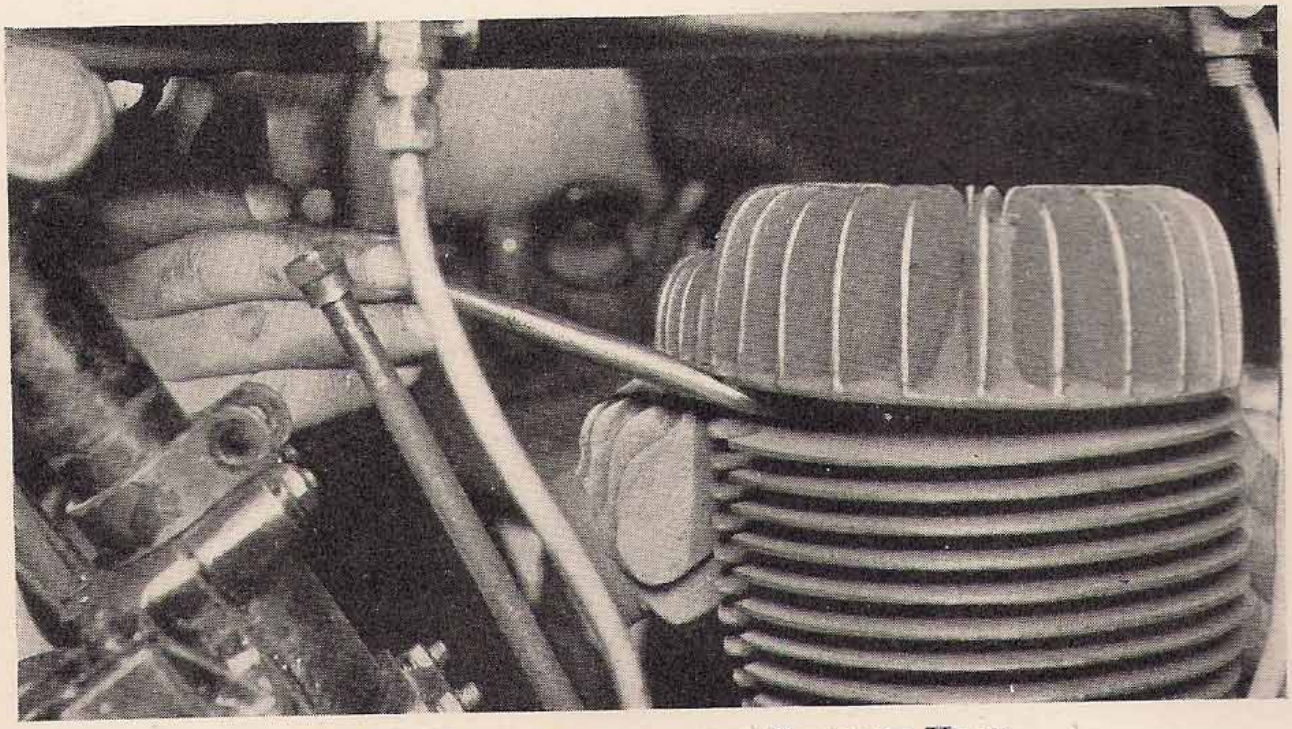

Fig. 3.—Method of removing Cylinder Head.

Prise off with a screwdriver. This should be done from both sides of the head, prising upwards not downwards.

the head, carefully take away the former whilst the sprocket is being steadied.

An assistant will be useful during this operation.

The sprocket and chain should then be supported by the method already mentioned (Fig. 5).

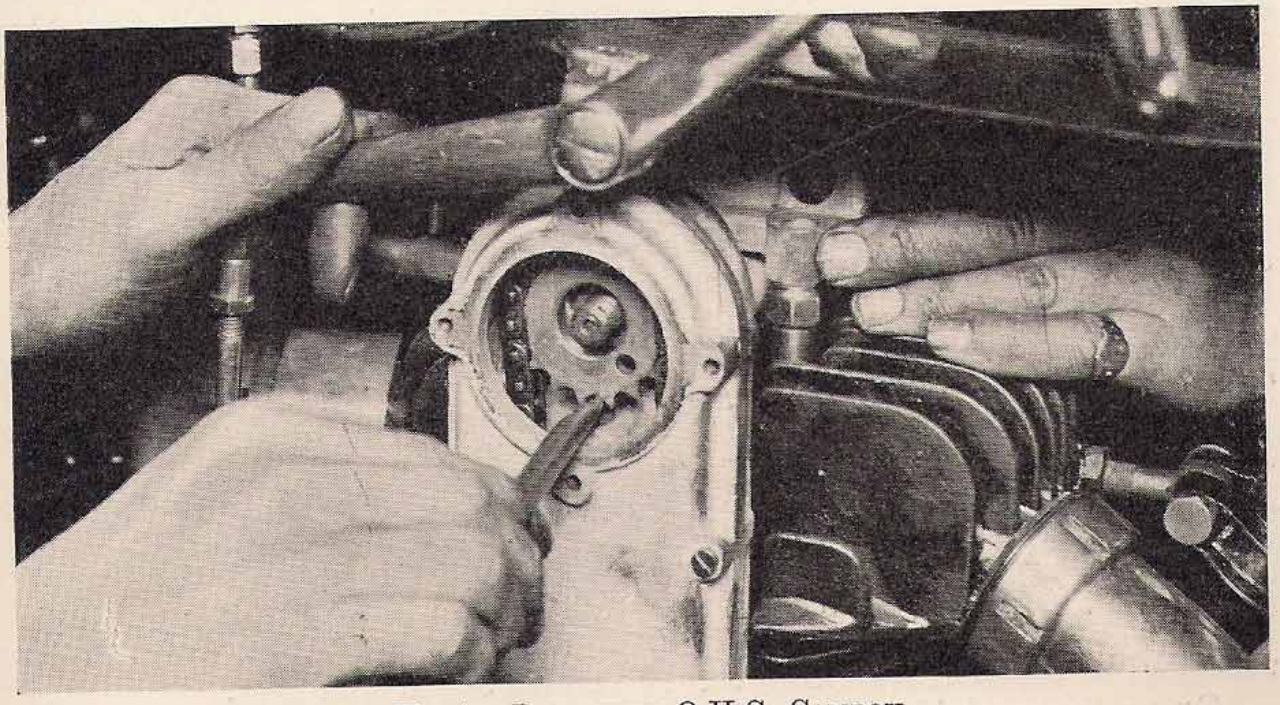

Fig. 4.—Removing O.H.C. Cambox.

The camshaft chain and sprocket in the timing cover should be steadied when doing this.

Compression Ratio should be altered only by changing Piston

It will not be out of place here to point out that on camshaft engines the compression should not be raised by taking any metal from the bottom or top of the cylinder, or the compression lowered by fitting a thicker washer to the cylinder foot, as this will alter the camshaft driving-chain centres. The makers' advice should be sought on this matter, as special pistons are supplied by them for the above purpose.

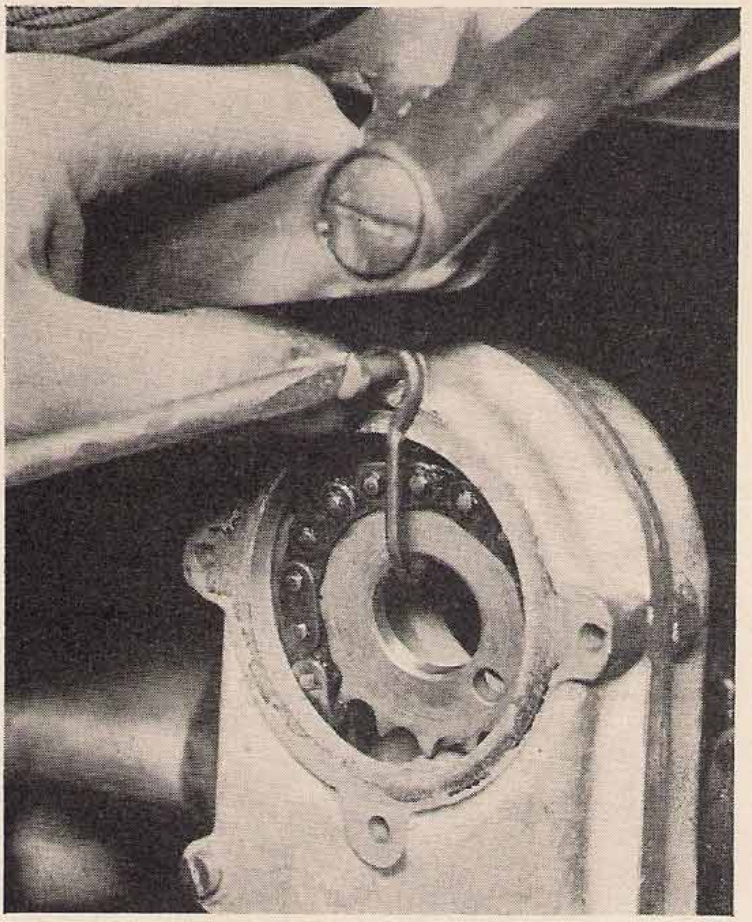

Fig. 5.—With Overhead Camshaft Engines.

Chain and camshaft sprocket securely supported by a wire hook to prevent them falling in the timing cover should the engine be revolved.

Making a Head Joint

Where cylinder heads are held down by means of pins screwed into the top of the cylinder barrel, refitting of the head will be simplified if the head washer is coated with a thin film of oil or vaseline and placed in position on the top of the cylinder. This will prevent the washer moving about during the fitting of the head, and possibly damaging the former when the holding-down pins are inserted.

O.H.V. Tappet Tubes

On o.h.v. engines where rocker boxes are fitted, the push rods are enclosed by tubes, and to get at the former the lock nuts on either end of the latter are unscrewed and the tubes telescoped one inside the other.

To remove the push rods on all o.h.v. engines, special extractor tools are supplied by the makers. Two types have been used (see Fig. 8).

Pistons

On engines where cast-iron pistons have been used, the gudgeon pin was held in position by a thin steel band fitting in a groove.

On earlier models with aluminium pistons the gudgeon pins were held in position with a split cotter, and on later models with aluminium pistons

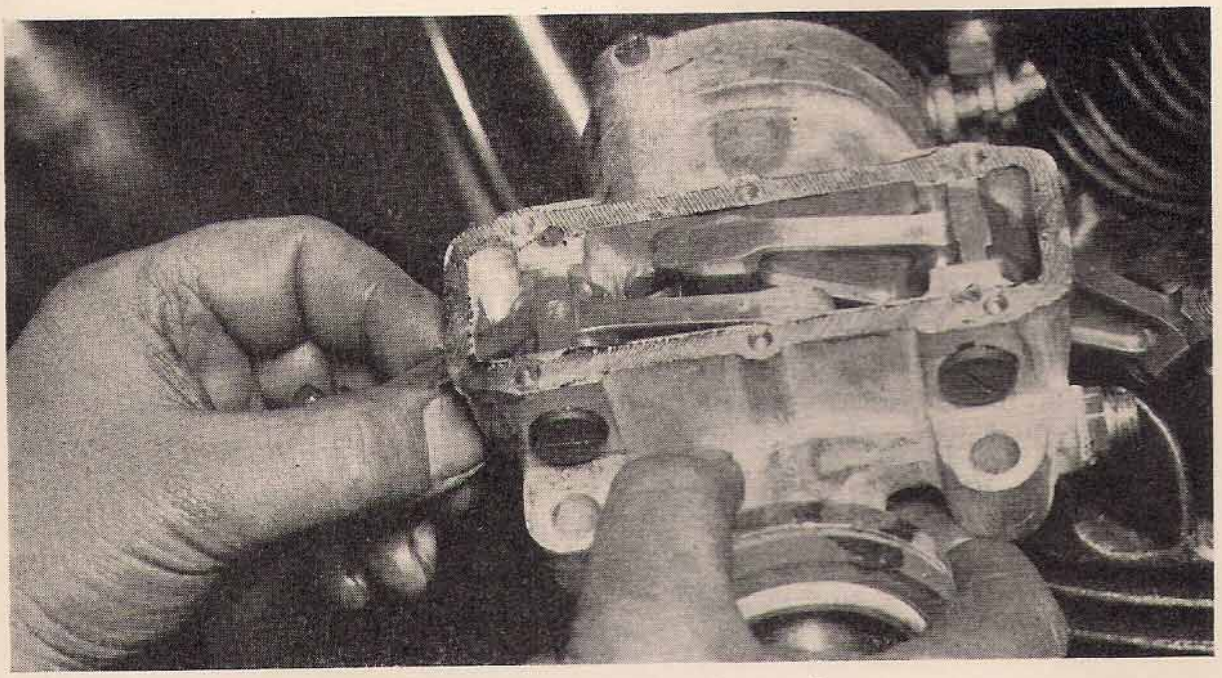

Fig. 6.—CAMBOX COVER REMOVED FOR INSPECTION.

by means of small spring retaining rings inside the gudgeon-pin hole on either side of the piston.

In assembling care should be taken to see that in the case of the steel band fixing, this is below the outside diameter of the piston.

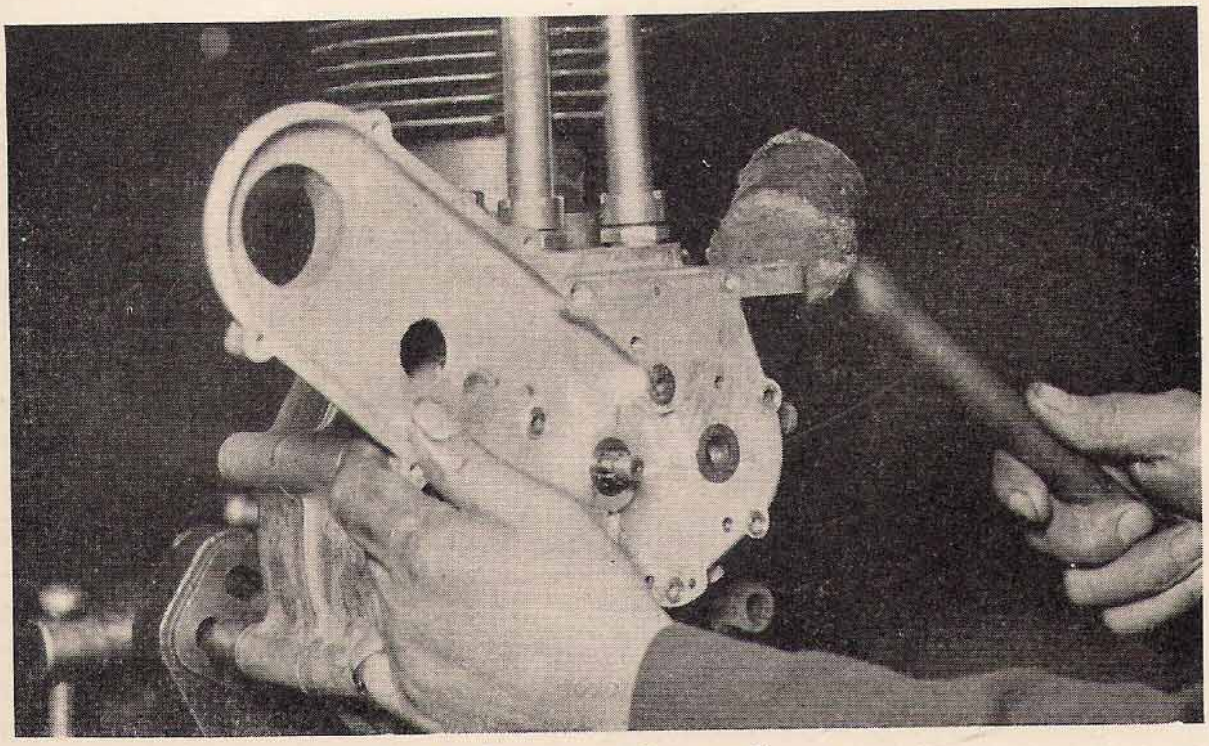

Fig. 7.—REMOVING TIMING COVER.

Tap lightly at the back or on top with a mallet, at the same time pulling the cover away and keeping it square with the crankcase.

Always renew Gudgeon-pin Fixings

In the case of the split-cotter fixing, the original cotter should never be refitted. Always use a new one. The same applies to the spring-retaining rings where these are used, and special care should be taken to see that both these are fitted, as it is quite easy when repairs are being hurried forward for one to be missed. Also see that the retaining rings snap properly into their grooves, as if not, damage will be done by the gudgeon pin forcing the retaining ring against the cylinder wall.

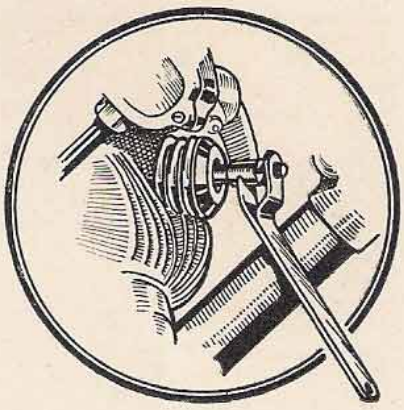

Fig. 8.—Push-rod Extractor.

In the case of all gudgeon pins not held in position with retaining rings, the former are a force fit in the piston bosses, so that care should be taken to support the piston adequately when the gudgeon pin is removed or inserted.

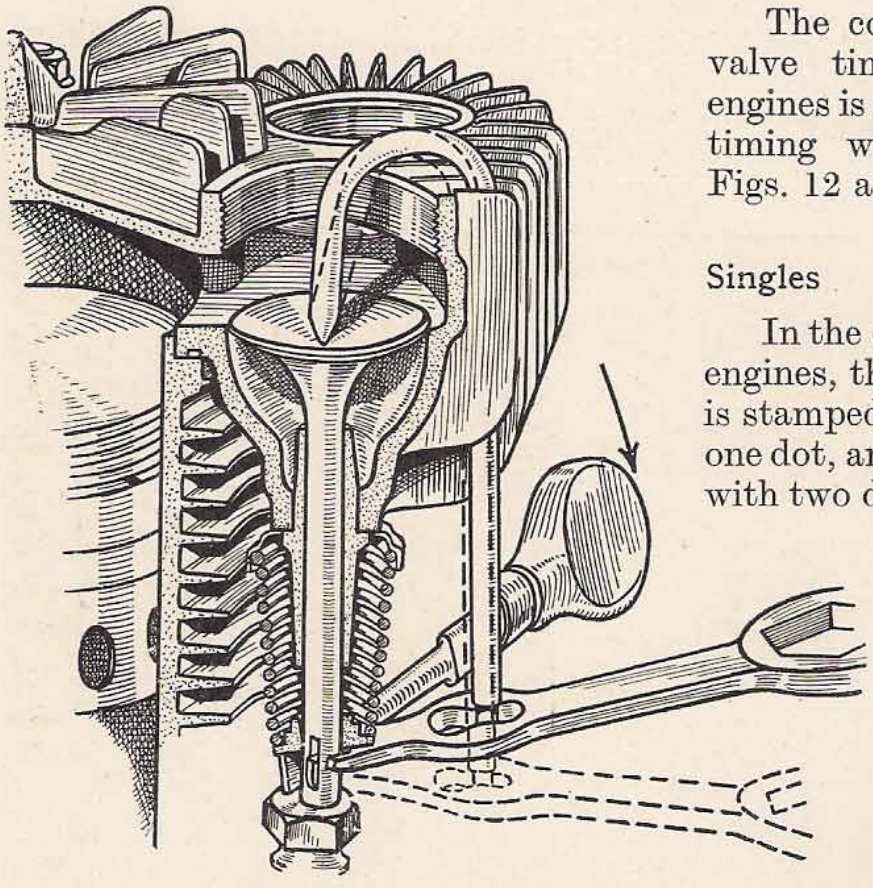

Fig. 9.—Using Valve Extractor.

This illustrates how to use a screwdriver in conjunction with the valve extractor to prevent the valve cone from canting on the stem. If this is not done an undue strain is put on the tool, which becomes distorted, as indicated by the dotted lines, and so loses its effectiveness.

Valve Timing

The correct setting for the valve timing on all A.J.S. engines is clearly marked on the timing wheels, as shown in Figs. 12 and 12A.

Singles

In the case of single-cylinder engines, the small timing wheel is stamped in one position with one dot, and in another position with two dots, these registering with similar marks on the inlet and exhaust camwheels.

Twins

In the case of twin-cylinder engines, there is an additional double camwheel which operates the two inlet valves. This double camwheel is marked with a

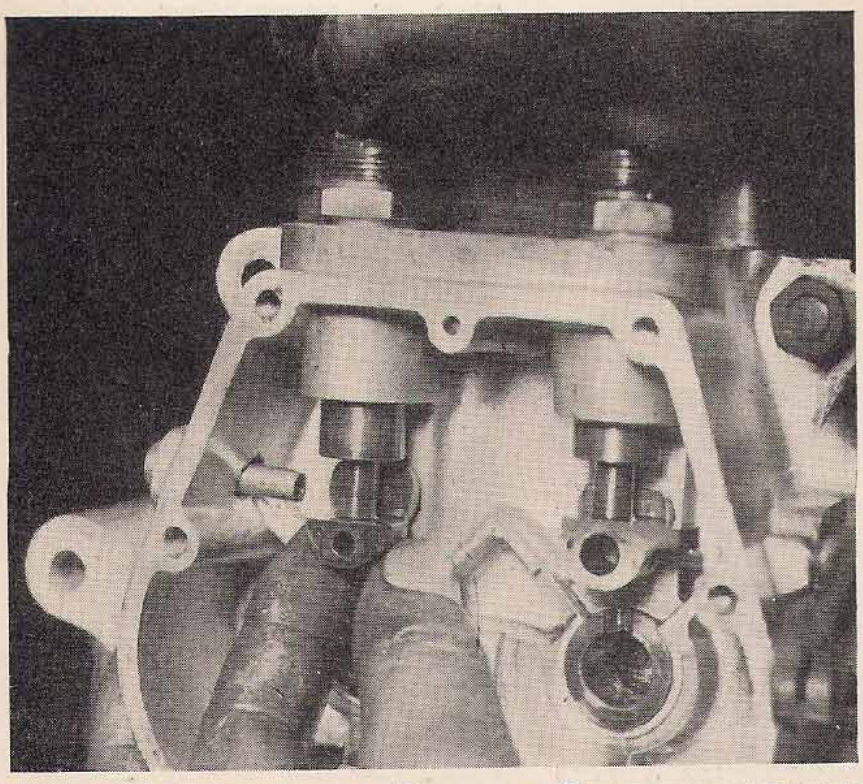

Fig. 10.—Examining for Excessive Clearance between the Foot of the Tappet and the Stud at the Back by twisting the Former with the Fingers.

"dash," which registers with a similar "dash" on the front exhaust camwheel.

O.H.C. Models

On overhead camshaft engines the small timing wheel is stamped with a dot which registers with a similar mark on the magneto driving sprocket. On this sprocket also is an arrow opposite the dot, which points to another arrow on the camshaft sprocket.

Main Bearings

Where plain bearings are fitted, and in case they have to be removed, first examine to see if a fixing screw is employed, as this should be taken out before the bush is driven out of the crankcase or otherwise damage may be done.

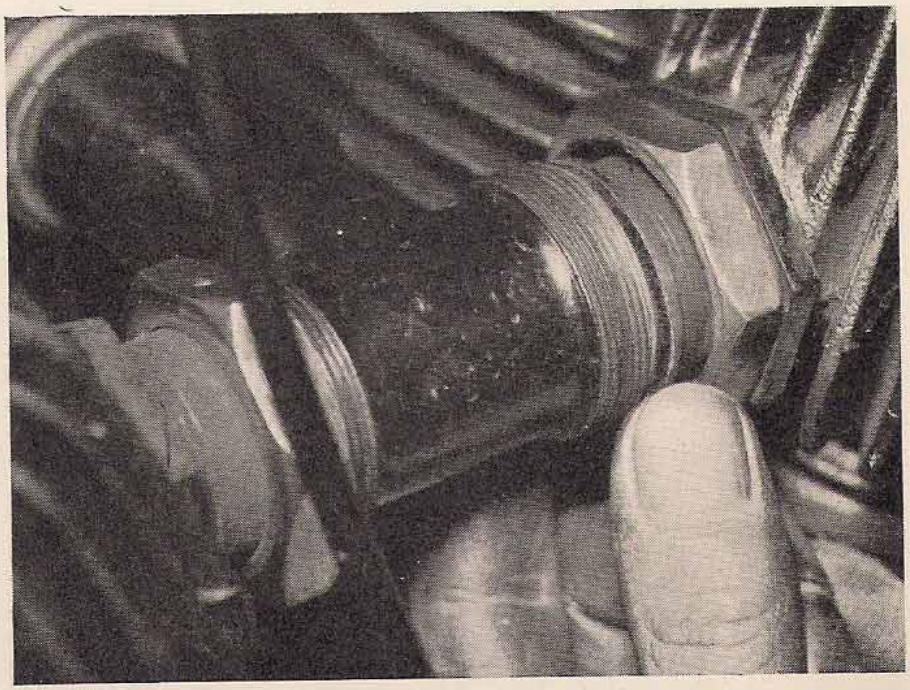

Fig. 11.—Making Airtight Joints on Twin Engines between the Induction and Inlet Pipes.

Slack off the lock nuts on the inlet pipes which are screwed into the cylinder. Screw out the pipes until their faces are flush with those of the induction pipe, leaving no gap. The induction-pipe lock nuts should then be tightened up and afterwards the inlet-pipe nuts.

Big-end Bearing

If the flywheels have been completely dismantled, take

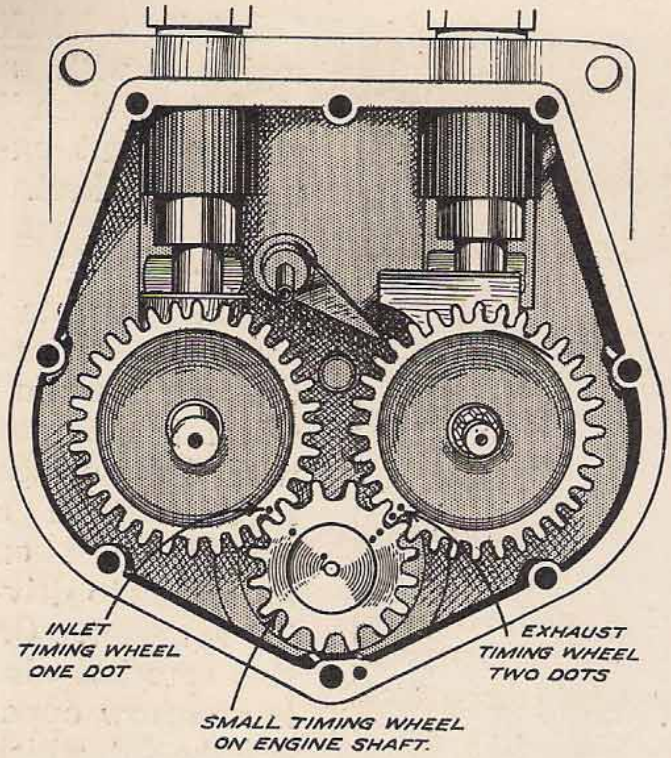

Fig. 12.—Correct Setting of Timing Wheels on Single-cylinder Engines.

care in assembling that a location peg is fitted to the crankpin, which registers with a slot in the flywheel. This is important, as the peg sets the position of holes drilled in the crankpin and up the web of the flywheel for oil feed to the big-end bearing.

Ignition Timing

All A.J.S. engines are provided with vernier adjustment. Fig. 14 shows this arrangement, a description of which might be useful.

The engine magneto driving sprocket is secured to its shaft by means of castellations which render wrong replacement impossible. The sprocket on the armature shaft of the magneto has a vernier adjustment which allows a very accurate and certain method of fixing the drive after the correct setting has been arrived at.

The setting of this vernier adjustment might sound a trifle complicated, but in reality it is quite simple. Fitted to the armature shaft on the magneto is a sleeve which has thirteen holes in a circle. Fitting over the collar on this sleeve is a magneto sprocket which has twelve holes similarly arranged.

On both the engine and the magneto sprockets will be found an arrow. These must point to each other when fitted in the chain. To do this, turn the engine

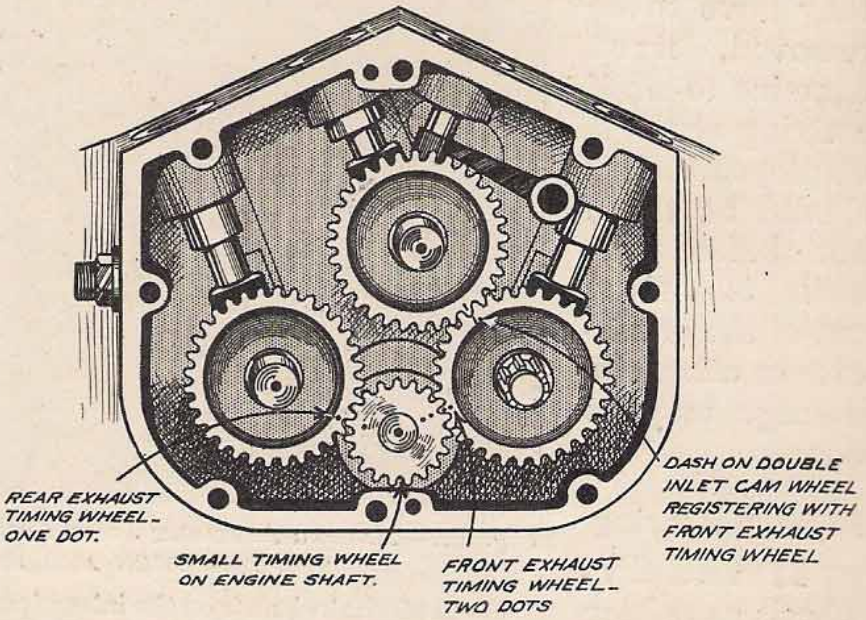

Fig. 12A.—Timing-wheel Setting on Twin-cylinder Engines.

over until the arrow on the driving sprocket is pointing directly towards the arrow on the magneto sprocket. The latter should be held free in the fingers, and moved

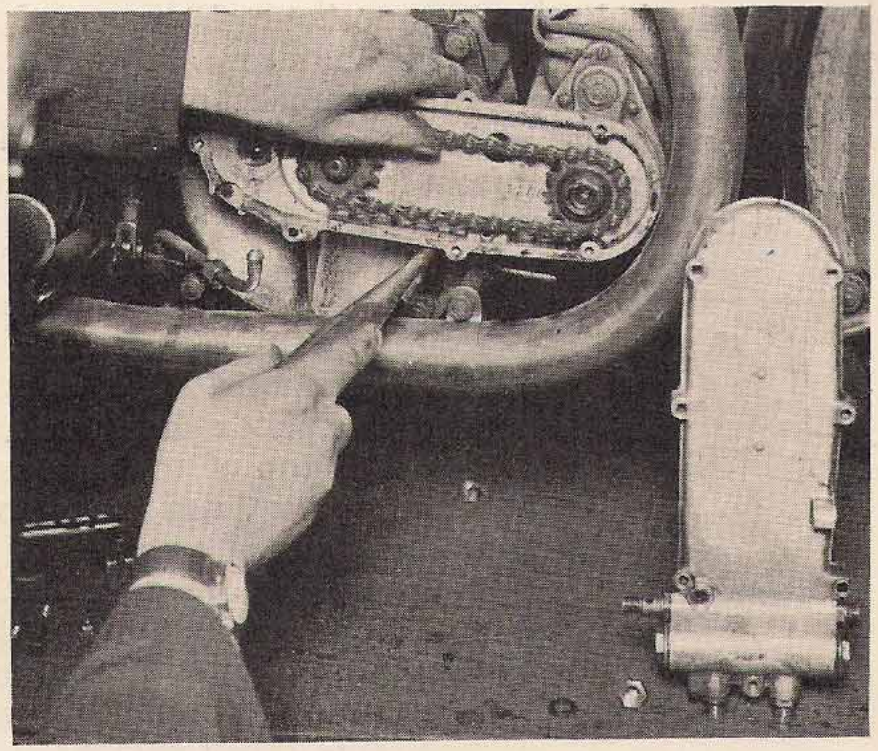

Fig. 13.—Adjusting Magneto Chain on Inclined Engines.

After the nuts on side of the platform have been slacked off, lever the latter up from the front. Note the chain inspection hole.

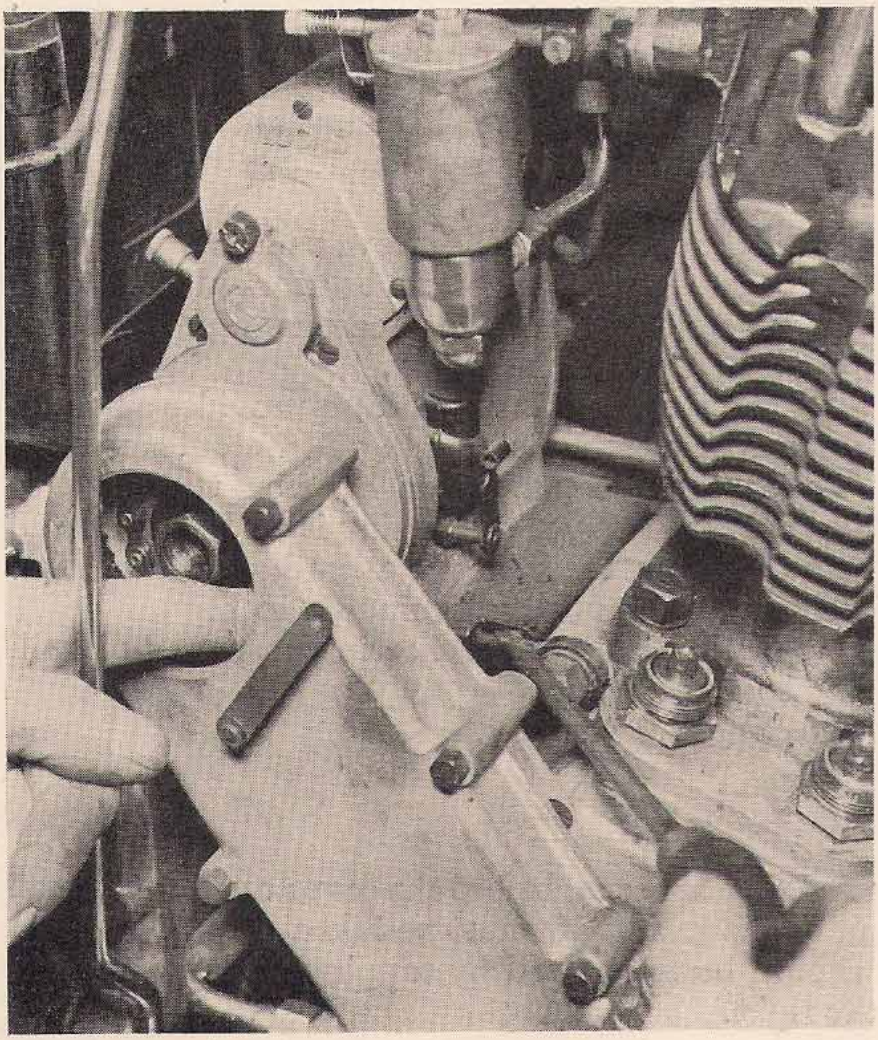

Fig. 13A.—Adjusting Magneto Chain on Vertical Engines.

After slacking the pins under the magneto platform, lever with a screwdriver between the magneto and engine plates. No inspection hole and cover is provided on this model, but can be incorporated by the makers if required.

a tooth backwards or forwards in the chain until the correct setting is arrived at.

Having done this, place the magneto sprocket on the sleeve and turn the armature shaft of the magneto until the mark found punched over one

of the twelve holes on the sprocket registers exactly with a similar mark on the outside of the collar of the sleeve. It will now be found that the marked holes in the sleeve and sprocket respectively coincide, and the peg washer can be pushed into these holes, which effectively prevents the sprocket from moving from its correct setting when the sleeve lock nut is screwed up, without the possibility of the timing moving in the process, as is the case sometimes with other methods.

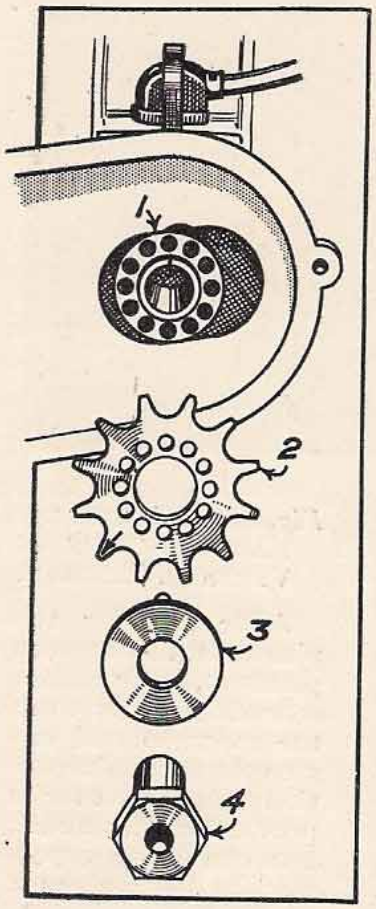

Fig. 14.—MAGNETO TIMING—VERNIER ADJUSTMENT.

1. Magneto sleeve. 2. Magneto sprocket. 3. Peg washer. 4. Sleeve lock nut.

As a means of verifying the timing, or if retiming is necessary on account of the sleeve having been disturbed, on the magneto armature shaft, the piston should be set its correct distance from the top of the compression stroke in the ordinary way, and the sleeve lock nut and peg washer should be removed. This will leave the armature shaft free from the engine drive, but still connected by the chain to the engine. See that the sprockets have their arrows facing each other, as previously mentioned, and that the marks on the sleeve collar and magneto sprocket register with each other. Set the contact-breaker points, fit the peg washer in the marked holes already mentioned, and tighten up the sleeve lock nut.

If the drive has been fixed up as before detailed, when dismantled at any time it can be put back without retiming.

If the one hole in the sleeve and in the magneto sprocket do not happen to be marked, it is well worth adding them, for reasons which will be obvious from the foregoing.

The vernier adjustment also provides a speedy means of altering the timing. First, remove the sleeve lock nut and peg washer from the magneto sprocket. Now, if the timing is to be advanced, fit the peg washer in the next hole to the left. This will advance the timing $\frac{1}{32}$ inch.

Fitting the peg washer in the next hole will give another $\frac{1}{32}$ inch, and so on.

To retard, work in the opposite direction.

GEARBOXES

When dismantling A.J.S. gearboxes, before the cover can be removed the lock nut on the end of the mainshaft must be taken off. This has a left-hand thread, and should be unscrewed by tapping with a punch in the hole provided, to the right.

Behind this nut will be found either a plain steel thrust washer, located by a peg in the cover, or one washer and one ballrace.

How to take up Endplay

In both cases, excessive lateral movement or endplay of the mainshaft is controlled by fitting a thrust washer of suitable thickness until the movement of the mainshaft endways can just be felt.

The plain-thrust washer type can be converted to the ballrace type by the necessary parts which can be supplied by the makers.

How to remove the High Gear

The only difficulty that may be experienced in dismantling an A.J.S. gearbox is in removing the top-speed gear or dog. A special tool is supplied by the makers to remove or fit this part. This job can, however, be carried out in a fairly simple manner.

The difficulty in removing or fitting the top-speed gear is in holding either the gear itself or the driving sprocket whilst the lock nut which holds these two parts together is unscrewed or tightened up as the case may be.

The sprocket can be held rigid for the above operations by holding the gearbox firmly in a vice, by means of the lug at the bottom, then fastening one end of the front or rear chain off the machine underneath the bench, and placing the other end round the sprocket, as shown in Fig. 15.

To unscrew or tighten up the lock nut, the chain has only to be reversed over the sprocket.

The top-speed gear is removed from its ballrace in the gearbox by being tapped with a mallet on the screwed end.

The one end of the chain mentioned above should be fastened to the bench by either a stout nail or wood screw, having a suitable size washer under its head to prevent the screw pulling through the chain link.

When Reassembling—Note

The following may be worth mentioning when gearboxes are being assembled. On the majority of A.J.S. gearboxes the sliding pinion on the mainshaft has a groove machined on one side of the teeth, in which operates an arch for sliding the pinion and engaging gear. In assembling this sliding pinion should be fitted with the groove referred to facing the gearbox cover.

Clutch

The clutches fitted to A.J.S. gearboxes are either single-plate in the case of the 2·48 and 3·49 h.p., and multi-plate on 4·98 h.p. and twin-

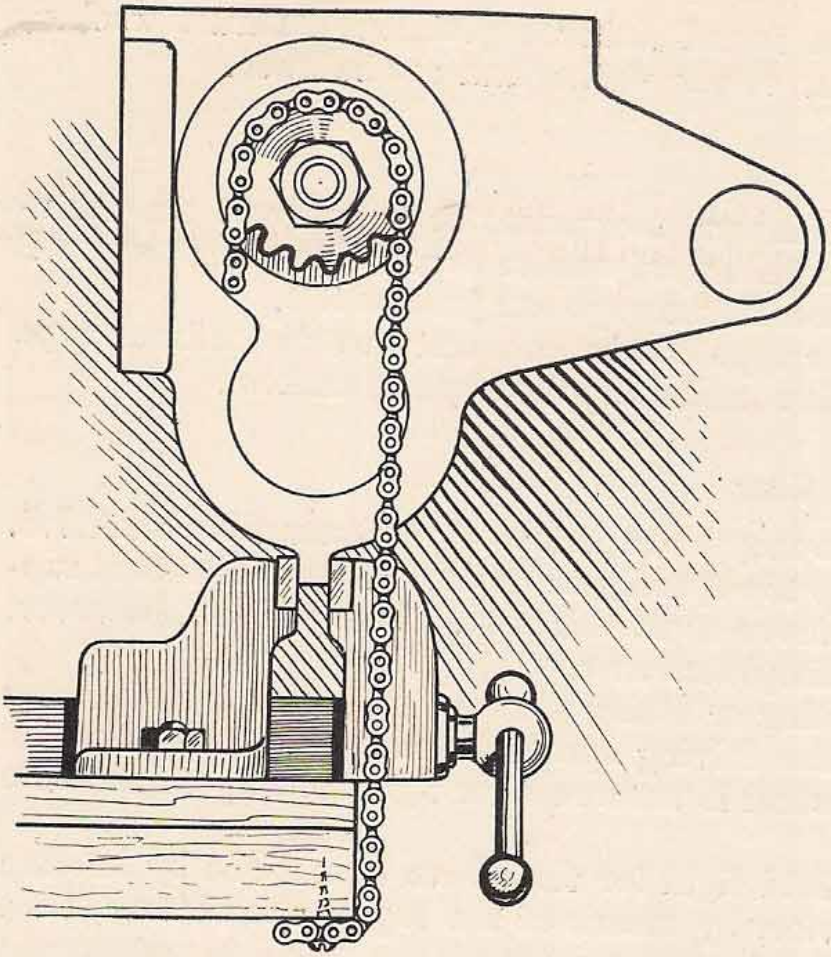

Fig. 15.—Method of removing Top-speed Gear.

This arrangement holds the spocket fast while the lock nut is unscrewed. To tighten up the lock nut, the chain is reversed on the sprocket.

cylinder machines (Fig. 16), and in all cases cork insets are used to transmit the drive.

The only parts of the clutch likely to show signs of wear are the teeth of the sprocket, the key in the sliding plate on the end of the mainshaft against which operates the long push rod, the lugs on the corked plate and the slots in the sprocket by means of which the corked plate is driven (these last two items only concern multi-plate clutches) and the cork insets themselves.

Recorking Clutch Plates

If the necessary facilities are available for doing this job, the following particulars will be useful.

Good quality close-grained corks should be used, and the size must enable them to be pressed in tight, leaving not less than $\frac{1}{4}$ inch standing out either side.

Before the corks are pressed into the plate or sprocket, as the case may be, the sides of the corks should be lightly smeared with fishglue or a similar preparation, to enable them to be firmly held in position, and then placed somewhere warm to dry.

The corks should be machined to the correct length by a V-shaped tool, the corks running at fairly high speed. They should be faced down in all cases, whether fitted to sprocket or plate, until they protrude $\frac{1}{8}$ inch either side.

Under no circumstances should oil be put on the corks: they must run dry.

On multi-plate clutches care should be taken to see when assembling that the corked plate has sufficient lateral movement to be just free between the plates on either side, as otherwise clutch drag, causing difficulty in changing gear, may be experienced.

Adjusting the Clutch

On the 4·98 h.p. and twin-cylinder machines from 1926 provision was made for regulating the lateral movement of this plate. It will be found on the clutch plate fixed to the mainshaft next to the gearbox on some models or the sliding plate on the end of the mainshaft on others that there are four pegs. There will also be seen four adjusting pins, which are secured by a locking device consisting of four short lengths of spring wire which fit in the slots in the heads of the pins.

When the corked plate with the two lugs already referred to has too much lateral movement, this can be adjusted by raising the spring wires out of their slots and screwing the pins up equally until the corked plate is just free.

On clutches where there is no provision for adjusting, the lateral movement should be taken up by recorking the plate.

Foot-starter

On all A.J.S. gearboxes up to 1929 the foot-starter mechanism was fitted on the outside of the gearbox, and with these machines the following tips may be useful in replacing the foot-starter crank return springs.

On these gearboxes, where one end of the spring is attached to the foot-starter quadrant, proceed as follows (see also Figs. 17 and 17A):

After fastening the spring on the outside of the quadrant-shaft bracket, and inserting the quadrant shaft in its bearing, hook the free end of the

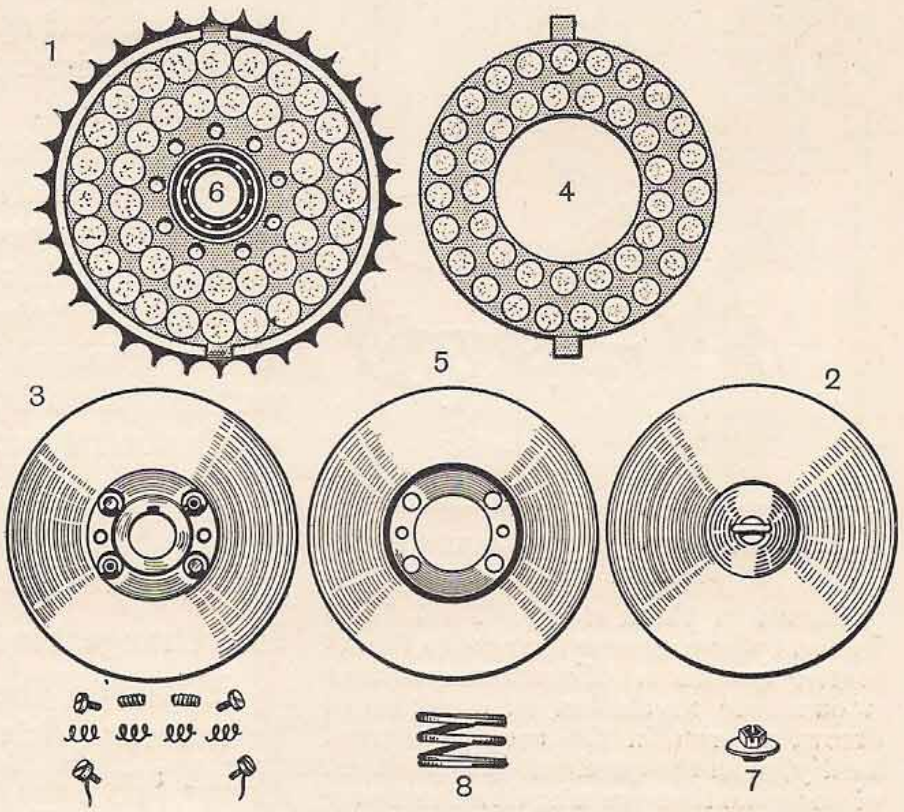

Fig. 16.—A.J.S. 4·98 H.P. AND TWIN CLUTCH PARTS.

1. Clutch sprocket fitted with cork inserts.
2. Sliding plate (note key in centre which passes through main gearbox shaft).
3. Fixed plate, with adjusting pins and locking device.
4. Plate fitted with cork inserts (driven by No. 1).
5. Dished plate (driven by No. 3).
6. Ball bearing on which No. 1 revolves when clutch is disengaged.
7. Clutch-spring adjusting nut.
8. Clutch spring.

spring over the top spoke of the quadrant, turn the latter a complete revolution to the right, and now push the quadrant into position, so that the stop on the former engages with that on the chain stay of the frame, at the same time pressing with both thumbs on the outer coils of the spring, down and over the kick-starter shaft bearing.

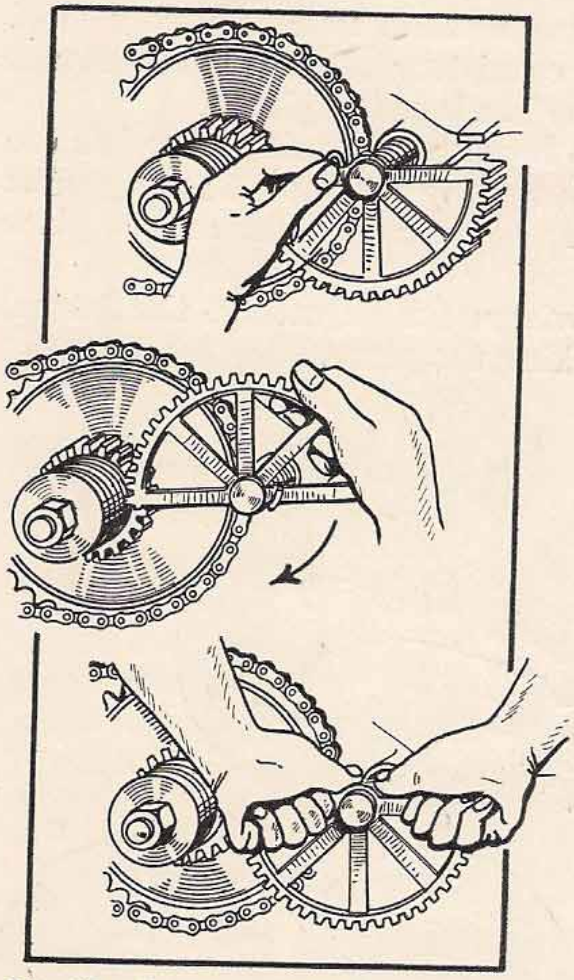

Fig. 17.—METHOD OF REPLACING FOOT-STARTER SPRING.

Shown in three stages. First hook free end of spring over top spoke of foot-starter quadrant. Then turn quadrant a complete revolution in direction of arrow, as seen in the second picture. Lastly, push the quadrant into position, at the same time pressing down and over foot-starter shaft tube.

On 1928 and 1929 2·48 h.p. machines one end of the return spring was hooked round the foot-starter crank, and although not difficult perhaps to fit or remove, the most simple and quickest way is to fasten a stout piece of string on to the hooked end of the spring, and pull the latter inwards and backwards until the hook is released. Fitting the spring is carried out in the same way.

This method will avoid damage to the crank and spring and possibly the hands, if prised off with a screwdriver or similar tool.

On some gearboxes the end of the foot-starter shaft is splined or serrated, and in this case the crank was not definitely positioned.

When refitting, the normal position of the crank should be just over the vertical, that is, inclined slightly towards the rear of the machine.

REPAIRS TO A.J.S. WHEELS, FORKS, ETC.

Interchangeable and Detachable Wheels

Fitted to the brake drum are six permanent driving studs, three of which are short and plain, acting as dummy drivers, and the other three longer and screwed.

On one flange of the hub are six holes corresponding in position with the six studs on the brake drum. On the other flange of the hub are six larger holes, corresponding in position with the holes on the opposite flange.

The wheel is fitted to and driven by the above six studs, the hub being held securely to the brake drum by means of three sleeve bolts passing through three of the large holes in the one hub flange, and screwing on to the three driving studs in the brake drum.

A centre spindle, screwed at the end, passes through the hollow spindle of the hub and engages with an internally screwed dummy bearing in the brake drum, which locks the whole up solid.

Inside each of the three larger holes in the hub flange, through which pass the sleeve bolts, is a narrow groove, and near the end of each sleeve bolt is a spring-loaded ball.

Should the sleeve bolts become loose, they are prevented from unscrewing right off the driving stud by the ball in the sleeve bolt dropping into the groove in the hole in the flange.

How to remove the Wheel

To remove the wheel from the drum first unscrew the three sleeve bolts right out, next the centre spindle, together with the distance piece, the space left by the latter enabling the wheel to be drawn off the driving studs. This leaves the drum supported in the frame by the dummy bearing.

The above applies to front and rear wheels where they are interchangeable. In refitting reverse the operations.

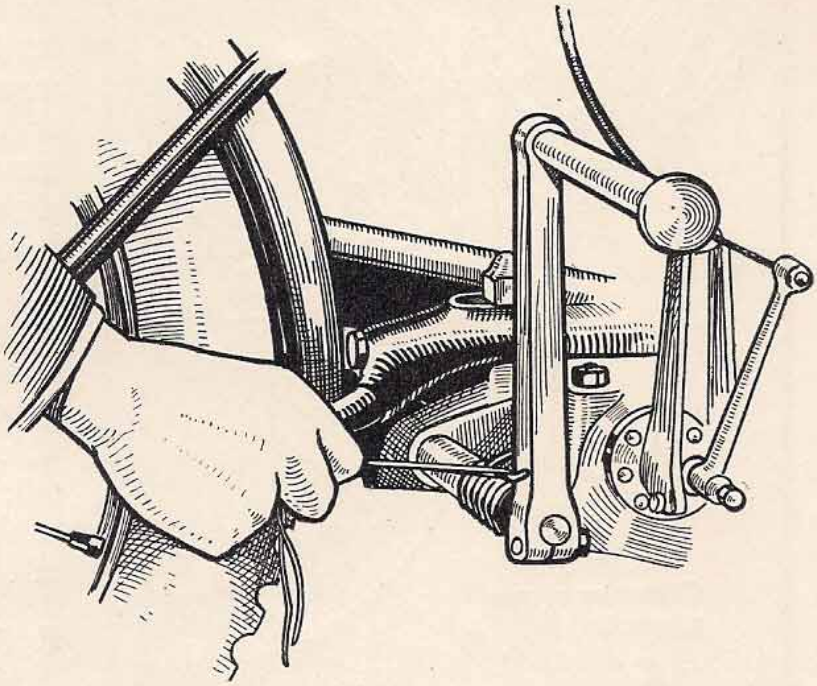

Fig. 17A.—METHOD OF REPLACING FOOT-STARTER SPRING.

In cases where the spring end is hooked round the foot-starter crank, a piece of string used as shown is convenient for unhooking or replacing it.

HUBS

Ball-bearing Type

On all machines up to 1928 the hubs ran on ball bearings of the cup-and-cone type, and later on taper roller bearings, both being disk adjusting by means of the cup (right-hand thread), on the side of the hub opposite the brake drum.

Two methods of adjusting or removing the cup have been used, either by means of a peg spanner fitting in holes in the face of the cup or in slots on the outside of the cup.

In dismantling first remove the lock ring, screw out the cup, when the hollow spindle and balls can be taken away.

On machines up to 1927 the cup on the brake side of the hub was "fixed," i.e. screwed left-hand into the hub and reeled in.

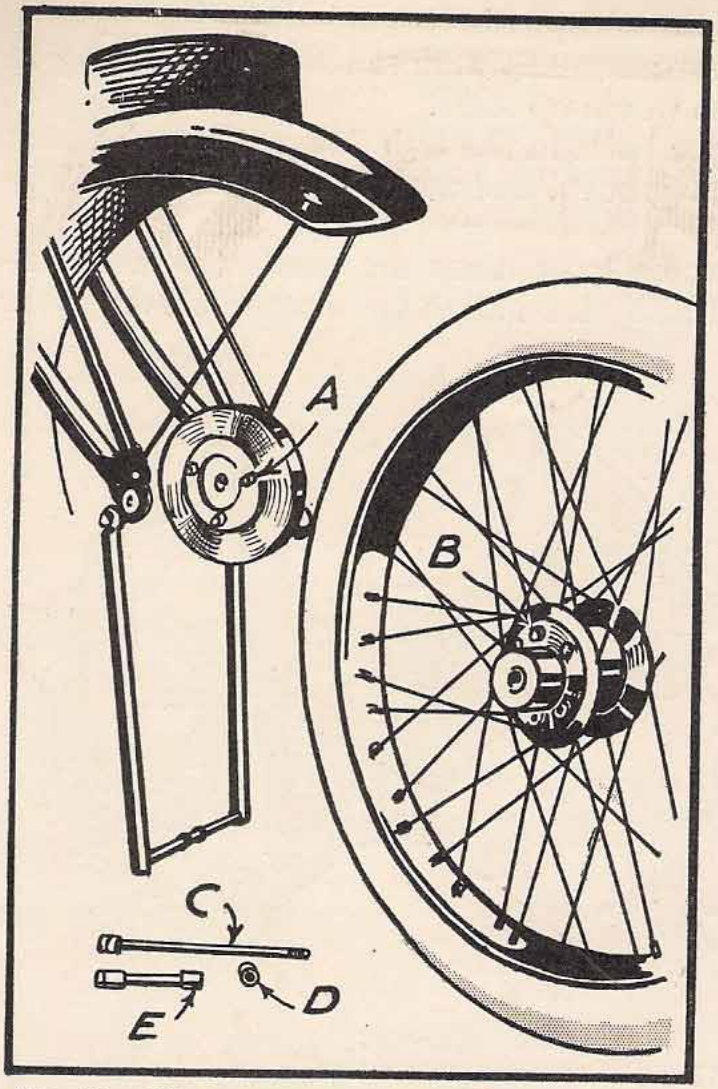

Fig. 18.—How to remove the Front Wheel.
A.—Driving Pins. C.—Centre Pin.
B.—Sleeve Nuts. D.—Distance Piece.
E.—Sleeve Nut.

Unscrew the three sleeve bolts and take out the centre pin, which will allow wheel to be drawn off the driving studs on the brake drum.

On later models this cup was secured by means of a lock ring in the same manner as the cup on the other side of the hub.

On those hubs where the brake side cup is " fixed " it is a difficult matter to remove it, owing to the fact that, as has already been mentioned, it is reeled in, and the removal and replacement, if this is necessary, should in the ordinary way be undertaken by the makers. A tool, however, can be supplied by them for the above purpose, or if the necessary facilities are available for making one, a tool can be made to remove and replace the cup quickly and effectively (see Fig. 19).

Roller-bearing Type

In the case of the taper roller-bearing hubs there are one or two important points which should have careful attention when the bearings are being dismantled or assembled.

To dismantle release the locking nut and screw out the adjusting ring ; the dished plate containing the felt washer and plain plate will then drop out.

Take out the spring ring from the opposite side of the hub and remove the felt washer and holder, consisting of two plates and retaining ring (the latter being between the two plates). The hollow spindle can then be pressed or driven out from either end, bringing with it one of the outer races ; the other race can then be driven out.

After examination has been made, if any excessive wear has taken place on the races of the spindle itself, a complete bearing should be fitted. No attempt should be made to remove the cage holding the rollers, or damage will be done, as these are fitted by a special process.

No component parts of the hollow spindle are supplied, only the complete unit.

Important when Reassembling

To reassemble press in the outer race on the fixed or plain end of the hub, *taking great care that it goes in square.* This race is pressed in about $\frac{1}{32}$ inch beyond its actual position to enable the felt washer and its retaining ring, together with the two plates, to be put in and the spring ring to snap into its groove. *Great care must be taken to put the plate with the larger hole in last. This is most important.*

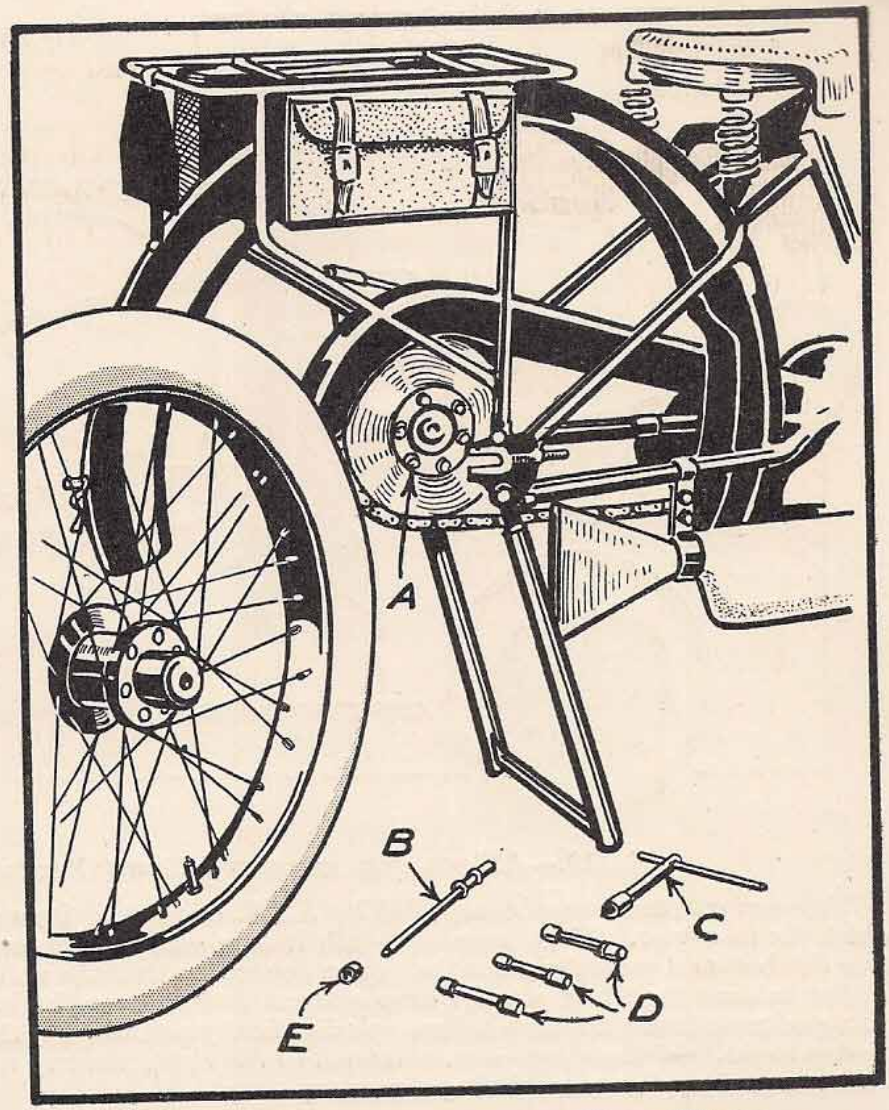

Fig. 18.—How to remove the Rear Wheel.

A.—Driving Pins. C.—Box Spanner.
B.—Centre Pin. D.—Sleeve Nuts.
E.—Distance Piece.

With the box spanner provided *first* unscrew the three sleeve nuts which pass through the hub flanges. *Then* unscrew the centre pin and draw it completely out, together with distance piece. The wheel may now be drawn off the driving studs in sprocket.

This other race can now be forced back until the plates are tight on the spring ring. The hollow spindle can now be inserted, the short end being placed in first. *The long end of the spindle must be on the adjusting side.*

The outer race can now be pressed in until there is about $\frac{1}{16}$ inch endplay in the spindle, insert the plain plate and dished plate with the felt washer, screw in the adjusting ring, *and gradually screw down until there is just a fraction of endplay in the spindle.* This should be ·001 inch. *It is of the utmost importance that the bearings are not adjusted too tight, as this would ruin them in a few miles.*

Having got this adjustment correct, the locking ring can be put on and tightened up, *again taking care that the adjusting ring does not creep forward and make the bearings too tight.*

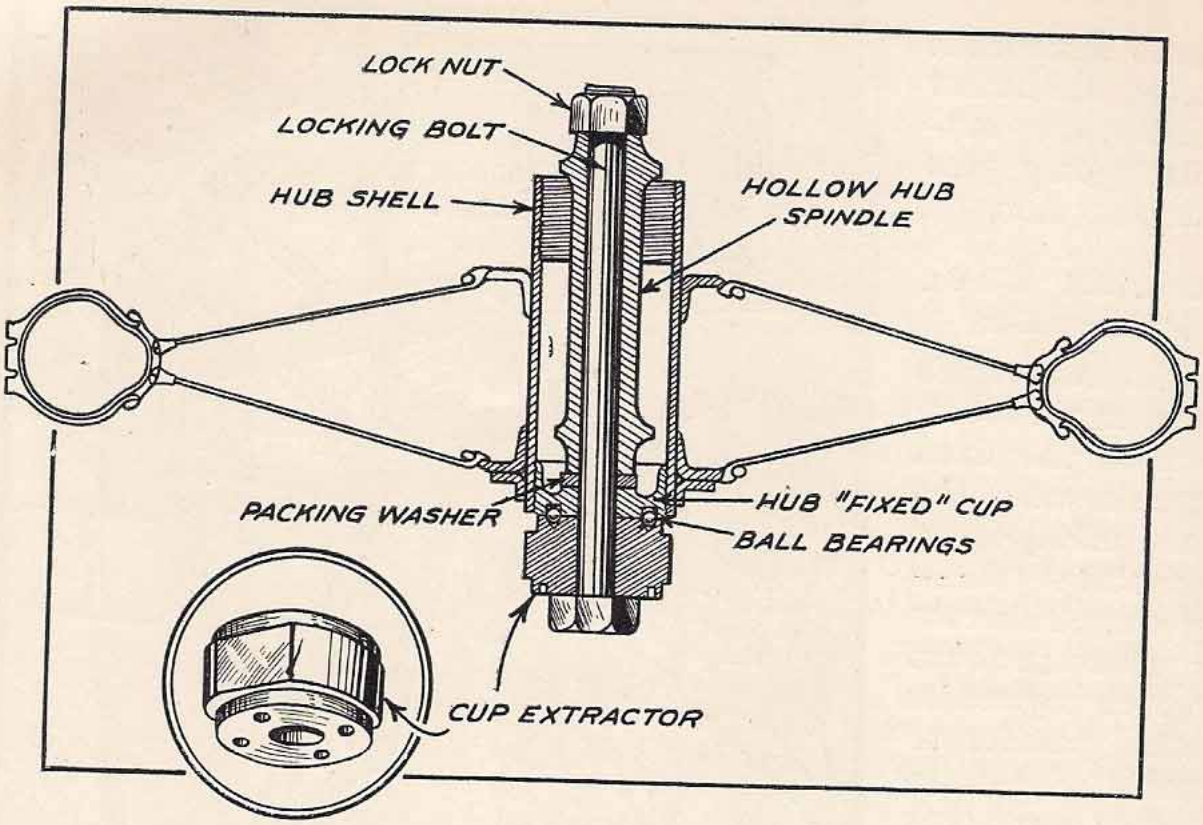

Fig. 19.—A Tool for removing Hub "Fixed" Cup.

The cup extractor can be supplied by A.J.S. or made. Pass a bolt through the tool, which fix in a vice. Next insert a $\frac{1}{8}$-inch ball in each of the four holes, thread the hub over the bolt and carefully place the cup on the tool so that the balls fit the holes in the cup. Whilst holding the wheel steady, drop a stout washer over the bolt to the bottom of the hub, and next insert the hub hollow spindle, finally screwing on the bolt nut and screwing up deadtight. If the wheel is now turned to the right, the cup will easily unscrew. The same method applies when fitting a new cup.

Brakes

On all A.J.S. machines, except very early models, the brakes are of the internal expanding type, the brake shoes being aluminium and operated by a cam and lever.

Assuming that the brake drum complete has been taken away from the machine, to dismantle to get at the shoes the anchor plate, to which is fitted the brake lever and shoe-expanding cam, must first be removed, and difficulty may be experienced in unscrewing the lock nut which secures the anchor plate to the dummy bearing of the drum (see Fig. 21).

Tackling a Difficult Job

The difficulty in removing this lock nut is in most cases due to it having rusted up.

If the following instructions are carried out the removal of the lock nut can be effected fairly easily in the most obstinate cases.

If the hubs of the wheels have not been dismantled fix the brake

drum to the hub and secure by means of the centre spindle, first taking care to see that the centre spindle does not stand out beyond the end of the hollow spindle more than ½ inch. The wheel distance pieces and extra packing washers should be used to get this distance. Now screw the centre spindle up tight so that the brake drum is locked up solid to the hub and hold the end of the centre spindle firmly in a vice.

With an open-ended spanner the anchor-plate lock nut should now be unscrewed (right-hand), whilst at the same time the brake lever is pushed hard forward. The latter action expands the brake shoes on to the drum and locks the whole solid, enabling the nut to be freed.

Examining Parts for Wear

When dismantled it may be found that, in the case of the quick-detachable wheels, the dummy bearing, where it fits in the drum centre, and the latter may show signs of wear, in every case caused by the wheels being run with slack bearings. Unless the wear is very bad there is no need to replace either the dummy bearing or the centre, as all they have to do is support the brake drum complete when the wheel is removed.

Careful inspection, however, should be made of the drum driving studs, and if the threads are not good they should be replaced. The same applies to the sleeve bolts. This is important, as a loose sleeve bolt can hammer the hub flange and in time possibly crack it.

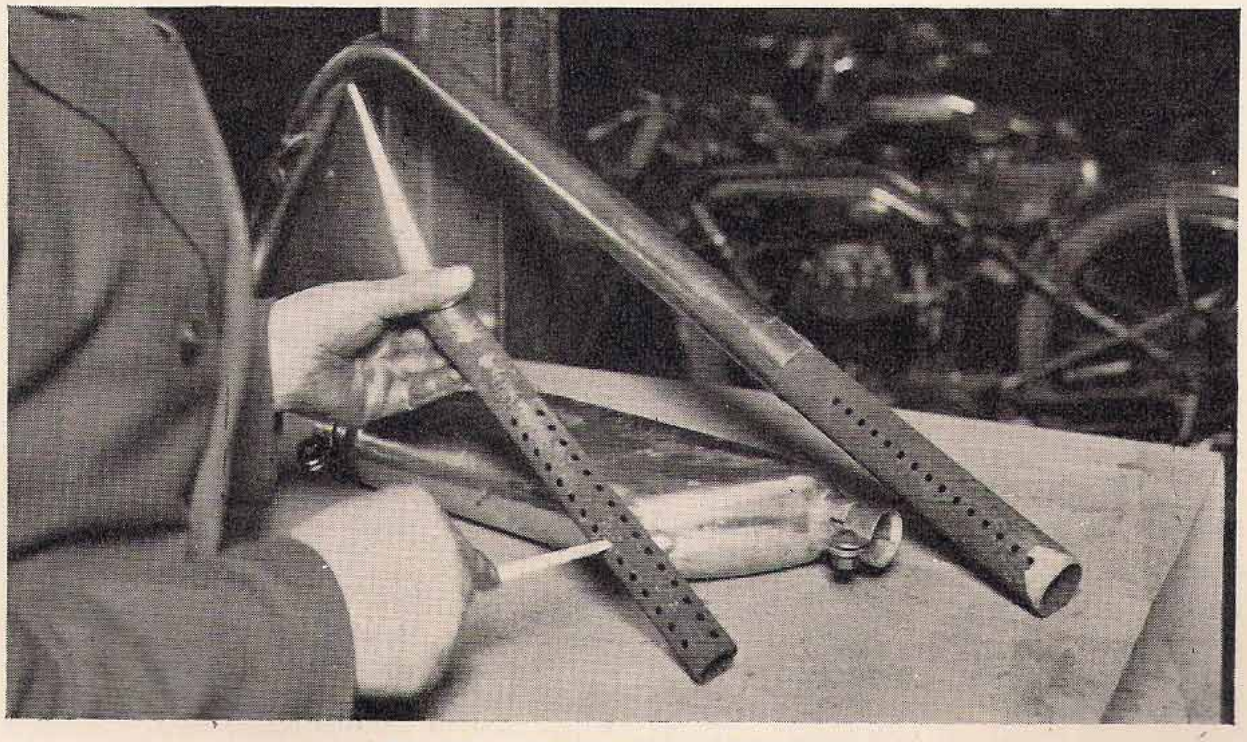

Fig. 20.—Attention to Silencer.

Cleaning the holes in the silencer baffle pipes, which in time get choked with carbon.

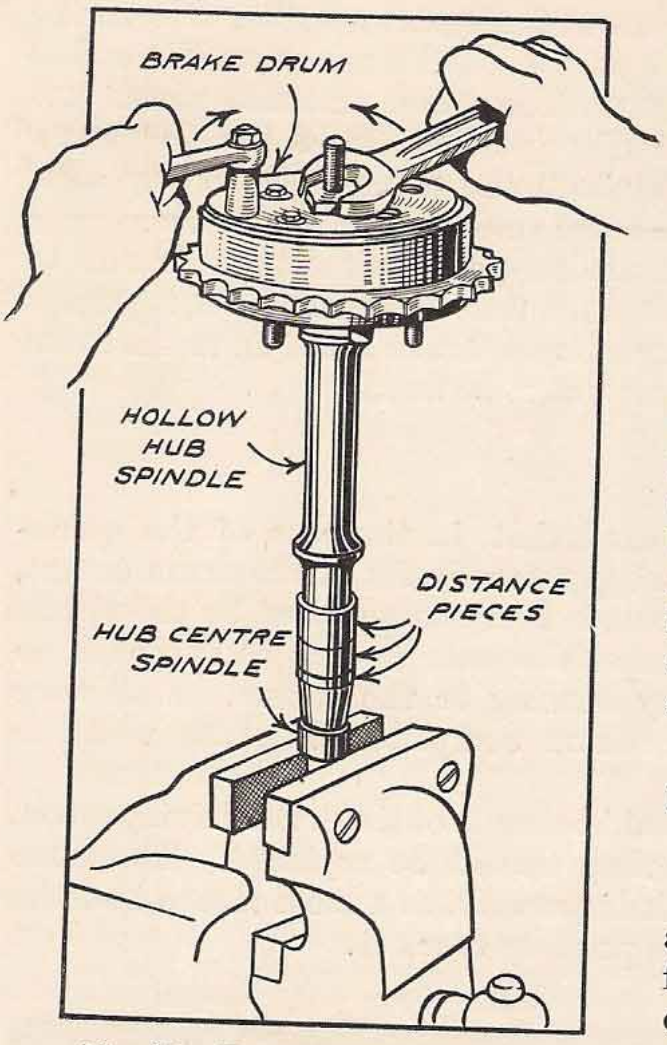

Fig. 21.—To dismantle Brake.
Shows the method of removing the brake anchor-plate lock nut in order to get at the shoes.

stem, should this have been left tightened on the pad pegs.

The nut below the knob should then be removed and the control spindle unscrewed right out. Next remove the fork from the frame in the usual way, the sleeve and pads being withdrawn with it. Take away the pads from the fork stem and shake out the sleeve, or if this happens to stick in the stem, screw the control spindle into it and withdraw. If wear has taken place, the holes in the stem should be enlarged to a suitable size and oversize pegs fitted to the pads.

The screwed driving studs being a loose fit in the drum need not cause any concern, as they are held securely by the drum centre and locked up solid when the sleeve bolts are tightened up.

Rear-wheel Alignment

For checking the rear-wheel alignment in the frame after adjusting the chains, or if the wheel complete with brake drum has been removed, on machines from 1926 a device is fitted to the frame for carrying out the setting of the rear wheel quickly and correctly (see Fig. 22).

Dismantling the Steering Damper —1929 Model

First remove the handlebars and unscrew the damper knob a few turns; then tap it smartly on the top with the hand, which will release the sleeve in the fork

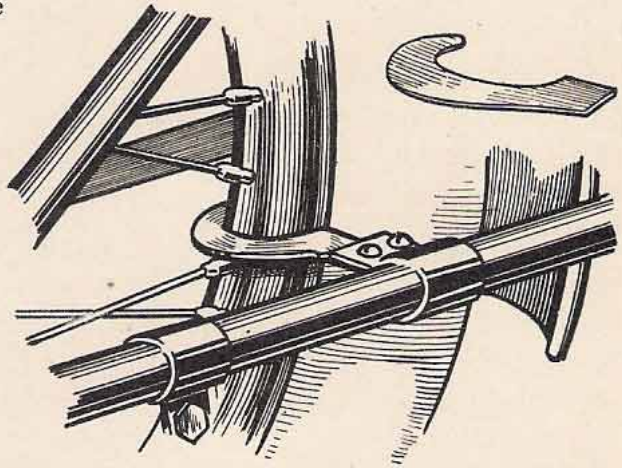

Fig. 22.—Checking Rear-wheel Setting.
Clipped to the chain stay is a flat piece of steel at right angles to the wheel. To check the setting of the wheel a gauge, which is supplied with the tool kit, is used. This fits round the rim of the wheel as shown. If the setting is correct, the end of the gauge should just touch the flat piece of steel.

Reassembling

To assemble, first screw the sleeve on the control spindle and insert the sleeve into the fork stem; then fit the pads, seeing that their pegs fit in the grooves of the sleeve; then remove the control spindle, and whilst holding the pads in position gradually work the fork stem and the pads into the frame lug.

The forks can now be fitted up in the ordinary way, afterwards screwing the control spindle into the sleeve and fastening the former to the fork stem by the lock nut.

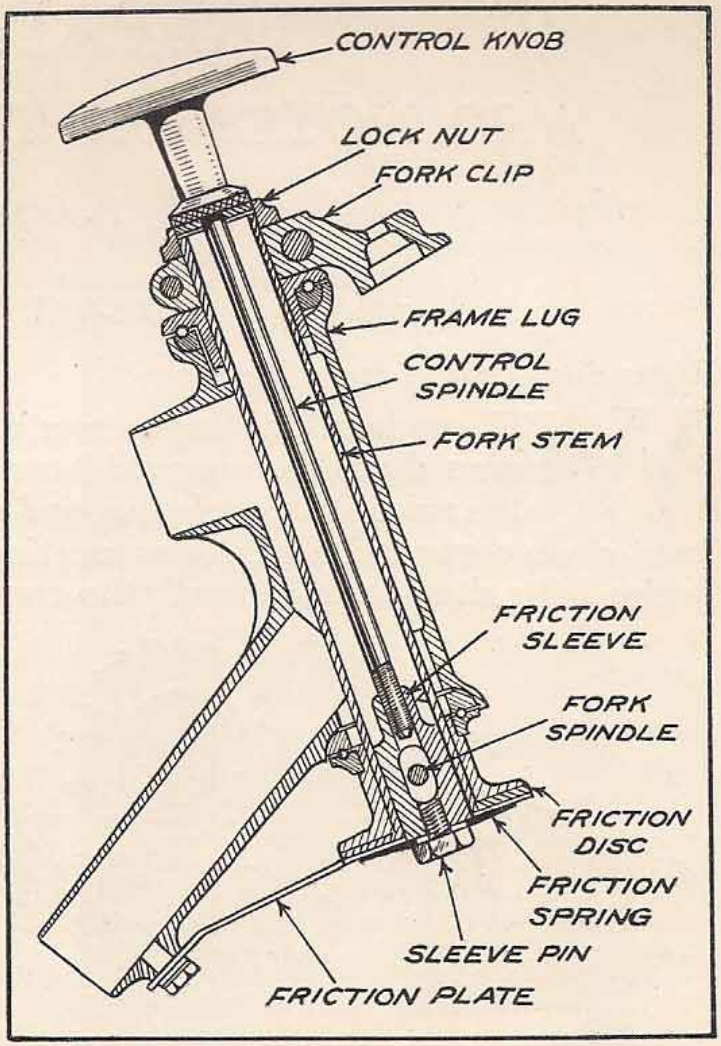

Fig. 23.—Steering Damper Arrangement (1930–31).

1930–31 Steering Damper

In this case (see Fig. 23) there is no need to remove the fork. First remove the pin securing the friction spring to the damper sleeve, which is inside the fork stem, next slack off a few turns the pin securing the friction plate to the frame lug and swing aside, this releasing the fabric friction disk. If it is required to dismantle completely, first unscrew the hexagon nut below the control knob which secures this to the fork stem and unscrew the control spindle right out.

The nut on the end of the rear fork spindle which passes through the fork stem lug should now be taken off and the spindle unscrewed out of the fork side plate or link, and withdrawn from the lug about three-quarters of its length. *Do not take it right out.*

This spindle passes through an elongated hole in the damper sleeve and must be withdrawn just sufficiently to free the latter.

The sleeve can now be taken out of the fork stem from the bottom.

In refitting reverse these operations, but when inserting the sleeve, see that the elongated hole is facing the fork spindle.

TIMING CHARTS FOR

1919–1928

MODELS.	INLET.		EXHAUST.		IGNITION MAX. ADV. Before T.D.C.	Tappet Clearance.	
	Opens before T.D.C.	Closes after B.D.C.	Opens before B.D.C.	Closes after T.D.C.		Ex.	In.
6 h.p., 1919-20: Front Cylinder	0°	30°	54°	0°	35½°	·008″	·006″
Rear Cylinder	0°	30°	50°	12°	35½°	·008″	·006″
3·49 h.p. Touring S.V., 1921.	8½°	48°	58°	25°	37°	·008″	·006″
3·49 h.p. Sporting S.V., 1921	21½°	60°	60°	32½°	37°	·008″	·006″
3·49 h.p. Touring S.V., 1922-4	8½°	48°	58°	25°	37°	·008″	·006″
3·49 h.p. Sporting S.V., 1922-4	17½°	60°	53°	27°	42½°	·008″	·006″
7 h.p., 1921-8: Front Cylinder	0°	27°	54½°	0°	34°	·008″	·006″
Rear Cylinder	0°	27°	51°	0°	34°	·008″	·006″
3·49 h.p. O.H.V., 1923-7	15°	58°	50°	25°	47°	·008″	·006″
3·49 h.p. Sporting S.V., 1925-7	15°	58°	50°	25°	37°	·008″	·006″
3·49 h.p. Touring S.V., 1925-7	15°	58°	50°	25°	38°	·008″	·006″
4·98 h.p. O.H.V., 1926-7	10°	33°	51°	5°	37°	·008″	·006″
4·98 h.p. S.V., 1927	15°	58°	50°	25°	38°	·008″	·006″
3·49 h.p. K3 S.V., 1928	20°	48°	48°	35°	34°	·008″	·006″
3·49 h.p. K4 & 5 S.V., 1928	20°	48°	48°	35°	43°	·008″	·006″
3·49 h.p. K6 O.H.V., 1928	20°	50°	50°	35°	46°	·008″	·006″
3·49 h.p. & 4·98 h.p. K7 & 10 O.H.C., 1928	30°	55°	50°	25°	52°	·018″	·016″
4·98 h.p. K8 O.H.V. & K9 S.V., 1928	20°	51°	61°	12°	37°	·008″	·006″
2·48 h.p. K12 S.V., 1928	17°	44°	41°	27°	39°	·008″	·006″

"A.J.S." ENGINES

1929–1930

MODELS.	INLET.		EXHAUST.		IGNITION MAX. ADV. Before T.D.C.	Tappet Clearance.	
	Opens before T.D.C.	Closes after B.D.C.	Opens before B.D.C.	Closes after T.D.C.		Ex.	In.
9·96 h.p. M1 & 2, 1929	20°	51°	58°	13°	35°	·008″	·006″
3·49 h.p. M3 Touring S.V., 1929	20°	51°	50°	35°	37°	·008″	·006″
3·49 h.p. M4 & 5, Sporting S.V., 1929	20°	51°	50°	35°	40°	·008″	·006″
3·49 h.p. M6 O.H.V., 1929	20°	51°	50°	35°	45°	·008″	·006″
3·49 h.p. M7 Overhead Camshaft, 1929	30°	55°	50°	25°	53°	·018″	·016″
4·98 h.p. M8 O.H.V., 1929	20°	51°	50°	35°	37°	·008″	·006″
4·98 h.p. M9 Touring S.V., 1929	20°	51°	50°	35°	35°	·008″	·006″
4·98 h.p. M10 Overhead Camshaft, 1929	30°	55°	50°	25°	49°	·018″	·016″
2·48 h.p. M12 S.V., 1929	20°	51°	58°	13°	38°	·008″	·006″
9·96 h.p. R2 Touring S.V., 1930	20°	51°	58°	13°	35°	·008″	·006″
3·49 h.p. R4 & 5 Touring S.V., 1930	20°	51°	50°	35°	41°	·008″	·006″
3·49 h.p. R6 O.H.V., 1930	20°	51°	50°	35°	46°	·008″	·006″
3·46 h.p. R7 Overhead Camshaft, 1930	20°	55°	68°	25°	50°	·018″	·016″
4·98 h.p. R8 O.H.V., 1930	20°	51°	50°	35°	38°	·008″	·006″
4·98 h.p. R9 S.V. Touring, 1930	20°	51°	50°	35°	39°	·008″	·006″
4·95 h.p. R10 Overhead Camshaft, 1930	20°	55°	68°	25°	47°	·018″	·016″
2·48 h.p. R12 O.H.V., 1930	20°	51°	50°	35°	39°	·008″	·006″

1931

9·96 h.p. S2 Touring S.V., 1931	20°	51°	58°	13°	35°	·008″	·006″
3·99 h.p. S4 S.V., 1931, & 3·49 h.p. S5 S.V., 1931	20°	51°	50°	35°	41°	·008″	·006″
3·49 h.p. S6 O.H.V., 1931	20°	51°	50°	35°	46°	·008″	·006″
3·49 h.p. S7 Overhead Camshaft, 1931	20°	55°	68°	25°	50°	·018″	·016″
4·98 h.p. S8 O.H.V., 1931	20°	51°	50°	35°	38°	·008″	·006″
4·98 h.p. S9 S.V., 1931	20°	51°	50°	35°	39°	·008″	·006″
4·98 h.p. S10 Overhead Camshaft, 1931	20°	55°	68°	25°	47°	·018″	·016″
2·48 h.p. S12 O.H.V., 1931	20°	51°	50°	35°	39°	·008″	·006″