

HANDBOOK

OF



Motor Cycles

MODELS

36/2, 36/2A, 36/5

36/8, 36/9, 36/18

MANUFACTURED BY

A.J.S. MOTOR CYCLES

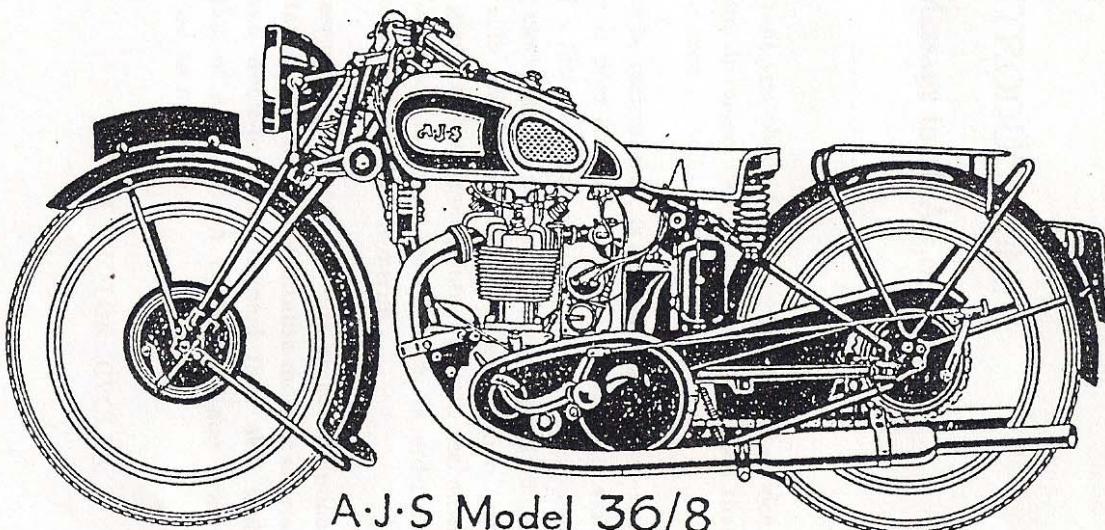
PLUMSTEAD, LONDON, S.E.18

ENGLAND

PRICE ONE SHILLING

Supplied free with each new Cycle

DRIVING AND ADJUSTMENT INSTRUCTIONS



A·J·S Model 36/8

Motor **A·J·S** Cycles

PROPRIETORS: MATCHLESS MOTOR CYCLES (COLLIERS) LTD.,

PLUMSTEAD, S.E.18, ENGLAND

Codes:

Telephone: Woolwich 1010 (4 lines).	A.B.C. 5th Edition. A.B.C. 6th Edition. Bentley's and Private Code.	Telegrams and Cables: "Icanhopit," Woolwich.
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GENERAL INFORMATION.

INTRODUCTION.

A Personal Message to all A.J.S. Owners.

IT IS our sincere desire that you obtain from your A.J.S. the service, comfort, enjoyment and innumerable miles of low-cost travel that we have earnestly endeavoured to build into it.

A motor cycle, it must be remembered, is a highly specialised piece of engineering, and 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. In the following pages we give, without going into intricate technical detail, much valuable information that you should have, in order to give your cycle the careful attention which it merits.

Neglect to make necessary adjustments, or only casual attention to the lubrication of important parts, will soon neutralise the best efforts of the designers who have whole-heartedly devoted their skill and knowledge to the production of A.J.S. Motor Cycles, and may bring needless trouble and expense to its owner.

TAKING OVER A NEW MACHINE.

HAVING filled up with petrol and oil it is advisable before starting the engine to sit on the cycle and to become familiar with the controls. Neutral or free engine position of the gears on all hand-change models is the notch first removed from low gear or extreme downward position. The engine must always be started with the gear in this neutral position. The ignition is controlled by a trigger on the left side of the handlebar, and the air by a similar trigger on the right side, while the throttle is controlled by the right-side handlebar grip. All controls open or advance by an inward movement, and for starting, the air should be completely closed and the ignition only about half advanced. This latter is necessary to avoid back-firing. A small milled-edge screw at the bottom of the mixing chamber controls the air supply to pilot jet. This screw is accurately set at the works, but on account of variation in fuel or temperature, it may be found desirable to alter the adjustment occasionally. It should be explained, therefore, that by unscrewing more air is admitted, thereby weakening the mixture, or vice versa, screwing in enriches the mixture by decreasing the air supply. This adjustment only affects carburation on very small throttle openings and dead slow running. The taper needle attached to the throttle piston controls the petrol supply on large throttle openings. To weaken the mixture this needle must be lowered, or alternatively, to enrich it is necessary to raise same. These remarks are intended only to roughly convey some idea of the carburettor working, and owners are advised to refrain from making any adjustments without good cause. (See Carburettor adjustment.)

The petrol is turned on by pushing inwards the end of the sliding plunger marked ON. Assuming that the tanks have been filled with petrol and oil of the recommended brand, and that all levers have been set as above, to start the engine first flood the carburettor by depressing the tickler button on float chamber until petrol actually overflows from the vent hole. Then with the valve lifter raised, turn the engine over a few revolutions in order to charge the cylinder or cylinders. Then give the kickstarter pedal a vigorous push, releasing the valve lifter lever when the pedal has almost reached the bottom of its travel, when the flywheels should have sufficient momentum to carry over compression. Repeat if necessary and immediately the engine starts reduce the throttle opening to check speed.

DO NOT under any circumstances race the engine while cold, but allow it to idle for a moment or two in order to warm up, and see that the oil is circulating properly. Then, while seated on the cycle, disengage the clutch by drawing inwards the lever situated on the left side of the handlebar and engage the first gear. Then gently release the clutch lever, when the cycle will commence to move forward. When well under way, smartly de-clutch and simultaneously move the gear into second position, releasing the clutch lever gently as before when the change has been made, after which repeat the operation until top gear is reached. In all changes of gear the clutch should be released a fraction of a second only before shifting the gear lever, and with reasonable care a change of gear can be made without a sound.

The movements of the gear lever must be made slowly and firmly, under no circumstances should the gears be allowed to grate.

CONTROL.

With a foot change a totally different method of operation should be observed from that described for hand control.

The effort obtained with the foot and the leverage on the control is very much greater than with hand change, and certain precautions must be observed to avoid damage to the gears and control mechanism.

Under no circumstances should a violent kick be given to the pedal, a steady pressure being all that is required. It must be clearly understood that under certain conditions the layshaft and mainshaft gears may be rotating at equal speeds, and the dogs on the gears may be positioned against each other. Therefore, if undue force is used, breakage of the gear selectors or control mechanism could result from violent pressure on the pedal. A downward pressure engages a higher gear, and vice versa, an upward movement makes a change down.

In making a change of gear, the clutch should be released and the pedal simultaneously moved with a steady toe movement. When the end of the pedal travel has been reached, the pedal must be held firmly with the foot until the clutch has been re-engaged. It is not sufficient to just kick the pedal and remove the foot when the end of the travel has been reached.

“DON’T’S” IN DRIVING.

DO NOT race the engine unnecessarily, or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth getaway.

DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.

DO NOT allow the engine to labour on high gear on a steep gradient, and remember that an easier, faster and better ascent can be made on the next lower gear.

DO NOT make a practice of starting in second speed.

DO NOT under any circumstances allow the chains to run very slack or very dry. Either will soon cause trouble and adjustments are easy.

Slack chains will inevitably cause harshness of transmission.

DO NOT force engine or drive above a maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount’s maximum capabilities. However, until all bearings are well run in, it is advisable to refrain from speed bursts, and the accompanying possibility of seized bearings, piston rings, etc. The first 500 miles of an engine’s existence is far more important than the next 5,000.

DO NOT race the engine in neutral gear position, violently accelerate from a standstill, or drive at full speed on full throttle, etc., when in a residential district. Any motor cycle (or, for that matter, any motor vehicle) when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every A.J.S. owner to studiously refrain from any of the practices enumerated, or any calculated to cause annoyance to the public in general. Recollect that the degree of silence of your cycle is judged not by the actual noise it is making, but by comparison with other noises present. For example, in a busy street your cycle might be inaudible, while in a quiet, narrow street of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.

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 grades are specially recommended: Summer, Castrol XXL, Mobiloil D, or Aeroshell; and Winter, Castrol XL, Mobiloil D, or Aeroshell.

Engine Lubrication—Models 36/8, 36/9 and 36/18.

On all the above models a wet-sump non-circulating oiling system is employed. A double-acting oil-pump plunger is used, one end of which delivers oil to the engine, and the other end draws oil from the tank and immediately returns same, in order to provide a tell-tale by which the correct functioning of the pump unit can be determined at a glance upon lifting the oil tank cap. As the oil supply to the engine is decreased so also, at the same time, the return to the tank is decreased. The amount of oil pumped into the engine is varied by altering the setting of the control knob on pump unit (see illustration). Screwing this knob down, i.e., in a clockwise direction, cuts down the amount of oil, turning the reverse way increases the amount of oil. A stop is fitted underneath the control knob so that the oil supply cannot be cut right off. When the engine leaves the factory the oil supply is set a little on the generous side. After the engine has been run in well, say after 500 to 600 miles, or if the engine smokes excessively, the control knob should be screwed down about one-eighth of a turn, then re-test for say 50 miles, if still too much oil, screw down a further one-eighth of a turn and so on. Endeavour to set the oil supply so that when the throttle is opened smartly with the engine idling or running on low gear, a puff of smoke issues from the exhaust pipe. An approximately correct setting is obtained by screwing the control knob lightly down to stop, then unscrewing half a turn. Every 2,000 to 3,000 miles drain off oil from crankcase and replace by half-pint of clean oil. A plug in the bottom of the crankcase and a plug near the base of cylinder on the driving side, is provided for this purpose. **Do not put petrol or paraffin in the crankcase.**

Engine Lubrication—Models 36/2 and 36/2a.

The engine fitted to these models, unlike any of the singles, has a dry sump crankcase, and the lubrication system is entirely different. No adjustment is provided, the correct supply of oil to all parts of the engine being controlled by means of suitably dimensioned passages. As on other models, the oil is carried in a tank underneath the saddle, but unlike other models the oil level must not be allowed to fall below the half-full mark. In fact, so far as is practicable possible the level should be maintained at approximately one inch below the return spout immediately underneath the tank filler cap. The reason for this is that the more oil the tank contains, the cooler and less contaminated it will remain in its incessant circulation. An efficient filtering system is provided consisting of a felt cartridge through which the oil is compelled to pass on its way back to the supply tank. This cartridge is readily removable upon unscrewing the hexagonal cap on the oil tank top. It should be thoroughly washed in clean petrol once every one or two thousand miles, while once each season the entire tank should be removed, and after thoroughly washing out with petrol, it should be refilled with clean fresh oil.

Notes on the Dry Sump Oiling System, Models 36/2 and 36/2a.—If the engine is for any reason dismantled, the crankcase must not on any account be separated until the oil 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 refitting 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 firmly screwed home. The entire oiling system is simplicity itself, 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 a 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 the 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 plunger is the larger one, the engine sump is always kept clear of oil, hence the term "dry sump," while at the same time a large quantity of clean, cool oil is forced under pressure to all working parts.

CHAINS.

The primary chain runs in oil, and should need very little attention other than occasional adjustment, and the oil kept up to the correct level in the case (verify level weekly). The inspection cap orifice is positioned to prevent over-filling. 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 careful wiping it should 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.

GEAR BOX.

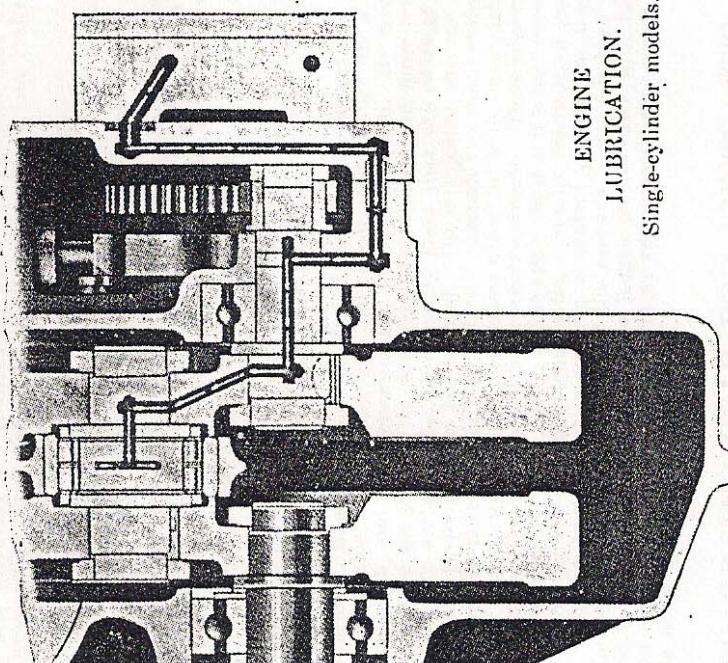
Once every 500 miles a grease gun full of grease should be injected into the gear box. It is desirable to verify the level of lubricant in the gear box, which should be from one-third to half full. If the above-mentioned injections do not maintain this correct level, the interval between each should be reduced accordingly.

Lubricants specially recommended are Castrolease Medium, Mobilgrease No. 2, or Shell Motor Grease (soft).

A little grease should be injected also through the various nipples observed on the gear box end (except 36/5)—weekly advised.

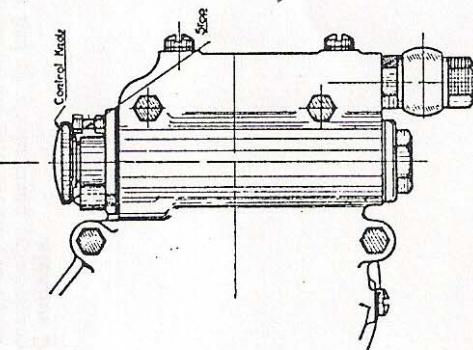
HUBS.

Every 500 miles or even more frequently in continuous bad weather a small quantity of grease should be injected into both front and rear hubs via the grease nipples provided.



ENGINE
LUBRICATION.

Single-cylinder models.



PUMP UNIT.
Sketch showing
method of controlling
oil supply referred to
Page 7.

ADJUSTMENTS & MAINTENANCE.

ROCKERS—O.H.V. MODELS.

Grease should be regularly injected via the three nipples on the aluminium rocker box and cover at least once every 300 miles or weekly. The nipple on the cover directs grease into the push rod capped ends while the others convey grease direct into the rocker bearings.

BOWDEN CABLES.

To lubricate Bowden inner cables has hitherto meant the entire removal of the cable, unsoldering one end nipple, etc., altogether a difficult and expensive job, and one, consequently, usually neglected. By means of a specially designed oil gun, it is now possible to flood the inner wire with lubricant in a few seconds, and we can only state that the effect of this on a dry cable has to be tried to be believed. Oil is injected through a small bared patch on the outer casing and is forced through the spiral casing on to and along the inner wire. All Bowden cables are fitted with small metal clips, which will be observed approximately at the centre of each. These clips cover the small bared patch referred to above, and to apply the gun it is only necessary to slide the clip along the casing to enable the specially constructed 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 plunger is then all that is required to efficiently flood the entire length of the cable with lubricant. The cost of this special gun is 5s. 9d., and we recommend every owner to have one in his home tool kit.

BRAKE AND GEAR ROD JOINTS, ETC.

In addition to the foregoing, all moving parts, such as brake and gear rod joints should be oiled occasionally, particularly in bad weather. Bicycle lubricating oil or machine oil suitable.

Valve and Tappet Clearance.—The correct clearance between tappets and valve ends must be accurately maintained. The clearance recommended for O.H.V. models is .006 for the inlet and .008 for the exhaust. On side valve models .004 is the clearance recommended for the inlet and .006 for the exhaust. Check the clearance when the engine is warm, not when cold. Suitable spanners for the adjustment are provided in the tool kit.

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 heads, it is advisable to remove the cylinders each 5,000 miles in order to inspect the piston rings and remove any deposit from the grooves in which they operate.

To Decarbonise Models 36/2, 36/2a and 36/9.—To remove the cylinder head for decarbonising, unscrew the seven holding-down bolts on top of the cylinder head and disconnect the sparking plug cable, the head can then be lifted off. If it is desired to remove the cylinder barrel as well, the base fixing nuts must be unscrewed from the studs (on the 36/2 and 36/2a Models one nut is inside the valve spring compartment and on these models it is necessary to remove the exhaust pipes before the cylinders can be withdrawn) but before drawing off the cylinder barrel the engine should be turned over until the piston is at the lowest position of its stroke, and then lift off the barrel carefully, taking care when the piston is free not to let it fall sharply against the connecting rod, as this may bruise or distort the skirt.

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. The top of the piston should 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. To remove the gudgeon pin from the piston, take out one of the retaining springs which will be found on either side of the gudgeon pin. These fit into recessed rings in the piston bosses, and to withdraw, the ends must be squeezed together with the special small pliers provided. Afterwards the gudgeon pin can be pushed out.

Note.—It is advisable not to reverse the position of the piston on single cylinder models, and imperative on the twin-cylinder models, upon which also the pistons must not be inter-changed on account of the fact that front and rear differ.

After replacing the piston, see that both the gudgeon pin retaining springs are in place and a tight snug fit. 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 the crankcase and base of the cylinder. If the washer between the cylinder head and the barrel has been damaged in detaching the head, replace with a new one. Smear the face of the cylinder head with a thin film of oil or vaseline. This will act as an adhesive to which the washer can be fixed, and will retain the washer in its correct position whilst fitting the cylinder head on to the barrel. Place the cylinder head squarely on the barrel and then screw in the holding-down bolts, afterwards tightening these evenly.

If it is required to remove or inspect the valves of Side Valve Models (except 36/5), the detachable head must be removed as mentioned previously and the valves will then be exposed.

If the seatings are all pitted, grind in the valves with fine emery flour mixed with oil into paste, or with one of the specially prepared pastes marketed, taking care that all emery is cleared out of the valve chamber after the operation. The valves should, generally speaking, be ground in about every 1,500 miles.

In the case of the 36/5 machine, the cylinder head and barrel are in one piece, and the former therefore cannot be detached as is the case with all other models. The general instructions for decarbonising, however, will hold good in the case of this particular model. In order to remove the cylinder of the 36/5 Model, the exhaust pipe and the cylinder head and barrel are in one front down tube must be removed, also high tension wire to the plug. The carburettor can either be left in place on the cylinder by removing the slides and the petrol pipe from the bottom of the float chamber, or alternatively, the carburettor can be detached from the inlet port. Next unscrew the four nuts which hold the cylinder barrel to the crankcase, when the cylinder complete can be lifted off. The decarbonising of the head can be accomplished with the aid of a long screwdriver or similar tool with which to scrape or chip off the carbon. It is desirable to remove valves on side valve models while cylinder is *in situ*.

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

To Decarbonise O.H.V. Models.—To remove the cylinder head for cleaning and valve grinding, first withdraw throttle and air slides, then, after disconnecting the petrol pipe, tap end, unscrew the two nuts securing the carburettor which can then be removed. Next drain the petrol tank and afterwards remove the U pipe connecting the two sides. Then unscrew the four tank fixing bolts. Next remove the sparking plug and unscrew exhaust pipe nut and inlet valve oil pipe. Then unscrew the two ring nuts at the bottom end of push rod cover tubes, and push the lower end of the tubes up to expose the tappets. Next raise the tank sufficiently to permit of unscrewing the four rocker box fixing bolts, when the whole rocker box assembly including push rods and cover tubes may be lifted clear. All that now remains is to unscrew the four cylinder head fixing bolts, when the head may be lifted off.

GRINDING IN VALVES.

It is advisable to grind the valves of O.H.V. models upon each occasion that decarbonisation is undertaken, and having removed the cylinder head as already described, it will be found convenient, in order to facilitate valve removal, to rest the head of each valve in turn upon a small block (wood preferable) while the springs are being 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 carefully scraping all carbon deposit off the cylinder head interior and valve heads, the face of each valve should be smeared with a grinding paste (this may be obtained already mixed) and the valve revolved slightly backward and forward (never revolve completely) while slight 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 backward and forward movement.

Note.—A small clamp tommy wrench to facilitate valve grinding can be supplied at a cost of sixpence.

Generally, one application only 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 mixture should be carefully washed off with petrol, and both valve stems and guides cleaned thoroughly. Prior to refitting, it is advisable to smear each valve stem with graphite grease.

The re-assembly after decarbonisation should be in the reverse order of dismantling and meticulous care must be taken to see that the cylinder head and cylinder top faces, together with the gasket, are perfectly clean, before the head is applied, and also to make certain that all cylinder head bolts are tightened down evenly and firmly. Upon refixing the rocker box assembly it will be found advisable to first remove the cover in order to see that the push rod ends are correctly located encircling the rocker studs. The engine should be revolved to a position at which both tappets are down. In refixing the petrol tank it will be found most convenient to secure the rear end first. When the assembly has been completed and before starting up the engine, carefully check the rocker clearances, and if necessary, adjust the valve tappets.

TO ADJUST VALVE TAPPETS.

The adjustable tappet ends are exposed on S.V. models upon removing the valve covers, and upon O.H.V. models by slackening off the lower push rod cover ring nuts, and telescoping the lower portion of the tubes up into the upper portions. The recommended clearances are as already stated, .004 inlet and .006 exhaust on S.V. models, and .006 inlet and .008 exhaust on O.H.V. models. To obtain the best results these clearances should be accurately maintained and a cheap set of engineer's feeler gauges will be found very useful for checking purposes. Check clearance preferably when engine is warm (not hot).

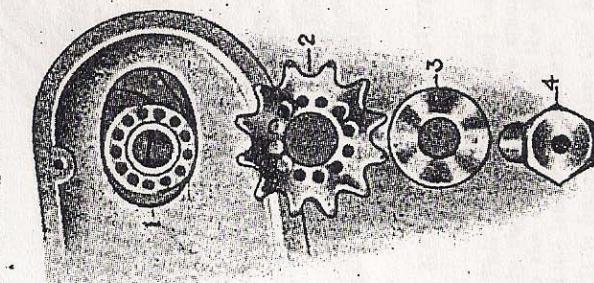
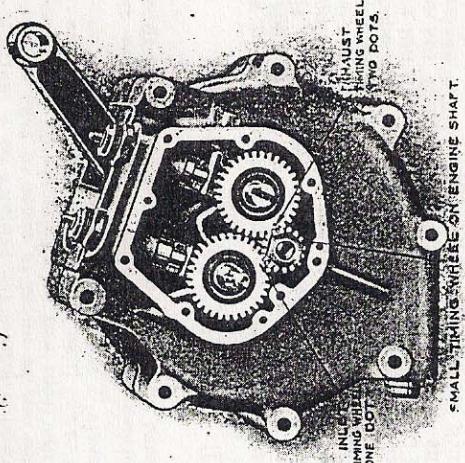
VALVE TIMING (Single Cylinder Models).

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. 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 wheel, 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.

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

ARRANGEMENT OF TIMING GEAR.

Single Cylinder O.H.V. and Side-Valve Models.



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 replacements 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. Fitted to the armature shaft of the magneto is a sleeve (1) which has thirteen holes ranged in a circle; (2) chain sprocket which has twelve holes similarly arranged; (3) is a peg washer by which the sprocket is locked to the sleeve, and (4) is the sleeve lock nut which secures the whole assembly. To set the timing, and assuming that sleeve 1 is in position, first turn the engine until the exact prescribed position is obtained. Then fully advance the ignition and gently turn the magneto anti-clockwise until the points are just about to separate. Then apply the chain and sprocket 2, after which taking care not to disturb either piston position or magneto shaft, gently insert peg on washer 3 into the hole which is in correct register, after which securely screw home nut 4. By reason of the unequally spaced holes in sleeve 1 and sprocket 2 very fine adjustments are possible.

VALVE TIMING (Twin Cylinder Models).

The timing wheels on these models are also marked for re-setting purposes, and the marked tooth on the small pinion must necessarily mesh with the marked tooth gap on the single cam wheel. To remove the cam wheel after the timing gear cover has been taken off, it is necessary to revolve the engine until the marks referred to coincide, after which raise the front inlet valve by means of a screwdriver or suitable lever, when the cam wheel can be freely withdrawn. To replace this wheel it is necessary, unless help is available, to hold the front inlet valve in a raised position by means of a small block of suitable height inserted between the cylinder base and the lower valve spring cup. Then holding all four cam levers up with the fingers, gently insert the cam wheel, taking care to see that the marks coincide.

IGNITION TIMING.

The correct setting for Models 36/2, 36/2a and 36/5 is $\frac{3}{16}$ in. before T.D.C. while for Models 36/8, 36/9 and 36/18, the setting is $\frac{3}{16}$ in. before T.D.C., in all cases with the ignition lever in the fully advanced position.

TO RE-TIME IGNITION (Twin Models).

The magneto sprockets of the twin cylinder models are both taper bore unkeyed and to re-time after dismantling re-assemble in the usual manner and tighten the sprocket fixing nuts, particularly that on the magneto end which will not be disturbed subsequently. Then, after slackening off the nut securing the lower engine end sprocket, gently lever same loose with a stout screwdriver or the hooked end of a motor car tyre lever. Now carefully revolve the engine until the rear piston is at the prescribed position, observing that it is on the stroke in which both valves are closed. Then fully advance the ignition control, and taking care not to disturb the position of the piston gently turn the magneto armature in an anti-clockwise direction (the normal direction of rotation) until the points are just about to separate on the cam or hump nearest the rear cylinder, at which position the lower sprocket fixing nut must be securely 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.

MAGNETO CHAIN ADJUSTMENT

REAR WHEEL ADJUSTMENT GAUGE.—Continued.

Examine the driving chain occasionally, and, if slack, it must be tightened. The magneto is carried behind the cylinder on a platform which is pivoted at its rear end, and can be raised in order to take up any chain slack. To adjust the chain, the front and rear bolts should be unscrewed a turn or two and the platform raised from the forward end. When the desired chain tension is arrived at carefully re-tighten the bolts.

Note.—The correct adjustment allows a whip of about $\frac{1}{4}$ in. as the top run of the chain is lightly pressed up and down midway between the sprockets.

ADJUSTMENT OF PRIMARY CHAIN.

On the 36/5 model, adjustment of the primary chain is made by sliding the gear box back on the lug to which it is fixed. To do this first slack off the top gear box fixing nuts, and screw the adjuster draw bolt to tighten or slacken the chain as the need may be, afterwards secure the fixing nuts very firmly. On all other models provision for chain adjustment is made by tilting the gear box, the upper fixing bolt holes being slotted for the purpose. To adjust the chain, first slacken the top gear box fixing bolt, extended nut, then if it is desired to tighten the chain slack off the adjuster bolt nut nearest the engine, and screw up the nut farthest from engine until the correct tension is obtained, after which re-tighten the nut nearest the engine and lastly the extended gear box fixing nut. Correct adjustment on all models should allow a whip or movement of $\frac{1}{4}$ in. to $\frac{1}{2}$ in. as the lower run of the chain is lightly pressed up and down midway between the sprockets. It is necessary to remove the inspection cover on the chaisecase front to establish the adjustment, and while this cover is removed take the opportunity of checking the oil level which, as stated elsewhere, should reach the bottom of the inspection hole with the cycle standing on level ground.

ADJUSTMENT OF REAR CHAIN.

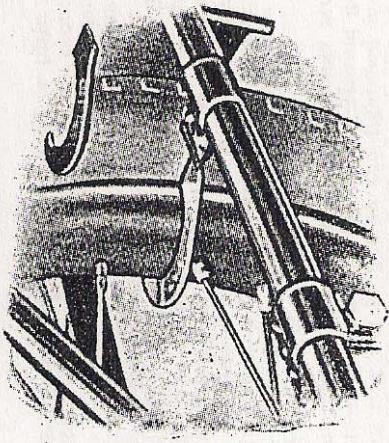
On all models, adjustment of the rear chain is obtained by sliding the rear wheel bodily backwards in the slotted fork ends. To adjust, first slack off the nuts on each side of wheel axle and screw the adjuster bolt in each fork end to exactly the same extent, taking care to leave the wheel in correct alignment. (See adjustment gauge illustration.) It may be found that moving the wheel back will cause the rear brake to bind. This possibility should not be overlooked, and the necessary adjustment is easily made by means of the brake rod adjustment. The correct adjustment for the rear chain should allow a movement of $\frac{1}{4}$ in. as the chain is lightly pressed up and down midway between the sprockets.

Notes on Chain Adjustment.—The tension of all chains should be tried in a number of places and the adjustment described obtained for the tightest position. When making any adjustment take the opportunity of generously applying lubricant if necessary.

REAR WHEEL ADJUSTMENT GAUGE.

On the right-hand side of the bottom chain stay will be found a piece of sheet metal, held in position by a clip which passes round the tube, Model 36/5 excepted.

In the tool kit will be found a flat gauge that can be fitted round the rim (see illustration). When replacing the rear wheel after removal, or after making adjustment to chain, place the gauge on the rim with the extension plate to the right, and set the wheel so that the edge of the gauge just touches the plate that is held by the clip on the chain stay.



REAR WHEEL ADJUSTMENT GAUGE. (Heavyweight Models.)

This ensures the wheel being correctly aligned and must be done before finally tightening up the spindle nuts. Do not attempt to unscrew the clip from the chain stay, as the position of the plate is set correctly before the machine leaves the factory.

It is important that this gauge should bed properly on to the rim on both sides; the best method of ensuring this being to see that the hooked end is properly encircling the bead of the rim. Then pull the gauge end into place firmly. Some pressure is necessary to apply the gauge when tyre is highly inflated.

WHEELS.

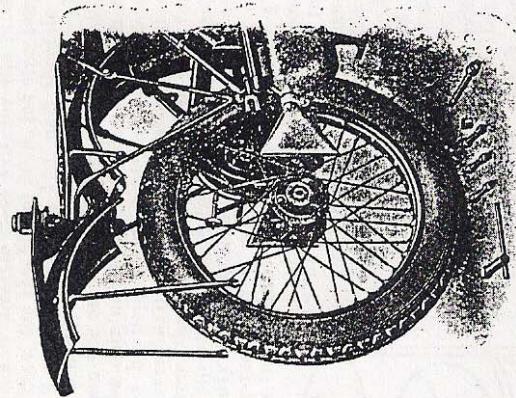
With the exception of Model 36/5 all models are fitted with hinged rear mudguards and detachable rear wheels.

To Remove Detachable Rear Wheel.—Place cycle on stand and unscrew the two pins which hold the stays of the hinged portion of the rear mudguard to the frame. This hinged portion can now be swung up out of the way. Next, with the special box spanner provided, unscrew the three sleeve nuts which pass through the hub flanges. To prevent the wheel revolving while unscrewing the sleeve nuts, place the foot against the tyre at the bottom of the wheel, or alternatively, the change speed lever can be placed in gear. The three sleeve nuts extend right through the wheel, and off-side hub flange, and screw on to the three threaded studs on the driving sprocket. There are also three plain studs on the sprocket which act as dummy drivers. These fit into the three remaining holes in the hub flange. After the sleeve nuts have been removed unscrew the left side axle extended nut when the centre axle is free to be withdrawn, during which operation the loose distance collar will probably fall out of position. The space left by this distance collar will allow the wheel to be drawn off the driving studs on the sprocket and removed from the forks. If for any reason the wheel should be difficult to pull off the driving studs, insert the centre spindle (without distance collar). This will steady the wheel while drawing it off the driving studs.

Note.—It is very important to point out that when the centre spindle is removed, the wheel is hanging on one fork end only, so any rough treatment must be carefully avoided or there is a great danger of straining or fracturing the fork end. Under no circumstances must the centre spindle be withdrawn until the cycle is jacked up on the stand, and likewise the spindle must always be in position before the cycle is taken off the stand.

To Replace the Wheel, push it on to the driving studs with the centre spindle in position. Next apply the long sleeve nuts and screw up tightly. The centre spindle may then be withdrawn and re-inserted with the distance collar in position when the left side extended nut must be screwed tightly home. If the rider wishes to fit a new inner tube without removing the wheel complete this may be done by first detaching one side of the outer cover and withdrawing the tube in the ordinary way. Then take out the centre spindle with distance piece, whereupon the old tube may be passed through the gap left by the distance collar and a new one inserted. Replace the centre spindle before manipulating the tyre.

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THE A.J.S. QUICK DETACHABLE WHEEL.

Important Note.—Periodically test wheel fixing sleeve nuts with the special spanner provided, and keep them tight. A dull hammering will be heard and felt at low speeds if the nuts are at all slack.

WHEEL BEARINGS (IMPORTANT).

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.

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 1/32nd in. 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 1/16th in. 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.*

To Remove Front Wheel.—Disconnect the yoke end of the operating rod from the brake drum lever, remove anchor plate bolt which passes through the lug between the fork blades, and after slackening off the spindle nuts on either side, the wheel will then fall out of the slots in fork ends. When the wheel is replaced, see that the brake anchor pin is screwed in tightly and the spindle nuts are tight.

ADJUSTMENT OF HAND GEAR CONTROL.

Occasionally the movement of the gear box resulting from primary chain adjustments necessitates adjustment of the hand gear control. To test for correct gear rod adjustment, proceed as follows:—Place cycle on stand and remove the split pin from the top gear rod yoke end pin (i.e., the pin which passes through the end of the gear lever) also at the same time slack off the lock nut securing this top gear rod yoke end. Now place the gear lever into third gear position, and after removing the top yoke end pin from which split pin has already been withdrawn, lightly alternatively pull and push the gear rod by hand in order to feel the action of the gear box internal spring indexing plunger. As the sliding gears move either side of the correct third gear position the resistance of the spring plunger will be plainly felt, and the exact position at which this plunger is in full engagement with the third gear notch must be accurately and definitely found. Having established this correct position, offer up the gear rod to gear lever, which latter must, of course, be in the third gear position, in the case of four-speed models (second gear position on three-speed models) and screw the top yoke end up or down as the need may be until the pin can be quite freely inserted. Before locking the yoke end into position, it is advisable to again obtain by hand the exact position of third gear as already described, and check the rod length for correct setting, after which the yoke end may be secured by means of its lock nut and the pin refitted. It must be understood that if the correct adjustment is obtained for the third gear all the remaining gears will also be correct as regards rod adjustment.

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 overleaf. The correct level of

CARBURETTOR ADJUSTMENT.—Continued.

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 Model 36/5 the combination is jet size 7/5 and throttle slide 4x5, for the Model 36/8 and 18, jet size 180, throttle slide 29x4, for the Model 36/9, jet size 140, and throttle slide 6x4, and for Model 36/2 and 2a, jet size 140, and throttle slide 6x3. With these combinations it is possible to use full or nearly full air under all conditions, except perhaps when the engine is 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 $\frac{3}{4}$ open, slowly open up the throttle to full open, during which the engine should respond with a missfire, but upon a sudden opening of the throttle again with fully retarded ignition and about $\frac{3}{4}$ air, it should sputter and stop. This is, of course, only a rough test 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 $\frac{1}{4}$ advanced, and air about $\frac{3}{4}$ 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 quite certain that the ignition is set correctly. 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 and 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.

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.
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 (most likely distorted flange).
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).

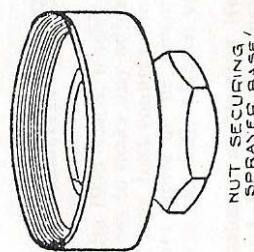
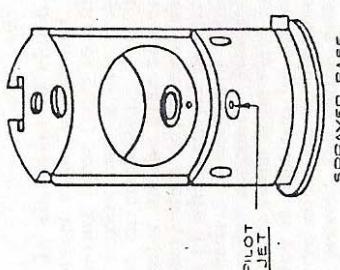
BRAKE ADJUSTMENT.

The brakes of the A.J.S. machines require no attention other than the occasional adjustment of the control mechanism. In the case of the rear brake this is effected by means of a finger and thumb operated nut at the rear end of the brake rod, turning to the right to take up pedal slackness and vice versa to slacken. In the case of the front brake the adjustment is made all models except the 36/5 by means of a finger and thumb operated cable stop on the top of the front fork girders. Turning this stop to the left or contra-clockwise takes up slack. On the 36/5 Model the adjustment is made by turning the rod itself by means of the knurled edge ring nut to the right to tighten or vice versa as the need may be. After making any adjustment be certain that the wheel runs quite freely.

ADJUSTABLE SADDLE.

(Models 36/8, 36/9 and 36/18 only).

An adjustable saddle position is provided on the above models, as illustrated. The under-carriage of the saddle at the front is provided with a bolt which can be fitted into either of three holes in a lug on the top tube. The rear end of the under-carriage is slotted to permit the saddle to be moved forwards or backwards. To adjust the position of the saddle, the pin and





It is advisable in all cases when adjusting the steering head to place a box or some other article under the engine to take the weight off the front wheel, so that the forks may move freely. Always slack off steering damper fully when making adjustments and take up all shake but leave steering head perfectly free. Tight adjustment will cause difficult steering and slack adjustment is likely to cause damage to the head ball races by the balls hammering small indentations in the races.

STEERING DAMPER.

The manipulation of the steering damper will be perfectly obvious. Turning to the right, that is clockwise, has the effect of tightening the steering. The correct tension may be adjusted to suit individual rider's requirements.

TO ADJUST FORK ACTION DAMPER.

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 a 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.

CLUTCH ADJUSTMENT.

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STEERING HEAD AND HANDLEBARS.

All the 1936 A.J.S. machines are fitted with adjustable handlebars. If the rider wishes to make any adjustment, slacken off the bolts which pass through the split lugs that connect the handlebars to the forks, and partly rotate the handlebars upwards or downwards until the desired position is attained. Afterwards carefully tighten up the bolts of the split lug.

Adjustment of Steering Head.—Slacken the nut which bolts the split lug round the ball head, and adjust the large hexagon nut by turning to the right to take up slack and vice versa.

FORK SPINDLE ADJUSTMENT.

The fork action damper can best be adjusted while the cycle is actually in motion and a badly corrugated surface, such as may be found on many 'bus routes, provides the best conditions 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.

CARE OF 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 danger of igniting the gas coming from the plates.

Storage.—If the equipment is laid up 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.

Testing the Condition of the Battery.—It is advisable to complete the inspection by measuring the specific gravity of the acid, as this is a very good indication of the state of charge of the battery.

An instrument known as a "Hydrometer" is employed for this purpose. These can be bought at any Lucas Service Depot, price 4s. 6d.

The specific gravity figures are: 1.285 to 1.300 when fully charged, about 1.210 when half discharged, and about 1.150 when fully discharged.

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 below 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 takes a few seconds only, and will amply repay the owner by reason of additional service and immunity from failures.

Solo.

Model 36/5—	Front tyre	25x3	... 15-16 lbs.
	Rear tyre	25x3	... 22-23 lbs.

Models 36/8, 36/9 and 36/18—

Front tyre	26x3.25	... 15-16 lbs.
Rear tyre	26x3.25	... 18-20 lbs.

Models 36/2 and 36/2a—

Front tyre	27x4	... 14-15 lbs.
Rear tyre	27x4	... 16-18 lbs.

Note.—The above recommended pressures apply to average weight drivers. For abnormal weights, carrying a pillion passenger or using a sidecar add 2 lbs. 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.

- 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.

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.

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—

- 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 (36/2 and 36/2a Models only).

- 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.