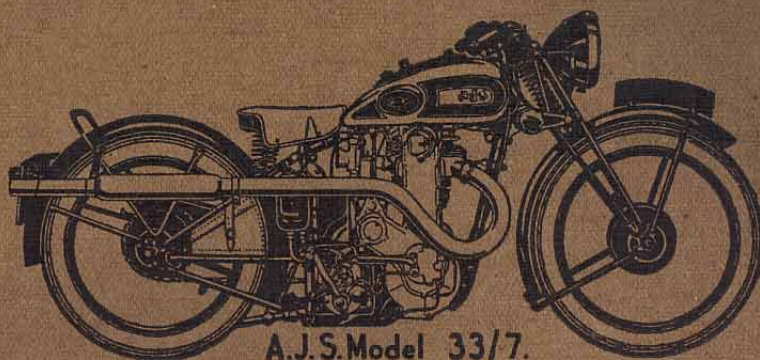


A.J.S.

Motor Cycles



A.J.S. Model 33/7.

HANDBOOK

for

OVERHEAD CAMSHAFT

TROPHY MODELS 3.46 H.P. & 4.95 H.P.

MANUFACTURED BY

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

PLUMSTEAD, LONDON, S.E.18.

PRICE - ONE SHILLING.

A. J. S.
Motor Cycles
O.H.C. TROPHY MODELS
3.46 H.P. and 4.95 H.P.

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FOREWORD

In giving the following information we have endeavoured to meet the needs of all A.J.S. Camshaft Model Owners—that is, both the original A.J.S. Camshaft machines and the present Trophy Models. Apart from detail modifications and improvements the machines are very similar so that this booklet will apply to both types of machines. On the assumption that the purchasers of A.J.S. Camshaft Models are already conversant with the driving of a Motor Cycle we have only included just covering remarks on this subject. That accessibility has been very carefully studied in designing A.J.S. machines will become apparent to owners of Camshaft Models, when making adjustments of any description, so that no difficulties should be experienced in carrying out the instructions contained in this booklet.

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DRIVING INSTRUCTIONS

Assuming that the owner is already conversant with, and can ride a motor cycle, a description of the control layout will be helpful and obviate those anxious few moments when taking over a new or strange machine. First of all the Four Speed Gear Change, if hand operated, has the following positions: Low or First Gear at the bottom of the Quadrant, Neutral is next, Second, Third and Top follow on to the top of the Quadrant. With Foot Operated Gear Change, first of all find Neutral position by moving the Pedal up or down, then First Gear is engaged by pressing the lever downwards, Second by raising the Pedal, and Third and Top Gears are engaged with subsequent upward lifting of the Pedal. The opposite action is necessary to change to lower gears, the correct way of changing to lower gears being fairly obvious—merely depress the Pedal downwards to the limit of its travel to engage each lower gear. In the case of both hand or foot operated Gear Change, do not impose any stress on the lever by attempting to wrench the lever from one position to another, as by merely pushing the machine backwards or forwards the Gear Lever can be moved quite easily to any position.

Handlebar Controls are situated and operated in the following way: Twist grip Throttle Control—Right Handlebar opening inwards. Air Control lever—Right Handlebar opening inwards. Front Brake Control Lever—Right Handlebar inverted lever. Clutch Control Lever—Straight Pull—Left Handlebar. Exhaust Valve Lifter Straight Pull Lever on Right handlebar. Ignition Control Lever—on left Handlebar—to advance move inwards, retard outwards. On electrically equipped models the Dipping and Dimming Control switch is fitted to left Handlebar.

Starting.—Do not overflood the Carburettor, only depress the Tickler enough to feel resistance by the float lifting. If Petrol runs out of the Carb. intake turn off the Petrol Tap before kicking the engine over, but remember to turn this on again after the engine is started. Starting is much easier if the engine is kicked over once or twice with the throttle wide open, the air lever closed and the Exhaust Valve lifted afterwards, almost closing the throttle more than $\frac{1}{2}$ when attempting to start the engine.—See Carb. Ins.—Pages 14, 15, 16.

On the Road.—It does not occur to every rider to adjust the machine to suit his personal requirements, although numerous make this their first job when taking over a new machine. With the provision made for adjustment of the Saddle, Footrests, and Handlebars to suit individual requirements it is possible to obtain a feeling of comfort and security.

Gear Changing.—Riders will find that it is not necessary or desirable to completely withdraw the Clutch when changing gear. After a little practice gear changing can be done quickly and quietly if the throttle is left slightly open and the Clutch is only withdrawn slightly. The gear lever should then be moved sharply from one position to another.

Braking.—Educate yourself to using both front and rear brakes together, using the rear only, invariably leads to skids on wet roads. On dry surfaces it is possible to apply considerable pressure to the front brake control without any tendency of the front wheel to skid, but exercise care on wet or slippery roads, and learn by experiment the maximum amount of pressure that can safely be applied.

CAMSHAFT ENGINE DETAILS.

346 c.c. Model—Bore 70 m.m.—Stroke 90 m.m.
 495 c.c. .. —Bore 79 m.m.—Stroke 101 m.m.

TAPPET CLEARANCES.

Inlet—16 thou. Exhaust—18 thou. When engine cold.

CAMSHAFT AND MAGNETO CHAIN SIZE.

Number of Rollers—Camshaft $\frac{3}{8}$ x .230 ... 86
 —Mag. Chain $\frac{3}{8}$ x .230 51
 Piston Ring Gap—10 thou.

SPARKING PLUG TYPE AND SIZE.

Competition Engine Lodge H.54—14 m.m.
 Racing Engine Lodge BR.50—or BR.52—14 m.m.

COMPRESSION RATIOS AVAILABLE.

346 c.c.	6.8 to 1	7.5 to 1	11 to 1
495 c.c.	6.5 to 1	7.5 to 1	11 to 1

ENGINE SPROCKETS — No. OF TEETH.

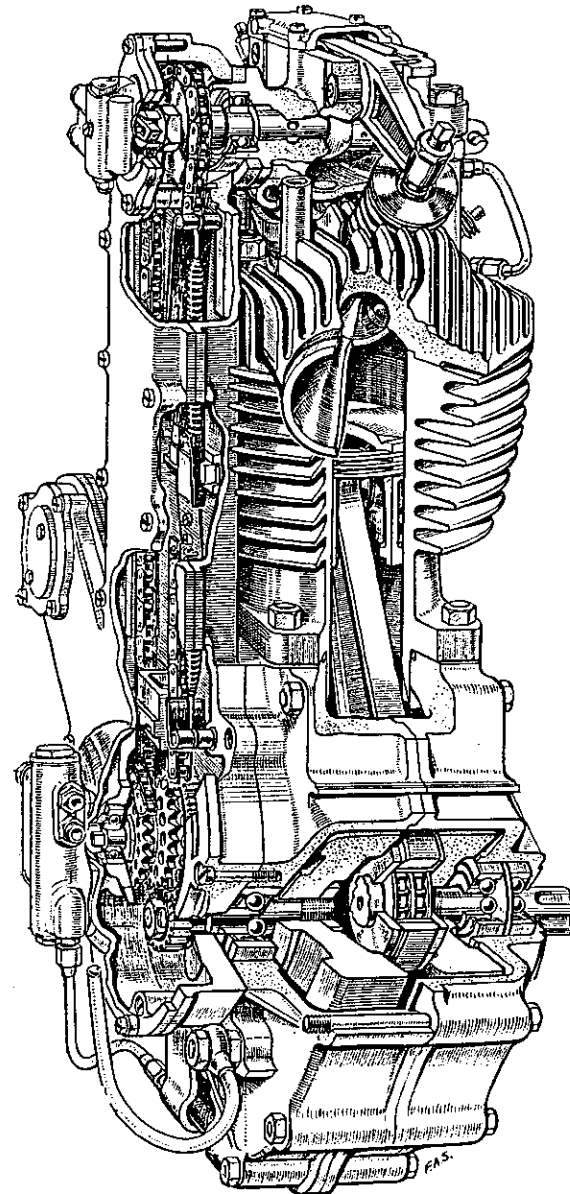
346 c.c. Standard and Racing Solo	21 Sidecar 18
495 c.c. Standard Solo	24 .. 21
495 c.c. Racing Solo	25 .. 21

DISMANTLING AND ASSEMBLING : ENGINE

Cylinder Head Removal.—First remove Petrol Pipe, Carburettor complete (as this is taken from the Cylinder Head remove Knurled ring from top of Carburettor Body and withdraw both slides, leave these attached to their Cables and swing them out of the way). (Extreme care should be taken not to damage the throttle needle whilst this is exposed); Sparking Plug, Oil Feed Pipes to Valve Guides, Oil Feed Pipe from main Engine Pump to Rocker Box and Oil Drain Pipe to Rocker Box Pump, also Exhaust Pipe Locking Ring, etc. Next remove the four Pins holding the Rocker Box Pump and top Inspection Disc. Take away the Pump drive and its retaining ring and the Camshaft locknut will then be visible, withdraw the Cotter Pin from the nut, this can then be unscrewed. Prior to removing the Pegged Plate which locates the Chain Wheel and Sleeve turn the Engine slowly over until the top of the Compression stroke is reached; now unscrew the four Rocker Box Pins, and withdraw the three that are free to come away, then the Rocker box is free, but when taking this away see that the chain wheel is held in position by the tool provided in the tool kit. The tubular portion of this can be used for pushing the Camshaft out of the Chain Wheel, use two chain cover Pins for holding this tool to the chain cover. Six Cylinder Head Bolts are now visible on top of the Head, also two nuts will be found holding the Cylinder Head to the Barrel underneath. Remove all of these.

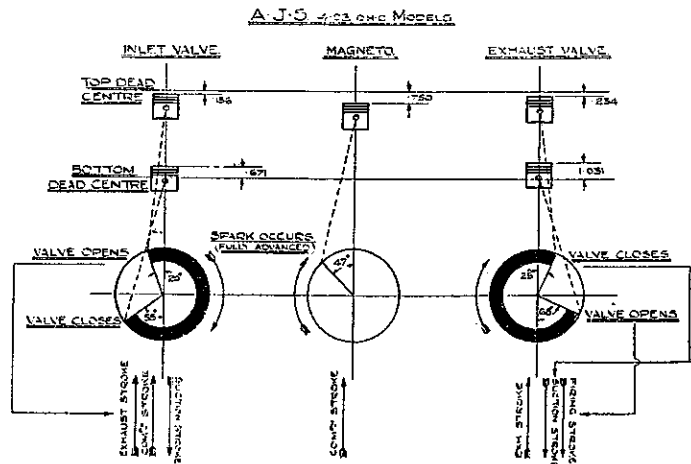
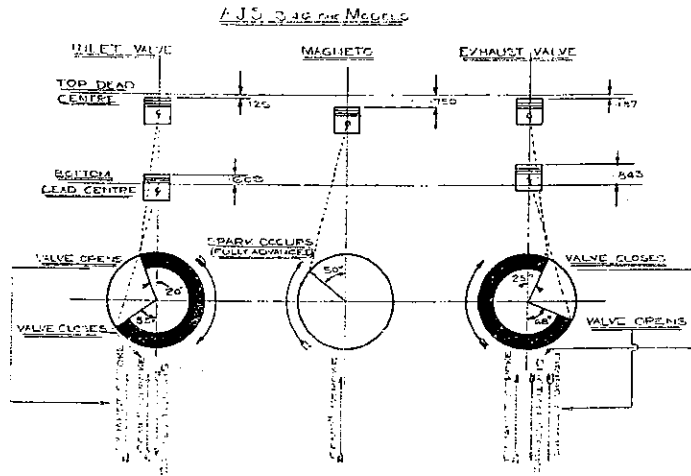
—4—

THE A.J.S. "TROPHY" O.H.C. ENGINE.



—5—

VALVE AND IGNITION TIMING.



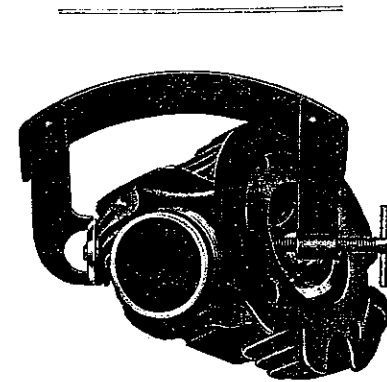
-6-

The cylinder head can then be lifted up and off. There is no Spigot or washer on the Cylinder Barrel, but the Head must be lifted high enough to clear the two Cylinder Head studs. If the Cylinder Barrel is removed do not prise this from the Crank-case but place the palms of the hands round the finning and rock the Cylinder from side to side and when it starts to leave the crank-case lift upwards. Do not let the connecting rod fall heavily against the mouth of the Crank-case or the crank-case face will be damaged. When removing the Piston, only withdraw one Gudgeon Pin Circlip with the special pliers provided and then either push the Gudgeon Pin out from the opposite side or insert a screw-driver inside the Gudgeon Pin and bear the screw-driver to one side and turn the Pin slowly out of the Piston Bosses. The Gudgeon Pin is a sliding fit in the Piston and Small End. When the Piston is removed either remember the correct original position indicated by the remaining Circlip, or take a sharp instrument and make a mark on the inside of the piston to indicate front and back; be sure to replace the Piston in its original position.

For the removal of the Valves we list a special tool costing 5s. 9d. Part No. XB3340; and for Valve Grinding a Small Tool costing 1s. 6d. Part No. XB3360.

The accompanying illustration shows the method of operation of both the valve extractor and the valve grinding tool; although the Cylinder Head shown does not of course belong to a Camshaft Model the operation is similar. For portability the valve extractor is made to fold. Be careful to see that the portion of the tool which depresses the valve spring collar is central before compressing the spring, otherwise it is almost impossible to remove the split cones. An important factor to watch when replacing the valve springs is that the collars are replaced underneath the valve springs. Whilst the cylinder head is dismantled remove the oil feed nipples to the valve guides to ascertain that these are clear; the inlet nipple, it will be noticed, is purposely restricted with a disc, so be careful to see that these nipples are replaced correctly.

Re-assembling—After replacing the Piston, rotate the piston rings in their grooves until the respective gaps are at equal distances round the piston, and make sure that the crankcase washer is still unbroken, otherwise replace. Lead the piston into the cylinder by holding the piston as far round as possible with the thumb and first finger, at the same time closing in the rings round the piston. The Cylinder barrel has a chamfer lead-in for the rings to enter. When the cylinder is again on the crankcase tighten the cylinder nuts down evenly, not independently.



VALVE EXTRACTOR.

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NO CYLINDER HEAD WASHER IS USED ON THE A.J.S. CAMSHAFT ENGINE.

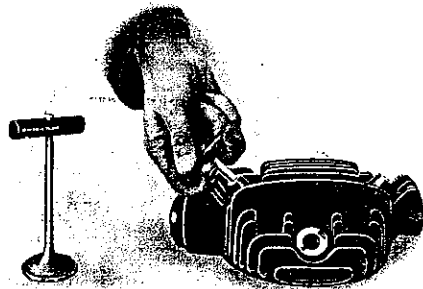
Originally the faces of the cylinder head and barrel are ground in, and providing they remain clean and unscratched can be replaced without any jointing compound or attention other than washing with petrol. If however, either of the faces are marked, causing compression leaks, remove the two holding down studs by two nuts together on the thread of the stud to unscrew this, then smear the faces with very fine emery paste, and grind in the same manner as in valve grinding until all the marks are removed. Be sure to remove all traces of emery paste with petrol after this operation.

Actually it is much better and easier to grind in these faces when both the cylinder barrel and head are away from the engine; there is then no danger of emery paste finding its way into the engine and the cylinder head can be rotated freely on the barrel. When the Cylinder head is again in position, replace the nuts to the studs which protrude through the cylinder barrel, follow on with the long cylinder head bolts, and lastly, the short cylinder head bolts. Tighten these down together, not independently. Before replacing the rocker box make sure that the small hardened caps are fitted over the valve ends, and place the one rocker box bolt nearest to the exhaust lifter into its hole, then locate the threaded end of the camshaft into the centre of the chain wheel, afterwards pushing out the tool holding this in position. Watch that the rubber washer between the rocker box and the chain cover settles into position properly.

When the chain wheel is in position on the shaft and the rocker box tightened down it is possible to feel the chain tension. Any excessive slackness after the machine has completed a considerable mileage can be taken up by fitting washers of the correct thickness under each leg of the rocker box. It is essential however, that approximately $\frac{1}{8}$ in. or $\frac{1}{2}$ in. of side movement always exists in the chain.

A small plug is situated about half way up the camshaft drive cover: when this is removed it is possible to insert a narrow screw-driver to ascertain that the tensioner blade is following the chain and not idle against the side of the cover.

Providing the flywheels have not been rotated the pegged plate can be replaced through the chain wheel and sleeve, but if the flywheels are not in the original position, turn the engine slowly over until T.D.C. of the compression stroke is reached: the hole in the sprocket and that in the sleeve should then coincide although sometimes the shaft has to be rotated slightly to bring the two into line so as to replace the pegged plate. A rough check for the valve timing is, that with the piston on T.D.C. and the contact breaker points just breaking with the ignition lever fully retarded, both the hole in the chain wheel and the sleeve should be together at 50° to the right from T.D.C.



HOW TO USE THE A.J.S. VALVE GRINDING TOOL.

When Replacing the Carburettor always refit the slides and cables into position before re-fitting this to the engine, otherwise difficulty will be experienced in locating the throttle needle valve into position in the carburettor. When replacing the carburettor it will be noticed that no flange washer is used, merely make sure that both the faces are clean and smear with shellac jointing compound. It is essential to refill or "prime" the oil pipes with oil when re-assembling the engine to ensure that oil is fed to all bearings when the Engine is started up. Should it ever be necessary to replace a tensioner blade, first disconnect all oil pipes and remove the camshaft drive cover; the drive is then visible. First unhook the tensioner blade spring at the top, and the blade and spring can then be withdrawn from the bottom peg; when replacing verify that the spring eye locates in its groove half way along the bottom peg. The top eye of the spring also fits into a groove in the blade pin at the top.

If it is ever necessary to remove the engine from the frame, time will be saved by removing the engine and gearbox unit complete. To do this remove the two top front engine bolts, slacken off the others, take out the two bolts running through the gearbox plates and saddle pillar down tube, and providing all the other connections have been disconnected the complete unit can be taken away.

Ignition Timing.—See Magneto and Magdyno.—Pages 18 and 19

Important.—Only adjust the valve lifter lever cable enough to raise the exhaust valve very slightly from its seat, particularly if a high compression piston is fitted in the engine.

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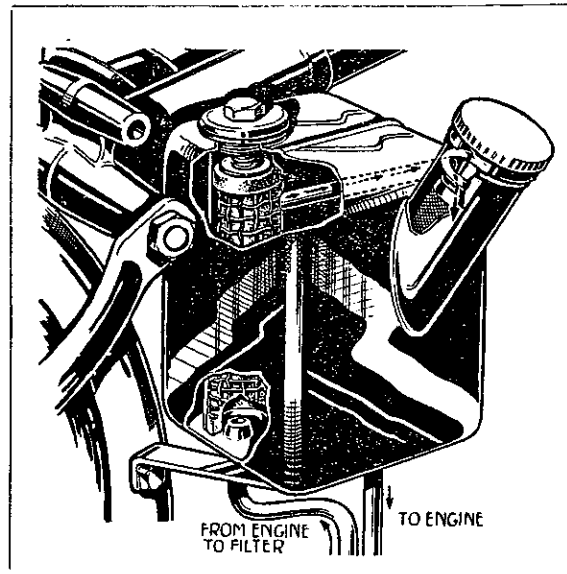
ENGINE LUBRICATION

All A.J.S. Camshaft Engines have dry sump lubrication. Oil is fed to Big End of the Engine and the Rocker Box by the main pump on the Timing Chain Cover. This Pump also draws oil from the Sump and returns it to the filter in the Oil Tank, an illustration of which is given below, although this is for another model. By removing the plated hexagon plug in the top of the Oil Tank it is possible to withdraw the filter for the purpose of cleaning. To do this immerse the filter in clean Petrol but always make sure that it is thoroughly dried out before replacing. The filter should be cleaned every 500/1,000 miles. We recommend that all the oil is drained from the Oil Tank every 4,500 miles and the tank replenished with fresh oil. It is necessary to top up the oil level in the Tank from time to time, and obviously it is most economical to drain the Tank when the oil is at its lowest recommended level. The correct Oil level in the Oil Tank being almost up to the end of the return pipe—do not overfill, otherwise oil will leak from the filler cap—and never let the level fall below the Tank being half full. We recommend the use of Castrol "R" for Racing purposes and Castrol X.L. for general and competition purposes.

A small adjustable oil pump is fitted at the top of the Timing Chain Cover; the purpose of this is to drain the oil from the sump of the Rocker Box and return it to the crankcase sump.

To increase the suction on this, unscrew the lock-nut on the adjuster and turn the adjuster with a screw-driver in an anti-clockwise direction, and to decrease the suction vice versa. After making the adjustment always tighten the locknut. *This Pump is correctly set before the machine leaves the Factory and should seldom if ever need adjustment.*

FABRIC OIL FILTER



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GEARBOX

Gearbox.—To adjust the primary chain it is possible to swing the Gearbox bodily on its lower fixing bolt, and to carry this out the following instructions should be observed:—

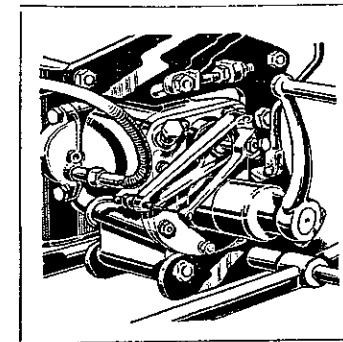
Slack off the centre nut on the foot gear change mechanism and to tighten the, front chain first slack off the nut on the adjuster bolt nearest the Engine and turn the nut on the other side of the anchorage in the same direction, i.e., anti-clockwise, until the correct chain tension is obtained. To ascertain this remove the small inspection disc on the front chain cover, the tension can then be felt with the fingers. It is most important to leave approximately $\frac{3}{8}$ in. or $\frac{1}{2}$ in. up and down movement. After the correct chain tension has been arrived at, re-tighten the adjuster nut nearest the Engine and also the centre nut on the gear change mechanism. Always make a point of adjusting the front chain first and the rear afterwards. The illustration below shows a similar Pivot mounted gearbox but with hand operated gear change; the adjuster referred to, however, is clearly visible.

Should the gear positions of the foot gear change mechanism not correspond to those of the gearbox index, the short rod between the operating lever on the foot change mechanism and the striker lever on the gearbox, can be adjusted, as provision is made for this.

To check off the relation between the two first engage any gear and then remove the split cotter and yoke end pin from the top of the Short Gear Rod; if the two are correct, the holes in the Yoke end and the lever coincide; that is, when the lever is centralised, as a small amount of free movement always exists in the lever. Otherwise unscrew the locknut under the Yoke end and bring the Yoke end into line, afterwards tighten the lock nut and replace the pins, etc. Only a small alteration to the length of the gear control rod is ever necessary.

Should the Kick-starter return spring ever need replacing, unscrew the Pinchbolt through the kick-starter crank, draw the crank from the splines, take away the Spring cover and old spring, enter the end of the new Spring into the Gearbox end cover first, utilise a pair of pliers to spring the end of the Spring into the locating hole in the Kick-starter Shaft. To increase the spring pressure move the location of the spring end hole by hole in a clockwise direction until the correct tension is obtained.

Replenishment of the gearbox lubricant is very simple and the method fairly obvious. The filler Plug is situated on the right hand side of the gearbox cover plate. Prior to filling with lubricant remove the level plug, which will be found about half way up on the gearbox end cover, then fill until the lubricant starts to run from the level hole, afterwards replace the level and filler plugs.



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CLUTCH AND TRANSMISSION

The accompanying illustration shows a sectioned view of the Clutch fitted to Camshaft Models. If there is a tendency for the Clutch to slip, make sure first of all that a little play exists between the Push Rod adjuster and the Push Rod.

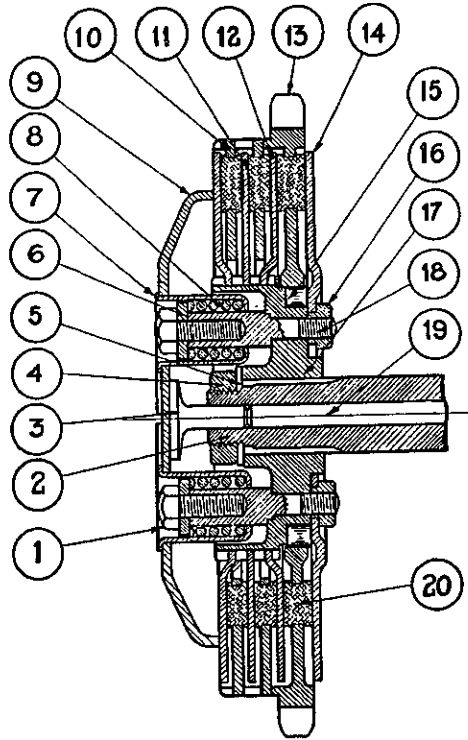


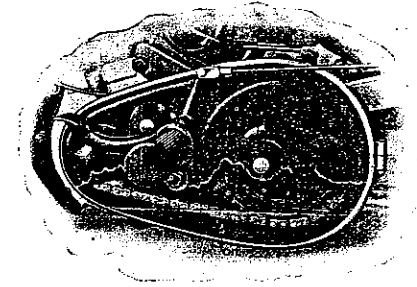
Illustration 9.

CLUTCH PARTS.

- | | | |
|---------------------------------------|---------------------------------|-----------------------------|
| 1. Clutch Spring Screw. | 7. Clutch Spring Box. | 14. Clutch Back Plate. |
| 2. Main Shaft. | 8. Clutch Spring. | 15. Roller Bearings. |
| 3. Clutch Thrust Pin. | 9. Clutch Spring Box Plate. | 16. Clutch Spring Stud Nut. |
| 4. Main Shaft Nut. | 10. Friction Plate. | 17. Clutch Centre. |
| 5. Locking Washer for Main Shaft Nut. | 11. Clutch Centre Plate Dished. | 18. Clutch Spring Stud. |
| 6. Clutch Spring Screw Washer. | 12. Clutch Outer Plate. | 19. Clutch Rod. |
| | 13. Clutch Sprocket. | 20. Cork Inserts. |

If the adjuster pin bears on the Clutch Push Rod, this prevents the Clutch Springs from exerting pressure on the Plates. It is impossible to increase the Spring pressure by tightening the Clutch Spring Pins, as these are screwed right home, and any undue pressure on these will break away the heads of the pins.

In addition to the Clutch Push Rod adjustment, a clutch cable adjuster is provided. This can be adjusted with the fingers, but make a point of tightening the locknut, otherwise the adjuster may vibrate and gradually work back, eventually causing the Clutch to slip through absence of play in the Clutch Lever. Although the front chain cover contains an oil bath, this does not necessarily mean that the clutch runs in oil, if the correct oil level is adhered to, centrifugal force will keep the oil out of the clutch, although a certain amount may find its way into the clutch, this in no way impairs its efficiency. Actually the Clutch is intended to run dry. The method of dismantling the chain cover and Clutch for examination or Clutch Plate removal is as follows: Remove the footrest arm and Brake Pedal, next the Pinch Pin at the rear of the aluminium retaining band and the rubber seal strip. The outside portion of the chain cover can then be drawn away leaving the Clutch, Chain, Shock Absorber etc., visible. The Clutch Plates can now be withdrawn after removing the six spring bolts, springs, thimbles and thrust pin. To remove the Clutch Sprocket unscrew the centre nut from the shaft and the Sprocket will then come away with the Clutch centre. To dismantle the Sprocket from the centre, unscrew the six nuts securing these two parts, but be very careful when taking them apart because there is a Thrust race of Ball and Roller Bearings between the two and these will drop out if not carefully handled. When re-assembling the Clutch, the Ball and Roller bearings should be placed alternately round the centre, and to keep them in position smear them with vaseline or grease after replacing the nuts securing the Sprocket to the centre, punch and slightly spread the end of the pins in the nuts to make sure that they cannot become loose. The sequence of the Clutch Plate replacement can be seen clearly from the illustration. If the distance Pieces between the two sides of the Chain Cover have been removed see that these are replaced before re-fitting the outside portion of the Chain Cover. When replacing the Rubber Seal strip, smear Shellac Jointing on the inside of this. The ends of this strip should coincide with the ends of the aluminium retaining strap. Replace the Brake Pedal before the footrest arm.



When a chain is joined up with a spring clip, it is most important that the clip is correctly fitted over the cover plate. The open end should always face in the opposite direction to which the chain travels. Fit this so that the plate and spring clip are on the inside of the chain, i.e., next the spokes.

Replacing Chain.—When replacing a chain it will facilitate the fitting of the spring link if the ends of the chain are encircling an equal portion of the sprocket. This also applies to removing the spring link.

Back Chain.—Slack off the nuts on each side of back hub spindle and move the wheel backwards by means of the adjusting screws in fork-ends. Care must be taken to adjust each side equally or the wheel will be out of alignment (see adjustment gauge, Illustration 19). Screw the spindle nuts up tightly again after the chain is properly adjusted. It may be found that moving the wheel back has caused the brake to be "on." This is easily rectified by means of the brake adjustment.

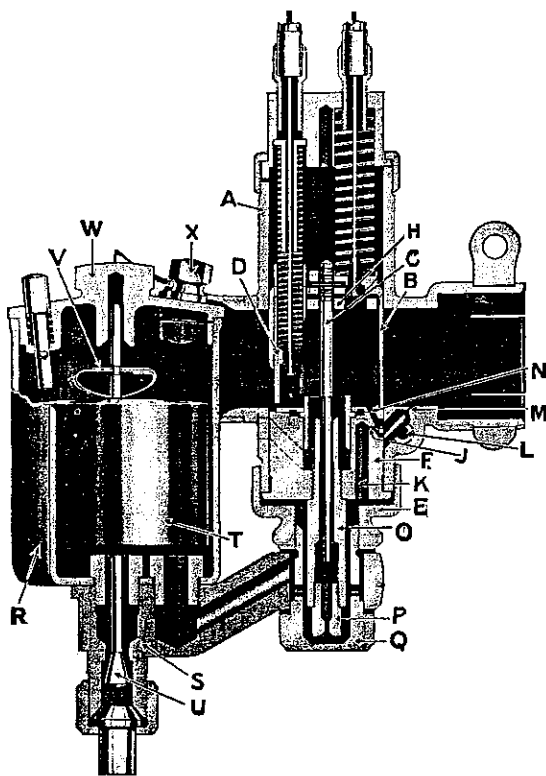
If the chain is too slack it is apt to "whip," which intensifies the wear and tends to break the rollers. If on the other hand it is too tight, a crushing effect is produced on the rollers, and the whole chain is strained unduly.

The chain should be adjusted and kept adjusted, so that it can be pressed down in the centre with the finger about $\frac{1}{4}$ in.

CARBURETTOR

The Carburettor fitted as standard to the Camshaft Models is an Amal. There are four ways in which the quality of the mixture can be varied, these are as follows:—

1. Alteration of Main Jet size (P) to adjust setting from $\frac{1}{4}$ to full throttle.
2. Needle position (C) in Throttle Valve $\frac{1}{2}$ to $\frac{3}{4}$ Throttle.
3. Throttle Valve cut-away on the air intake side (H) $\frac{1}{2}$ in. to $\frac{3}{4}$ in. Throttle (numbered on top of slide showing variation).
4. Pilot air adjustment (L) closed to $\frac{1}{2}$ Throttle.



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When the machine is despatched from the Factory the Carburettor has been correctly set, but if the machine is used under varying atmospheric conditions, slight adjustments may be necessary. In the first case if starting is difficult and the Engine refuses to "idle" evenly, slowly screw the Pilot Air Adjuster inwards, but if on the other hand the Engine is inclined to "eight stroke" at slow speeds, screw the Pilot Air Adjuster out until this disappears. A point worth mentioning about starting is that the Throttle Stop (illustration) should be set so as to lift the Throttle Slide slightly off its seat, the twist grip can then be left in the "closed" position when starting the Engine. The next adjustment is carried out by fitting a throttle Valve with a different cut-away. If when opening the Throttle spitting back through the Carburettor, or misfiring occurs, this indicates a weak mixture. To correct this fit a Throttle Valve with a smaller cut-away.

Black smoke from the exhaust or "eight stroking" at low-intermediate Throttle openings indicates richness, fit a Throttle slide with a larger cut-away.

As a guidance each throttle Valve is stamped with two numbers. The first indicating the type of Carburettor, and the latter indicating the amount cut-away from the intake side of the valve in sixteenths of an inch. Thus—6,4, is a type 6 Valve with $\frac{4}{16}$ in. cut-away.

The necessity for alteration to the needle position may be checked in the following way: Start the Engine and open the air lever to its fullest extent, open Throttle control half way and notice whether the exhaust note is crisp and the Engine lively, then close air lever slightly, if this results in increased Engine speed raise the needle to the next position in the throttle valve. On the other hand, if the Engine speed does not increase when the air lever is closed to about half way and the throttle opening increased, or if any tendency to "eight stroke" occurs, then lower the needle to the next position in the throttle slide. To alter the needle position pull away the small spring clip locating the needle in the Throttle Valve and afterwards force this home again. For a Semi-Automatic setting where the Rider intends to use the Air Lever judiciously and studies extreme economy, lower the needle one groove further after carrying out this range of tests. For speed work, the Main jet size may be increased by 10% as the air lever should always be full open on full throttle openings.

STANDARD CARBURETTOR SETTING

Main Jet size.	Needle position.	Cut away.
33/7 160	3	6/4
33/10 200	3	6/5

RACING CARBURETTOR SETTING

For 50/50 Petrol Benzol and Engine Compression ratio 7.5 to 1.

Main Jet size.	Cut away.	Bore size.	Carb. Type No.
33/7 52	4/5	1 $\frac{1}{16}$	N.M.8617
33/10 58	4/5	1 $\frac{1}{16}$	N.O.3131

For Discol R.D.1 Fuel, and Engine Compression ratio 11 to 1.

Main Jet Size.	Valve No.	Bore Size.	Carb. Type No.
33/7 55	12	1.06	N.M.7091
33/10 65	12	1.18	M.D.9921

—15—

On the Racing Camshaft Models, an Amal Racing Carburettor with Twin Fuel feeds is fitted. When tuning this for speed work select the main jet size which gives maximum power and speed with the Air and throttle full open. The correct size is readily found by moving the air lever at full Throttle openings; any increase in power obtained by half closing the air lever indicates that the jet size is too small. Loss of power on closing the Air Lever slightly shows that the main jet is rather too large. It is far better to err on the rich side with Carburettor settings. Weakness "Cooks" Sparking Plugs and other Engine parts.

Idling or slow running is governed by a knurled screw on the side of the Carburettor; for Petrol Benzol it should be unscrewed about two and a half turns, but for Discol R.D.1 fuel, only about half a turn. Always adjust this control so that a clean pick-up and good acceleration are obtained. From one eighth to three quarter throttle is governed by the throttle cut-away; this is indicated in the way explained previously. Three quarter to full Throttle is governed by main jet size.

LUCAS MAGNETO AND MAGDYNO LIGHTING SET

When Camshaft Models are not fitted with Magdyno Lighting a Lucas Racing Magneto is fitted. Magnetos have now reached such a stage of perfection that trouble is seldom if ever experienced with these. Their condition, however, does affect the performance of the machine considerably. If any trouble is experienced with the Magneto this will usually be traced to either the High Tension pick-up or the contact breaker. Should starting become difficult and Ignition is suspected, inspect the following points, remove sparking plug, hold this against the cylinder with the high tension lead attached to the terminal and kick the Engine over (be careful to see that the hand is nowhere near the terminal, and that the plug body makes contact with the cylinder or a shock will be felt) if there is no spark at the points, take the terminal away from the plug and hold this about $\frac{1}{8}$ in. from the Cylinder, at the same time kicking the Engine over; if a spark is now visible the fault is in the Sparking Plug. Check off the gap between the points, this should be 20 Thou and if necessary adjust them by either tapping the electrodes together or springing the outside electrode away with a thin screw-driver. If the plug still refuses to spark, unscrew the centre from the plug body and clean the mica insulation with a Petrol soaked rag. Make sure when assembling the plug that the gap between the points is correct. Should it be impossible to obtain a spark from the High Tension Terminal against the Cylinder, first remove the High Tension Pick-up and examine this; if any carbon or dust exists wipe this away, also take a pencil or similar object, cover this with a cloth and insert into the hole left by the removal of the Pick-up, press this lightly on to the Slip ring, and to remove any carbon which exists rotate the Engine with the Kick Starter.

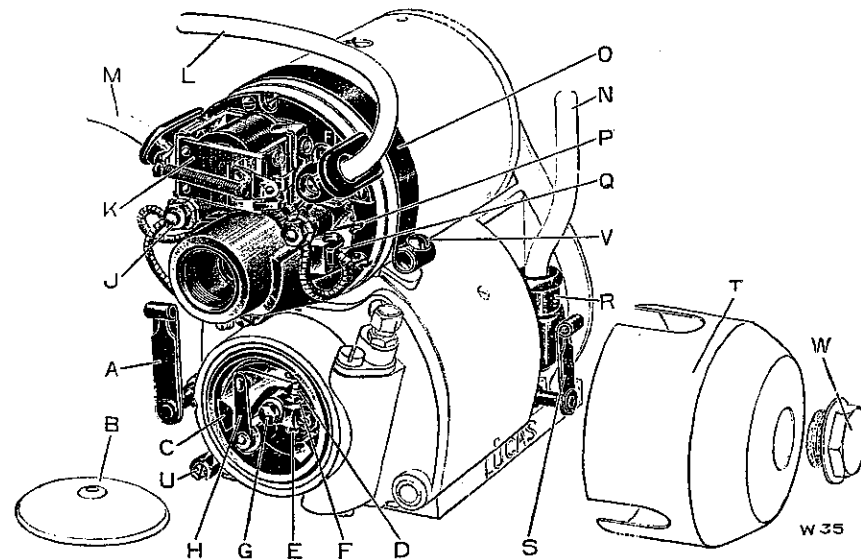
Should this not have the desired effect turn to the contact breaker. A Spanner is provided in the tool kit for adjusting the contact breaker points and removing the contact breaker centre pin. Take the Contact breaker out bodily by first unscrewing the Contact breaker Centre Pin and Rocking the Pin from side to side in the centre of the Contact Breaker, it will then leave the taper hole in the Armature shaft. Now that the Contact Breaker is free turn the Rocker Arm locating spring and prise the Rocker Arm off its Pin; the Points will then be visible. If these are pitted or show indications of scaling, file the surfaces of both evenly with a smooth file, afterwards smooth with fine emery cloth.

When replacing the Rocker Arm on its Pin see that this is an easy fit: a little grease should be smeared round the pin. Be careful when re-fitting the contact breaker to see that the keyway on the taper of the contact breaker body locates properly in the Armature shaft before tightening the Centre Pin.

A Gauge is provided on the side of the Contact Breaker spanner for checking the gap between the points.

Lucas Magdyno.—The previous information covering the Lucas Magneto applies also to the Magneto Portion of the Magdyno. The Dynamo portion of the instrument is detachable and can be removed in the following manner:—

Unscrew Dynamo leads (M and L) Dynamo securing strap (O) and Nut from Drive cover, the Dynamo is then free. Wrap some insulating material round lead M, otherwise the battery will be discharged if the bare end touches any portion of the machine; occasionally refill the lubricator fitted to the drive cover with grease and screw the cap down. In the event of the Dynamo ceasing to charge, remove the Dynamo end cover and observe whether the cut-out closes when the engine is "revved up." If it does not, verify that all three brushes are settling down on the commutator properly. If after checking all the leads and connections as being tight and the dynamo still refuses to charge, take the machine to your nearest Lucas Depot for attention. *Never attempt to push the points of the cut-out together, this will result in a dead short.* If you are compelled to run the engine for any length of time without the Battery, or if any trouble is experienced with the Dynamo withdraw the brushes from their housings and clip them under the brush springs or remove the Dynamo altogether until this can be attended to either by the nearest Lucas Depot or an electrician. Both the Lucas Magneto and Magdyno are intended to run without attention for at least 10,000, after which the Instrument should be dismantled for the bearings to be repacked with grease.



A—Securing spring for contact breaker cover. B—Contact breaker cover. C—Fibre heel. D—Contact points. E—Locking nut. F—Adjustable contact point. G—Contact breaker fixing screw. H—Locating spring. J—Nut securing brush eyelet. K—Cut-out. L—Cable to headlamp switch terminal marked FI. M—Cable to headlamp switch terminal marked +. N—Cable to sparking plug. O—Dynamo securing strap. P—Spring lever holding brush in position. Q—Carbon brush. R—Pick-up. S—Securing spring for pick-up. T—Cover. U—Earthing terminal. V—Screw securing dynamo strap. W—Cover fixing screw.

Timing.—If the magneto has been removed from the machine it will be necessary to see that it is timed correctly after it is refitted.

The 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. Fitting over a collar on this sleeve is the chain sprocket (2), which has twelve holes similarly arranged. Now on the sprocket on engine driving shaft and on the magneto shaft will be found an arrow. These must point to each other before anything else is done. The first thing then in timing up is to set these two arrows so that they face exactly towards each other. To do this turn engine over until the arrow on the driving sprocket is pointing directly towards the arrow on the magneto sprocket. This latter should be held free in the fingers and moved a tooth backwards or forwards in the chain until the correct setting is arrived at. When this is so, place the magneto sprocket on to the sleeve, and turn the armature shaft of magneto until a mark found punched over one of the twelve holes on the sprocket exactly registers with a similar mark on the outside of the collar of the sleeve. It will now be found that the marked holes in sleeve and sprocket respectively exactly coincide, so that all that has to be done is to push the peg washer (3) into these holes, which effectively prevents the sprocket from moving from its correct setting, and tightly screw up the sleeve lock nut (4), which can be done without fear of

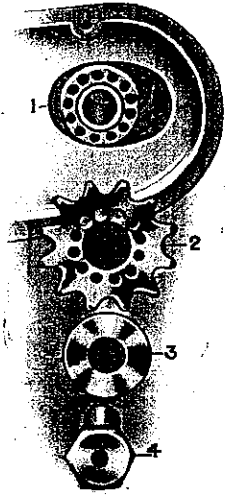
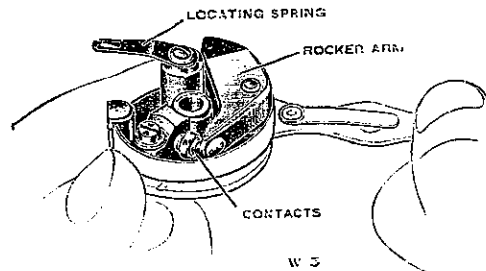


Illustration 5.
VERNIER TIMING ADJUSTMENT.

the timing shifting in the process, as is often the case with other methods. As a means of verifying the timing, or if the sleeve (1) has been removed from the magneto armature shaft, set the piston its correct distance from top of compression stroke (see ignition timing for details), making sure it is not on the exhaust stroke.

With the piston in this position take off the sleeve lock nut on magneto sprocket and remove the peg washer. This will leave the armature free from the engine drive, but still connected



CONTACT BREAKER.

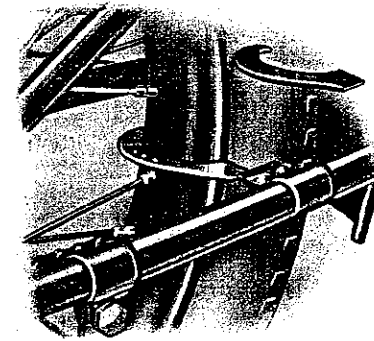
via the chain to the engine. See that the sprockets have their arrows facing as previously mentioned. Move the ignition control lever to the limit of its motion of advance. Remove the cover of contact breaker and slowly turn the armature till the fibre block of the make and brake lever rises on the inclined plane of the steel segment just sufficient to separate the points. This is the firing point, and with the piston in the position referred to above the sleeve and sprocket should register if correctly fitted up. If so, the drive should be fixed up as before detailed. It is, however, always advisable to check the timing after tightening up.

Magneto Adjustment.—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 retighten the bolts.

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.

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 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.

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 be 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.

DETACHABLE REAR WHEEL

To remove proceed as follows.—Put the machine on the 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 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 unscrewed then unscrew the centre pin and draw it completely out, together with the distance piece. The space now left by the distance piece will allow the wheel to be drawn off the driving studs in the sprocket, and removed from the fork ends.

To replace the wheel, push it squarely on to the driving studs and next (with the distance piece in position) screw up the centre pin moderately tight. The three sleeve nuts can now be screwed up tightly, afterwards giving a final turn to the centre pin. It is very important to point out that when the centre pin is removed the wheel is hanging on one fork only, so any rough treatment must be carefully avoided or there is a great danger of damage.

Removal of 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.

IMPORTANT

INSTRUCTIONS WHICH MUST BE CAREFULLY CARRIED OUT FOR DISMANTLING AND RE-ASSEMBLING TAPER ROLLER BEARING HUBS:—

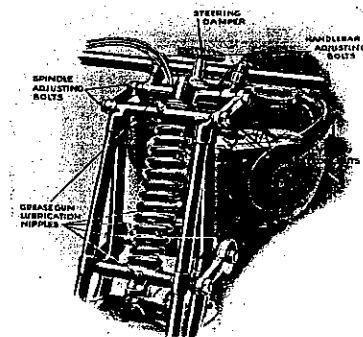
To dismantle, release the locking nut and screw out the adjusting ring. The dished plate containing felt washer and plain plate will then drop out. Take out spring ring from the opposite side of hub and remove felt washer and holder consisting of two plates and retaining ring, the latter being between 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 $1/32$ 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 $1/16$ 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.

STEERING HEAD AND HANDLEBARS

All the 1933 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.

It is advisable in all cases when adjusting the steering head to place a box of some other article under the engine to take the weight off the front wheel, so that the forks may move freely.



SPRING FORK ADJUSTMENT

To take up any play which may have developed in the side links, unscrew the spindle lock nuts on the right-hand side of the forks (looking at the machine from the front see illustration), and turn the spindles by means of the heads on the left-hand side until all slackness is taken up. Afterwards tighten up lock nuts.

To dismantle the steering damper, unscrew the control bolt holding the star washer and disconnect the anchor plate from the bottom of the steering head. When reassembling, always screw up the centre bolt before the anchor bolt, to ensure that the anchor plate seats squarely.

The fork dampers require very little attention except, perhaps, an occasional wiping of the friction discs with a rag dipped in petrol. Adjustment is, of course, a matter of personal preference. However, if the dampers are dismantled at any time, note should be made of the order of assembly. This is: star washer, spring washer, locking washer (with raised face outwards), and, finally, hand adjusting wheel.

GEAR RATIOS

Competition Models—Wide Ratios.

Engine Sprocket.	Top.	Third.	Second.	Low.
25 Teeth	4.51	5.46	7.98	13.40
24 "	4.70	5.68	8.32	13.95
23 "	4.90	5.93	8.67	14.56
22 "	5.13	6.20	9.07	15.22
21 "	5.37	6.49	9.50	15.95
20 "	5.64	6.82	9.98	16.75
19 "	5.95	7.18	10.50	17.63
18 "	6.27	7.58	11.09	18.61
17 "	6.64	8.03	11.68	19.70

Racing Models—Close Ratios.

25 "	4.51	5.46	6.58	11.60
24 "	4.70	5.68	6.86	12.08
23 "	4.90	5.93	7.16	12.60
22 "	5.13	6.20	7.48	13.18
21 "	5.37	6.49	7.84	13.80
20 "	5.64	6.82	8.23	14.49
19 "	5.95	7.18	8.67	15.26
18 "	6.27	7.58	9.15	16.10
17 "	6.64	8.05	9.69	17.05

On 4.95 H.P. Competition Models a 24 Tooth Engine sprocket is fitted. On the 4.95 H.P. Racing Model a 25 Tooth Engine Sprocket is fitted. On both the 3.46 H.P. Racing and Competition Models a 21 Tooth Engine Sprocket is Fitted. For Sidecar work fit a 21 Tooth Engine Sprocket to the 4.95 H.P. Model and for the 3.46 H.P. a 19 Tooth Engine Sprocket.

APPROXIMATE ENGINE REVOLUTIONS

at different Speeds—Miles per Hour.

Diameter of Driving Wheels, 26 in.

m.p.h.	GEAR RATIO.													
	3½	4	4½	4¾	4¾	5	5¼	5½	5¾	6	6¼	6½	6¾	7
5	242	259	275	291	307	323	339	356	372	388	404	420	436	452
10	485	517	549	582	614	646	679	711	743	776	808	840	873	905
15	727	775	824	873	921	970	1018	1066	1115	1164	1212	1261	1309	1357
20	969	1034	1098	1164	1228	1293	1358	1422	1487	1552	1616	1681	1745	1810
25	1212	1293	1373	1455	1535	1616	1697	1778	1859	1940	2020	2101	2181	2262
30	1454	1550	1648	1746	1842	1940	2036	2132	2230	2328	2424	2521	2618	2714
35	1697	1810	1923	2037	2149	2262	2375	2488	2602	2716	2828	2941	3054	3166
40	1939	2068	2196	2328	2456	2586	2716	2844	2974	3104	3232	3362	3490	3620
45	2182	2327	2471	2619	2763	2909	3055	3200	3346	3492	3636	3782	3926	4072
50	2424	2586	2747	2909	3070	3232	3394	3555	3717	3879	4040	4202	4363	4525
55	2666	2845	3022	3200	3377	3555	3733	3911	4089	4267	4444	4622	4799	4977
60	2908	3100	3296	3492	3684	3878	4072	4264	4460	4656	4848	5042	5236	5428
65	3150	3359	3571	3783	3991	4201	4411	4620	4832	5044	5252	5462	5672	5880
70	3394	3620	3846	4074	4298	4524	4750	4976	5204	5432	5656	5882	6108	6332
75	3638	3879	4121	4365	4605	4847	5089	5332	5576	5820	6060	6303	6544	6784
80	3876	4136	4392	4656	4912	5172	5432	5688	5948	6208	6464	6724	6980	7240
85	4118	4395	4667	4947	5219	5495	5771	6044	6320	6596	6868	7144	7416	
90	4364	4654	4942	5238	5526	5818	6110	6400	6692	6984	7272			
95	4606	4913	5217	5529	5833	6141	6449	6756	7064	7372				
100	4848	5172	5494	5818	6140	6464	6788	7110						

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, conditions or representation contained in any catalogue, advertisement, leaflet, or other publication shall not be construed as enlarging, varying, or overriding 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 the 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 easily 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 of a motor cycle and sidecar combined when carrying more persons or a greater weight than that for which the machine was designed by the manufacturers.
- 3.—The attaching of a sidecar to a motor cycle 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.

Any motor cycle or 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 when 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 enforced.

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

Motor A.J.S Cycles

PLUMSTEAD ROAD, LONDON, S.E.18.

Telegrams: "ICANHOPIT, WOOLWICH"

Telephone: WOOLWICH 1010