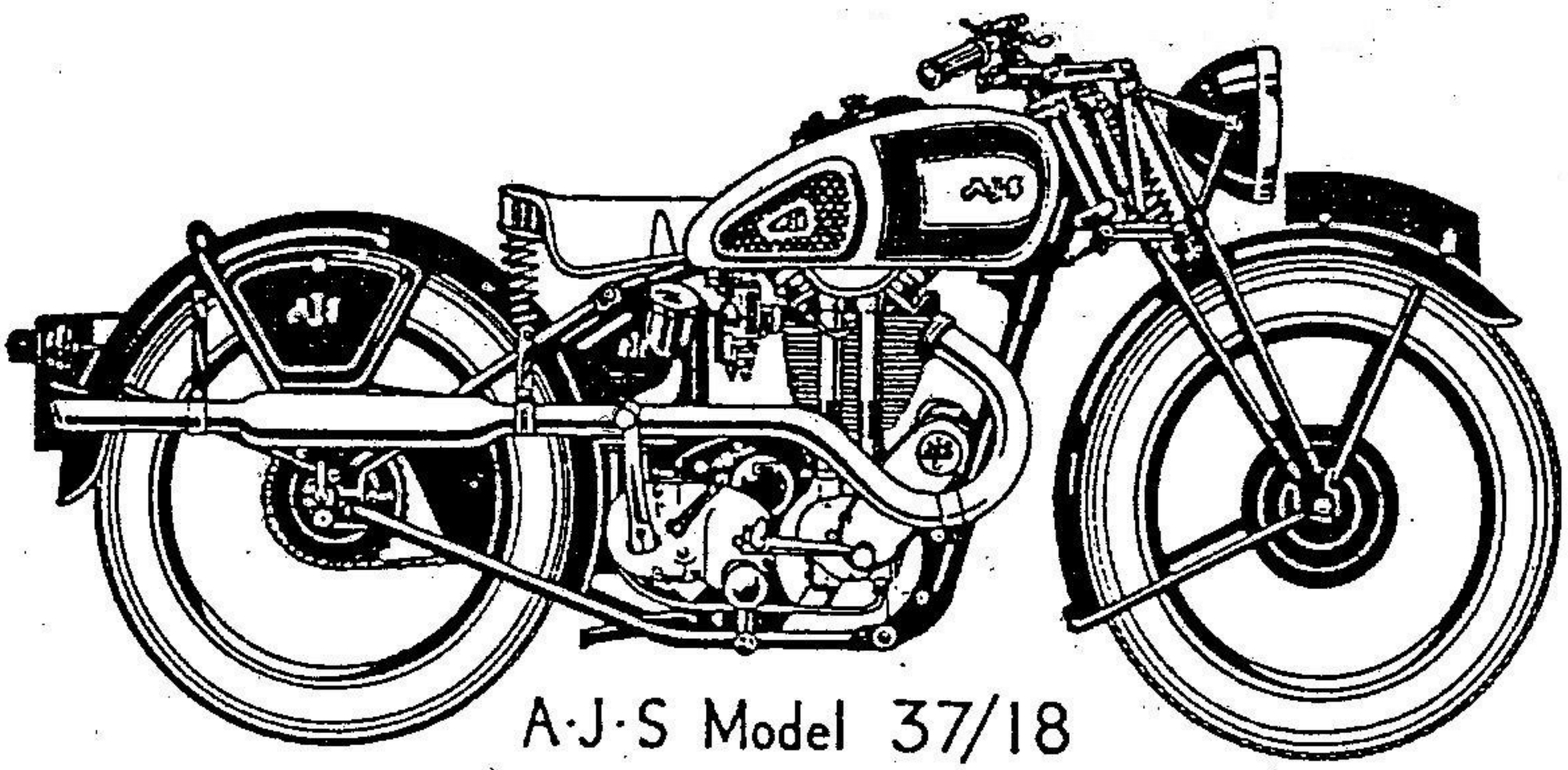
1937 Single Cylinder Models

37/8, 37/9, 37/12, 37/16, 37/18, 37/22 and 37/26

DRIVING AND ADJUSTMENT INSTRUCTIONS

MODELS:

37/8, 37/9, 37/12, 37/16, 37/18, 37/22 and 37/26



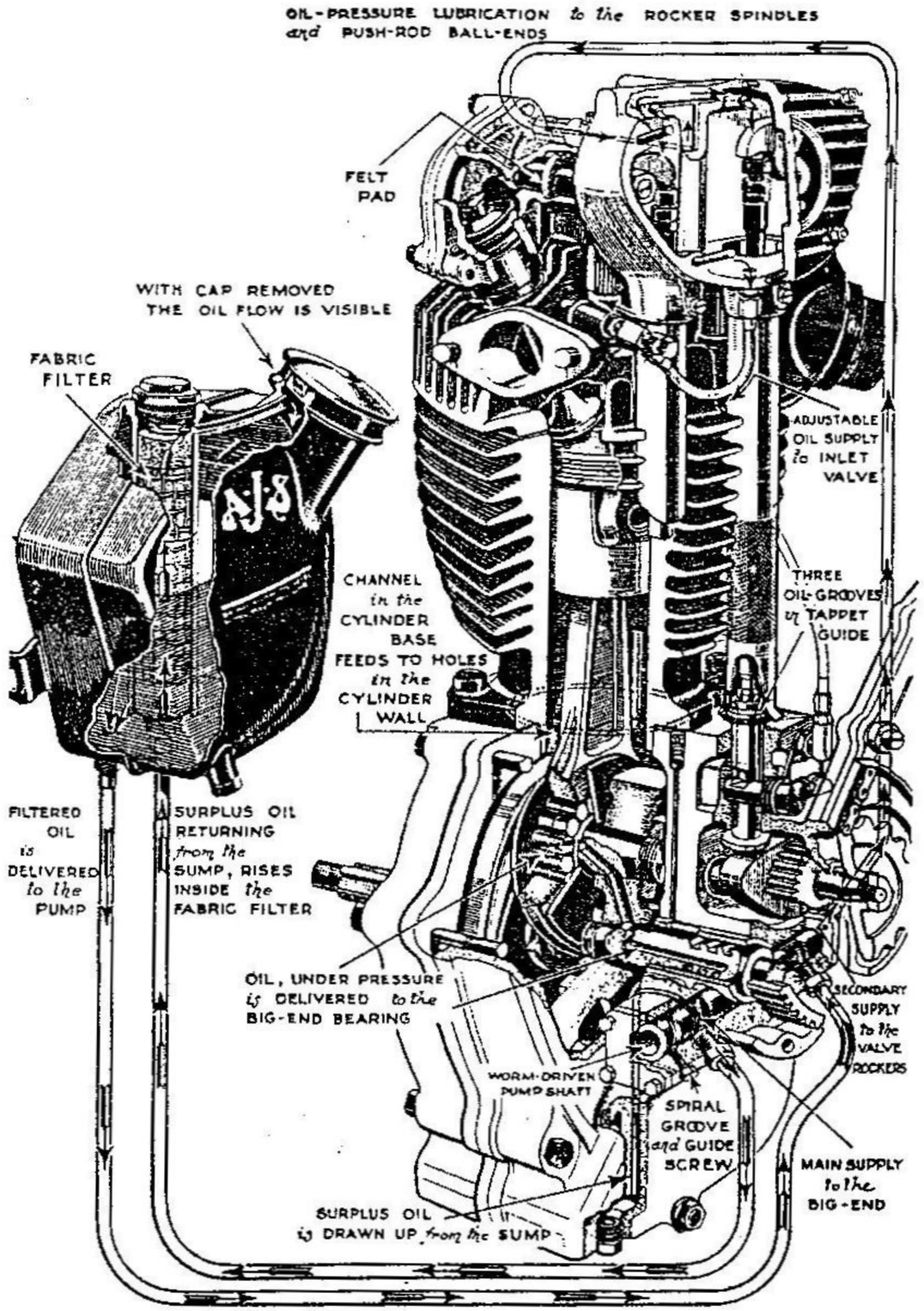
A·J·S Model 37/18

Motor A·J·S Cycles

GENERAL INFORMATION

STARTING.

Before taking the cycle on the road, a new owner is advised to first sit on the saddle and to become familiar with the various controls. Neutral or free engine position of the gears is indicated by pointers on the gear change pedal and the gear box end, and it must be observed that this neutral position is obtained before starting up the engine. The ignition is advanced and retarded by a small lever on the left handlebar and when starting this lever should be set to about its midway position. The throttle is controlled by means of a twist grip on the right handlebar and adjacent is the small lever by which the air supply is controlled. Both open by an inward movement. When starting from cold, the throttle should not be more than about one-sixth open and the air completely closed. The petrol is turned on by pressing inwards the end of the sliding plunger on the petrol tap marked PUSH ON. Assuming that the tanks have been filled and all levers set as above, to start the engine first flood the carburettor until petrol actually overflows from the vent hole in the float chamber cap. Then raise the exhaust valve by means of the handlebar lever and turn the engine over two or three revolutions, keeping the valve raised. Then turn the switch on panel to position I.G. and C.H. (coil-ignition models only) and give the kickstarter pedal a vigorous push downward, releasing the handlebar valve lifter when the pedal is nearly at the bottom of its travel so as to take the maximum possible advantage of the flywheel momentum. Immediately the engine starts, open up the air and reduce the throttle opening to check the engine speed. Do not, under any circumstances, race the engine up from cold, but allow it to idle at a fair speed for a moment or two to warm up, and while doing so, take the opportunity of observing that the oil is circulating properly. Then, sitting astride the cycle, gently move same forward until the stand is released, after which disengage the clutch by drawing inwards the large lever on the left handlebar. Then with the right foot move the gear change pedal to obtain low gear (a downward pressure on Models 12, 16, 22 and 26, and an upward pressure on heavyweight models) and slowly release the clutch lever while still keeping pressure upon the foot change pedal with the right foot when the cycle will commence to move forward. When well under way, again release the clutch and engage second gear, this time with an upward movement of the pedal on lightweight models and a downward movement on heavyweight models, retaining the pressure as before until the change of gear has actually been accomplished. Repeat the operation until



Oiling System.

LUBRICATION

Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. The following makes and grade are specially recommended: Summer—Castrol XXL, Mobiloil D, or Aeroshell; and Winter—Castrol XL, Mobiloil D, or Aeroshell.

Oil is carried in the tank underneath the saddle, and in use the level of oil in the tank should never be allowed to fall below the half-full mark. The integral oil pump is of the double-diameter single-plunger type, the larger diameter being used for exhausting the crankcase sump, and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to the tank. Provision is made on all models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run. It is necessary to remove the oil tank filler cap when the returning oil may be observed running from the small spout immediately underneath the cap. This check should be made preferably upon starting up the engine from cold, as, owing to the fact that when stationary oil from all parts of the engine interior drains back to the sump, and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than that delivering fresh oil, and partly to variations in the amount of oil suspense in the crankcase according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time, only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for external adjustment of the oil supply except to the inlet valve on O.H.V. models, the correct delivery to each part of the engine being arranged internally by suitably dimensioned passages. It might here be explained that oil is delivered to the timing gear chamber, which, after filling same to a pre-determined level, overflows into the flywheel chamber, and so drains away to the sump. Oil is also forced into the timing gear side flywheel axle bearing, and thence through a drilled passage in the flywheel to the big end bearing, the splash from which passes up into the cylinder interior. In addition to this splash, the cylinder receives oil via a direct ball valve controlled oil passage, which ensures a very adequate supply under all conditions for this, the most vital part of the engine. No attention to the oiling system is required other than observing the return of oil to the tank prior to a run, and the continual replenishment of the supply tank, the level of oil in which, as mentioned above, must be above the half-full mark, and must not be filled when

the engine is cold to a level higher than one inch below the return pipe outlet. The adjuster for inlet valve oiling referred to consists of a needle-pointed screw-down control which, once set, requires little or no attention. The approximate correct setting of the screw is one half revolution from right home and unless troubled with valve squeak or excess of oil, owners are advised to leave the adjustment as set on road test.

NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps, and also the guide screw, when the plunger can be pushed out large end first. When re-assembling, the plunger must be inserted after the crankcase sections have been bolted together, and before re-fitting the end caps, the guide screw must be replaced, with its relieved tip engaging the profiled cam groove in the plunger. By moving the plunger to and fro while this screw is being introduced, the correct location of the groove can be easily felt, and the screw in question must be finally firmly screwed home. The entire oiling system is simplicity itself (see oiling system illustration on Page **2** only one moving part being employed, viz., the double-diameter plunger. This plunger is rotated by the engine shaft, and moves backward and forward while rotating, under the influence of the small guide screw which engages with the profiled annular groove cut in the plunger end. As the plunger moves in its housing in one direction, the large end draws oil from the sump, while at the same time, the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement of the plunger the large end returns to the tank oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhausting end of the plunger is the larger, the engine sump is always kept clear of oil, hence the term "dry sump." At the same time a large quantity of clean, cool oil is being forced under pressure to all working parts. An efficient filter for the oil is provided in the tank consisting of a felt cartridge through which the returning oil is compelled to pass before emerging from the spout immediately underneath the tank filler cap. This cartridge filter can be removed upon unscrewing the hexagonally-headed cap on the top of the oil tank. Monthly, or about once every 1,000 miles, this filter should be removed and carefully washed in clean petrol, while once each season or not less frequently than once every 5,000 miles, the entire tank should be drained, thoroughly washed out with petrol, and afterwards filled to the correct level with fresh, clean oil. To avoid undue waste, it is quite permissible to arrange for this clean-out when the oil is at the lowest recommended level, although it must be pointed out that normally it is highly desirable to add fresh oil frequently in small

quantities in preference to allowing the supply to become almost exhausted before refilling, the reason for this being that the more oil there is in the tank, the cooler it will keep in circulation.

SPECIAL WARNING.

1.—Never mix oil of different make or grade.

2.—A ditry or choked oil filter cartridge will inevitably cause heavy oil consumption. If thoroughly soaking and washing in petrol does not effect a cure, fit a new cartridge. (Serial No. 35/G3/T71, price 2s. 6d.)

CHAINS.

The primary chain and the dynamo chain both run in an oil bath case and, provided that the oil level is correctly maintained will require no attention other than occasional adjustment. The inspection cap orifice on the chain case determines the correct level and it is imperative that the level is not allowed to fall more than about 3/16in. below the height of the bottom edge of this orifice. Failure to maintain this level will result in rapid chain wear and possible destruction. It is, therefore, advisable to make a practice of verifying the level weekly. The rear chain should be removed every 1,500 to 2,000 miles in summer, and every 1,000 miles during winter, and thoroughly washed in paraffin. After carefully wiping, it should then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used, the chain should be laid in soak overnight in order to ensure penetration to all link joints. If treated in this manner, at least 8,000 to 10,000 miles of satisfactory service should be obtained.

The case covering the magneto drive chain on models fitted with magneto ignition are packed with grease during assembly. A grease nipple is fitted to the outer cover and a small quantity of grease should be added periodically, say once every 1,000 miles.

GEAR BOX.

Monthly, or about once every 1,000 miles, a small quantity of grease should be added, if necessary, via the aperture on the gear box top cover by an oval metal cap. This cap is slotted at one end to allow of it being twisted round to uncover the aperture. The gear box must not be entirely filled and under normal conditions the addition of about two ounces of grease every 1,000 miles will be found ample. WEEKLY inject a little grease at all grease-gun points.

NOTE.—The greases recommended for gear box lubrication are supplied in collapsible tube containers with a suitable bent spout to facilitate injection into the gear box interior. Castrolease (Medium), Mobilgrease No. 2, or Shell Motor Grease (Soft).

WHEEL HUBS.

Upon assembly, all hubs are tightly packed with grease. To prevent the entry of mud and water in use, a small additional quantity of grease should be injected by means of the grease gun via the nipples provided on each hub, about once every 500 miles.

FORK SPINDLES.

To maintain efficient front fork action, adequate spindle lubrication is essential and an injection of grease via the various nipples provided is recommended weekly, or at least once every 500 miles.

STEERING HEAD BEARINGS.

Two grease-gun nipples are provided, and a small quantity of grease only should be injected monthly, or once every 1,000 miles.

DYNAMO LUBRICATION (Coil-Ignition Models).

Use oil very sparingly. A few drops of oil should be inserted through the lubricator on the driving end once every 500 miles, and a small quantity of grease should be pressed into the hole to be seen on the commutator end once every 1,000 miles. Avoid using too much grease or pressure, otherwise it may be forced through the bearing on to the commutator and cause trouble.

NOTE.—The Lucas dynamo fitted to magneto-ignition models is packed with grease before leaving the works and lubricators are not, therefore, provided. After the motor cycle has run several thousand miles, the dynamo should be dismantled for cleaning, adjustment and re-packing the bearings with grease. This is carried out preferably at the nearest Lucas Service Depot.

BRAKE CAMS, LEVER AND ROD JOINTS.

Inject grease sparingly into brake cam nipple about once every 1,000 miles, or monthly. Grease brake pedal bearing occasionally and oil brake rod joints frequently, particularly in bad weather.

BOWDEN CABLES.

A small metal clip will be observed on all the control cables. These clips cover a small bared patch on the outer casing through which lubricant can be injected by means of a specially constructed oil gun. This article is not supplied in the standard tool kit, but owners are advised to obtain one, price 5s. 9d., for their home tool kit. The operation of flooding the inner wire with lubricant takes only a few seconds, and the effect upon a dry cable has to be tried to be believed. Oil is injected through the small bared patch on the outer casing and is forced through the spiral casing on to and along the inner. All that is necessary is to slide the small clip along the casing to enable the specially designed oil gun to be clamped with the bared patch occupying a central position on the rubber pad on the gun nozzle. A few turns of the screwed gun plunger then floods the entire length of the cable with lubricant.

VALVE STEMS (Model 37/9 only).

Grease nipples are provided to permit grease to be injected on to each valve stem only as and when required. A very small quantity only should be injected and not more frequently than once every 500 miles.

ADJUSTMENTS & MAINTENANCE

DECARBONISATION.

The period for which an engine will run satisfactorily without being decarbonised depends to a great extent upon driving conditions. Generally, however, this process should be carried out every 1,500 to 2,000 miles. The need for decarbonising will be indicated by a tendency to pink or knock when ascending hills, or upon accelerating after rounding a corner, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, it is advisable to remove the cylinder each 5,000 miles in order to also inspect the piston rings and remove any deposit from the grooves in which they operate

TO REMOVE CYLINDER HEAD (S.V. Model 9).

First remove the sparking plug and then unscrew the eight nuts by which the head is fixed, when same can be lifted off. Should the gasket adhere to either the cylinder head or cylinder top, it should be gently eased off and deposited where damage is impossible. After carefully removing all carbon from both the piston top and interior of cylinder head, all traces of the deposit should be wiped off with a clean cloth. Before replacing the cylinder head thoroughly clean both surfaces of the gasket and also the flat surface of cylinder top and cylinder head. To facilitate subsequent removal a good tip is to smear the threaded interior of the cylinder head fixing nuts with graphite grease before refitting. It is imperative that all these nuts are evenly tightened down and to ensure this it is advisable to screw them on just finger tight and then go over each in turn, slightly increasing the pressure until all are firmly and evenly tightened down. As an additional precaution it is advised to again go over these nuts upon first starting up the engine and while still warm. If the cylinder head fixing nuts have a very dry or rusty appearance, before attempting their removal thoroughly soak them with paraffin.

TO REMOVE CYLINDER HEAD (O.H.V. Models).

First remove the entire exhaust system, petrol feed pipe and sparking plug, together with the small oil feed pipe from the O.H. rocker box to inlet valve guide. Then unscrew the top cap of carburettor mixing chamber and gently withdraw the throttle and air slides. Next remove the four tank fixing bolts and raise the tank to allow access to the cylinder head fixing bolts. A wooden block placed across each tank support bar will be found a convenient method of securing

the tank in a raised position. Next remove the detachable caps enclosing the valve springs each secured by four cheese head screws, after which unscrew the four bolts by which the rocker housing is secured when the entire rocker box with push rods and enclosing tubes can be withdrawn. It now only remains to unscrew the four cylinder head fixing bolts when the head can be lifted off. It will be observed that a soft copper or copper and asbestos washer is used for the cylinder head joint, this should be carefully removed and placed in a safe position awaiting re-assembly. To facilitate re-assembly, it will also be found desirable to remove the rocker box inspection cap so as to expose the top ends of the push rods.

TO GRIND IN VALVES.

In the case of O.H.V. models, valve grinding is advised upon each occasion when decarbonisation is undertaken. After the cylinder head has been removed as described, to remove valves it will be found convenient to rest the head of each in turn on a small block (wood preferably) while the spring is compressed to allow of the removal of the taper valve cap divided collar. It may be necessary to give the valve spring cap a sharp tap to release this taper collar. After removing all carbon deposit, the face of each valve seating should be smeared with a good grinding paste (this may be obtained already mixed) and the valve revolved slightly backwards and forwards (never revolve completely) while light pressure is applied to the head. During this operation it is advisable to occasionally raise the valve off its seating and turn in the guide slightly, afterwards repeating the backwards and forwards movement.

Generally, one application of grinding paste will be ample for the inlet, but two or three applications may be necessary to entirely restore the exhaust valve seating. After this grinding-in has been satisfactorily accomplished, all traces of the grinding-in mixture should be carefully washed off with petrol, and both valve stems and guides cleaned thoroughly. Prior to re-fitting, it is advisable to smear each valve stem with graphite grease.

A special tool for compressing valve springs can be supplied at 6s. 6d. (Part Number TTK8).

A small clamp tommy wrench to facilitate valve grinding, can also be supplied at a cost of 6d.

Care must be taken when replacing the O.H.V. rocker housing to see that the valve spring cups are correctly located. The assembly is best done by first of all sliding the rocker box roughly in position, then make certain that the push rod ends are correctly located in the tappet tops, after which make certain that the valve spring cups fit snugly into their respective positions, whereupon the four rocker box fixing bolts may be screwed down. Unless this care is taken, there is a danger of breaking the fixing bolt lugs of the rocker housing. Both tappets should be down during the re-assembly process. See that the hardened caps are refitted to valve ends.

To Grind in Valves—contd.

For S.V. Model 9, valve grinding during alternative decarbonisation is sufficient and care is necessary as with O.H.V. models to avoid interchanging the two valves. Tappet and rocker clearances must always be checked after cylinder head removal and the correct adjustment obtained. (See instructions below.)

TO ADJUST TAPPETS ON S.V. MODELS.

Remove valve spring cover and with the spanner provided in tool kit, hold the tappet and slack off the lock nut securing the adjustable tappet head. Then screw the head up or down as may be required, to obtain the correct clearance, after which securely tighten the locking nut. The correct clearance is .006 for both inlet and exhaust.

NOTE.—Tappet clearances should be tested while the engine is warm, not hot.

TO ADJUST TAPPETS ON O.H.V. MODELS.

First remove the rocker box cap secured with four small nuts on lightweight models and two knurled-edge thumb nuts on heavyweights; this will expose the adjustable ends of the valve push rods. Next revolve the engine until the piston is at approximately the top of the compression stroke (see note below) and with the spanners provided in the tool kit loosen the lock nut securing the adjustable push rod end and unscrew same until the correct clearance is obtained, after which securely re-tighten the lock nut. Always make a point of checking the adjustment obtained after this lock nut has been tightened. The correct clearance between the rocker ends and the valve ends when valves are completely closed and the engine cold is the nearest approach to nil possible. It should be observed that the push rods are free to be revolved with the fingers while at the same time no perceptible up and down movement of the rocker is possible.

NOTE.—Owing to the presence on the cam flanks of what are technically known as quietening curves, which are actually a very slight incline from the base circle of the cam to the foot of the hump, it is necessary when checking valve clearance to make quite certain that the tappet ends are on the base circle and it is for this reason that clearances should be checked with the piston at the extreme top of the compression stroke at which position both tappets are well clear of the described quietening curves. For the same reason it is necessary to check valve timing with a rocker clearance sufficient to skip the slight inclines. (See Valve Timing.)

VALVE TIMING.

The timing gears are marked for re-setting purposes, and the correct opening of the valves is as follows: the inlet commences to open 20 degrees before top of exhaust scavenging stroke, and closes 67 degrees up the compression stroke. Exhaust valve commences to open 75 degrees from bottom of firing stroke and closes 28 degrees down induction stroke. To test valve timing, the tappets must first be set to .016in. clearance. (See instruction above for normal running clearances.)

IGNITION SETTING.

The correct ignition setting for coil-ignition Models 12 and 16 is 5-16in. before T.D.C., for magneto-ignition Models 8, 18, 22 and 26, 7-16in. before T.D.C., and for the side valve Model 9, $\frac{1}{4}$in. before T.D.C. in every case with the ignition fully advanced.

TO RE-TIME IGNITION ON MODELS 12 and 16.

Remove the bakelite contact breaker cap and slacken the screw securing the contact breaker cam. Then with a small punch operating in one of the slots in this cam, give a sharp but light tap. This will loosen the cam on the taper end of the shaft to which it is fitted. Now set the piston and the ignition lever in the position mentioned above, after which gently turn the cam with the fingers in an anti-clockwise direction until the contact points are just about to part, in which position carefully re-tighten the cam fixing screw and replace the bakelite cap. It is essential, in this ignition setting operation, to obtain exactly the prescribed piston setting on the compression stroke, i.e., the stroke at the top of which both valves are closed.

NOTE.—Check contact breaker gap before setting timing (.018 to .020).

TO RE-TIME IGNITION ON MODELS 8, 9, 18, 22 and 26.

Remove the outer portion of aluminium magneto chain cover and slack off the nut securing the lower sprocket. Then, with a stout screwdriver, or the hooked end of a stout tyre lever, gently lever the sprocket loose from the taper on the camshaft to which it is attached. Then carefully turn the engine until the piston is at the exact position described above (according to model), observing that it is on the stroke at which both valves are closed. Now fully advance the ignition and remove the contact breaker cap, after which gently turn the magneto with the fingers in its ordinary direction (i.e. contra-clockwise when looking at the sprocket end) until the contact points are just about to break, in which position the sprocket fixing nut most be carefully re-tightened. Needless to add, it is of vital importance to correctly obtain the prescribed piston position and to secure the chain sprocket at the exact position at which the contact points commence to part. To find the exact point of break, place a piece of cigarette paper between the points and turn the magneto armature until the paper is just released, and no more, upon a gentle pull.

TO ADJUST THE DYNAMO CHAIN (All Models).

Adjustment is arranged by revolving the dynamo unit in its cradle mounting, and the correct adjustment should permit a movement of about $\frac{1}{4}$in. to $\frac{3}{8}$in. as the top run of the chain is lightly pressed up and down midway between the sprockets. When checking, try a number of positions and obtain the described adjustment at the tightest place. To adjust, first slacken the dynamo clamp bolt and then twist the unit bodily in its mounting in a forward or clockwise direction to tighten. Always check the adjustment after the clamp bolt has been re-tightened. It will be found that the tension of both dynamo and primary chains can

be checked by the fingers passing through the inspection cap orifice, it being, of course, necessary to remove the cap for the purpose. This cap is released upon unscrewing the knurled edge screw.

IMPORTANT.—Should it be necessary for any reason to remove the chain sprocket on the dynamo, it is absolutely essential both during removal and re-fitting to hold the sprocket with a spanner while loosening or tightening the fixing nut. The object is to relieve the dynamo armature of any bending strain, and two flats will be found on the sprocket boss to permit of the application of a spanner.

TO ADJUST THE MAGNETO CHAIN (Magneto-Ignition Models).

Adjustment to the magneto chain is obtained by tilting the unit bodily on the lower crankcase bolt upon which the platform is mounted, the upper fixing bolt holes being slotted for the purpose. To adjust the chain, first remove the outer cover of chaincase, then slack off slightly only the two crankcase bolts by which the magneto platform is fixed and insert a lever or screwdriver under the top edge to force the back end up until the correct adjustment is obtained, when securely tighten the two fixing bolts and before replacing the outer chain cover smear the chain with grease if necessary.

NOTE.—The correct adjustment allows a whip of about ½in. as the top run of the chain is slightly pressed up and down midway between the sprockets.

TO ADJUST PRIMARY CHAIN.

To obtain adjustment for the primary chain, provision is made to swing the gear box bodily upon its lower fixing bolt. It will be observed that the upper fixing bolt operates in slotted holes to permit of the necessary movement. To make adjustment, the offside nut of the top gear box fixing bolt must first be slackened. Then to tighten the chain adjustment, first slack off the nut on adjuster bolt nearest the engine and turn the nut furthest from engine clockwise until the chain is tight, after which slack off the nut furthest from engine and tighten down the nut nearest to engine until the correct adjustment is obtained, when securely tighten up the nut furthest from engine to lock the adjustment, and also securely re-tighten the offside nut on the top gear box fixing bolt. The correct adjustment (which should allow a whip or movement of ⅜in. to ½in. as the top run of the chain is lightly pressed up and down midway between the sprockets) should be obtained for the tightest place.

TO ADJUST THE REAR CHAIN.

Put down the centre prop stand, then slack, slightly only, both rear wheel spindle nut and also the large nut securing the brake drum dummy spindle (both nuts on left side). Then adjust the chain as required by means of the bolts which pass through each of the fork ends, after which securely re-tighten spindle nuts. The correct adjustment (which should allow a whip of ⅜in. to ½in. when chain is pressed up and down) should be obtained for the tightest place.

NOTE.—Before tightening the rear chain, the adjustment of the front chain should be inspected and if attention to each is required, the latter should be treated first.

IMPORTANT.—Care is necessary when tightening rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels and about four inches from and parallel to the ground, should be observed to just touch each tyre at both sides of wheel centre simultaneously. Alternatively, a straight wooden batten about five feet long is a very handy article to be used for the purpose of checking wheel alignment, applied as in the case of string, parallel to and about four inches from the ground.

TO REMOVE DETACHABLE REAR WHEEL (Heavyweight Models only).

Remove the left-side axle nut and also the three long square-headed bolts which secure the wheel hub flange to the brake drum. Then withdraw the centre spindle, when the distance piece between the right-side fork end and hollow wheel spindle will fall out. The wheel can then be pulled off the driving pegs on brake drum and after removing the rear portion of back mudguard on Model 18, or raising the rear hinge portion on Models 8 and 9, can be taken away. On all models, the rear mudguard stays or tubular mudguard arch assemblies are slotted at the lower end to allow of easy detachment. It will be observed also, that the rear lamp cable has a sleeve connector for the same purpose. This connector is exposed upon sliding the rubber covering back.

NOTE.—The three long bolts securing the detachable rear wheel must always be efficiently tightened. Slackness will lead to wear, and is usually accompanied by a dull thudding noise when the engine is labouring. Such symptoms must, therefore, not be ignored.

TO DISMANTLE AND ADJUST WHEEL BEARINGS (All Models).

Instructions which must be carefully carried out for dismantling and re-assembling taper roller bearing hubs:—

To dismantle, release the locking nut and screw out the adjusting ring. The dished plate containing felt washer and plain plate will then drop out. Take out spring ring from the opposite side of hub and remove felt washer and holder consisting of two plates and retaining ring, the latter being between the two plates. The spindle can now be pressed or driven out from either end, bringing with it one of the outer races. The other race can then be driven out, if desired.

To re-assemble, press in outer race on fixed or plain end of hub, **taking great care that it goes in square.** This race is pressed in about 1/32in. 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. **Care must be taken to put the plate with the larger hole in last. This is most important.** This outer race can now be forced back until the plates are tight on the spring ring. The 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 other race can now be pressed in until there is about 1/16in. **end play in the spindle.** Insert plain plate and dished plate with felt washer, screw in adjusting ring, **and gradually screw down until there is just a fraction of end play in the spindle.** This should be .001 of an 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.**

CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the most likely cause is incorrect cable adjustment. When correct it should be possible to move the actuating lever (part to which lower end of cable is attached) to and fro with the fingers, and if this free movement cannot be felt, the cable adjustment must be slackened. This is done by screwing down the knurled edge cable adjuster on the gear box end plate. If the cable adjustment is found satisfactory, then adjustment should be made to the clutch spring adjuster nuts, each of which should be screwed in exactly half turn, when a re-trial should be made. If necessary, repeat —but be careful to adjust each of the four nuts a similar amount. Normally, the correct adjustment of these nuts is five complete turns from right home; and after dismantling the clutch, the correct setting is obtained by screwing all four nuts right home and then slackening off five complete revolutions. Uneven or excessive tightening of these nuts will prevent the clutch releasing properly.

STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for correct adjustment by exerting pressure upwards from the extreme tips of the handlebars, while the steering damper, if fitted, is completely slacked off. Should any shake be apparent, the top domed nut on steering column should be slackened and the lower nut screwed down until all trace of slackness has disappeared, when the top domed nut should be again tightened down. Hold the lower nut while tightening down the upper one.

IMPORTANT.—To guard against unconsciously over-tightening the head bearings, the effect of which is extremely difficult steering, it is advisable to jack up the front of the machine (a box of suitable height under the crankcase will serve) in order that all shake may be taken up satisfactorily and the steering head left perfectly free.

FRONT FORK SPINDLE ADJUSTMENT.

Provision is made for taking up side or endwise wear of the various fork spindle bearings. The need for adjustment will be made apparent by a click or creaking noise heard when the steering head is abruptly turned. By placing the fingers partly over the spindle link and partly upon the lug through which spindle passes first determine which spindle or spindles require adjustment. Then slack off both spindle nuts and turn the spindle bodily by means of the hexagonal offside end in a right-hand or clockwise direction to take up slack. Do not turn more than half a revolution before a re-trial with the nuts re-tightened. Care is essential to guard against over-tightening when the fork will become stiff in action or most probably refuse to function. The washers which are fitted between the lug ends and the spindle side plates are not provided for frictional purposes, but to prevent actual seizure in the event of the spindle adjustment being too tight. Never attempt to adjust more than one spindle at a time. The necessary friction damper effect is provided independently and is adjusted as follows:—

TO ADJUST FORK ACTION DAMPER.

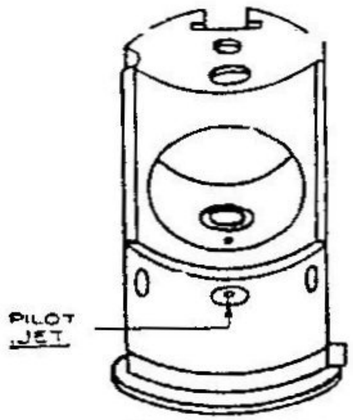
The fork action damper can best be adjusted while cycle is actually in motion, and a badly corrugated surface such as may be found on many bus routes provides the best condition for the purpose. The ebonite damper hand nut should be screwed sufficiently tight to make the fork action sluggish under such circumstances as those described and will subsequently require very little variation for other conditions of road surface to provide the maximum degree of comfort.

CARBURETTOR ADJUSTMENT.

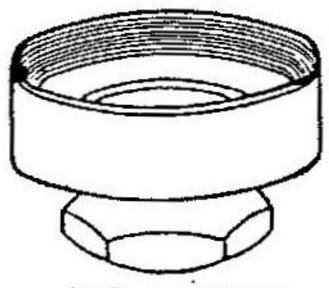
Although owners are advised to refrain from tampering without good cause with the setting of the carburettor, a rough idea how this unit functions and how adjustments may be effected is given below:—

The correct level of petrol is maintained by means of a float and needle valve, operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the petrol supply to the engine is obtained firstly by the main jet, and secondly by means of a taper needle attached to the throttle valve and operating in a tubular extension of the main jet. The main jet controls the mixture entirely from $\frac{3}{4}$ to full throttle, and the adjustable taper needle from $\frac{3}{4}$ down to $\frac{1}{4}$ throttle. The cut-away portion of the air intake side of throttle valve controls mixture from $\frac{1}{4}$ throttle down to about $\frac{1}{8}$ open, and a pilot jet with independently adjusted air supply takes care of idling on nearly closed throttle up to about $\frac{1}{8}$ open. These various stages of control must be borne in mind when any adjustment

is contemplated. The correct jet size and throttle cut-away is selected for each model and should not be altered without some very good reason. For Models 9, 16 and 26, the combination is 150 main jet and 6x4 throttle slide. For Models 8 and 18, the combination is 180 main jet and 29x4 throttle slide. For Models 12 and 22, the combination is 120 main jet, and 5x3 throttle slide. With this combination it is possible to use full or nearly full air under all conditions, except perhaps when the engine is cold or pulling hard up hill on full throttle, when some benefit may be obtained by closing the air down a trifle. Weak mixture is always indicated by popping or spitting at the air intake, whilst a rich mixture usually causes bumpy or jerky running, in extreme cases accompanied by black smoke from the exhaust. A rough test for correct setting is to warm the engine up and then fully retard the ignition, and with the air about ¾ open, slowly open up the throttle to full open, during which the engine should respond without a misfire, but upon a sudden opening of the throttle again with fully retarded ignition and about ¾ air, it should splutter and stop. This is, of course, only a rough test but is, nevertheless, a fairly accurate guide to correct main jet and needle setting. To check the pilot jet and air control setting, warm up the engine, and with the ignition about ⅔ advanced and air about ¾ open, with throttle almost closed, the engine should idle positively and evenly. If it fails to do so, slacken the lock nut securing the pilot jet air screw, which will be observed at the base of the mixing chamber, and find a position at which even firing is obtained. The adjustment of this screw is not unduly sensitive and it should be possible to obtain the correct adjustment in a few seconds. Before concluding that incorrect carburation is responsible for heavy consumption, and before carrying out any of the tests described, make certain that the ignition is set correctly, and the sparking plug points are not adjusted too wide or too close (.020 to .025 recommended). This is most important. In the event of adjustment of the air screw failing to affect slow running in the manner described, it may be reasonably assumed that the minute passage for petrol has become choked. This is always a possible danger unless meticulous care is taken to prevent the entry of dust or foreign matter of any description into the petrol tank. The jet or petrol passage in question consists of a small hole drilled in the side of the sprayer base. This sprayer base may be pushed out of the mixing chamber upon removing the float chamber and the large nut at the bottom of the mixing chamber. To make the location of the petrol passage quite clear, a line illustration is shown, and in the event of difficulty being experienced, a fine piece of steel wire (a strand of Bowden cable will do) should be passed through the very small hole indicated by an arrow.



SPRAYER BASE.


NUT SECURING SPRAYER BASE.

IMPORTANT.—Never run the engine on full retard and full throttle for more than a few seconds at a time.

Failure to obtain good idling may be due to:—

1. Air leaks, either at the junction of the carburettor and engine or by reason of a badly worn inlet valve stem or guide.
2. Faulty valve seatings or incorrect tappet clearances.
3. Sparking plug faulty or points too close.
4. Too much ignition advance.
5. Contact points dirty or setting too close.
6. Defective sparking plug cable.

Failure to obtain satisfactory petrol consumption may be due to:—

1. Late ignition setting (carefully follow instructions).
2. Bad air leaks.
3. Weakened valve springs (renew).
4. Leaky float, causing flooding (renew).
5. Taper needle extension insufficient (note position before altering).
6. Compression poor, due to worn piston rings, or defective valve seatings (test compression with wide open throttle).
7. Incorrect tappet adjustment.

ELECTRICAL EQUIPMENT.

Miller lighting and ignition equipment is fitted to Models 12 and 16, and Lucas dynamo lighting with separate magneto for Models 8, 9, 18, 22 and 26. The dynamo charge rate on all models is controlled by means of a constant voltage automatic unit. This unit functions when the dynamo generated voltage rises above 7.3 to 7.5 volts and under fully charged battery and no load condition only a small current flows through the system. As load is switched on the dynamo output automatically increases to meet the demand. It is therefore only under run-down battery conditions and during daylight running that a high charge rate will show on the ammeter, and under such conditions a rate as high as 5 to 6 amps may be recorded. The normal rate, however, is between 2 and 4 amps, according to the condition of the battery.

The object of this constant voltage control system is, of course, to maintain a fully-charged battery without the risk of over-charging so commonly experienced in the past with switch charging rate control and particularly so on motor cycles with their unavoidably small capacity batteries. The head lamp fitted has a double filament driving light bulb in addition to a parking light bulb, the dipped filament being brought into instant use as and when required by means of a switch on the left handlebar. As in car practice a red warning light is provided on the tank panel (coil ignition models only) to remind the driver to switch the ignition off when the engine is not running and the contact breaker points are together. This light goes out immediately the dynamo is revved up to supply sufficient current to close the automatic cut-out contacts, but may glow slightly when the dynamo is generating maximum output.

BATTERY.

TOPPING UP.—At least once a month, the vent plugs in the top of the battery should be removed and the level of the acid solution examined. If necessary distilled water, which can be obtained at all chemists and most garages, should be added to bring the level above the top of the plates, but well short of the bottom of the vent plugs. When examining the cells, do not hold a naked light near a vent, as there is a danger of igniting the gas coming from the plates.

STORAGE.—If the equipment is laid by for several months, the battery must be given a small charge from a separate source of electrical energy about once a fortnight, in order to obviate any permanent sulphation of the plates. In no circumstances must the electrolyte be removed from the battery and the plates allowed to dry, as certain changes take place which result in loss of capacity.

DYNAMO.

The only parts of the dynamo calling for occasional attention are the brushes and the commutator, which are readily accessible when the end cover is removed. The brushes should slide freely in their holders. They should be clean and the face in contact with the commutator should appear uniformly polished. Dirty brushes may be cleaned with a cloth moistened with petrol. The commutator surface must be kept clean and free from oil or brush dust. (See earlier instructions re dynamo lubrication.)

CONTACT BREAKER (Coil Ignition).

Occasionally remove the bakelite contact breaker cover and examine the contacts. If they are burned or blackened, clean with a very fine emery cloth and afterwards with a cloth moistened with petrol. Take care to wipe away all particles of dirt or metal dust.

ADJUSTMENT (Coil Ignition).

The contact breaker gap is carefully set and should not be altered unless it varies considerably from the correct setting. If adjustment is necessary, proceed as follows:—

Turn the engine until it is seen that the contacts are fully opened, then slacken the nut securing the stationary contact screw and adjust this screw until the gap is about .018 to .020. After making the adjustment, care must be taken to tighten the locking nut by which the stationary contact screw is secured.

NOTE.—Check contact breaker gap at 100 and 300 miles. Owing to an initial settling down, there is a tendency for the gap to decrease in the first few hundred miles of use. This may seriously affect ignition setting. Subsequently, adjustment will only be necessary at long intervals, but should be checked every 1,000 miles.

PERIODICAL INSPECTION OF NUTS, ETC.

Satisfactory service depends largely upon the necessary immediate attention to details. The old adage, "A stitch in time save nine," applies with particular force to motor cycle maintenance. Make a point of occasionally testing with a spanner the security of all nuts. There is possibly more dissatisfaction and damage caused through neglecting such details than for any other reason. It must be remembered that a motor cycle is a highly specialised piece of engineering and that while it does not call for great engineering skill in driving, the exercise of a little mechanical sense and the occasional use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be obtained with the requisite degree of satisfaction. Therefore do not wait until tomorrow, but adjust it now.

CLEANING.

If the machine is used to any extent in bad weather, a small hose is almost indispensable for removing mud. Care should be exercised to avoid directing water on to the engine, carburettor, or other such parts. If a hose is not available, soak dirt with paraffin before removing. Do not attempt to rub or brush mud off any enamel surface when dry or the polish will soon be destroyed. For the engine, etc., a good stiff paint brush and pot of petrol is preferable.

TYRES AND SERVICE.

To obtain satisfactory life and service from the tyres is largely within the user's control, and the first essential to obtain this is proper inflation. The correct amount of pressure is governed substantially by the load to be carried and it is, therefore, difficult to lay down a hard and fast ruling. Assuming the weight of driver to be normal, the pressures recommended may be regarded as satisfactory, and we urge all users to make a practice of checking the actual pressure by means of a low-pressure Schrader tyre gauge. This take a few seconds only

and will amply repay the owner by reason of additional service and immunity from failures.

		Solo.	With Pillion.
Front tyre ...	26x3.25 ...	14-15 lbs. ...	16-17 lbs.
Rear tyre ...	26x3.25 ...	20-22 lbs. ...	22-24 lbs.
Sidecar tyre ...	26x3.25 ...	— ...	14-15 lbs.

The above recommended pressures apply to average weight drivers. For abnormal weight drivers, add two pounds per square inch to rear tyre only.

CORRECTIVE MEASURES.

No adjustments should be made or any part tampered with, until the cause of the trouble is known. Otherwise adjustments which are correct may be destroyed.

Engine Suddenly Stops:—

Petrol shortage in tank.
Choked petrol supply pipe or tap.
Choked main jet.
Water in float chamber.
Oiled-up or fouled sparking plug.
Water on H.T. pick-up or on sparking plug.
Choked vent hole in petrol tank filler cap.

Engine Fails to Start, or Difficult Starting:—

Lack of fuel or insufficient flooding if cold.
Excessive flooding, allowing neat petrol to enter cylinder.
Oiled-up sparking plug.
Stuck-up valve or valve stem sticky.
Weak valve spring or valve not seating properly.
Too liberal throttle opening.
Pilot jet choked.
Contact breaker points dirty or gap incorrect.
Retaining clip on contact breaker cover out of position (coil ignition only).

Loss of Power:—

Valve or valves not seating properly.
Weak valve spring or springs.
No tappet clearance or excessive clearance.
Lack of oil in tank.
Brakes too closely adjusted.
Badly fitting or broken piston rings.
Punctured carburettor float.
Creeping ignition lever.
Sticking valve.

A.J.S. MOTOR CYCLES,
PLUMSTEAD,
LONDON, S.E.18.

Engine Overheats:—

Lack of proper lubrication.
Weak valve springs.
Pitted valve seats.
Worn piston rings.
Late ignition setting.
Punctured float, causing rich mixture.
Air control to carburettor out of order.
Creeping ignition lever.

Engine Misses Fire:—

Loose terminal on coil (coil ignition only).
Valve spring weak.
Defective or oiled plug.
Incorrectly adjusted contact breaker.
Incorrectly adjusted tappets.
Defective sparking plug cable.
Oil on contact breaker points.

Excessive Oil Consumption:—

Stoppage or partial stoppage in pipe returning oil from engine to tank.
Clogged or partially clogged cartridge filter in oil tank. (Drain sump and test with filter removed.)
Badly worn or stuck-up piston rings, causing high pressure in engine crankcase.
Air leak at rear oil pump end cap.

GUARANTEE

If a defective part should be found in our motor cycles, motor cycle combinations or sidecars, or in any part supplied by way of exchange before referred to, it must be sent to us CARRIAGE PAID and accompanied by an intimation from the owner that he desires to have it repaired or exchanged free of charge under our guarantee, and he must also furnish us at the same time with the number of the machine, the date of the purchase or the date at which the alleged defective part was exchanged, as the case may be.

Failing compliance with the above, such articles will lie here AT THE RISK OF THE OWNER, and this guarantee and any implied guarantee, warranty or condition shall not be enforceable.

We do not guarantee specialities such as tyres, saddles, chains, magnetos, lamps, etc., or any component parts supplied to the order of the purchaser differing from standard specifications supplied with our motor cycles, motor cycle combinations, sidecars or otherwise.

IMPORTANT NOTE.—Any part sent to us for any reason whatsoever must bear distinctly the sender's name and address and instructions or requests relative to parts must be sent separately by letter post.