Introduction

In compiling this Instruction Book we have been to considerable trouble to make it as clear and comprehensive, and thus as useful as possible. We hope therefore that Velocette owners will make full use of it.

The Velocette differs in many ways from other machines and therefore requires a little special knowledge of its construction and adjustment.

Those who are already familiar with earlier Velocette models will find that on this model several alterations have been made in the construction of the machine, and in certain cases adjustments have been provided for in a different manner.

A careful study of the instructions will therefore be found to be well worth while.

VELOCE LIMITED

June, 1933.
DRIVING INSTRUCTIONS AND GENERAL INFORMATION

STARTING UP, &c.

On taking delivery, fill the tanks with petrol and oil respectively. The oil tank should be filled to about 1/4 of the top. We use and recommend Wakefields X.X.I., but during the Winter or under cold conditions, Castrol X.L. may be used. Take out the gearbox filling plug and the gearbox level plug, which is screwed in to the front of the housing behind the outside striking lever and pour oil into the filling hole, until it is seen to run out through the level hole, when the plugs may be replaced.

Use XXL for the Gearbox. Do not under any circumstances use grease or any form of gear oil. This is most important. Turn on the petrol, depress the tickler of the carburetter until the petrol supply is just felt, but do not flood excessively. Place the gear lever in neutral position and set the ignition control midway between advance and retard. The lever is fully advanced when furthest away from the rider. Close the air lever and open the throttle very slightly. Opening the throttle too far will cut out the action of the pilot jet and make starting difficult. The throttle slide should be approximately 3/8 up for easy starting.

When the engine is warm always start with the air lever fully open. Lift the exhaust valve with the trigger lever on the left-hand side of the bar, sharply depress the kick starter to the full extent of its travel, and at the same time release the exhaust valve lifter to allow the valve to close. In very cold weather raise the exhaust valve by means of the lever and turn the engine round a few times with the throttle half open and the air lever closed, this tends to free the piston. The controls can then be returned to their normal positions for starting. When starting from cold always allow a few minutes to elapse after the engine starts before running it up to high revolutions, so as to allow the oil to circulate to all parts. Check oil circulation by removing oil filler cap. There should be a good return flow into the oil tank while the engine is running. This indicates that the lubrication system is working properly. Having started the engine, raise the clutch lever on the left-hand side of the handlebar and bring the gear lever back into first position in the gate, or if a foot gear change is fitted, depress the lever as far as it will go. If the gears do not engage at the first attempt do not force the lever, but drag the machine slightly backwards, which will alter the position of the gears and make engagement possible at once, or momentarily release the clutch again with the gear lever in neutral and then make another attempt. Having engaged low gear release the clutch gently and at the same time slightly open the throttle when the engine will take up the load gradually and the machine move away smoothly. Do not release the clutch lever suddenly as the drive is then taken up as this may stall the engine. Speed up the machine by opening the throttle, and to change into second gear partly close the throttle, raise the clutch lever and move the gear lever smartly into second position, or with a foot gear change, raise the lever with the foot to the limit of its travel and release it. Re-engage the clutch by releasing the lever gradually. To change into third speed or top gear repeat this process. When letting in the clutch after making a change of gear open the throttle at the same time. To change to a lower gear disengage the clutch, but do not close the throttle, and smartly move the gear lever back into the position required or press down on the foot gear change lever.
For normal running the air lever should be fully or nearly fully open. The clutch should be used only for gear changing, for starting away from the rest, and for bringing the Machine to a standstill. It must not be used to control the speed of the Machine by slipping. Do not allow the engine to labour, but change down in good time, and for the first 500 miles at least do not run the engine for long periods at full throttle, and keep the speed below 40 miles per hour. To stop, close the throttle, apply the brakes, and as the Machine slows down withdraw the clutch. Put the lever into neutral and release the clutch immediately.

**ENGINE LUBRICATION.**

Oil is delivered by gravity to the feed side of a double gear pump fitted at the bottom of the timing case and driven by a skew gear on the crankshaft. The supply from the pump is fed through an oil way and to a pipe cast in the timing cover, where it is divided, a portion of the supply being taken direct to the roller bearing, the remainder being delivered through the hollow crankshaft direct to the centre of the crankpin. The oil passes through the roller bearing big end and is thrown off to lubricate the cylinder, piston and the crankpin main bearings, etc.; that portion of the supply which is taken to the roller bearings lubricates the roller spindles, and, by means of oil grooves, a quantity passes along to lubricate the valves and valve guides and out of the opposite ends of the bearings to lubricate the push rod ball ends, etc. The oil, falling by gravity down the push rod cover, collects in the timing case up to a predetermined level enabling the timing gears to dip into it and carry it round over the gears, the cams and cam followers. The excess oil flows into the oil sump through a hole in the partition between the crankcase and the timing case, and, after draining down to the sump, is taken back to the oil bath by the return half of the oil pump. The sump is fitted with a drain cock and a filter to separate any water which may occur in the oil, and the update level is controlled by a float operated by oil level in the sump. The oil sump is provided with a dipstick to facilitate checking the level of the oil. The crankcase is provided with two filter traps, one inside the tank in the sump and the other at the top of the oil pan.

An efficient filter is incorporated in the oil tank to prevent foreign matter circulating with the oil. An efficient sump strainer is fitted to the piston to prevent oil reaching the combustion chamber. **Never keep the oil in circulation too long.** Drain the oil from the tank at least once every 2,000 miles and fill up with fresh oil. With a new machine we recommend changing the oil at first not more than 500 miles, once every 2,000 miles unscrewing the oil feed union from the bottom of the oil tank — the filter is attached to this union and screws out of position with it. The crankcase drain plug is fitted in the bottom of the crankcase right underneath and between the frame tubes. Clean the crankcase tank and the filter first in paraffin and then in clean petrol or benzol and allow to dry thoroughly before replacing and filling up with fresh oil. Do not use under any circumstances fuel except one of the numerous flushing oils which are on the market. Use Castrol X.T. for Summer and X.L. for Winter.

**Spark Plugs.** The engine being a high efficiency one, it is important to use the correct type of plug. The type fitted has been found to be the most suitable: it is a K.L. type L.C.S.S. 14m./Thread.

**Gearbox Lubrication.** As previously described, the gearbox should be filled up to the level of the level of the level with Castrol X.T.L. and the level of the oil should be checked from time to time. After the first 500 miles with a new machine drain all the oil out of the gearbox and refill with fresh oil. If it is desired to do so, the gearbox may be flushed out with clean petrol. In normal service the gearbox oil should be changed every 2,000 miles — no other attention is necessary, but it cannot be too strongly emphasized that ordinary engine oil is the only lubricant which should be used. Heavy gear oil or grease will not find their way to the various bearings in a satisfactory manner and may involve some bearing running dry with the consequent risk of seizure.

**Hub Lubrication.** The bearings are packed with a special high melting point grease when the Machine is delivered. A small quantity of Castroloese heavy should be added from time to time with the grease gun provided in the tool kit. Do not over-lubricate the hubs otherwise the surplus grease will be likely to get into the brakes and impair their efficiency.

**Chain Lubrication.** The front chain is enclosed in a sheet metal cover and a quantity of oil is put into the chain case at these Works before the Machine is tested. The oil in the chain case should be replenished from time to time, through the inspection plug hole in the front of the cover.

It is important always to keep the chain cover well supplied with oil. The rear chain should be lubricated with an oil can from time to time and occasionally should be removed and put into a bath of paraffin and also brushed well to remove all external dirt and to allow the paraffin to penetrate into the interior of the chain joints. The chain should then be given another bath in fresh paraffin and, after being well shaken and rinsed, should be hung up to dry. The chain is then ready for reassembly before being put back into service. Alternatively, after cleaning, the chain may be placed in a bath of warm but not boiling graphite grease. The grease must be warm enough to be quite fluid. After soaking the chain in the bath for about half an hour, let the bath cool down until the grease solidifies and then remove the chain, which will be ready for use. Use Wakefield's Castroloese G.

**Lubrication of Front Fork Spindles, Brake Cams, &c.** The front forks are provided with grease nipples and the spindles should be lubricated with the grease gun provided from time to time. Similar attention should be given to the grease nipples on the brake cam spindles, brake pedal and brake head. Always bear in mind that it is better to lubricate a little and often, rather than to neglect this attention for a considerable time and then over-lubricate. For these parts use Wakefield's Castroloese Medium.

**DECARBONISING THE ENGINE.** First remove the petrol tank after turning off both taps, disconnecting the petrol pipe and undoing the tank fixing bolts at the front and rear. Unscrew the ring holding the mixing chamber cover to the carburettor, take off the carburettor, undo the exhaust pipe clip at the cylinder head, take off the exhaust pipe and take out the sparking plug. Undo the bolts holding the rocker box cover to the rocker box, also the bolts holding the rocker covers to the side of the rocker box and top cover. Undo the nuts holding the top and bottom flanges of the push rod tube. Take off the rocker box top cover. Lift out the two rockers, and take out the two push rods. These are interchangeable, but it is desirable to keep the inlet one for the inlet side and vice versa. Next undo the central bolt holding the rocker box to the cylinder head and loosen the gland nut on the push rod tube which will now be found to be finger tight. Lift off the rocker box complete. Undo the four cylinder head nuts and lift the head off the barrel. If it is necessary to replace the cylinder barrel this can then be lifted out of place after taking out the four long studs which screw into the nuts at the bottom. A copper cylinder head washer is fitted and this must not be lost — it should be hung up carefully to avoid damage.

To remove the valves obtain a Terry Valve Spring Remover, this is available from us price 8s., part number KA 183, which should be quoted when ordering.

To grind in the valves use very fine emery powder mixed with oil or paraffin, or one of the proprietary class of valve grinding compounds. Only
a very small quantity should be used. The valves must be revolved backwards and forwards and lifted frequently from the seatings to prevent pitting of concentric rings on the seatings. When the valve is lifted, it should be brought down in another position to ensure a good seating. To hold the valve when grinding we recommend the special tool which we can supply for this purpose, price 1½ post free.

If, after prolonged service, the seats of the valves are pitted badly or are worn concave or convex, the valves should be refaced in a lathe. This will avoid grinding the seats in the head unnecessarily. We will replace valve at 3½ per pair (return postage extra) if sent to us. Similarly, if the seats in the head are pitted or require regrinding, we can recut them and remove superfine metal from around them if the head is sent us. The charge is 3½ return carriage extra. When sending the cylinder head, always pack it carefully in a wooden box, as the fins are brittle and break easily. Cardboard or paper only are useless as packing. When replacing the valves and springs, see that the valve seats are properly fitted into the serration. They must not be mixed as they are machined in pairs. To remove the piston take out the circlip. This is a small spring steel ring and is removed by prising it out of position with a sharp bradawl or a suitably pointed instrument by means of the small slot which is cut in none of the piston bosses. The gudgeon pin can then be pushed or lightly driven out from the opposite side of the piston. Always use a soft metal punch for tapping out the gudgeon pin and always cover the cylinder opening in the crankcase with clean rag stuffed in to prevent the circlip or anything else accidentally dropping into the crankcase. Always note, before removing the piston, which side of the engine the slot for the removal of the circlip is fitted, or mark the piston so that it is put back in the same position.

PISTON RINGS.

To remove the piston rings, insert three or four thin metal strips between the rings and the piston. Slide the rings over the piston, taking care not to bend the rings any more than is necessary to remove them and not to distort them, as they are rather susceptible to breakage. Special care should be taken with the slotted scraper ring, as owing to its construction, it is very easily broken.

FITTING NEW RINGS.

If new rings are fitted to the piston during decarburising, it is most important to check the ring gaps before finally assembling the engine. Place each ring squarely in the bottom of the cylinder bore about 1" up. Now with a feeler gauge verify the gap between the ends of the rings. The gap for the top ring should be .010" minimum. The gap for the second piston ring and the scraper ring should be .008" minimum. Under no circumstances must the clearance be less than these.

RE-ASSEMBLING.

Refit the piston complete with rings and insert the circlip, taking care that this is pushed right home into its groove in the piston boss. The piston is machine bored to give clearance for the valves and it must be fitted with the larger flat portion to the front, otherwise serious damage will be caused. When retubing the cylinder barrel compress the rings so that they will slide into the bore easily. Avoid trapping them and breaking them, and also see that the ring gaps are equally spaced round the piston, and are not in line.

The utmost cleanliness must be observed when carrying out this operation and the hands should be thoroughly washed after the decarbonising operation, so that no dirt gets on to the piston, which would be likely to abrade it.

Cylinder Head Joint. Unless this shows signs of blowing it will not require attention. If, however, there are signs of leakage examine the faces of the joint washer and if necessary fit a new one. Very carefully clean the surfaces and refit the cylinder head. Tighten the cylinder head nuts a little at a time so that the head is pulled down perfectly evenly. Be careful not to strain the nuts when tightening, as if considerable force is used it will be found that it may still be possible to go on turning the nuts, but excessive pressure of this nature is quite unnecessary to hold the head securely and to make a satisfactory joint and may cause serious distortion.

Refitting the Rocker Box. Refit the bottom portion of the rocker box and pull it down to the head lightly by means of the central fixing bolt. Tighten up the gland nut as far as possible with the fingers, refit the push rods, being careful that they engage properly in the sockets in the bottom rockers and are in their correct respective places (exhaust in exhaust rocker and inlet in inlet rocker). Refit the top rockers and finally put back the rocker box cover and bolt it down firmly and evenly, tightening down the bolts a little at a time to avoid distortion.

The utmost cleanliness is essential when carrying out this operation and the faces of the rocker box and rocker box cover must be perfectly clean of all the old jointing compound. A light smear of oil is necessary on the rocker surfaces before replacing them, and the barrels should be scrupulously clean. A light smear of jointing compound should be used on the faces before fitting the rocker box top and bolting it down. There are numerous brands of jointing compound available, but go for a good substitute. Having tightened down the rocker box and cover, tighten up the nuts on the top and bottom flanges and the push rod cover.

Adjustment of the Tappets. These should be adjusted when the engine is cold and should be set so that there is just no clearance. It is very important to observe these directions carefully and not to vary the setting from that which we specify. The tappets are adjusted by slackening off the tappet lock nuts and then turning the tappet end in the rocker until the correct adjustment has been obtained and then tighten up the lock nuts. When setting the inlet clearance it is desirable to have the exhaust valve full open and vice versa.

SPECIAL NOTE.

When tightening up the cylinder-head-steady clip, always make sure, before tightening the clip to the frame, that the steady is held securely by the bolt to the clip.

We recommend when decarbonising that new copper and asbestos washers be fitted between the valve spring covers and the guides.

GENERAL INFORMATION RE ENGINE.

It should not be necessary to detach the timing cover or to dismantle the engine further than the removal of the cylinder head and barrel in the course of ordinary service, but the following points should be noted if the engine is completely stripped. The timing gears are all marked for retiming purposes, so that by setting the gears so that the marks on the teeth register the timing will be correct.
To remove the magneto gear, undo the nut on the end of the armature, which will extract the gear from the taper. After the nut loosens, it will almost immediately tighten again and it is then that it commences to draw off the gear.

Retiming the Magneto. If the magneto gear has been taken off always refit it loosely on the armature, but set it so that the marks on the gear and the cam wheel are in register. This is particularly important as the magneto gear offers resistance as a part of the crankcase release or breather. Therefore be correctly timed in relation to the piston which it will only be if assembled so that the marks register. Next set the piston 1/2 before top dead centre (40 degrees before top dead centre of timing disc is used) of the compression stroke and set the control lever on the handlebar to the fully advanced position. The contact breaker points must be correctly adjusted to the gap. Refit the magneto armature until the contact breaker points are just separating and tighten the magneto gear nut, being careful not to move the armature in relation to the gear when doing so. To find top centre of the compression stroke take off the inlet rocker cover and take out the sparking plug. Turn the engine forward slowly until the inlet valve is seen to open and close. Insert a cycle spoke or stiff wire through the sparking plug hole and turn the engine very slowly forward until the piston reaches its highest point in the cylinder which may be felt by means of the spokes. Now turn the crankshaft slightly backwards until the correct position for setting the magneto is obtained.

ADJUSTMENT FOR MESH OF INTERMEDIATE GEAR. Chiefly for purposes of initial assembly the intermediate gear spindle is capable of adjustment to alter the meshing of the intermediate gear with the crankcase pinion and cam wheel. It is very unlikely that further adjustment will be required. To adjust the meshing it must be unscrewed from the previous adjustment in the direction of the gear. Use the graduated thread of the gear. To adjust the meshing is right-hand threaded. A tubular spacer may then be inserted through the three holes in the centre of the gear to undo the three bolts holding the housing of the spindle to the crankcase. It may be necessary to turn the valve a little to bring the holes opposite the bolt head. However, if the mesh is not sufficient the meshing of the biels will move to bring the bolts in the right-hand direction. The final adjustment should allow perfect freedom with freedom from backlash. Tighten the bolts fully after finally setting the gear and replace the damping ring in order to maintain the same. The damping ring must be right-hand threaded. Do not recommend altering the initial setting which is carefully adjusted before the machine leaves the factory.

Dynamo Belt Adjustment. After a little use it may be found that the dynamo belt will require slight readjustment. To do this take off the dynamo belt cover and loosen the bolt passing through the top of the dynamo and turn the dynamo in its carrier being careful not to move it sideways. The dynamo is mounted eccentric to the outer casing of the dynamo and thus provides for tightening or loosening the belt by the rotation of the dynamo itself.

Dismantling the Engine-shaft Shock Absorber. Take off the dynamo belt cover in front part of the rear chain cover, the rear chain sprocket and chain, and draw out the split pin from the crankcase nut. Lower the nut which is a right-hand nut by means of the special spanner which is provided to fit the external diameter of the crankshaft nut. It may be necessary to use a metal bar to do it. Screw the nut right off which will allow the dynamo drive pulley and the spring to come away. Do not lose the plain washer which is fitted between the nut and the spider on the mainshaft. The shock absorber clutch will then draw off the splines and the engine sprocket can be pulled off. To reassemble, grease the sprocket internally and place it in position, grease the splines of the shock absorber, fit the clutch and sprocket if necessary. Put the spring and the pulley on the end of the shaft and screw on the nut making sure that the small tab on the pulley is turned towards the outside. This will prevent the concave sprocket in the nut. The small tab ensures that the shock absorber is tightened up dead tight so that it clamps the plain washer firmly against the splines on the shaft. Under no circumstances must the nut be slackened back or loosened in order to get the split pin in place. There are eight splines provided for the pin so that it can always be fitted by driving the nut round until the split pin is opposite the hole in the shaft.

CLUTCH AND GEARBOX.

Adjustment of Clutch. The clutch is inserted to bed down with service, particularly on a new machine, and in the first 100 or so miles running it is important to make certain that adjustment is made to compensate for the effects of bedding down. There should always be at least 3/16ths of free movement on the cable. From experience with the clutch cable we have found that this is very satisfactory. Any further readjustment should be made by rotating the clutch spring carrier if additional free movement is required. Place the machine on the rear stand, remove the nuts securing the front portion of the rear chain cover and slide the cover out of position—it is telescoped into the rear portion of the rear chain cover. The sprocket will now be accessible and the clutch adjusting tool engaged with one of the serrations

the size being 1/8. The Taper should be held to the middle notch for standard purposes, although the position may vary on certain engines. For further instructions see instruction leaflet issued by Messrs. Amal Ltd, Holford Works, Perry Barr, Birmingham.

To Fit New Throttle Control Wire. Take off clip holding outer casing of control wire, remove nipple from twist grip, screw off ring holding throttle slide in carburettor, lift up throttle slide and unscrew inner wire from slide. Insert new wire by threading through, taking care to well it while doing so. Reassemble.

To Adjust Throttle Control Wire. Shift twist grip off, see that throttle slide is closed. Slacken off clamping nut, holding outer casing, slide casing up or down until all slack or lost motion is taken up, clamp tightly using a screwdriver to hold bottom hexagon to avoid twisting holder off where it screws into carburettor.
in the clutch spring carrier which is immediately behind the sprocket. The clutch spring carrier is pulled round anti clockwise to increase free movement or clockwise to decrease it.

If the adjustment has been lost altogether, or if a new cable has been fitted, slacken off the cable completely and screw in the clutch spring carrier clockwise until it is possible just to feed the clutch slipper when the kick starter is depressed. Now adjust the clutch cable until there is slack in it. Do not force the adjustment so as to tend to withdraw the clutch, but just ease that there is no slackness in the outer casing. Now with the clutch adjusting tool adjust the clutch spring carrier anti-clockwise as described previously, until the necessary free movement is obtained on the cable. Important. When adjusting the clutch the gear lever must be in the neutral position.

N.B.- Failure to maintain the adjustment so that there is sufficient free movement in the clutch operating mechanism will be likely to cause serious damage to the clutch thrust race owing to this being subjected to a heavy and constant thrust load which it is not intended to carry. When the adjustment is correct the thrust race carries no thrust load when the clutch is engaged.

CLUTCH.

Dismantling the Clutch and Re-assembling. First remove the dynamic belt cover, the belt, the back portion of the belt cover, the rear chain cover and the gearbox sprocket and rear chain. Take off the outer portion of the front chain cover and remove the sleeve gear nut part C.S.29 by turning this anti-clockwise with the pegged spanner provided in the tool kit. Remove the rear chain cover. Take care in removing the chain cover not to damage the cortex packing washer which is inserted between the two halves. The clutch will not pull out of the sleeve gear complete or can be taken off by first pulling up the clutch from the bottom plate with the spring carrier and springs then sliding off the clutch chain wheel and finally pulling off the clutch from back plate. Remove the three thrust pins from the back plate otherwise they will drop out and be lost. The chain links will wear until they are practically flat with the steel plate. After the removal of the clutch housing plate, the chain tension and the thrust washer and thrust cup are accessible for examination. Put a little grease on the thrust race before reassembling also a little grease between the rails in the chain wheel ball race. The ball races should be tight in the chain wheel and an easy fit on the centre bearing of the clutch back plate. To re-assemble slide on the clutch back plate. Slip the three thrust pins into position in the back plate, the chain wheel, the clutch front plate, and screw up the sleeve gear lock nut. Finally proceed with the adjustment as previously described. Should the chain wheel require new inserts fitting it may be sent in. These Works for this to be done the charge is 3/6 return postage extra.

GEARBOX.

Dismantling and re-assembling. Drain out all oil. It is unnecessary to remove the gearbox from the machine to dismantle it, and it is easier to leave it in position. Take out the three bolts holding the kick start housing B.K.4 to the gearbox end cover. Pull out the housing complete with the kick start crank and ratchet B.K.14. Unless it is required to change the kick start spring B.K.19 do not dismantle the ratchet from the housing. On machines which are not fitted with kick starters the layshaft can be removed by unscrewing the back end bearing cap B.K.3 from the gearbox end cover. Take off the hexagon nut from the end of the shaft and remove the rear chain cover and rear chain. Tap the gear shaft into the box about an inch. Take out all the end cover bolts and if a Footchange is fitted disconnect the gear rod from the outside striking lever and remove the complete footchange. Take off the nuts from the ends of the selector bars. The ends of the bars protrude through the end cover. It will now be possible to remove the end cover. Hang up the packing washer out of harm's way till needed when refitting.

Now screw out the two selector bars. If the nuts are threaded back on to the bars they will serve as a seating for levelling out of place. Alternatively if a piece of about 1/2 thick and long enough to span across to the gearbox housing is drilled to fit over the bars the nuts can be packed with washers and when screwed down will draw the bars out. The low gear will pull off the end of the layshaft B.K.3 and the middle gear B.K.80 which will allow the layshaft complete with fork to come out. The two end gears on the layshaft are a tight press fit and it is difficult to remove without a press. There should however be no necessity to disturb them. On machines fitted with cleats in ratio gears when a 171 sleeve gear B.8/3 is fitted, the layshaft driving gear B.82/2 (72 Teeth) will only disengage from the sleeve gear in one position. It will therefore be necessary to turn the layshaft round until this one position is found. This is an accurate 54 teeth of Top-gear "pick up" making the sleeve gear teeth. Similarly the layshaft can only be refitted in this one position. To remove the cam plate the striking mechanism first take out the pivot bolt and adjusting pin. Undo the nut securing the outside striking lever B.K. 65 to the spindle B.K. 67. If the end of the spindle is now tapped into the gearbox the striking plate and cam plate may be removable from inside. Reassembly is simply a reversal of the operations described above.

Kick Starter. To change the kick starter return spring B.K. 19 and take off the kickstarter cover. Take out the kick starter cotter and drive out the cotter using a soft metal punch to avoid damaging the threads. Take out the spring anchor peg B.K.73/2 from the top of the housing. The crank simply pulls off the end of the ratchet or the ratchet may be tapped through the housing. It will bring the spring with it. Fit one loop of the new spring over the peg in the ratchet. See that the thrust pins K.10 and the engaging spring B.K.10/2 are in place and refit the ratchet and spring into the housing, setting the spring and ratchet in such a position that the other loop is below the hole in the housing through which the anchor pin goes. Screw in the anchor peg, taking care that its projection is engaged in the kick-back hole. Hold the large end of the ratchet in a vise and turn until the spring is in tension and the crank cotter and crank can be refitted. Refit the cotter with the threaded end towards the rear of the Machine. Finally refit the complete housing to the end cover making sure that the thrust washer B.K.82 is in place in the ratchet.

ADJUSTMENT OF HAND GEAR CHANGE.

After readjusting the primary chain, the gear rod may need re-setting. Loosen the lock nut at the bottom end of the rod and detach the top joint of the gear rod. Readjust the bottom joint by screwing it up or down as may be needed until with the outside striking lever on the gearbox in 2nd speed position the gear lever fits snugly into the 2nd gear position in the gate on the tank.

ADJUSTMENT OF THE FOOT GEAR CONTROL.

Remove the foot gear lever and the cover plate immediately behind the lever. Move the outside striking lever on the gearbox until second speed or
third speed is engaged, either of these positions may be used for adjusting purposes. It will be possible to feel the pawl in the gearbox click into the catch in the cam plate as the gear is engaged. Next slacken the locknut just inside the fork end. Screw up the adjusting nut next to the lock nut in a clockwise direction until play has nearly all been removed. Retighten the lock nut and spindle nut and try the adjustment again. If the bearing is too tight, undo the spindle nut and locknut, and turn the adjusting nut anti-clockwise or outwards from the hub. Tap the hub across the brake side using a wood mallet or wooden block to give freedom, and readjust as before. Never rub the machine without a slight trace of play in the wheel bearings as this will put a heavy artificial load on the bearings and tend to break them up. A sixty-fourth of an inch play on the wheel rim in all positions is sufficient. See that the bearings are not binding when making and testing the adjustment and always tighten the spindle nuts fully before checking the final adjustment.

ADJUSTING THE PRIMARY CHAIN.

Slightly loosen the nuts clamping the gearbox to the cross tube on the frame underneath the gearbox. Tighten the chain tension screw on the gearbox adjuster bolt at the top of the gearbox a little in an anti-clockwise direction. Turn the forward nut on the stud a little in the same direction to draw the gearbox back. Check the adjustment through the inspection cover on the primary chain cover. It is desirable to tighten up the clamping nuts underneath for checking the adjustment. Having arrived at the correct adjustment tighten all nuts fully, particularly both nuts on the gearbox adjuster bolt. From 5 in. to 10 in. up and down movement on the chain is correct.

ADJUSTING THE REAR CHAIN.

Slacken the rear wheel spindle nuts and the rear brake anchor pin, undo the lock nuts on the chain adjuster screws. Screw in the adjusting screws a little at a time to force the rear wheel spindle backwards. To keep the wheel in correct alignment it is desirable to count the number of turns given to each screw so that they may be turned a similar amount. Tighten up the spindle nuts after checking the adjustment. Tighten up the lock nuts after making the final adjustment and finally make quite sure that the brake anchor pin is tightened up fully.

N.B.—Always re-fit the spring clips to the chains so that the closed end of the clip faces in the direction of travel of the chain.

ADJUSTMENT OF WHEEL BEARINGS.

Both wheel hubs are fitted with Taper Roller Bearings and these seldom need adjustment. There should always be the slightest perceptible play at the wheel rim in all positions.

ADJUSTING THE FRONT BRAKE.

The knurled screw and locking screw are fitted near the front bottom spindle of the front forks. Undo the locking ring and screw up the knurled adjuster until the correct adjustment has been obtained and then lock up the lower knurled ring. After prolonged use, if the limit of adjustment has been reached, thin packing pieces may be inserted between the steel slippers on the ends of the brake shoes and the brake shoes. These pieces can be cut easily from a piece of ordinary thin tin plate.

ADJUSTING THE REAR BRAKE.

The rear brake adjustment is made by screwing the plated hexagon nut further on the brake rod at the rear end. After prolonged use, if the limit of the adjustment has been reached, a packing may be inserted as described for the front brake, or if necessary the brake lined with new friction material.

ADJUSTING THE STEERING HEAD.

Slacken off the column lock nut, this is a large hexagon nut immediately below the steering damper knob. Undo the clamping bolt in the fork head clip. To remove play, tighten down the column lock nut a little, retighten the clamping pin and check the adjustment. The steering column must be quite free, without play. This adjustment is best made when the front of the engine is supported from the ground on a block of wood, or when the front wheel is quite free in turn. If the steering head is damped at any time, it is very important to note the number of balls fitted in each race. 19 quarter inch balls are fitted in each bearing. Under no circumstances must more be fitted, as the steering of the machine will be seriously affected if too many are put in.

ADJUSTMENT OF FRONT FORKS.

To take up end play in spindles undo the nuts on both ends of the spindle to be adjusted. Now turn the squared end of the spindle anti-clockwise until play has been removed. Tighten the nuts again and check the adjustment by trying the knurled washers, these washers must be just free to turn.

The shock absorber hand adjusters must be turned clockwise to tighten, and should be set to suit individual needs. Generally the fork should return slowly after being depressed to obtain proper damping. For lubrication of forks, use Castrol Aeseal Medium. Do not over-lubricate the front bottom spindle as the grease may get into the shock absorber and reduce its efficiency.
PRINCIPLE DIMENSIONS, GEAR RATIOS, &c.

Engine. Bore 68 m/m.
Stroke 68.25 m/m.
Capacity 248 c.c.
Compression ratio:—with compression plate 6.75 : 1.
without compression plate 7 : 1.
Fuel:—No. 1 Petrol.
Fuel:—No. 1 Petrol, to which has been added not less than 25% Benzol.

Gearbox. Gear Ratios. With 19T. sprocket
Top 6.85 : 1.
Third 8.45 : 1.
Second 11.4 : 1.
First 16.1 : 1.
A nineteenth tooth sprocket is fitted as standard.

Chains. Pitch \( \frac{4}{4} \) inch
Width 0.05".

Tyres. 26 x 3.25".

Inflation pressures. Front wheel 16 lbs.
Rear wheel 18 lbs.
Increase rear tyre pressure to suit weight of passenger if pillion passenger is carried.

Ground Clearance: 5".
Height to top of saddle: 271".
Wheel base: 524".
Weight complete: 275 lbs. approx.
Width over handlebars (overall width): 29".

Always give Engine Number with Serial Letter when ordering Spares or writing us on any matter relating to the Machine.