

**Matchless**  
IN NAME & REPUTATION

**INSTRUCTION BOOK**

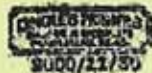
**MODEL A/2**  
**"Silver Arrow"**

**Supplied free with each  
new cycle.**

**Replacement Copies  
1/- each**

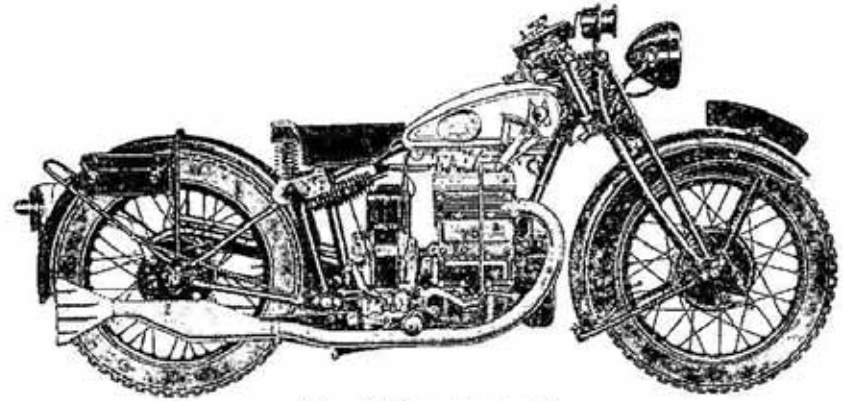


Dated -11/30



# DRIVING & ADJUSTMENT INSTRUCTIONS.

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The "Silver Arrow."

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## MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED,

*Manufacturers,*

Registered Offices:

**44-45, Plumstead Rd., Plumstead,  
London, S.E.18, England.**

Nearest Station: WOOLWICH ARSENAL, S.R.      Factories: BURRAGE GROVE and MAXEY ROAD,  
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And MAST POND WHARF, WOOLWICH.

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Telephone: Woolwich 1010 (4 lines).      Code { A.B.C. 5th and 6th Edition  
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## GENERAL INFORMATION.

### INTRODUCTION.

#### A Personal Message to all "Matchless" Owners.

It is our sincere desire that you obtain from your Matchless "Silver Arrow" the service, comfort, enjoyment and innumerable miles of low cost travel that we have earnestly endeavoured to build into it.

A motor cycle, it must be remembered, is a highly specialised piece of engineering, and while it does not call for great engineering skill in driving, the exercise of a little mechanical sense, and the occasional use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be obtained with the requisite degree of satisfaction. In the following pages we give without going into intricate technical detail, much valuable information that you should have, in order to give your cycle the careful occasional attention which it merits. Neglect to make necessary adjustments, or only casual attention to the lubrication of important parts, will soon neutralise the best efforts of the designers who have wholeheartedly devoted their skill and knowledge to the production of this ideal machine, and may also bring needless trouble and expense to its owner.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.

#### TAKING OVER A NEW MACHINE.

Having filled up with petrol and oil of the recommended brand it is advisable before starting the engine to sit on the cycle and to become familiar with the controls. Neutral or free engine position of the gear lever is the first notch forward from the extreme rear end of gate and engine must always be started with the gear lever in this neutral position. Ignition is advanced or retarded by means of a lever on left of handlebar. To advance the spark this lever is drawn inwards, for starting it should be about three-quarters advanced.

NOTE.—When cycle is provided with twist grip control for throttle, both air and ignition levers are fixed on right handlebar, the lower and longer lever operating the ignition.

The throttle and air levers for carburettor both open inwards, the top lever operating the air and the lower and longer one the throttle (see note above). For starting, throttle should be about one-sixth open, and air completely closed. A small milled edge screw at the bottom of mixing chamber controls the air supply to pilot jet. This screw is accurately set at the works, but on account of variation in fuel or temperature, it may be found desirable to alter the adjustment occasionally. It should be explained therefore, that by unscrewing, more air is admitted thereby weakening the mixture or vice versa, screwing in enriches the mixture by decreasing the air supply. This adjustment only affects carburation on very small throttle openings, and dead slow running. The taper needle attached to the throttle piston controls the petrol supply on large throttle openings. To weaken the mixture this needle must be lowered or alternatively, to enrich, it is necessary to raise same. These remarks are intended only to roughly convey some idea of the carburettor working and owners are advised to refrain from making any adjustments without good cause.

The petrol is turned on when the sliding petrol tap plunger is pulled out as far as possible. Assuming that the tanks have been filled with petrol and oil of the recommended brand and that all levers have been set as above, to start the engine firstly flood the carburettor by depressing the tickler button on float chamber until petrol actually overflows from the vent hole, then after turning the ignition switch on panel to the ON position (Electric equipped Models only) give the kickstarter a sharp push downward. The engine should start immediately and if it fails to do so, or stops after a few revolutions, try further flooding. If everything is in order the engine will start with ridiculous ease and the kickstarter may even be operated by hand if desired. Allow the engine to idle for a moment or so to warm up, and see that the oil is circulating properly. Then seated on the cycle disengage the clutch by drawing inwards the lever situated

### Taking Over a New Machine—contd.

on the left side of the handlebar. Then shift gear lever into the starting gear (first notch forward from neutral) after which gently release the pressure from handlebar clutch lever, when the cycle will commence to move forward. When well under way smartly declutch and simultaneously shift the gear lever into third speed position as before, releasing the clutch lever gently when the change has been made, after which repeat the operation to obtain high gear. In all changes of gear the clutch should be released a fraction of a second only before shifting the gear lever and with reasonable care a change of gear can be made without a sound.

The movements of gear lever must be made slowly and firmly, and under no circumstances should the gears be allowed to grate (see Gear Control Adjustment).

### DRIVING.

In general driving it is always advisable to advance the ignition as far as possible without causing knocking. When ascending a steep hill, as the engine slows, care should be taken to retard the ignition just sufficiently to prevent knocking, and if a change of gear then be made the ignition should be again advanced, as the speed of the engine is increased by the use of the lower gear. For descending exceptionally steep and dangerous hills the third or even second gear may be engaged, enabling the frictional resistance of the engine to assist in retarding the descent. We do not, however, under any circumstances, recommend using the bottom gear for this purpose, as by doing so, an abnormal and unfair strain would be imposed upon the rear driving chain under certain circumstances.

It is advisable to ease the clutch slightly when rounding acute corners or when travelling slowly on top gear. If this practice is adopted from the first, much unnecessary gear changing will be avoided.

### "DON'TS" IN DRIVING.

- DO NOT race the engine unnecessarily or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent smooth getaway.
- DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes
- DO NOT allow the engine to labour on high gear on a steep gradient and remember that an easier, faster, and better ascent can be made on the next lower gear.
- DO NOT under any circumstances, allow the chains to run very slack or very dry. Either will soon cause trouble, and adjustments are easy. Slack chains will inevitably cause harshness of transmission.

### "Don'ts" In Driving—contd.

- DO NOT force engine or drive above a maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount's maximum capabilities. However, until all bearings are well run in, it is advisable to refrain from speed bursts and the accompanying possibility of seized bearing, piston rings, etc. The first 500 miles of an engine's existence is far more important than the next 5,000
- DO NOT race the engine in neutral gear position, violently accelerate from a standstill, or drive at full speed on full throttle, etc., when in a residential district. Any motor cycle, or for that matter, any motor vehicle when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every "Matchless" owner to studiously refrain from any of the practices enumerated, or any calculated to cause annoyance to the public in general. Recollect that the degree of silence of your cycle is judged not by the actual noise it is making but by comparison with other noises present. For example, in a busy street your cycle might be inaudible, while in a quiet narrow street of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.

## LUBRICATION.

### ENGINE.

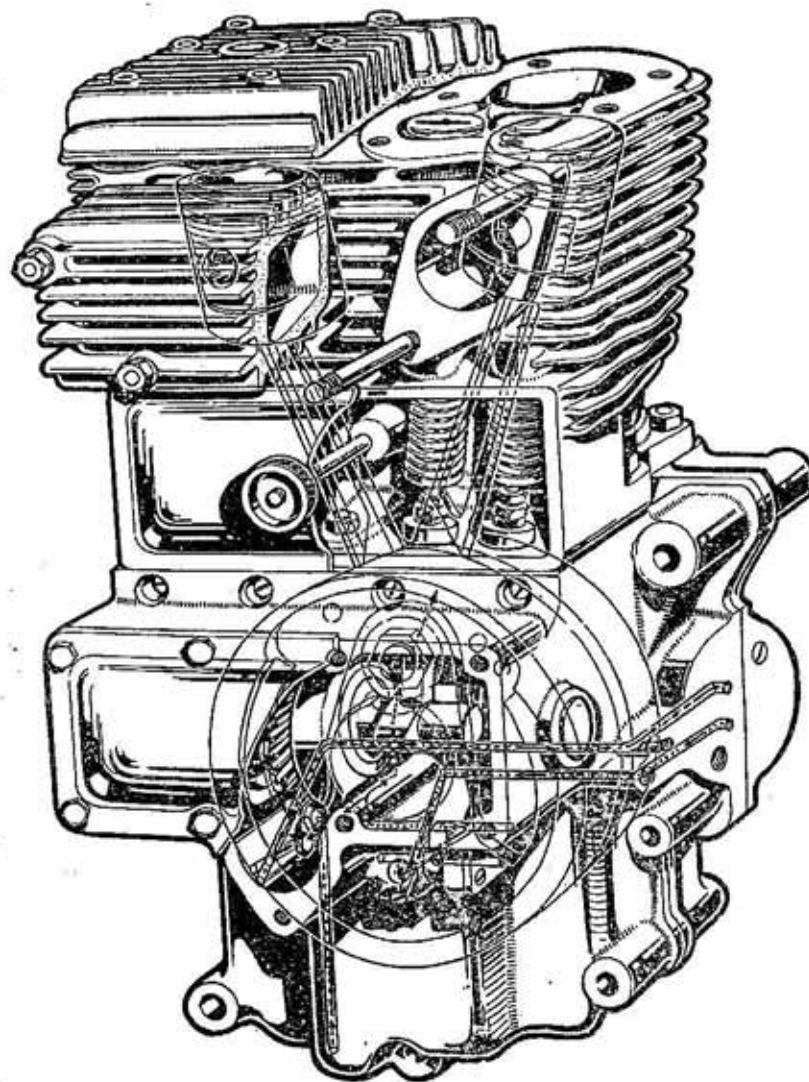
Proper lubrication is of vital importance and the use of only the best lubricant will be repaid many times over by long wear and good service. After extensive tests we have decided to recommend Wakefield Castrol X.L. as the most suitable, and advise all owners to use this and no other. The identifying letters used by most oil firms denoting the different grades in which that oil is supplied are imitated so that it is essential, when ordering oil, to specify the brand as well as the grade. "Castrol X.L." not just "X.L." As an additional precaution, it is advisable to buy from the branded cabinets or from sealed packages. See where your oil is drawn from. The oil is carried in a tank fixed to the front of the engine crankcase, and the level in this tank should never be allowed to fall below half full. The mechanical oil pump is of the double diameter single plunger type, the larger diameter being used for exhausting the crankcase sump and the smaller diameter for delivering fresh oil to all the essential parts of the engine from whence it drains back into the sump to be returned to the tank again. On panel-equipped models part of the oil supply is by-passed through a sight feed located on the panel, and therefore,

## Engine—contd.

observable during either day-light or night riding. In addition, on all models the oil can be observed returning to the tank via the small spout fitted just underneath the filler cap. The return flow of oil should be verified prior to the commencement of each run. No provision for external adjustment of the oil supply is made, the correct flow to the various parts being arranged internally. A clear impression of the simple yet ingenious oiling system may be obtained at a glance at the sectional illustration opposite. It will be seen that oil is forced direct to the timing gear chamber, and after filling same to a predetermined level, overflows into flywheel chamber, and so to the sump. Oil is also forced to the timing gear side crankshaft bearing and thence through a drilled passage in the flywheel to the big end bearings, the splash or leakage from which partially lubricates both cylinders. In addition to this splash however, the cylinders are both provided with a direct oil supply. No attention to this oiling system is required other than observing the return flow of oil to the tank and the continual replenishment of the supply tank the level in which, as mentioned above, must be maintained over half full and must not, when the cycle is cold, be filled to a higher level than approximately one inch below the return oil nozzle.

## NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated before the pump plunger has been withdrawn. To withdraw this plunger it is necessary to remove firstly the two end caps and the guide screw, when the plunger may be pushed out large end first. Upon re-assembling the plunger must be inserted after the crankcase has been bolted together and before refitting caps the guide screw must be replaced with its relieved end engaging the profiled cam groove on the plunger, and carefully tightened down. By moving the plunger to and fro while this screw is being introduced, the position of the groove can be easily felt. As will be seen, the entire oiling system is extremely simple, only one moving part being employed, viz., the double diameter plunger. This plunger is rotated by a worm cut on the engine shaft, and moves backward and forward at the same time under the influence of the small screw mentioned above, which engages the profiled annular groove in the plunger end. As the pump plunger slides in its housing in one direction, oil is drawn from the sump by the large end, while at the same time the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement, the large end returns the oil already drawn from the sump back to the tank, while the smaller end draws a fresh charge from same. This action, of course, goes on all the while the engine is revolving, and since the exhausting end of plunger is the larger one, the crankcase sump is always kept clear of oil, hence the expression "dry sump." At the same time, of



Sectional Engine Illustration showing Oil Passages.

### Notes on the Oiling System—contd.

course, a large quantity of fresh, cool oil is forced under pressure to all working parts. A filter for the returning oil is provided in the supply tank immediately underneath the filler cap. This filter should be removed once every 500 miles and cleaned in petrol, while once each season or not less frequently than every 5,000 miles the entire tank should be removed and thoroughly washed out with petrol, after which fresh clean oil should be added. To save unnecessary waste it is quite satisfactory to arrange this clean out when the oil is at a low level in tank, although normally it must be noted, it is highly desirable to frequently add fresh oil to the tank in preference to allowing it to run almost empty and then replenishing, the reason being that the more oil the tank contains, the cooler it will keep in circulation.

As already mentioned, a part of the oil pump delivery (on panel-equipped Electric Models), is taken up to an illuminated sight feed, from whence it drains by gravity to the engine. It is important that no air leak occurs in this system, the effect of which would tend to cause the sight feed bowl to fill up, even at moderate speeds. Should the sight feed window be accidentally broken, the ends of the two pipes may be connected by a piece of rubber tubing, when the oil will merely flow up one pipe and down the other.

### CHAINS.

The primary chain is normally kept well lubricated by oil mist from the crankcase release valve, which mist settles out in the chain cover and is led by means of a suitable duct into the path of the chain. Although for all ordinary purposes this method of lubrication is quite satisfactory, if the maximum degree of service is desired, it is advisable to entirely remove the chain once every 3,000 miles and thoroughly wash in paraffin. After carefully wiping it should then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in soak overnight in order to ensure penetration to all the link joints. The rear chain should be similarly treated but at rather more frequent intervals, not more than 1,500 to 2,000 miles in summer, and 1,000 miles in winter. If treated in this manner at least 10,000 and 15,000 miles of satisfactory service should be obtained from the front and rear chains respectively.

### FORK SPINDLES.

Every 500 miles the fork spindles bearings should be flooded with a good quality grease, preferably Tecalemit Grease or Wakefield Castrolase. This process takes a few seconds only by means of the special grease gun provided, which merely requires holding nozzle end against the rounded nipples on fork spindles and given a few sharp strokes.

### HUBS.

Every 500 miles (or more frequently in continuous bad weather) the lubricators in the centre of both front and rear hubs should have a small quantity of grease forced through them. (Wakefield Castrolase suitable).

NOTE.—Castrolase can be obtained in special push down lid canisters for easy filling of grease gun in  $\frac{1}{2}$ lb., 1lb., and 2lb. sizes.

### GEAR BOX.

Once every 500 miles a grease gun full of Wakefield Castrolase (light) should be injected into gear box interior via the small grease nipple provided. Occasionally, the grease plug should be unscrewed in order to verify the lubricant level. The correct level is just above the bottom of the threaded hole into which this plug screws. Therefore, when the plug is removed the grease should overflow slightly when the cycle is standing level and if the occasional additions recommended above fail to maintain this level the supply should be increased accordingly. At the same interval, viz., once every 500 miles, a few strokes of the grease gun should be applied to the small grease nipple fixed to the clutch worm. While this is being done, the engine should be running with the gear lever in neutral or free engine position. It should be explained that grease injected here is forced direct to the high speed pinion bearing, which is only called into use when using the lower gears, or in free engine position. Therefore, in cases in which these gears are used more than is normal, for example in mountainous districts, the application of grease should be made rather more frequently than normal. This same remark as indicated above also applies to the general lubrication of the gear box.

### BRAKE AND GEAR ROD JOINTS.

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

### BOWDEN CABLES.

To lubricate Bowden inner cables has hitherto meant the entire removal of the cable, unsoldering one end nipple, etc., altogether a difficult and expensive job and one consequently mostly neglected. By means of a specially designed oil gun, it is now possible to flood the inner wire with lubricant in a few seconds, and we can only state that the effect of this on a dry cable has to be tried to be believed. Oil is injected through a small bared patch on the outer casing and is forced through the spiral wire casing on to and along the inner wire. All Bowden cables on the A/2 Model are fitted with small metal clips which will be observed fitted approximately to the centre of each. These clips cover the small bared patch referred to above, and to

apply the gun it is only necessary to slide the clip along the casing to enable the specially constructed gun to be clamped with the bared patch occupying a central position on the rubber pad on the gun nozzle. A few turns of the screwed plunger is then all that is required to efficiently flood the entire length of the cable with lubricant. The cost of this special gun is 6s. 6d. and we recommend every owner to have one in his home tool kit.

## GENERAL DESCRIPTION AND MAINTENANCE REPAIRS.

### ENGINE.

The power plant of the Matchless "Silver Arrow" incorporates the latest research discoveries. The two cylinders are cast in one block and are set at 18° to one another. The inlet manifold is cast integral and consequently cold spots with accompanying fuel waste and difficult carburation are impossible. The detachable dual cylinder head is designed to give the best possible shape combustion chamber, maintaining a degree of efficiency hitherto only possible with overhead valves, and their consequent complication of moving parts. The pistons are of aluminium alloy fitted with fully floating gudgeon pins of 11-16 diameter and two piston rings, the lower of which acts as an oil scraper in addition to its usual duty. The oiling system as described elsewhere, is of the "dry sump" type and particularly simple in layout. The valves are all operated from one camshaft through the medium of robust rectangular tappets fitted with adjustable heads. The camshaft is mounted upon three bearings across the crankshaft axis and is driven by spiral worm gears. These gears are arranged to run submerged in oil which coupled with the silence of worm gears in operation, provide a degree of valve gear silence hitherto only associated with multi-cylinder car engines. Upon the rear end of the camshaft is mounted a driver for the magneto or magdyno unit, to which it is coupled through the medium of a rubber disc. The connecting rods are mounted side by side with independent roller bearing to each big end. All valves operate in long, detachable, chilled, cast-iron guides, generously lubricated and entirely enclosed. The timing gears are marked for correct setting and the valve timing is as follows:—

Inlet commences to open 10°—1-32in. before T.D.C.	} When checking, tappets must be set to give .008 clearance.
Inlet closes 55°—19-32in. after B.D.C.	
Exhaust commences to open 60°—23-32in. before B.D.C.	
Exhaust closes 10°—1-32in. after T.D.C.	

NOTE.—The running tappet clearance is .004 for all valves and should be carefully checked with the feeler gauge provided in tool kit.

### TIMING GEAR.

As already described the timing gear consists of one camshaft mounted upon three bearings and set at right angles to the flywheel axle, from which it is driven by helical worm gears, giving the necessary 2 to 1 reduction. All four cams are machined on the one shaft and are accurately ground after hardening to give the correct cam profile. The rounded ends of the rectangular tappets operate direct on the cams. The tappet guides are of chilled cast iron and are a tight push in fit, being accurately located and held in position by means of bolts which register with a groove cut in their exterior, and also by means of a tapered wedge collar.

### TO REMOVE CAMSHAFT.

First remove magneto or magdyno base fixing bolts and slide the unit back upon its platform to disengage the coupling joint. It should be noted that in the actual process of withdrawing the camshaft, the magneto or magdyno unit can be moved on its platform sufficiently to clear without disconnecting any of the various cables or controls. Next remove all bolts securing the sheet metal timing case cover, when same is free to be removed, exposing timing gears. Next remove the nut securing the coupling disc to the projecting end of camshaft (this nut is screwed L.H. thread and must therefore be turned in a clockwise direction to release), and gently force the coupling disc off the tapered end of camshaft by means of a suitable lever. Now remove the nut securing the small helical worm pinion to flywheel axle (R.H. thread) and screw on to the threaded end of this pinion the special internally screwed extractor provided in the tool kit. Now turn the bolt which passes through the end of this extractor in a R.H. direction, when the pinion will be forced off the tapered end of the flywheel axle. Next remove the cylinder head and withdraw both valves and springs from the rear cylinder (see Decarbonisation for instructions). Now remove the screws which locate the tappet guides for rear cylinder and raise the guides sufficiently in their housing to allow the large gear wheel on camshaft to clear as it is being withdrawn. As explained these tappet guides are a push-in fit only, and upon removing the locating screws it will be found possible to push them up as described. Lastly remove the four nuts securing the aluminium cap which carries the rear end bearing for camshaft, and gently withdraw this cap. The camshaft is then free to be drawn out through the hole exposed. The re-assembly must be carried out in exactly the reverse order, and care must be exercised to avoid damage to the various joint washers. The camshaft gears, as mentioned elsewhere, are marked for re-setting purposes and it is necessary to carefully slide the small worm pinion on to the flywheel axle with

### To Remove Camshaft—contd.

the marked tooth coinciding with the marked tooth space on the large pinion attached to camshaft, after which gently revolve the engine until the key on flywheel axle engages with the keyway in the small worm pinion, when the latter may be pushed on to the shaft tapered end and firmly secured with the fixing nut.

### TO RE-TIME MAGNETO.

Having completed assembly as above, place the magneto driver coupling disc on the projecting taper end of camshaft and secure with its fixing nut just sufficiently loose to permit of it being turned with the fingers. Now slide the magneto or magdyno unit into position with the coupling properly engaged. Then revolve the engine until the rear piston is exactly on top dead centre of the stroke in which both valves are closed. The actual position of the piston can be determined by passing a piece of wire through the sparking plug hole. Now remove the bakelite contact breaker cover and after fixing the ignition lever on the handlebar in the full retard position, gently turn the magneto armature with the fingers in the normal direction of rotation until the contact breaker points are just about to part on the No. 1 cam or hump on the cam ring. The No. 1 cam or hump it should be explained, is the one on the right side looking at the contact breaker end of magneto. Therefore with the setting described, the fibre pad on the contact breaker bell crank will be almost exactly adjacent to the high tension pickup marked No. 1. Now holding carefully the untightened coupling disc on camshaft, slide the magneto back again sufficiently to permit of the application of a spanner to the L.H. thread coupling disc fixing nut, which nut must be firmly tightened. Before finally fixing the magneto, once more set the pistons as directed above and having done so, observe that the contact points definitely part as the ignition lever on handlebar is moved from the fully retard position to about one-third advanced. Having satisfactorily checked for correct setting the magneto may be finally secured in position by the three base bolts.

**NOTE.**—A very accurate, although a rough and ready test only for correct ignition setting is to start up the engine and after allowing it a few seconds to warm up, fully retard ignition and fully open the throttle when the engine should run at about the same speed as when travelling on the road at about 30 m.p.h. If any considerable variation to this speed is found it is a sure indication of incorrect setting and should be immediately corrected. Under no circumstance whatever should the engine be allowed to run for more than a few seconds in this fully retarded, full throttle position, and these remarks are only intended as a rough guide or check for the inexperienced.

### DECARBONISATION.

Although the period for which an engine will run satisfactorily without being decarbonised depends largely upon driving conditions,

### Decarbonisation—contd.

it is nevertheless advisable to carry out this operation once every 2,000 miles. The procedure is as follows:—

Remove both sparking plugs and stays from the front and rear of cylinder head to the cycle frame. Then remove all cylinder head fixing bolts and the head may then be lifted clear. Now carefully remove the cylinder head gaskets and revolve the engine until both pistons are at the extreme top of their respective cylinders. Then with a suitable scraper or an old penknife, carefully scrape all carbon deposit from the piston tops, afterwards carefully wiping with a clean calico rag. Similarly remove all deposit from the cylinder head and after cleaning the gaskets lay them in position on the top of cylinder block. Then place the head in position and replace all holding-down bolts in their correct positions, but do not tighten down. Now, starting with the two bolts in the centre of the head, tighten down lightly, after which also lightly tighten down all remaining bolts, a pair on opposite sides at a time. Then give each bolt in turn a final tighten down exerting an equal pressure to each bolt. Lastly, before refitting the cylinder head stays, start up engine and after allowing it to warm for a moment or so, again go over each bolt in turn to obtain the final equal pressure to each, when the stays may be refitted and firmly secured in position.

### GRINDING IN VALVES.

Although grinding the valve seatings need not necessarily be done upon each occasion the engine is decarbonised, it is nevertheless desirable to do so at least once every 4,000 to 5,000 miles, or roughly upon each alternate decarbonisation. At the same interval, the entire cylinder block should be removed in order to clean the carbon deposit from the piston ring grooves. To remove cylinder, first detach the head as already described. Then remove the valve spring cover. Next remove the exhaust pipe and manifold and also withdraw the throttle and air valves from carburettor mixing chamber. Then after disconnecting the petrol pipe and removing all cylinder holding down nuts the cylinder may be lifted clear. Now place the cylinder on a bench with valve heads underneath and with a stout screwdriver depress each spring in turn by exerting pressure upon the valve spring cap so that the cotter may be removed, when the valves are free to be withdrawn. Do not interchange the valves. To grind in first wipe each valve and remove any traces of carbon deposit. Then smear the seating with a thin layer of grinding paste, which can be obtained already mixed, and after inserting the valve to be ground in its correct location, turn, by means of a screwdriver operating in the slot in the valve head, to and fro only (never make a complete revolution). After a few such movements, raise the valve head off its seating and continue the process, raising the valve after every few movements. Generally one application only of grinding paste will be sufficient to obtain a clean matt surface entirely free of pit marks, but if necessary



### Grinding in Valves—contd.

the operation should be repeated to obtain this desired finish. Before replacing the valves, which as mentioned above, must under no circumstances be interchanged, carefully clean away, with petrol, all traces of the grinding mixture, and remove all deposit from the valve ports and manifold. The replacement of the valve cotters is accomplished in a similar manner to their removal, viz., by resting the valve heads on a bench and depressing the valve springs by means of a stout screwdriver.

### PISTON RINGS.

All piston rings should be bright over their entire circumference, and any showing brown marks, particularly at the gap, should be replaced, as such symptoms are a certain indication of leakage. When new, the ring gap when tried in the cylinder should be about .006in. to .010in.

### TO REFIT CYLINDER AFTER REMOVAL.

Although possible single handed, help is recommended for this process, as great care is necessary when applying the cylinder to avoid fracturing the fragile piston rings. The mouth of each cylinder is generously chamfered to allow of the easy entry of the piston rings, and when applying the cylinder, the pistons must be introduced in line with the bore and not at right angles to the base as is usual. Both pistons and cylinder bores should be wiped with a clean calico rag and smeared with perfectly clean and fresh engine oil. It must also be observed before fitting cylinder, that the base jointing washer is undamaged. After fitting and firmly tightening down the cylinder fixing nuts, the head and all other parts removed may be replaced as described elsewhere. The final operation of the decarbonization process is to set the tappets to the correct clearance. This should be done after the engine has been started and allowed to warm up, and the correct clearance when warm is .004in. for both inlet and exhaust. The inlet tappets, it might be mentioned, are the two nearest the centre, the exhaust tappets being the extreme front and rear respectively.

NOTE.—A feeler gauge of correct thickness, viz., .004in. is provided in the tool kit.

### GEAR BOX.

The construction of the gear box is roughly as follows:—The body or shell consists of an aluminium casting secured to the rear engine cradle plates by two bolts, which pass through the casting and also through slotted holes in the engine plates; the object of these slotted holes being to provide for front chain adjustment. The shell carries a main and also a secondary shaft upon each of which is mounted four gear wheels by the alternate clutching of which to their respective shaft by means of keys or splines four speeds are obtained. The sliding movement of the gears is imparted by means of a lever

### Gear Box—contd.

operating in a suitable shaped quadrant fixed to the tank and the correct location of each gear position is ensured by an internal indexing spring plunger. The clutch consists of cork and ferodo faced sliding plates, kept in contact with plain metal plates by means of a central spring, the pressure of which is released by means of a hand lever operating through the medium of a Bowden cable, a quick thread worm, and a long push rod passing through the mainshaft. In driving, it should always be remembered that the engine gives best results when running smoothly. It should not be driven at low speeds on top gear with full throttle as this will cause snatch in the transmission, leading to heavy tyre wear and unevenly worn chains. The gears should be freely used, and at the least sign of jerkiness when hill climbing, or running slowly on the level, a change to a lower gear should be made. It is not possible to lay down hard and fast rules on this matter, as conditions vary to such a large extent as the result of the load carried, wind velocity, etc. Generally speaking, however, it is desirable to change down to third gear on the level when the road speed falls below 16 m.p.h. and on a steep hill when the speed falls below 22-24 m.p.h. or to second gear if the speed on third falls below 12-15 m.p.h. Generally speaking the bottom gear is only required for exceptional or emergency circumstances. Under any conditions recollect that the gear box is provided for use.

### TO REMOVE GEAR BOX END PLATE FOR EXAMINATION OF GEARS.

First remove the kickstarter crank, after which the return spring and cover, together with the tubular sleeve, may be withdrawn. Detach the cable from the slotted end of clutch worm lever. To accomplish this it will be found convenient to revolve the clutch worm by means of a spanner applied to its flattened end, when the nipple and cable can be easily slipped through the slot on the end of the clutch worm lever. Next unscrew the cable adjuster from the slotted support stud attached to the gear box end plate, after which all the end plate fixing nuts may be removed, leaving same free to be withdrawn. In the actual withdrawal process, pressure must be applied to the kickstarter axle end in order to prevent same, and also possibly the layshaft upon which it is mounted, being drawn out of position. The reassembly must be made in the reverse order, and particular care must be taken to securely tighten down the end plate fixing nuts. A tubular box key, if available, will be found more convenient for this purpose than the open end spanner provided in the standard tool kit.

NOTE.—While the end plate is being removed, a pan or some receptacle must be placed underneath to catch the lubricant, the bulk of which will run out. When re-assembling, the faces of the end plate and gear box must be thoroughly cleaned and a new paper washer used if the old one has been damaged. Preferably coat with quick drying gold size.

### TO REMOVE GEAR BOX ENTIRELY.

First mark both H.T. Cables 1 and 2 to correspond with the figures stamped on magdyno adjacent to the pickups, then detach both pickups which as will be seen are secured by the pressure of small flat springs. These springs are turned upon their supports to permit the removal of the bakelite pickups. Next remove the bakelite contact breaker cap secured in a similar manner to the pickups and withdraw the steel cam ring. Next remove the countersunk head screw which secures the advance and retard cable spring box to the magdyno, when this spring box may be gently withdrawn. Next unscrew the magdyno base bolts when, after sliding unit back on the platform to disengage the coupling and detaching the various dynamo cables including the negative battery cable, the entire unit may be removed. Next remove the battery clamp and disconnect the positive cable sleeve connector fitted about six inches from the battery terminal. This connection is covered by a rubber sleeve which can quite easily be moved to permit of disconnection. The battery may then be removed. Next remove the four small bolts which pass through the top of the magneto and battery platform, and also the two nuts by which the forward end of same is secured to the engine crankcase when the platform is free to be removed. Now remove the short front brake rod and also detach the gear rod from the gear striker lever on the gear box. Also detach the clutch cable nipple from the clutch worm lever via the slotted hole in same and unscrew the screwed cable stop from the slotted yoke attached to the gear box, when the cable can be slipped through the slot provided. Now remove the left side footrest hanger and after removing the two nuts securing the outer half of front chain case gently remove the latter, and detach the connecting links of both driving chains. Next remove the two bolts which pass through the slotted holes in rear engine plates and slack off considerably all the nuts securing the off side rear plate when upon forcing the two plates apart to release the shallow tongue cut on the gear box side, the entire box can be lifted clear. The replacement of all parts must be carried out in reverse order and care must be taken to securely tighten all bolts securing the engine plates and the gear box. The various dynamo cables are identified by means of coloured sleeves and must be fixed as shown on the wiring diagram. It will be found advisable to connect the advance and retard cable to magdyno before this unit is actually fixed in position, and after fixing the cable spring box, care must be exercised to see that the cam ring is replaced with the narrow slot engaging with the projecting tongue on the advance and retard cable end, and by means of which the cam ring is revolved in its housing to provide the variable ignition setting controlled by the handlebar lever. Although a somewhat lengthy description is necessary for this gear box removal process, it will in practice be found quite straightforward should the occasion arise.

### CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the adjustment of clutch operating cable should be suspected. When correctly adjusted it should be possible to move the clutch actuating worm (part to which lower end of cable is attached) to and fro slightly with the fingers and if this free movement cannot be felt, the cable stop should be adjusted accordingly. If necessary, the bolt securing the clutch worm lever may be slackened and the worm portion revolved slightly back to provide a slacker adjustment, or forward to tighten. Should the clutch on the other hand develop harshness even with correctly adjusted chains, the clutch plates should be carefully removed and smeared with a mixture of powdered graphite and water worked up into a paste. Oil should not be used under any circumstances.

### FRONT CHAIN ADJUSTMENT.

It will be observed that provision for front chain adjustment is arranged by sliding the gear box bodily backward or forward as the need may be. To carry out adjustment first slack off the two bolts immediately below the gear box and passing through slotted holes in the rear engine cradle plates, then turn, in the required direction, the special long nut on the adjuster draw bolt (underneath gear box). To tighten chain, this nut must be turned in a left-hand or contra clockwise direction, or vice versa to slacken. After obtaining correct adjustment (see note below), firmly tighten the two gear box clamping bolts and, if necessary, re-adjust gear rod (see gear rod adjustment).

NOTE.—Correct chain tension should allow a whip or movement of  $\frac{3}{8}$  to  $\frac{1}{2}$  in. as chain is lightly pressed up and down. Check this in a number of positions by slowly revolving the engine and secure the above described adjustment at the tightest position.

### TO ADJUST REAR CHAIN.

Owing to the fact that the movements of the spring frame affects slightly the tension of the rear chain, it is essential when checking or making adjustments to the latter, to set the frame in the normal position occupied when rider is seated, and springs consequently somewhat compressed. To ensure this it is necessary to sit upon the cycle with wheels on the ground and excessively tighten the frame dampers so that the friction is sufficient to hold the frame in its somewhat compressed state, when the load is removed. Having proceeded as above, next slack off slightly, only, the two wheel axle nuts and then carefully raise the cycle on to the prop stand. If the frame damper has been properly tightened the rear tyre will be well clear of the ground, and it must be noted that this is so. Now adjust chain as required by means of the adjuster bolts provided, taking care to screw bolts in to a similar extent. The chain tension should be tried in a number of positions by revolving the rear wheel and the correct adjustment at the tightest place should allow a movement

### To Adjust Rear Chain—contd.

up and down midway between the sprockets of  $\frac{3}{16}$  in. to  $\frac{1}{4}$  in. Finally, carefully retighten the wheel axle nuts and return the damper adjustment to normal. Care is necessary when tightening the rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, and about four inches from and parallel to the ground, should be observed to just touch each tyre at both sides of wheels centre simultaneously. Alternatively a straight wooden batten about five feet long is a very handy article to be used for the purpose of checking wheel alignment applied as in the case of string parallel to and about four inches from the ground.

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

### ADJUSTMENT OF GEAR CONTROL ROD.

As already mentioned, adjustment of the primary chain may necessitate a re-adjustment of the gear control, due to the movement of the gear box bodily during the former operation. On each occasion therefore, that the position of the gear box is altered the setting of the gear control rod must be carefully checked and corrected if necessary. To do this place the cycle on the stand and remove the split pin and washer from the top gear rod yoke end pin (i.e., the pin which passes through the end of gear lever). Also at the same time slack off the lock nut securing this top gear rod yoke end. Now place the gear lever into third gear position, and after removing the top yoke end pin from which split pin has already been withdrawn, lightly alternatively pull and push the gear rod by hand in order to feel the action of the gear box internal spring indexing plunger. As the sliding gears move either side of the correct third gear position the resistance of the spring plunger will be plainly felt, and the exact position at which this plunger is in full engagement with the third gear notch must be accurately and definitely found. Having established this correct position offer up the gear rod to gear lever which latter must of course be in the third gear position, and screw the top yoke end up or down as the need may be until the pin can be quite freely inserted. Before locking the yoke end into position, it is advisable to again obtain by hand the exact position of third gear as already described, and check the rod length for correct setting, after which the yoke end may be secured by means of its lock nut and the pin refitted. It must be understood that if the correct adjustment is obtained for the third gear all the remaining gears will also be correct as regards rod adjustment.

### STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for correct adjustment by exerting pressure upwards from the extreme tips of the handlebars with the steering damper well slacked off. Should any shake be felt it must be immediately taken up as follows:—

### Steering Head Adjustment—contd.

First loosen the top nut on steering column and then screw the under nut down until all shake has disappeared, when securely lock in position by means of the upper nut.

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

### TO ADJUST FRONT FORKS. SPINDLE ADJUSTMENT.

Provision is made for taking up side or endwise wear of the various fork spindle bearings. The need for such adjustment will be made apparent by a click or creaking noise when the steering head is abruptly turned. First by placing the fingers partly over the spindle link end and partly upon the lug through which the spindle passes, while the steering head is turned, ascertain which spindle or spindles require adjustment. Then after slacking off both end nuts, turn the spindle bodily by means of its hexagonal end, left-hand or contra clockwise to tighten. Do not turn at the most, more than one half a revolution before a re-trial with the end nuts tightened, as it is essential to guard against over-tightening, when the fork will become stiff in action or most likely refuse to function entirely. It should be explained here that the fibre washers fitted between the spindle lug ends and the spindle side plates are not intended for frictional purposes, but to prevent actual seizure in the event of the spindles being adjusted too tightly. The necessary damping action is provided independently and should be adjusted as follows:—

### TO ADJUST FORK ACTION DAMPER.

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

### SPRING FRAME ATTENTION.

The rear wheel springing arrangements, as will be seen, is extremely simple in layout and possesses perfect lateral rigidity. The moving portion carrying the rear wheel is hinged on "Silentbloc" bearings, and therefore requires no lubricating or other attention whatsoever. The spring damping action is arranged by means of fibre discs which slide across both faces of two parallel steel plates

### Spring Frame Attention—contd.

bolted to the frame seat lug. Since these plates are not adjustable provision against wear of the inner friction discs is made by clamping the spindles which carry same in the top bridge lug. Although wear of the friction discs is almost negligible, nevertheless once each season or at least each 5,000 miles, the two clamping bolts in the top bridge lug should be slacked off, and the hand adjusting ebonite nuts screwed up as tightly as possible, in order to draw the spindles out of the clamping lug, when the pinch bolts should be again tightened securely and the damper hand nuts re-adjusted to give the desired degree of friction. It will be found that the amount of friction required to give the maximum comfort varies considerably with the road surface, i.e., the rougher the surface, the more damping action will be required. For all normal conditions it will be found quite satisfactory to adjust this damping action in exactly the same manner as prescribed for the front forks, taking care to adjust each side nut to give as near as can be judged, equal pressure. Rubber stop buffers are provided to limit the spring frame movement, but only an exceptionally severe jolt will compress the springs sufficiently to bring these buffers into action, and the remedy is to apply more friction.

### TO ADJUST WHEEL BEARINGS.

To adjust either front or rear wheel bearings which are of the taper roller type, first slack off the left-hand side spindle nuts. Then loosen the outer of the two lock nuts on the inner side of fork ends and turn the inner of these two nuts in the required direction, i.e., clockwise to tighten the bearing adjustment and contra clockwise to loosen. After making the adjustment and before tightening the outside spindle nut be careful to securely tighten the outer of the two lock nuts inside fork end, after which the axle nut must be securely tightened.

**IMPORTANT NOTE.**—It must be understood that taper roller bearings must not be adjusted tightly, and unless a trifling amount of slackness is observed it is possible quite unknowingly to impose an enormous crushing strain on the slightly tapered rollers without same being made apparent by undue friction. This slight slackness must, therefore, always be maintained.

### TYRES AND SERVICE.

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

### Tyres and Service—contd.

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

	Solo.	With Pillion Passenger.
Front wheel 26x3.25 ...	15-16lbs.	... 15-16lbs.
Rear wheel 26x3.25 ...	21-22lbs.	... 26-28lbs.
Front wheel 27x4 ...	13-14lbs.	... 13-14lbs.
Rear wheel 27x4 ...	18-20lbs.	... 20-22lbs.

### INCORRECT ADJUSTMENT OR MISUSE OF BRAKES.

With the highly efficient brakes fitted, harsh application is liable to result in heavy tyre wear. Particularly does this apply if the brake coupling is not correct, thereby allowing a large proportion of the braking effect to be taken by one wheel only. The instructions given hereafter regarding brake synchronisation should be carefully followed, and under no circumstances, other than emergency, should the brakes be applied sufficiently harshly to cause either of the wheels to stop revolving or to cause a squeak of protest from the tyres.

### BRAKE CONTROL ADJUSTMENT.

Owing to the fact that the foot operation of the front wheel brake is effected through a Bowden cable, it is necessary, in order to obtain the correct and maximum braking effect, to adjust the controls so that the front brake is applied slightly before the rear. To do this both wheels should be jacked up on stands and during the process of setting the knurled adjusting nuts, the brake pedal should be lightly applied and the controls so adjusted that when it becomes difficult to move the front wheel against the action of the brake, the effect is only just noticeable on the rear wheel. When correctly adjusted, both wheels must of course turn freely when the brake pedal is released, and upon applying a moderate pressure to the brake pedal it should be observed that application of the hand brake lever does not cause any additional movement of the front brake expander lever, this indicating that the brake in question is in full engagement. Any tendency for the back wheel to squeak or skid upon a moderately strong application of the brake pedal indicates that the adjustment of the front brake foot operated cable is not sufficiently in advance of the rear, and in such a case the remedy is to either tighten up the front adjustment slightly or alternatively slacken the rear.

### CUTS IN TYRES.

Any but superficial rubber cuts are a menace to the whole tyre structure. The tyre casing retains its strength only so long as the whole of its plies are unbroken. If two or three strands are severed, the whole tyre casing is weakened and a large burst may result. The penetration of wet and road matter results in rapid deterioration of the casing.

## Cuts in Tyres—contd.

material to which it may gain access. Covers should be periodically examined, and any cuts, other than those purely superficial, efficiently repaired.

## CONCUSSION BURSTS.

If a tyre when travelling and bearing its share of the load, comes into contact with an obstruction, the impact, which is a product of the load carried and the velocity of the vehicle, may reach an extremely high figure and produce an excessive localised strain upon the material forming the casing, and a resultant fracture. The tread rubber, owing to its nature, may not show perceptible signs of bruising or damage as the result of even the most severe blow. An incorrectly inflated tyre is more susceptible to damage resulting from such blows than one inflated to the recommendations overleaf.

## CARBURETTOR ADJUSTMENT.

Although owners are advised to refrain from tampering with the setting of the carburettor without good cause, a rough idea how this unit functions and how adjustments may be effected is given below. The correct level of petrol is maintained by means of a float and needle valve operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers, and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the main petrol supply to the engine is obtained firstly by the jet or orifice, and secondly by a taper needle passing through the jet and attached to the throttle valve. As the throttle valve is opened a smaller part of the taper needle comes into action, thereby increasing the passage for the petrol. This needle being adjustable in length provides a fairly wide range of control without actual alteration to the jet size. A pilot or slow running jet is provided to take care of slow running or idling, and a throttle stop controls the actual speed at which the engine runs when the throttle is closed to the maximum extent possible in which position the engine should run or "tick over," to use an expression favoured by motor cyclists, slowly but positively. The correct setting of the main jet should permit of full air being used when running fast on full throttle. To test for correct setting, start up engine, and after allowing a few seconds to warm up, fully retard the ignition and fully open throttle. If it is now possible to open the air beyond the  $\frac{1}{4}$  or  $\frac{1}{2}$  open position it would indicate a too large jet, and the needle attached to throttle valve must be lowered or lengthened. This needle, it should be explained, is secured by a flat strip cotter engaging with a small notch in the needle. Several of these notches are provided to permit adjustment. When correct, the engine should commence to splutter immediately the air lever is opened more than

## Carburettor Adjustment—contd.

about  $\frac{1}{4}$ , but should run satisfactorily on the fully closed air position. Under no circumstances should the engine be run for more than a few seconds in this fully retarded fully opened throttle position. The only other adjustments are the air supply to the pilot jet and the throttle stop. The adjusting screw for the pilot jet air supply will be observed at the base of the mixing chamber. Screwing in enriches the mixture and, vice versa, unscrewing weakens. It must be clearly understood that adjustment to this screw affects the mixture only on extremely small throttle openings. Having set the throttle stop screw to give the desired idling engine speed, the pilot jet air screw is turned in the required direction to give even firing. The adjustment is not particularly sensitive, and no difficulty should be experienced in finding the correct position, when the locking nut should be tightened down to prevent any movement by vibration. Adjustment, if any, should be made to this air screw while the engine is warm and the ignition fully or nearly fully advanced. We mention this in order to remove the possible impression that the pilot jet setting is not correct should the engine stall when started up from cold. Once correctly set the pilot jet should not require attention except perhaps in extremes of temperature.

## TO REMOVE REAR WHEEL.

First put down the centre prop stand by holding same on the ground and gently pulling cycle backward. Next lean the cycle bodily to one side sufficiently to permit of the attachment of one side prop stand lengthening piece, after which lean the cycle to the opposite direction to apply the other side extension piece. The rear wheel will now be well raised from the ground. Now disconnect the rear brake rod cross head by withdrawing the split pin by which it is attached to the brake shoe expander lever and also disconnect the rear chain connecting link, after which release the wheel axle nuts. The wheel is then ready to be removed by drawing same backward until the axle is free from the slotted fork ends, at the same time twisting the wheel in the fork to release the brake cover plate anchorage.

NOTE.—See instructions re wheel alignment when refitting wheel (To Adjust Rear Chain).

## TO REMOVE FRONT WHEEL.

First put down prop stand with extensions as directed above and then raise the front of cycle on to the front wheel stand, which it should be explained is not sufficient to provide a safe balance by itself. Then remove the nut securing the expander lever and gently force this lever off the splined end of the expander to which it is attached. Next withdraw the two cables from their slotted anchorage, and after slacking off both axle nuts, gently force out each washer from the recesses in the fork ends in turn with a stout lever, at the same time exerting pressure downwards upon the wheel, which will then fall out of position.

### PERIODICAL INSPECTION OF NUTS, ETC.

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

### CLEANING.

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

**IMPORTANT NOTE.**—Upon no account should ordinary metal polishes be used upon chromium plated parts, as almost without exception such polishes contain oleic acid which attacks chromium. Should the chromium plating become dirty or lacking in lustre, a little "Goddard's Silver Plate Powder" should be used. This powder, incidentally, is obtainable at any domestic store. Reckitt's "Karpol" is also recommended for cleaning purposes.

### CORRECTIVE MEASURES.

No adjustment should be made nor any part tampered with until the cause of the trouble is known. Otherwise adjustments which are correct may be destroyed.

#### Engine Suddenly Stops:—

- Petrol shortage in tank.
- Choked petrol supply pipe or tap.
- Water in float chamber.
- Oiled up or fouled sparking plug.
- Water on magneto pick-up or sparking plug.

#### Engine Fails to Start:—

- Lack of fuel or insufficient flooding if cold.
- Oiled up sparking plug.
- Stuck up valve or valve stem sticky.
- Weak valve spring or valve not seating properly.
- Too liberal throttle opening.
- Ignition switch not on (Electric Models only).
- Contact breaker sticking.

### Corrective Measures—contd.

#### Loss of Power:—

- Valve or valves not seating properly.
- Weak valve spring or springs.
- No tappet clearance or excessive clearance.
- Lack of oil in tank.
- Brakes too closely adjusted.
- Badly fitting or broken piston rings.
- Punctured carburettor float.
- Silencer choked with carbon deposit.

#### Engine Overheats:—

- Lack of proper lubrication.
- Weak valve springs.
- Pitted valve seats.
- Worn piston rings.
- Late ignition setting.
- Punctured float, causing rich mixture.
- Air control to carburettor out of order.
- Silencer choked with carbon deposit.

#### Engine Misses Fire:—

- Valve spring weak.
- Defective or oiled plug.
- Incorrectly adjusted contact breaker.
- Incorrectly adjusted tappets.
- Defective sparking plug cable.
- Contact breaker arm sticking.

## LEGAL MATTERS.

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

To comply with the Law relating to motor cycles, the owner of a "Matchless" Model A/2 must:—

1. Hold a driver's license, which can be obtained from the Chief Constable or Corporation of a County Borough, or from the County Council. The charge for this license is 5s. yearly, and must be renewed annually from the date of issue. A Motorcar driver's license covers the driving of a Motorcycle.
2. Apply to the Taxation Department of the Local Authority of the district in which the vehicle is to be ordinarily kept, for Inland Revenue License and Registration Form RF 1/2 (Motorcycles only). The address of the above Taxation Department can be obtained, by enquiry, at a Post Office.
3. The Form RF 1/2, when obtained, must be filled in and returned, accompanied by the requisite remittance, which varies according to the date of registration and the term to be covered. For a full year, January 1st to December 31st, the fee is £3 (solo) or £4 with sidecar attached. In some districts evidence that the vehicle to be licensed is new and has not been previously registered may be demanded. Manufacturer's or Agent's invoice will serve.
4. See that his front plate is illuminated on both sides at night.
5. Never drive at a speed which is dangerous to the public.
6. Wherever necessary, give audible and sufficient warning by horn or other instrument, of the approach of his motor cycle.

For registration purposes the following particulars will be required:—

Weight of cycle unladen (with equipment required by Law), 320lbs.  
 Type or Model, "Matchless" Model A/2.  
 Manufacturer's horse-power, 3.97.

NOTE.—The above weight applies only to machines without electrical equipment, for which add 18lbs.

## GUARANTEE.

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

WE GUARANTEE, subject to the conditions mentioned below, that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, but this guarantee is to extend and be in force for six months only from date of purchase, and damages for which we make ourselves responsible under this guarantee are limited to the free supply of a new part in exchange for the part of the motorcycle, motorcycle 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 motorcycle, motorcycle 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 motorcycles, motor cycle combinations, and sidecars are liable to derangement by neglect or misuse, this guarantee does not apply to defects caused by wear and tear, misuse or neglect.

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

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

Any motorcycle, motorcycle 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 motorcycles, motorcycle 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 which the alleged defective part was exchanged as the case may be.

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

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

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

#### MACHINE NUMBERS.

The frame number will be found stamped on the right hand side of lug under saddle.

The engine number is stamped on the aluminium crankcase, transmission side, immediately beneath cylinder base.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.