

A.J.S.

Motor Cycles

INSTRUCTION BOOK

Twin-Cylinder Models
37/2 and 37/2A (Export)

Supplied free upon application
with each new cycle

Replacement Copies 1 - each

Motor **A.J.S.** Cycles

PLUMSTEAD, LONDON, S.E. 18

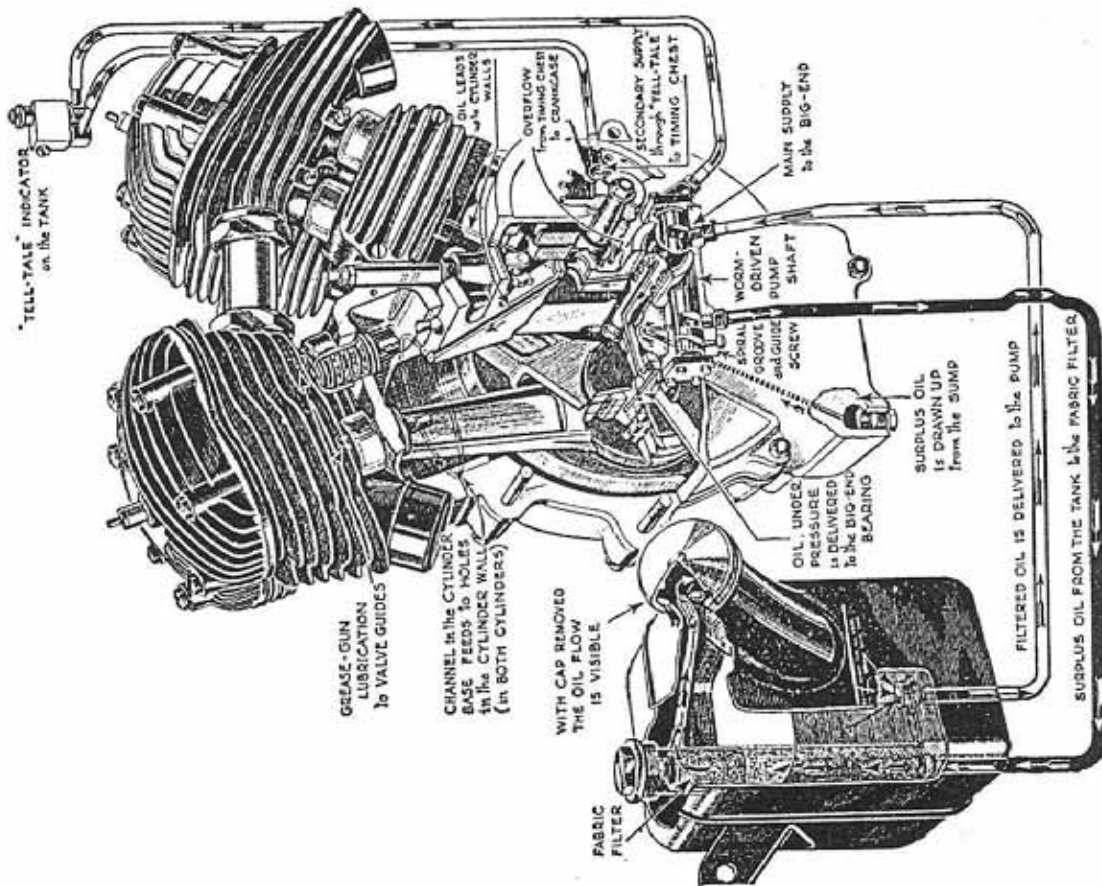
INTRODUCTION.

It is our sincere desire that every "A.J.S." owner should obtain from his mount the service, comfort, and innumerable miles of low-cost travel that we have earnestly endeavoured to build into it. Motor-cycling is one of the most economical and pleasurable modes of transport. A motor cycle, it must be remembered however, is a highly specialised piece of engineering, and must be treated with reasonable care and consideration. While it does not call for great 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 pages which follow we have endeavoured to give in simple and straightforward language comprehensive instructions concerning the lubrication and adjustments of those parts likely to require attention. 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 this ideal all-purpose machine, and may bring needless trouble to its owner.

We are always pleased to give "A.J.S." owners the full benefit of our wide experience in matters relating to motor cycles of our manufacture. Enquiries of a technical nature should be addressed to the Service Department, and must necessarily include full particulars of the cycle concerned, i.e., engine numbers in full, frame number and model, together with year of manufacture.

A.J.S. MOTOR CYCLES.



Oiling System—Model 37/2.

GENERAL INFORMATION

STARTING.

Before taking the cycle on the road, a new owner is advised to first sit on the saddle and endeavour to become familiar with the various controls. Neutral or free engine position of the gears is, if foot change is fitted, 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 two-thirds advance. 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 lifter lever on the left handlebar and turn the engine over two or three times, keeping the valves raised. Having charged the cylinder thus, then jerk the engine over compression without using the valve lifter at all. The most important detail affecting an easy start from cold is to use the smallest possible throttle opening. 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, disengage the clutch by drawing inwards the large lever on the left handlebar, and, at the same time, with the right foot, firmly raise the foot change pedal. Then 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 a downward pressure on the foot change pedal, with the right foot, retaining the pressure as before until the change of gear has actually taken place. Repeat the operation until top gear is reached, and endeavour to make the movements of hand and foot as simultaneously as possible, but remember that in all gear changes a steady pressure of the foot is advisable. It is

Starting—contd.

not sufficient to jab the foot pedal and then engage the clutch. With hand-gear change the only precaution necessary is to see that the gear lever is fully in engagement with the correct notch in the gate upon making any change of gear. When actually in motion it will be found sufficient to merely release the clutch a trifle to ease the drive and with reasonable care changes of gear can be made without a sound. Always endeavour to make smooth, silent gear changes and avoid racing the engine during the operation. With ordinary care the movements of the clutch lever and change pedal (or lever) are too quick to permit of any appreciable rise in engine revolutions, but until quite conversant with rapid gear changing it will be found desirable to close the throttle down while making a change. By suddenly engaging the clutch while the engine is racing, an enormous load is imposed on the gears and chains.

RUNNING IN.

For the first 500 miles at least, full throttle driving should be studiously avoided. Although mention is made elsewhere of the desirability of not exceeding 30 miles per hour during this running-in process, what is meant actually is "keep the engine well within its limits." Short speed bursts are permissible after this initial running-in, but it is recommended to avoid extended high speeds until at least 1,000 miles have been covered. At the conclusion of the first 100 miles and 500 miles' running, the adjustment of tappets, chains, and steering head bearings should be checked, and corrected if necessary. Subsequent to the initial settling-down process, attention to such details will only be necessary at very infrequent intervals.

"DON'TS" 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 attempt to start the engine with ignition on full advance or with throttle more than slightly open.
- 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.

" Don'ts in Driving—contd.

DO NOT force the 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 open 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 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 advisable 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 into 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 in 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, 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 fly-wheel 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 bearings, the splash from which passes up into each cylinder interior. In addition to this splash, each 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

*NOTE.—The plunger-type oil tell-tale on tank panel usually fails to operate until the oil in circulation warms up.

Lubrication—contd.

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.

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 5), 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 dirty 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. 3765, price 2s. 6d.).

CHAINS.

The primary chain runs 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 is packed with grease during assembly. A grease nipple is provided on the cover and a small additional supply of grease should be injected periodically, say once every 1,000 miles.

GEAR BOX.

Every 1,000 miles a small quantity of grease should be added. This may be done either by removing the exhaust system to expose the inspection cap on the gear box top, or via the angular grease nipple adjacent to the cap on footchange models, or the horizontal grease nipple near the top stud securing the gear box end plate on hand-change models. Lubricants specially recommended are:—Castrolase (Medium), Mobilgrease No. 2, or Shell Motor Grease (soft); all of which can be obtained in collapsible containers provided with a bent spout. The gear box should never be entirely filled, and under normal circumstances the addition of about one or two ounces every 1,000 miles will be found ample. The inspection cap referred to is slotted at one end to allow of its being turned round to expose the filling orifice, upon merely slacking off the fixing nuts. A little grease should also be injected through the nipples on the gear box end. One nipple is provided to permit direct lubrication of the gear change mechanism and another for speedometer drive when fitted; while the one on the end of the kickstarter spindle allows grease to be injected direct to the bearings of this spindle.

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 obtain efficient front fork action, adequate spindle lubrication is essential. Weekly, or at least once every 500 miles, grease should be injected until it can be observed oozing from the spindle ends.

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.

BRAKE CAMS, LEVER AND ROD JOINTS.

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

VALVE STEMS.

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.

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.

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 ping 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 HEADS.

First remove the sparking plugs, and then unscrew the eight cylinder head fixing bolts, when the head is free to be lifted off. Should the gasket adhere to either the head or cylinder top, it should be gently prised off and laid aside awaiting re-assembly. If the cylinder head fixing bolts have a dry, rusty appearance, a good tip is to generously apply paraffin before attempting their removal. 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, smear the threaded ends of all the cylinder head fixing bolts with graphite grease before refitting. It is imperative that all these bolts are quite evenly tightened down, and, to ensure this, screw them in finger tight and then go over each in turn, slightly increasing the pressure until all are perfectly tight. As an additional precaution, go round each bolt again in turn upon first starting the engine up, and while it is warm. If these instructions are carefully followed, it will be found possible to use the same gaskets over and over again, but remember that any blowing at the joint between the cylinder head and cylinder will quickly destroy the gaskets, and, as a safeguard, a spare should be available.

TO GRIND IN VALVES.

During each alternate decarbonisation, it is advisable to remove the valves and grind in to restore the seatings, also to clean the stems and guides. Having removed the cylinder head, next remove the valve chest aluminium cover, taking care not to damage the jointing washer.

To Grind in Valves—contd.

Then, with a stout screwdriver or suitable lever, raise the bottom valve spring collar, at the same time holding the valve head on its seating, and withdraw the valve cotter. Then smear the valve seat with a thin layer of fine grinding compound (obtainable already mixed), and after re-inserting the valve, turn it backwards and forwards by means of a screwdriver operating in the slot in valve head, raising the valve off its seating and turning to a different position after each half-dozen or so back-and-forward movements. When the paste ceases to bite, remove the valve and wipe the seating clean. If it is observed that the whole of the seating has not the required dull matt appearance, apply another coating of paste and repeat the grinding operation. When the seating is satisfactorily restored, carefully wipe away all traces of the grinding paste with a rag moistened with petrol. Before replacing the valve, carefully clean the guide interior and also the valve stem. If the latter is at all discoloured with oil deposit, carefully clean off by means of very fine emery cloth held between the thumb and forefinger and rubbing up and down the valve stem. Although both valves are similar, it is advisable to replace in their original position, and before refitting the valve inspection cover, the tappet clearances must be carefully checked and corrected if necessary. The recommended clearance is .004 for the inlet and .006 for the exhaust.

These clearances should be accurately and constantly maintained to obtain the best results, and a cheap set of engineer's feeler gauges will be found very useful for checking purposes.

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 15 degrees or 1/16th of an inch before top of exhaust scavenging stroke, and closes 52 degrees or 31/64ths of an inch up the compression stroke. Exhaust valve commences to open 58 degrees or 9/16ths of an inch from bottom of firing stroke, and closes 12½ degrees or 3/64ths of an inch down induction stroke. To test valve timing, the tappets must first be set to provide .016in. clearance. See instructions above for normal running clearances.

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 tappet clearance sufficient to skip the slight inclines. (See Valve Timing.)

IGNITION SETTING.

The correct ignition setting is ½in. before top dead centre with the ignition fully advanced.

TO RE-TIME IGNITION.

First remove the magneto chaincase cover (secured by six screws), and after slackening the nut securing the magneto chain sprocket (engine end), with a stout screwdriver or the hooked end of a stout tyre lever, gently lever the sprocket loose. Next revolve the engine by hand until the rear piston is at a position ½in. before it reaches the top of the compression stroke—i.e., the stroke upward immediately after the inlet valve has closed. Next remove the contact breaker cap, and, after making quite certain that the ignition is in the fully advanced position, gently turn the magneto armature with the fingers in a clockwise direction (looking at the contact breaker end) until the points are just about to break on the lower hump or cam. Holding carefully in this position, securely re-tighten the sprocket fixing nut.

The operation of re-timing the magneto, although requiring care, does not in any way justify the alarm with which many novices view it. Needless to add, it is of vital importance to correctly obtain the prescribed piston position and to secure the magneto 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 until the paper is just released and no more upon a gentle pull. Always make a point of re-checking the setting after the sprocket fixing nut has been tightened, and before replacing the chain cover add grease or adjust the chain tension, if either are necessary.

TO ADJUST THE MAGDYNO CHAIN.

Adjustment to the magdyno chain is obtained by tilting the unit bodily. It will be observed that the magdyno platform is held by two long bolts, the one nearest the rear cylinder operating in slotted holes to permit the necessary movement for chain adjustment. To adjust the chain, first remove the outer cover of the aluminium chaincase, then slack off, slightly only, the two magdyno platform fixing bolts, and insert a lever or the tip of a stout screwdriver under the forward end of the platform, and gently lever same up until the desired adjustment is obtained, after which securely retighten the platform fixing bolts, and, before replacing the outer cover, add grease if necessary.

NOTE.—The correct adjustment which should be obtained for the tightest place will allow a movement of about a quarter to three-eighths of an inch, as the chain is lightly pressed up and down midway between the sprockets.

TO ADJUST THE 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 extended off-side 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 extended off-side nut on the top gear box fixing bolt. The correct adjustment (which should allow a whip or movement of $\frac{3}{16}$ in. to $\frac{1}{2}$ in. 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.

First jack the rear wheel up on the stand, slack off the extended rear wheel centre spindle nut, and also the large nut securing the brake drum dummy spindle (both 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 retighten the spindle nuts. The correct adjustment (which should allow a whip of three-eighths to half an inch 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 the rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, 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.

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.

TO REMOVE DETACHABLE REAR WHEEL.

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

To Remove Detachable Rear Wheel—contd.

be pulled off the driving pegs on brake drum and after removing the rear portion of back mudguard can be taken away. On both 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. To replace the wheel, first push it squarely on to the driving pegs and insert the centre spindle, together with the distance piece. Then screw on and firmly tighten down the three long sleeve bolts, after which screw on the centre spindle end nut and securely tighten. 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, otherwise damage or breakage of the brake side fork end may result. **Under no circumstances must the centre spindle be removed until the cycle is jacked up on the stand, and the spindle must always be in position before the cycle is taken off the stand again.** If for any reason the wheel should be difficult to pull off the driving pegs, insert the centre spindle minus the distance collar. This will steady the wheel. If the rider wishes to fit a new tube without removing the wheel entire, he must first take off the one side of the tyre and remove the tube in the ordinary way. Next take out the centre spindle and distance piece only, leaving the sleeve nuts intact. This will be found to give sufficient space between the hub and fork end to allow the tube to be passed through and drawn completely out. Now replace the distance piece and the centre spindle, and proceed to refit the tube and cover. Fitting the centre spindle first holds the wheel firmly while the tyre is being manipulated.

PERIODICALLY TEST THE CENTRE SPINDLE AND SLEEVE NUTS WITH THE SPANNER AND KEEP THEM TIGHT. If the sleeve nuts are loose, a dull hammering will be felt when driving at slow speeds. If this is noticed, tighten the sleeve nuts at once. When the back wheel is removed, the wheel only is taken out, leaving the chain, sprocket, brake, chaincase, etc., remaining in their original position.

TO DISMANTLE AND ADJUST WHEEL BEARINGS.

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 $1/32$ in. beyond its actual position, to enable the felt washer and its

To Dismantle and Adjust Wheel Bearings—contd.

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 1/16 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.

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. REMEMBER THAT CONTINUOUS CLUTCH SLIP WILL QUICKLY RUIN THE INSERTS.

STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for slackness by exerting pressure upwards from the extreme tips of the handlebar with the steering damper completely slacked off. Should any shake be apparent, slacken the pinch bolt of the handlebar clip lug which encircles the steering column, and screw down the large nut underneath the steering damper knob.

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.

Always slack off the steering damper when testing for slackness or when making any adjustment.

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 first the left and then the right side 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.

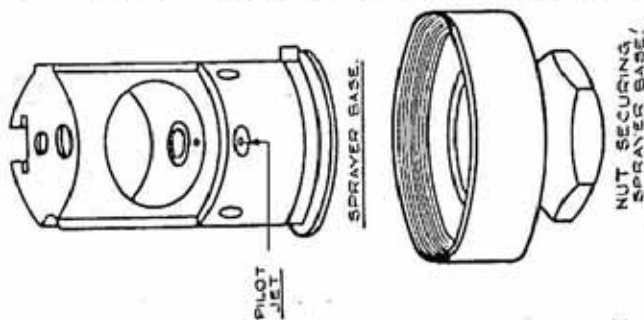
CARBURETTOR ADJUSTMENT.

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 $\frac{3}{8}$ open, and a pilot jet with independently adjusted air supply takes care of idling on nearly closed throttle up to about $\frac{3}{8}$ 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

Carburettor Adjustment—contd.

for each model and should not be altered without some very good reason. For Models 37/2 and 37/2A the combination is 140 main jet and 6x3 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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 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



NUT SECURING SPRAYER BASE

Carburettor Adjustment—contd.

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 badly worn inlet valve stems or guides.
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.

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.

Lucas combined magneto and dynamo (Magdyno) equipment is fitted, incorporating a constant voltage control 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 (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 to maintain a fully-charged battery without the risk of overcharging 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

Electrical Equipment—contd.

on the left handlebar. The bulb, which is used to illuminate the instrument panel at night, can be withdrawn complete with holder, and sufficient flex is fitted to enable same to be used as an inspection lamp if and when required.

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.

PERIODICAL INSPECTION OF NUTS.

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. 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.

Do not use ordinary metal polishes for chromium-plated parts. Such polishes almost without exception contain oleic acid which attacks chromium. Many special polishes are marketed but provided that reasonable care is taken to remove dirt and water, and a final rub over with a damp leather, the lustre will last indefinitely.

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.	Single S/c	Double S/c
Front tyre, 27x4.00	14-15lbs.	...	15-16lbs.
Rear tyre, 27x4.00	16-17lbs.	...	17-18lbs.

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.

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.

Corrective Measures—contd.

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:—

- 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.

LEGAL MATTERS.

NOTE.—In view of the insistent public objection to noisy motor cycles, a word of warning on this subject may not be out of place here. First, it has been noted, and freely commented upon, that much of the noise complained of is unnecessary, being due to injudicious driving as, for instance, violently accelerating from a standstill, racing the engine when stationary, driving on full throttle when ascending hills in residential districts, etc. Any motor cycle, or for that matter, any motor vehicle driven in this manner creates abnormal noise, and in the interests of all, we earnestly implore every "A.J.S." owner to studiously refrain from any of the practices enumerated.

To comply with the law relating to motor cycles, every owner must:—

1. Hold a driver's licence, which can be obtained from the Chief Constable or Corporation of a County Borough, or from the County Council. The charge for this licence is 5s. yearly, and must be renewed annually from the date of issue. A motor car driver's licence covers the driving of a motor cycle.
2. Insure against Third Party Risks (other risks may also be embodied in the Insurance Policy as owner may desire, but are not compulsory by law) and obtain from the Insurance Company decided upon either a Certificate of Insurance covering the full period of twelve months, or alternatively, as is most general, a temporary certificate, which must be produced when applying for Revenue Licence.
3. Apply to the Taxation Department of the Local Authority of the district in which the vehicle is to be ordinarily kept for Inland Revenue Licence and Registration Form (motor cycles only). The address of the above Taxation Department can be obtained by enquiry at a Post Office.
4. The form, when obtained, must be filled in and returned, accompanied by the Insurance Certificate referred to above, and the requisite remittance, which varies according to the date of registration and the term covered.
5. See that the rear number plate is illuminated at night.
6. Never drive at a speed which is dangerous to the public.
7. Wherever necessary, give audible and sufficient warning by horn, or other instrument, of the approach of his motor cycle (except between the hours of 11.30 p.m. and 7.30 a.m.).

NOTE.—In view of the continuous alterations in road traffic regulations, new owners are advised to make further enquiries unless quite conversant with all new regulations at the date of purchase.

NOTICE.—We do not appoint agents for the sale on our behalf of our motor cycles and other goods, but we assign to motor cycle Dealers areas in which we supply to such Dealers exclusively for the re-sale in such areas. No such Dealer is authorised to transact any business, give any warranty, make any representation or incur any liability on our behalf.

GUARANTEE

We give the following guarantee with our motor cycles, motor cycle combinations and sidecars, which is given in place of any implied conditions, warranties, or liabilities whatsoever, statutory or otherwise, all such implied conditions, warranties and liabilities being in all cases excluded. Any statement, description, condition, or representation contained in any catalogue, advertisement, leaflet or other publication shall not be construed as enlarging, varying, or over-riding this guarantee. In the case of machines which have been used for "hiring-out" purposes, or racing, or from which the trade mark name, or manufacturing number has been removed, no guarantee of any kind is given or is to be implied.

WE GUARANTEE, subject to the conditions mentioned below, that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, but this guarantee is to extend and be in force for six months only from date of purchase, and damages for which we make ourselves responsible under this guarantee are limited to the free supply of a new part in exchange for the part of the motor cycle, motor cycle combination, or sidecar which may have proved defective. We do not undertake to replace or refix, or bear the cost of replacing or refixing such new part in the motor cycle, motor cycle combination, or sidecar. We undertake, subject to the conditions mentioned below, to make good at any time within six months any defects in these respects. As motor cycles, motor cycle combinations and sidecars are liable to derangement by neglect or misuse, this guarantee does not apply to defects caused by wear and tear, misuse or neglect.

The term "misuse" shall include amongst others the following acts:—

1. The attaching of a sidecar to the motor cycle in such a manner as to cause damage or calculated to render the latter unsafe when ridden.
2. The use of a motor cycle or motor cycle and sidecar combined, when carrying more persons or a greater weight than for which the machine was designed by the manufacturers.
3. The attaching of a sidecar by any form of attachment not provided, supplied or approved by the manufacturers, or to a motor cycle which is not designed for such use.

Guarantee—contd.

Any motor cycle, motor cycle combination, or sidecar sent to us to be plated, enamelled, or repaired will be repaired upon the following conditions, i.e., we guarantee that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, such guarantee to extend and be in force for three months only from the time such work shall have been executed or until the expiration of the six months above referred to, and this guarantee is in lieu and in exclusion of any common law or statute, warranty or condition, and the damages recoverable are limited to the cost of any further work which may be necessary to amend and make good the work found to be defective.

CONDITIONS OF 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.

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