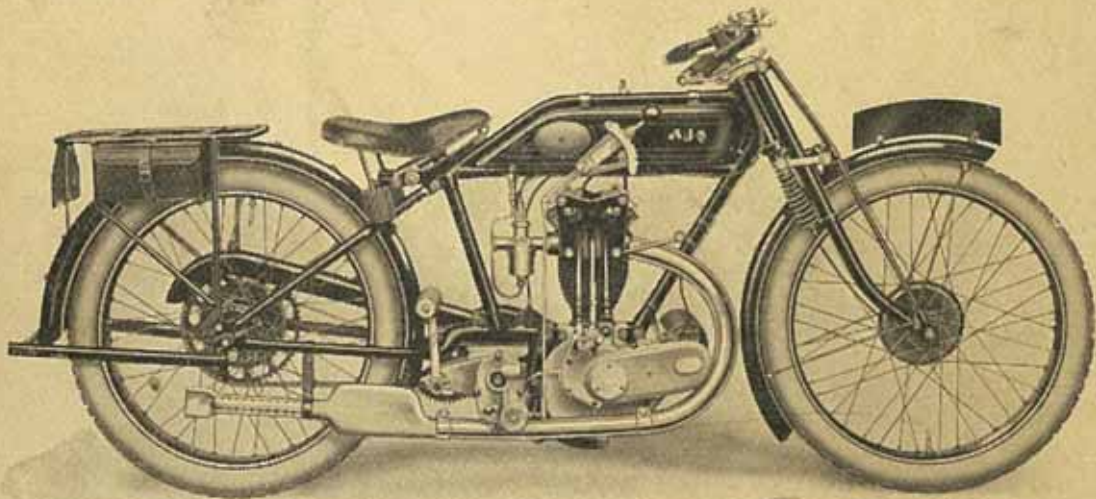


TELEGRAMS: "HOPIT. WOLVERHAMPTON."

TELEPHONE: 1731 (FOUR LINES).

A.J.S.

Motor Cycles



3.49 h.p. 3-SPEED A.J.S. SOLO MACHINE.
O.H.V. MODEL E6.

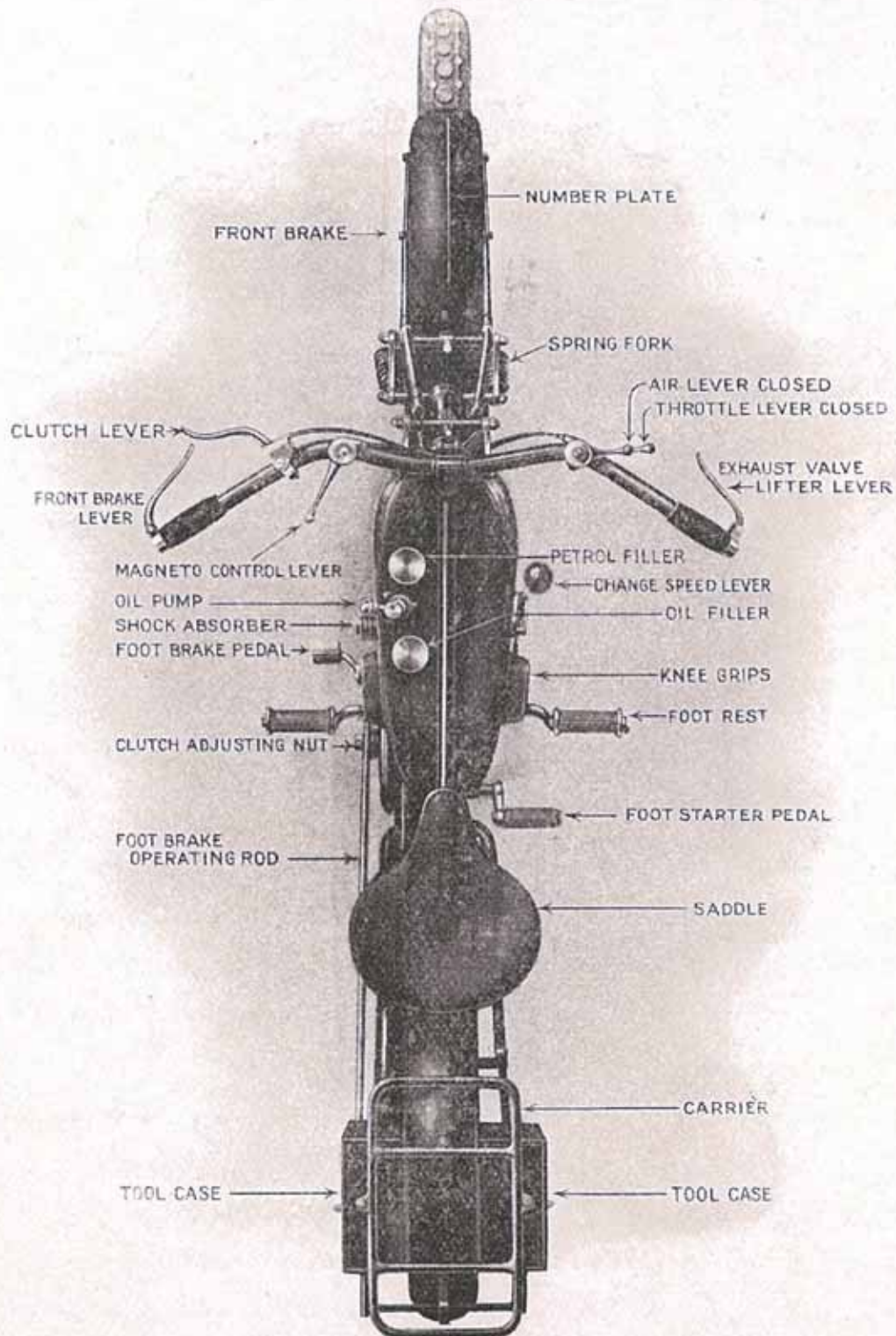
◦ 1925 ◦

HOW TO MANAGE THEM.

A. J. STEVENS & CO. (1914) Ltd.,
GRAISELEY HOUSE, WOLVERHAMPTON.

PLAN **A.J.S.** VIEW.

A.J.S. 3.49 H.P. O.H.V. MODEL E6.



3·49 H.P. **A·J·S** 3·49 H.P.

MOTOR CYCLES

(Over Head Valves).

FOREWORD.

IT has always been our earnest endeavour to construct our Motor Cycles on such simple and straightforward lines that the motor cyclist with little or no previous experience can manage and look after them.

Complications in the way of design have never been allowed to find a place in our products. This little booklet is intended as a guide on how to get the best out of the 3·49 h.p. A.J.S. by becoming acquainted with its salient features.

We have very carefully compiled the information in the following pages and trust it will be of assistance to the rider in keeping his machine in the best possible condition and elucidating any little troubles which may from time to time take place.

We particularly commend that portion of the booklet devoted to Driving Instructions and General Care of the Machine and to take particular note of those instructions which are emphasised by being printed in italics.

Re Supply of this Publication.

A copy of this booklet is supplied free with every new 3·49 h.p. A.J.S. Motor Cycle. Applications for extra copies must be accompanied in every case by a remittance for 6d. to cover cost and postage.

A. J. STEVENS & CO. (1914) Ltd

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Driving Instructions, etc.

For 3.49 h.p. Three-speed Overhead Valve A.J.S. Motor Cycle.

AFTER receiving the machine thoroughly examine it and get conversant with its details. Fill up with petrol and oil.

Only oil suitable for air cooled engines must be used.

Turn on the petrol by pushing the knob of the petrol tap where marked "on" and flood the carburettor by pressing the "tickler" on top of float chamber. The oil tap will be found below the elbow outside the tank, and is similar in operation to the petrol tap. This tap can be left in the "on" position while riding, and need only be turned off when the machine is left standing for a long period. For further instructions regarding lubrication see "Engine Lubrication" on Page 12.

To start the machine carry out the following operations:—

1. Place the gear lever in the second gear position marked on the gate change quadrant (Illustration B).
2. Nearly close the air lever (the shorter one) of carburettor control and open the throttle lever (the longer one) about one-third. The levers open to the left (inwards) and close to the right (outwards). The carburettor is the "BINKS." For full details and hints on adjustments, etc., see separate instructions.
3. Lift the exhaust valve by means of the lever under the right handlebar grip.
4. Engage the foot-starter with the right foot (using the instep of the boot) and press smartly backwards and downwards, at almost the same time release the valve lifter, and the engine should then start. Take the foot off the foot-starter pedal immediately the engine fires, but *do not allow the foot-starter to spring back with a "bang" after starting the engine. Bring the foot back with the pedal, and so prevent a heavy blow being given to the stop.* After once mastering these details the engine can be started with the back wheel on the ground.

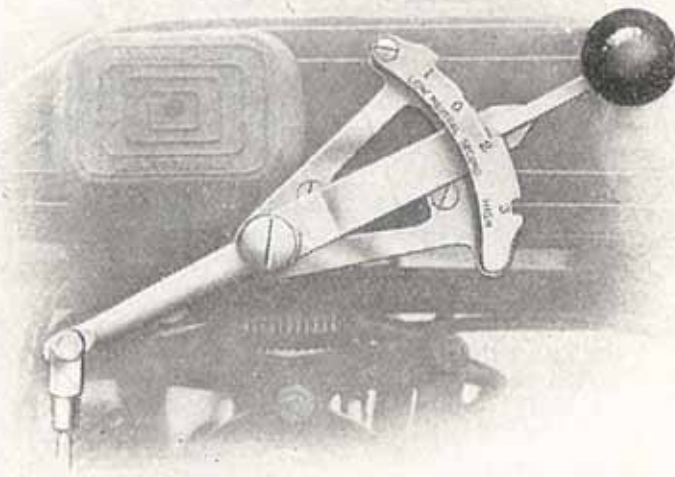
Presuming these instructions have been carried out take out the clutch by means of the clutch lever on the left hand side of handle bar—place the gear lever in the low position, speed up the engine by opening the throttle a little, and gently release the clutch lever. The machine will then move forward on the low gear. When the machine has attained a fair speed on this gear, again pull out the clutch and move the gear lever into second gear position, immediately re-engaging the clutch.

Repeat this operation to engage high gear. When running on high gear the machine must be controlled by means of the throttle lever and brakes. To stop, close the throttle, and when the machine is almost at a standstill take out the clutch and apply the footbrake.

The change speed lever is operated as follows:—To engage the low gear from neutral, press the lever lightly to the *right* and pull backwards (see "important warning" below). To move to second gear, again press lightly to *right* and move the lever forward into second gear position. To engage high gear from second, press the lever to the *left* and move it forward into the high position. How to operate the gear lever will be obvious if a careful examination is made of its construction. The gear lever has a positive stop for each gear, whether changing up or down, and is automatically locked in each position when released by the hand.

Important Warning.—

If the change speed lever does not move quite easily into position, do not attempt to force it. Move the machine slightly backwards or forwards, or turn the back wheel, while keeping a little pressure on the lever. This will bring the "dog clutches" in the gear box into proper position for engagement, and the gears will engage without using unnecessary force. Under no circumstances must this lever be forced into position, or the working parts will be strained and damage done.



THE A.J.S. PATENT CHANGE SPEED LEVER.

Illustration B.

This warning only applies when the machine is stationary not when being ridden.

Always drive with the air lever of carburettor open as far as possible consistent with the engine firing properly. It is not always necessary to stop the engine when the machine is brought to a standstill, but it can be left quietly running until ready to start away again. This can be done by taking out the clutch momentarily, and slipping the gear lever into the neutral position, afterwards releasing the clutch again. The engine will now be running free. Do not "race" the engine while standing, throttle it down just sufficient to keep it firing until ready to start away again. In the case of a short stop, as when obstructed by traffic, the clutch only need be taken out, but always remember to engage low gear when starting again.

Although it is not absolutely necessary to do so, it will be found a much nicer method of changing gear if the following instructions are carried out:—When changing from a low to a higher gear, slightly slow the engine down by closing the throttle a little immediately before changing. When changing down let the engine accelerate slightly with the clutch out before engaging the lower gear. A bit of practice will soon make the rider proficient. Never change from a high gear to a lower gear when travelling fast. Always slow down to the speed the machine would be travelling if the low gear was engaged, or, in other words, never change from high gear to second when travelling at over fifteen miles per hour, or from second gear to low gear when travelling above ten miles per hour. Never change to a lower gear for braking purposes; excepting on an exceedingly steep hill, otherwise the brakes are powerful enough.

Always change gear quickly and firmly, but without using unnecessary force.

When climbing a steep hill which necessitates changing down to a lower gear, always change while the machine has reasonable "way" on it. Do not let the machine come almost to a standstill before changing.

*If the machine will not climb a hill on top gear, do not force it to do so by slipping the clutch but change to a lower gear. If the clutch is allowed to slip for a lengthy period under such a heavy driving load it will—owing to the intense heat generated by friction—burn out the cork insets, in fact would destroy, by heat, any material of which a clutch may be composed. There is really no excuse for the rider who destroys his clutch by this practice. It is not only **bad** driving, but it is trying to make the clutch do the work of the gear box which is utterly impossible.*

Do not run the machine unnecessarily on low gear. This gear is only provided for ease of starting, and climbing exceptionally steep hills, or when negotiating thick traffic demanding a very slow rate of progress. Using the low gear unnecessarily simply means extra wear and tear, high petrol consumption, and shortens the life of the engine, and transmission.

When climbing an exceptionally steep hill it is sometimes an advantage to slightly retard the spark, but under normal conditions the spark lever should be kept in the "advanced" position. If the engine has any tendency to "kick back" when starting it with the foot starter, slightly retard the ignition. The lever on the left handle bar is moved inwards to advance and outwards to retard.

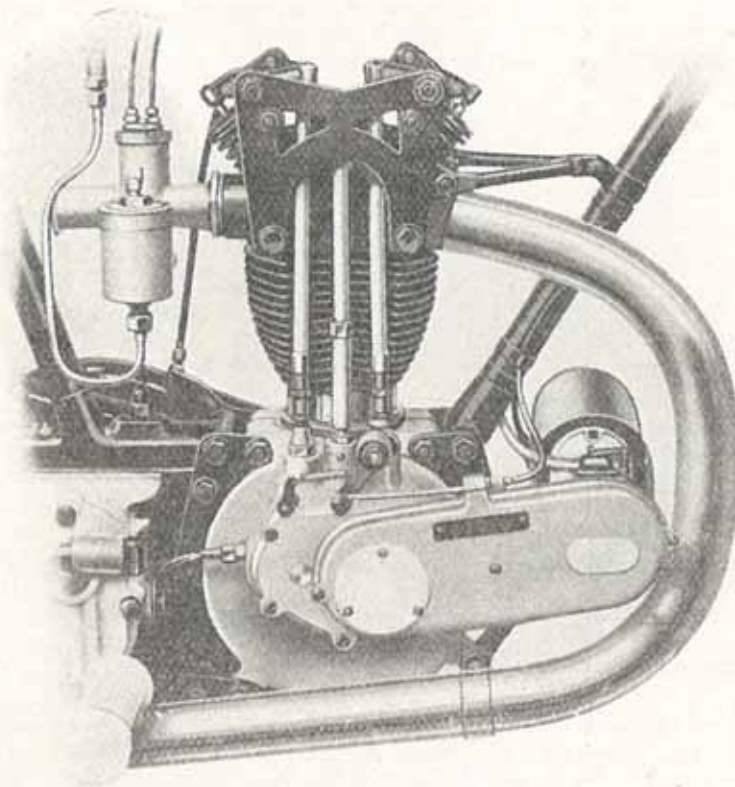
When running at very low speeds on top gear a slight harshness in the drive may be felt, which is common to all petrol driven machines, however well balanced an engine may be. More especially is this so in the case of a single cylinder engine. To counteract this we fit a shock absorber on the engine shaft, which damps out as far as possible any snatch at slow speeds. The driver has also a further means of eliminating this slight harshness by judicious use of the ordinary clutch. By easing the hand clutch a little, by means of the lever on the handlebar, the drive can be made just as sweet and as comfortable as one may wish. A slight pressure of the hand on this lever allows the clutch to slip slightly under the impulses of the engine, and so the clutch is instantly converted into a perfect shock absorber at the will of the rider. The foregoing hints also refer to "picking up" again after slowing down for a corner, or any other occasion when the machine is to be accelerated suddenly from a slow to a higher speed. It must be quite understood, however, that the clutch is not disengaged so much that it slips to the extent that the engine can "race." Only just so much pressure should be exerted on the lever to allow the clutch to absorb the impulses of the engine. We earnestly commend this paragraph to those riders who are anxious to get the best results and long life from the engine, gears, and chains, to say nothing of the added comfort and satisfaction.

Do not control the speed of the machine with the free engine clutch, excepting in very congested traffic as previously mentioned. Always drive "on the throttle." The object of the clutch is **not** to control the speed, the throttle in conjunction with the gear box and the brakes should be used for this purpose.

After a short run it will be found that the control of the machine is quite simple, and the disposition of the levers, operating the footbrake and the clutch, give the rider absolute mastery over his mount. On low gear the machine can be driven at a perfect crawl, and on high gear it is capable of attaining a speed to satisfy even the fastest of riders.

Care of the Machine.

Engine.



A.J.S. 349 H.P. ENGINE.
Illustration C.

Lubrication.—

The most important point in connection with the engine is lubrication. Give about one pumpful every 10 miles, and rather more if fast riding is indulged in.

The type we employ gives a direct feed to the engine, oil being delivered as the plunger rod ascends on the up stroke. To give a charge of oil to the engine, depress the plunger to its full extent. This will fill the barrel with oil, and the plunger being spring loaded it will automatically ascend, and in so doing force the oil into the engine, the plunger rising during the process until it is in position for the next charge to be delivered.

To cut off the oil supply at any moment, such as when the machine is left standing, the tap should be turned off. As a further precautionary measure the lubricator can be put out of action by pressing down the plunger to its full extent, and fixing it in this position by means of the small catch provided.

Riders and riding conditions vary, so it is absolutely necessary to leave the question of lubrication to each individual's judgment to a certain extent.

The engine working harshly, and a falling off of power, are the usual symptoms of under lubrication. Over lubrication is shewn by oil unduly working out of the valve tappets, smoke issuing from the silencer, and also loss of power. Over oiling will sometimes cause the exhaust valve to stick or move sluggishly in its guide. The symptoms are mostly apparent when the engine is cold. Misfiring occurs, also explosions in silencer and difficulty of starting.

Valve Adjustment.—See that the clearance between the valve stem and overhead rocker stud is properly adjusted. This should be from .010 to .015. The thickness of a visiting card is about the correct clearance. Check the clearance when the engine is hot, not when cold.

The adjustment is by means of the nuts found on the heads of the tappets. Resting upon these, by means of a ball and socket, are the long push rods. Two nuts will be found on each tappet, the top one being the adjusting nut and the lower the locking nut. To take up clearance the lower nut should be unscrewed a turn or two, which then allows the top nut to be raised on its thread until the correct clearance is obtained. When this has been done the lock nut must be screwed up again tightly. Use two spanners for this operation.

Cleaning.—To remove the cylinder for cleaning first disconnect all such fittings as exhaust pipe, inlet pipe, carburetor, etc. Proceed to remove the push rods, and to do this the valves must be depressed by means of the special valve tool. This is to allow sufficient clearance between the push rod and rocker for the former to be withdrawn. Next disconnect the cylinder steady bolt, found anchored to the rear down tube. To loosen the cylinder, the turnbuckles which tighten the U shaped

ENGINE.—continued.

holding down strap must be unscrewed until the strap is quite free on both sides. Take care to unfasten the turnbuckles evenly a turn at a time. When the strap is quite clear, push it up as high as it will go in order to allow room for the cylinder head to be drawn off the barrel. To detach the head, insert a screwdriver or similar tool between the top cylinder fin and head, prising the head carefully off the barrel on both sides. Take great care not to break the radiating fins.

Prise upwards, not downwards. When quite free the head can be lifted off and the U strap afterwards removed.

When the head is removed it is an easy matter to draw off the cylinder barrel. When doing this the engine should be turned over until the piston is at the lowest position of its stroke, and then take off the barrel carefully, taking care that when the piston is free not to let it fall sharply against the connecting rod, as this may bruise or distort the skirt of the piston.

Having removed the cylinder, wrap a clean cloth or rag round underneath the piston to prevent any foreign matter or dirt getting into the crankcase. If the combustion head is badly carbonised this must be cleaned. The generally accepted method being to scrape the chamber free of the carbon deposit, which can be done with an old screw-driver or similar tool. The top of the piston should also be scraped free of all deposit, using an old blunt knife or chisel, and while carrying out this operation see that no side strain is thrown on the piston. If the rings are quite free in their grooves they need not be removed, but if they are obviously choked up with burnt oil loosen them very carefully, take them off the piston and clean the grooves thoroughly. Take the piston off the connecting rod, to do this. First remove the gudgeon pin from the piston, take out the retaining springs, one of which will be found on either side of the gudgeon pin. These fit into recessed rings in the piston bosses and to withdraw must be squeezed together with the special small pliers provided. Afterwards the gudgeon pin can be pushed out from the driving side. Having got rid of all deposit from both the head and piston, wash all particles off with paraffin. Before replacing the cylinder after cleaning, carefully oil the piston, and see that the joints of the piston rings are on opposite sides of the piston. Take care when replacing the cylinder on to the crankcase to see that the packing washer is inserted between the top of crankcase and the base of cylinder. If the washer between the cylinder head and barrel has been damaged in detaching the head, replace with a new one, and similarly in the case of the cylinder foot washer. Should it be necessary to remove the valves when the head is detached, all that has to be done is to place the hooked end of the special valve extractor, which is provided in every tool kit, on top of the valve for the necessary leverage to lift the valve spring to allow the cotter to be withdrawn.

The valve can then be drawn out of the head. If the valve seatings are at all pitted, grind in the valves with fine emery flour, taking care that all emery is cleared out of the valve chamber after the operation. Generally speaking, the valves should be ground in about every 1,500 miles.

To remove the piston from the connecting rod close up the ends of the split cotter which passes through the boss and gudgeon pin, and withdraw cotter pin with pair of pliers. Push the gudgeon pin out of the piston from the side away from the cotter hole. In doing this operation it is advisable to get someone to hold the piston while the gudgeon pin is being tapped out.

Replace the gudgeon pin with the plain end first. It can then be seen whether the holes in the gudgeon pin register properly with the holes in the piston, before the gudgeon pin is finally tapped right in.

In replacing piston on connecting rod always fit the side with the split cotter on the timing side of the engine. If the split cotter pin is slack in its hole fit a new pin.

When replacing the cylinder head on to the barrel, remember that the head must be tightened down before the "steady" is again attached to the down tube. When the cylinder has been finally tightened down, then the length of stay of the steady can be adjusted so that the pin passes through the clip on down tube and eye of the stay without force.

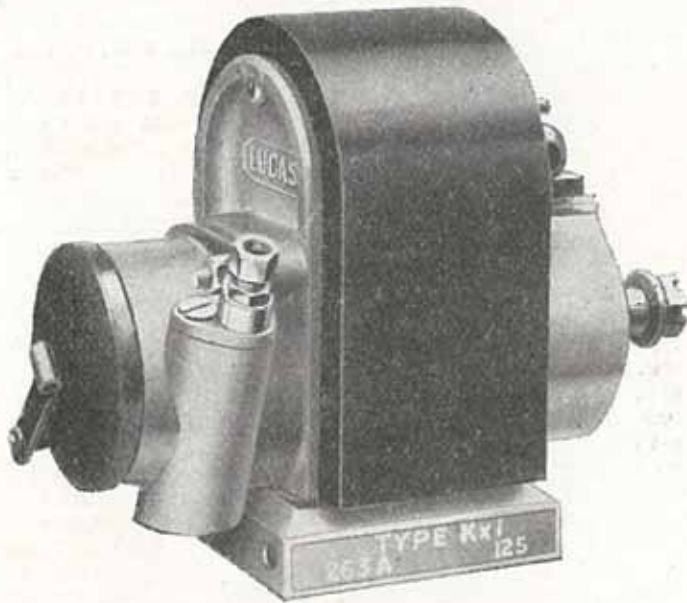
Another important point to remember is that the exhaust valve lifter must not be set to lift the valve more than $\frac{3}{16}$ -in. when in operation. If the valve lifter lifts the valve say $\frac{1}{8}$ -in., the inlet and exhaust valves foul each other.

Examine periodically the bolts which hold the engine in frame, and tighten any nuts that may have worked loose. Keep the engine clean externally, which can be done quickly and easily with a painter's brush and a pan of paraffin.

Drain old waste oil out of the crankcase of engine about every 1,500 miles. For this purpose a drain plug is fitted on chain case side of crankcase. See that four to five pumpfuls of fresh oil are pumped into the engine again, after draining out the old oil.

The valve rockers are loaded with graphite by a patent process, and do not require lubrication.

Magneto.



LUCAS MAGNETO.

TYPE K X I.

Illustration M.

Lubrication.

The instrument is provided with ball bearings throughout, which are packed with grease before leaving the manufacturers. Fresh lubricant should not be required under normal circumstances until the machine has run from 10 to 12 thousand miles.

Adjustment—The platinum contacts should be examined after about 1,000 miles, and if the break should be more than the thickness of a visiting card they should be adjusted. The proper distance of the gap is 0.5 m/m or roughly 1-64 in. full. Too great a gap will advance the timing. A special small spanner is provided with each machine, and the gauge of this is the correct distance for the break of the points. This adjustment, owing to the arrangement of the contact breaker, can be carried out without removing the contact breaker from the magneto. If it is necessary to take the contact breaker out, unscrew the long taper fixing screw, and pull the contact breaker off. The points only

need attention at very long intervals, and we warn users against unnecessarily interfering with the setting. *The platinum points must only be dressed with a dead smooth file if the surface has become at all pitted, and then the least possible amount taken off.* The greatest care must be exercised, as platinum is a very expensive metal.

Timing—If the magneto has been removed from the machine it will be necessary to see that it is timed correctly after it is refitted. 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 is supplied with a vernier timing 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 may at first sound a trifle complicated, but in reality it is perfectly simple. Keyed to the armature shaft of the magneto is a sleeve (1), which has thirteen holes ranged in a circle. Fitting over a collar on this sleeve is the chain sprocket (2), which has twelve holes similarly arranged. Now on the sprocket on engine driving shaft and on the magneto shaft an arrow will be found. *These must point to each other* before anything else is done. The first thing then in timing up is to set these two arrows so that they face exactly towards each other. To do this turn engine over until the arrow on the driving sprocket is pointing directly towards the arrow on the magneto sprocket. This latter should be held free in the fingers and moved a tooth backwards or forwards in the chain until the correct setting is arrived at. When this is so, place the magneto sprocket on to the sleeve, and turn the armature shaft of magneto until a mark found punched over one of the twelve holes on the sprocket exactly registers with a similar mark on the outside of the collar of the sleeve. It will now be found that the marked holes in sleeve and sprocket respectively exactly coincide, so that all that has to be done is to

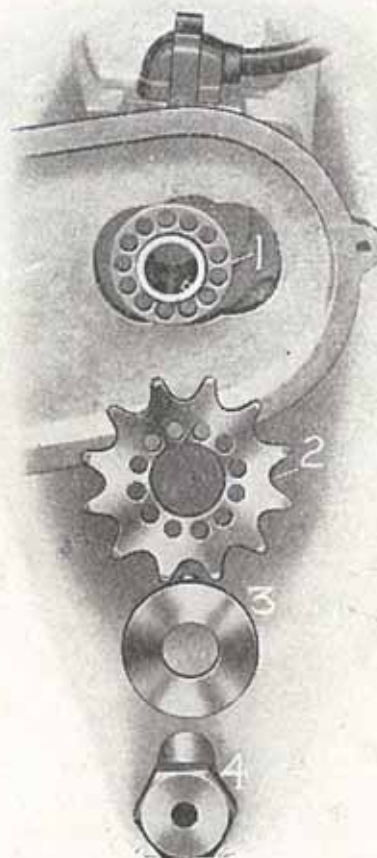
MAGNETO.—continued.

push the peg washer (3) into these holes, which effectively prevents the sprocket from moving from its correct setting and tightly screw up the sleeve lock nut (4), which can be done without fear of the timing shifting in the process, as is often the case with other methods. Set the piston $\frac{1}{8}$ -in. from top of compression stroke—make sure it is not on the exhaust stroke. With the engine in this position take off the sleeve lock nut on magneto sprocket and remove the peg washer. This will leave the armature free from the engine drive, but still connected via the chain to the engine. See that the sprockets have their arrows facing as previously mentioned. Move the ignition control lever to the limit of its motion of advance. Remove the cover of contact breaker and slowly turn the armature till the fibre block of the make and break lever arises on the inclined plane of the steel segment just sufficient to separate the platinum points. This is the firing point, and in this position the markings previously referred to on the sleeve and sprocket should register if correctly fitted up. If so, the drive should be fixed up as before detailed. It is, however, always advisable to check the timing after tightening up.

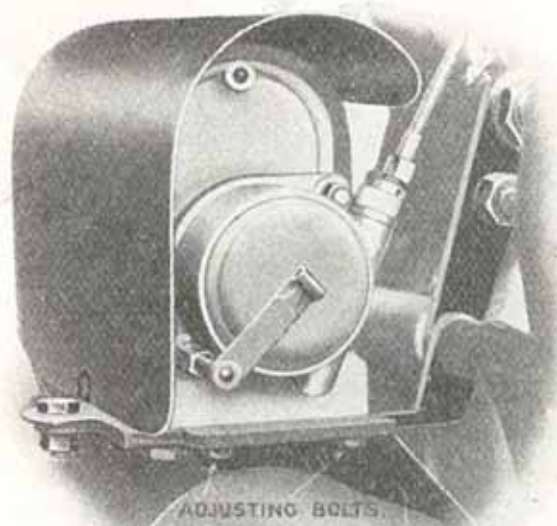
It will prevent misfiring, and make starting easier, if the slip ring is cleaned occasionally. This is done by taking out the high tension terminal and while the magneto is being revolved by slowly turning the engine round, insert a lead pencil the end of which is covered with a clean rag moistened with petrol. The pencil should be pressed on the revolving slip ring.

When Ignition Trouble is suspected—Before interfering with the magneto verify that the sparking plug, the cable, and the connections are correct. If these are in order, turn the engine slowly by hand and watch if the contact breaker lever works properly. This is bedded in a fire insulating bush, and in moist weather there is an occasional danger of the material swelling. If this happens, ease it out very slightly. This is a most common fault with all magnetos, and should be watched particularly by motor cyclists in winter. Do not take the magneto to pieces needlessly. It is easily possible to damage it.

Most Important—If it is necessary to take out the armature first see that the *carbon collectors and safety gap screw* are removed, or the collector ring will be broken during removal. Keep all parts clean and free from oil, particularly the *contact breaker*. Oil or dirt between the points will give instant trouble.



MAGNETO TIMING—VERNIER
ADJUSTMENT.
Illustration N.

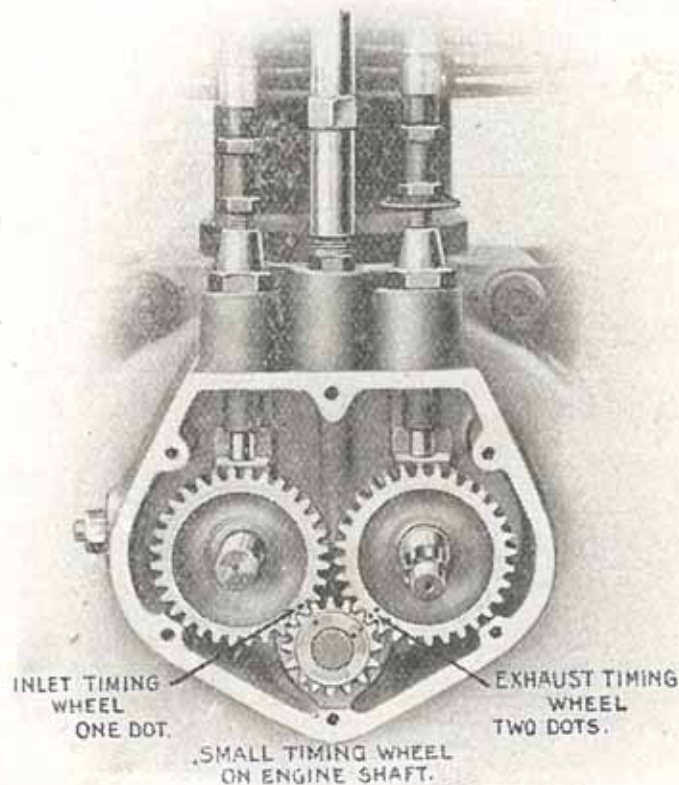


Magneto Adjustment.

—Examine the driving chain occasionally, and, if slack, tighten it by moving the magneto along the platform in a forward direction. Slackening off the four pins underneath the platform allows this. When the correct tension has been obtained, screw the pins up again tightly. Examine also the nuts securing the chain sprockets to the engine shaft and armature shaft of magneto respectively. After examination, before replacing the cover, oil the chain.

3·49 H.P. A.J.S. MAGNETO ADJUSTMENT.
Illustration D.

Engine Timing.—Except in case of necessity we do not advise tampering with the valve timing arrangement. However, if the engine has been completely dismantled for any reason, we make it a practice to so mark the timing pinions that replacement is a matter of perfect ease if the following instructions are carried out. To facilitate correct setting and meshing of the pinions these are marked with a dot system of identification as shown in Illustration E. On the small timing pinion will be found a single dot and a double dot. These dots correspond to similar marks on the inlet and exhaust valve timing pinions. To set the inlet valve place the single dot found stamped thereon, in register with the single dot on the small pinion, and similarly in the case of the exhaust wheel which has two dots stamped on it.



ARRANGEMENT OF TIMING GEAR
3·49 H.P. A.J.S.
Illustration E.

Magneto Timing.—The spark is timed to take place 16 m/m or $\frac{3}{4}$ -in. before the top of the compression stroke, with the magneto control lever in the fully advanced position.

With the exception of carrying out the above instructions, do not tinker with the engine, nor fancy you can do better than the makers by tampering with the valve timing gear.

Gear Box.

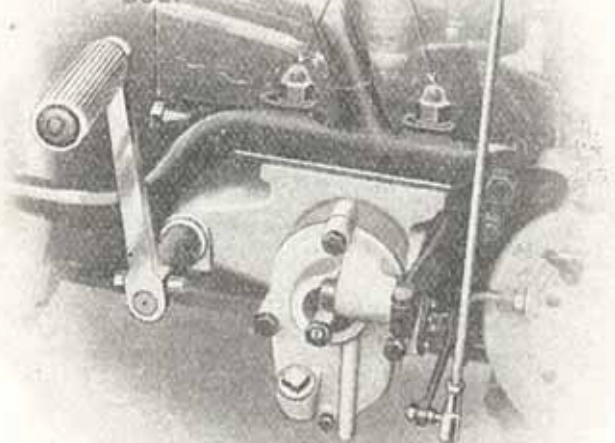
Lubrication.—

The gear box needs no attention whatever with the exception of replenishing with oil every 500 to 800 miles. Oil as used for the engine is suitable, but a very thick oil is the most suitable. It will facilitate the entry of oil into the box if the back wheel is slowly revolved (with gear in neutral position) while pouring in the oil.

To dismantle the box the following procedure must be carried out:—

First unscrew the set pin which holds the long lever on to the hexagon ended arm of the operating shaft. The clutch lever can then be knocked off the arm, and the operating shaft, which is now free, can be swung over out of the way or removed entirely by pulling it out of its housing. The short push rod can then be taken out, and the thrust lock nut unscrewed from the end of the main shaft.

ADJUSTING BOLT HOLDING UP STUDS



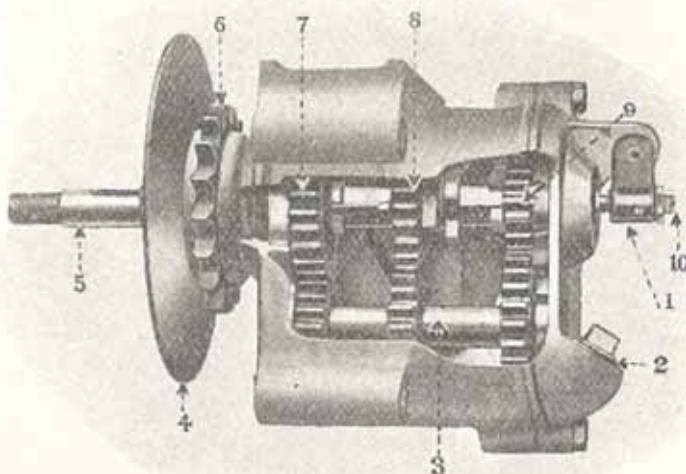
A.J.S. GEAR BOX IN POSITION.
Illustration F.

This has a left-hand thread, and the punch provided in the tool kit should be employed to unfasten it, using the large spanner as a hammer. Behind this will be seen the thrust washer. To take this out push the main shaft back a little, so as to allow the washer to be withdrawn. This washer fits on to a Dowel peg, and care should be taken when replacing to ascertain that this is correctly in place. Now take out all bolts round the cover of the box and pull the cover off. The low gear dog wheel and lay shaft can then be taken out, also the sliding sleeve. The main shaft, complete with clutch, etc., can be drawn out from the opposite side of the box. To reassemble simply reverse these operations.

N.B.—Be sure the Thrust Lock Nut is tight after replacing.

Do not forget to put fresh oil in the box after dismantling.

1. Clutch Operating Shaft for disengaging Clutch.
2. Oil Filler
3. Lay Shaft or Secondary Shaft.
4. Fixed Clutch Plate.
5. Main or Primary Shaft.
6. Sprocket for transmitting power to Road Wheel.
7. High Gear Dog Wheel.
8. Sliding Sleeve.
9. Low Gear Dog Wheel.
10. Bell Crank Adjusting Screw.



A.J.S. 3 SPEED GEAR (PORTION OF CASE CUT AWAY).
Illustration G.

Clutch.

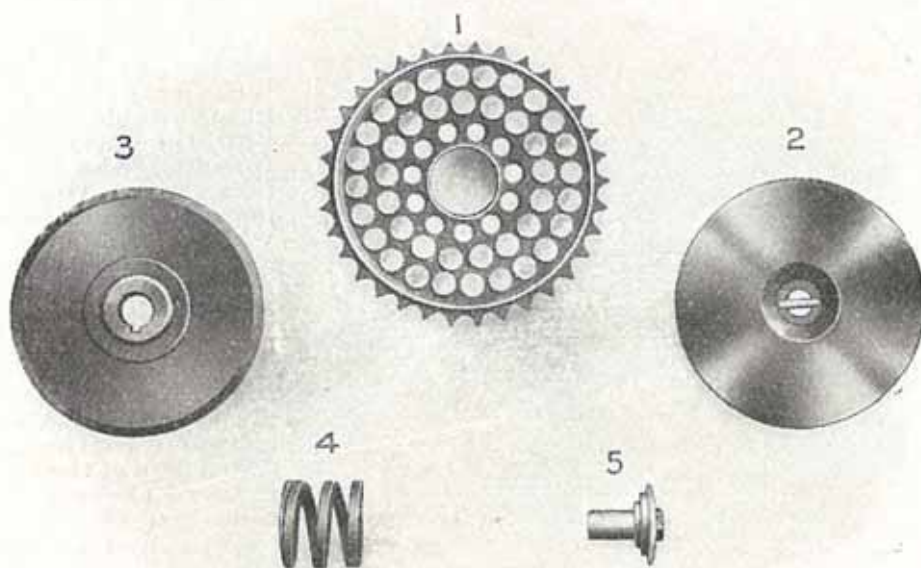


Illustration H.

- | | |
|---|---------------------------------|
| 1. Clutch Sprocket fitted with Cork Insets. | 3. Fixed Plate. |
| 2. Sliding Plate (note key in centre which passes through main Gear Box Shaft). | 4. Clutch Spring. |
| | 5. Clutch Spring Adjusting Nut. |

The Clutch parts are assembled in the following order—3, 1, 2, 4 and 5.

Adjustment.—

If the clutch should slip when climbing steep hills, tighten up the clutch spring a little by means of the adjusting nut on end of the clutch shaft, and adjust the Bowden cable until there is a little play in the lever. Do not tighten up the spring more than necessary to obtain a perfect grip, or unnecessary strain will be put upon the Bowden control, &c., when the clutch is disengaged.

Do not put Oil into the Clutch under any circumstances.

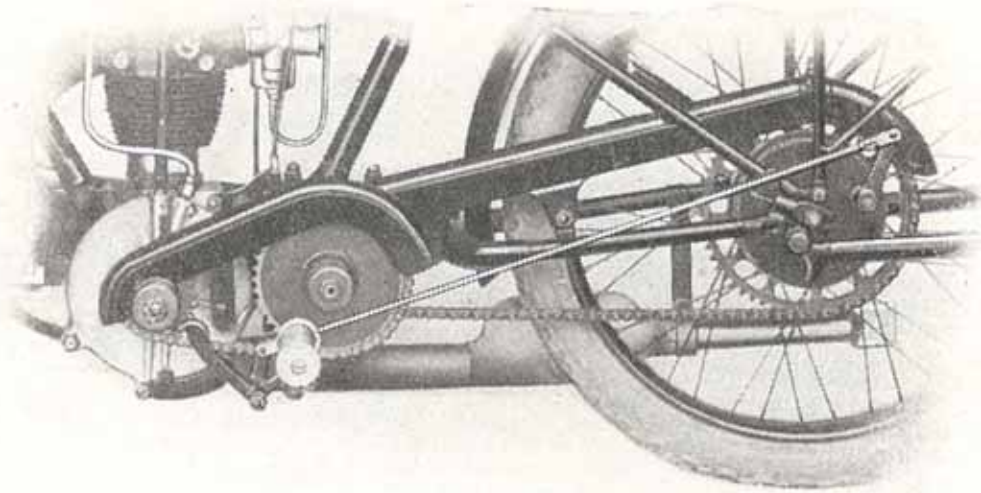
To take up excessive backlash in Bowden lever on handle bar adjust by means of the operating shaft adjusting screw No. 10 (Illustration G). A further adjustment is also provided by a stop formed by an extension of the rear engine plate (left-hand side) through which the Bowden cable passes. However, *always allow a little backlash in the lever, or the clutch spring cannot exert all its pressure on the plates.* If the clutch slips without any external reason, take it apart and ascertain if any portion of its mechanism is fouling another, and so keeping the plates apart. If the key in boss of clutch plate No. 2 (Illustration H) should foul the end of slot in shaft it would prevent the clutch engaging.

TO DISMANTLE THE CLUTCH, take off the front portion of the chain cover.

Unscrew the clutch spring adjusting nut No. 5 (Illustration H) and remove the spring No. 4. Take out the cotter pin of foot-starter crank and remove crank. This will allow the starting quadrant with its spindle to be drawn out until it can pass the stop on chain stay. The quadrant can then be swung clear of the clutch and allow the plates to be drawn off the clutch shaft. Before replacing, wipe the clutch plates clean, and smear a thin film of oil on the portion of shaft on which the front clutch plate slides. Also before replacing, examine the lock nut which holds the fixed plate in position. If loose see that it is carefully tightened up again.

CLUTCH.—continued.

It is, of course, necessary to take the chain off the clutch sprocket before this can be removed (see Illustration L for particulars of chain joint). It will be found that a flat key passes through a slot in the end of the clutch shaft, and fits in the boss of front or sliding plate. Great care must be taken to see that this key is in its proper position or the clutch cannot be disengaged. This key is clearly shown in Fig. 2 (Illustration H) across the centre of the plate. To fit this key when re-assembling the clutch, turn the shaft till the slot is perfectly horizontal. Then put key in slot with each end projecting equally on each side of the shaft. The sliding plate should then be slipped on shaft with its keyway in a corresponding horizontal position.



TRANSMISSION SYSTEM, SHOWING THE POSITION OF THE
REAR BRAKE PEDAL AND OPERATION.

Illustration I.

If to disengage the clutch becomes difficult smear a little oil on that portion of shaft on which the outer plate slides.

If the clutch should "drag," even when fully disengaged, it will make gear changing very difficult, especially when changing down, for the reason that the drive is never properly taken off the gears, thus making it difficult to move the gear lever. This difficulty can be temporarily overcome by suddenly closing the throttle before changing down, immediately opening the throttle again after the change is made. The closing of the throttle takes the drive off the gears, and so allows easy disengagement.

To those riders who prefer a light adjustment of the clutch, the following hint will be useful. A clutch that is lightly adjusted will sometimes slip for a time after changing gear, but the slip will cease if the throttle is momentarily closed when the slip takes place. This is explained by the fact that for the moment the drive is taken off the clutch and allows the plates to settle down to their work.

Transmission.

Adjustment of Chains.—To adjust the chain from engine to gear box it is only necessary to slack off the two nuts on top of bracket and slide the box bodily backwards by means of the adjusting bolt, situated at rear of bottom bracket.

It is important that the nuts are screwed tightly again after adjustment.

Back Chain.—Slack off the nuts on each side of back hub spindle, and move the wheel backwards by means of the adjusting screws in fork-ends. Care must be taken to adjust each side equally or the wheel will be out of alignment. Screw the spindle nuts up tightly again after the chain is properly adjusted. It may be found that moving the wheel back has caused the brake to be "on." This is easily rectified by means of the brake adjustment.

If the chain is too slack it is apt to "whip," which intensifies the wear and tends to break the rollers, especially in the case of the front chain. If on the other hand it is too tight, a crushing effect is produced on the rollers, and the whole chain is strained unduly.

The chains should be adjusted, and kept adjusted, so that they can be pressed down in the centre with the finger from $\frac{3}{8}$ in. on the front chain, and about $\frac{1}{4}$ in. on the back chain.

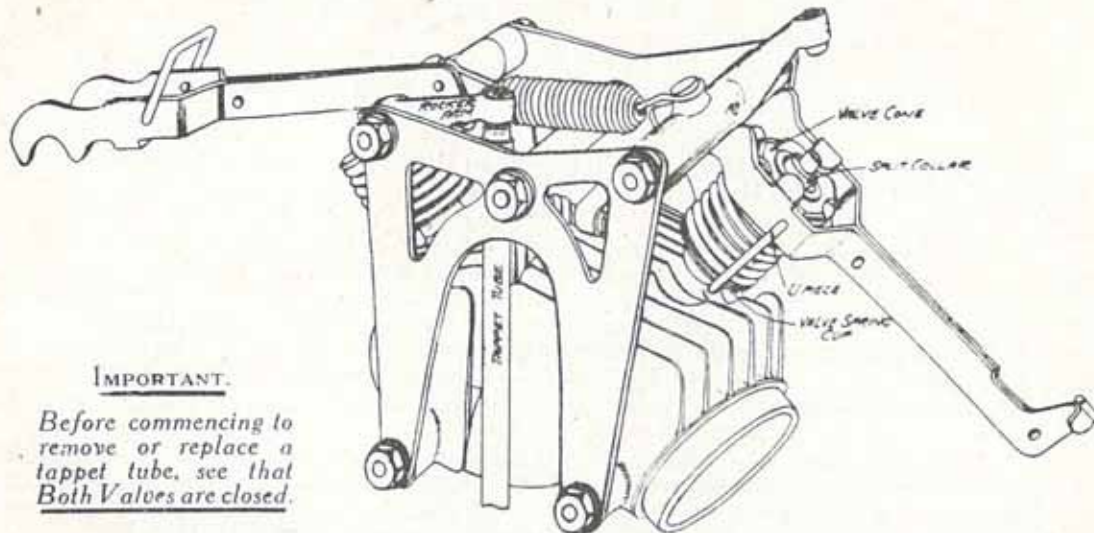
Care of Chains.

Lubrication.—As the chains of the 3'49 A.J.S. are only partly enclosed it is a good plan to make a point of oiling the chains every day before starting out. One oiling will suffice for a day's riding whatever mileage is done. An oil gun is the best means of oiling the chains. With this instrument draw a charge of oil from the oil compartment of tank, and insert spout of oiler into the chain case oil plug hole, which will be found on top of front of chain case above the front chain. Lift the exhaust valve and while pressing down plunger of oil gun, slowly turn the engine round with the foot starter, taking care that the oil from the oil gun is falling on the chain. This ensures the whole chain being well lubricated. Treat the back chain in the same way by slowly revolving the back wheel.

Long life, less need of adjustment, and complete satisfaction with the transmission is assured if the rider will make a point of oiling his chain frequently, to say nothing of the knowledge that they are regularly having a supply of fresh clean oil.

Valve Extractor,

Also Applicable to 1923 and 1924 Models.



IMPORTANT.

Before commencing to remove or replace a tappet tube, see that Both Valves are closed.

To Remove a Valve.—Hook the Extractor under the rocker (R) as shown on right of sketch, and depress the valve springs sufficiently to allow the hinged U-piece to be slipped under the valve-spring cup. Press the valve up on to its seat, remove the two halves of the split collar and withdraw the valve.

To Replace a Valve.—Depress the valve springs as before and insert the valve. If necessary, move the valve cone until it is central with the valve stem. Replace the split collar in its groove in the valve stem and push the valve down until the split collar fits properly in the valve cone. Slip the U-piece from under the valve-spring cup and gently release the springs.

To Remove or Replace a Tappet Tube with the Engine in the Frame.—Use the hook on the other end of the Extractor under the rocker arm (as shown on the left of the sketch) to depress the valve springs sufficiently to allow the tappet tube to be withdrawn or replaced.

Chain Repairs.

A Chain hardly ever breaks if properly adjusted (we have never yet heard of a chain breaking with our system of transmission), since it is usually worn out long before the breaking point is arrived at.

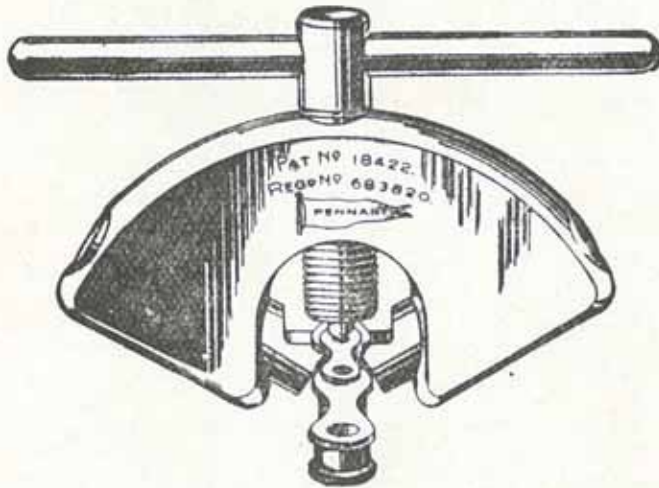


Illustration K1

If lubrication or adjustment is neglected, broken rollers may occasionally be found. The chain can, however, be easily repaired with the Pennant Chain Rivet Extractor (Illustration K1) and a few spare parts. This tool provides a simple means of removing the rivets, which cannot be filed down, as they are casehardened. It can also be used for putting in a new outer link.

This tool provides a simple means of removing outer links by pushing the rivet heads through the plate.

The illustration shows clearly the method used in the removal of the outer link by means of this tool.

Chain Rivet Extractor.

To Remove complete Links.—Screw down the punch on to the head of each rivet in turn through the top plate. Both rivets should be pushed out from the same side of the chain.

To Remove Broken Links.—Insert chain roller between the jaws and screw down the punch in order to press the head of the rivet through the top plate. Remove chain from extractor, and link will fall out.

Note. Before attempting to extract a rivet, compress the ends of the jaws to obtain a grip on the chain roller.

General.

Remember you have a bicycle as well as a power plant. Frequently oil the links of spring fork. Periodically put oil in the hubs or fill with grease. Oil occasionally any little moving parts about the machine such as brake shackles, Bowden levers, joints of control cables, the speed lever, gear box clutch lever, etc. An oil gun is a very useful accessory. A charge of oil can be drawn out of the oil tank and used for lubricating every part of the machine.

Keep the machine clean. If mud, etc., is allowed to accumulate, it will work into bearings, especially the hubs, and cause undue wear. Do not wash the machine down with a hose-pipe. By so doing it is easy to get water in the petrol tank or carburettor and cause trouble. Remove mud by means of a sponge and a bucket of water.

Pack tools tightly in the tool case with cleaning cloths, and so prevent them rattling about. Treat spare parts the same. The pannier bags can be used for carrying spare tubes if they are carefully and tightly packed, but it means certain destruction if they are not.

Keep the back tyre fully inflated, but not board hard, and see that security bolts are tight. It is not necessary to have the front tyre inflated as hard as the back.

Do not fit all-steel studded tyres. They are positively dangerous on granite sets or tramlines, especially if wet.

It is not necessary to carry a load of spare parts with the machine. The only parts that may be required under ordinary conditions are:—

One spare valve complete with spring, washer and cotter, a good substantial tyre repair outfit, one each spring link and half link for chains, two good sparking plugs an inside plaster for tyre in case of a bad cut or burst, and a good supply of observant common-sense.

For very long journeys or an extended tour it is wise to carry (in addition to the above) a spare front chain complete with spring link.

Any further information required we shall only be too happy to give if communicated with direct, but it will save unnecessary correspondence if our patrons will ascertain first, that the information is not already given in this booklet.

“Safety First” Hints.

Never drive faster than you can pull up in the distance you can see.

Never attempt to overtake another vehicle on a blind corner.

Always keep closely to your right side of the road when taking a blind corner.

If the machine will not comfortably climb a hill on high gear it is no disgrace to change down, and besides it is faster to do so.