

**Matchless**  
IN NAME & REPUTATION

# INSTRUCTION BOOK

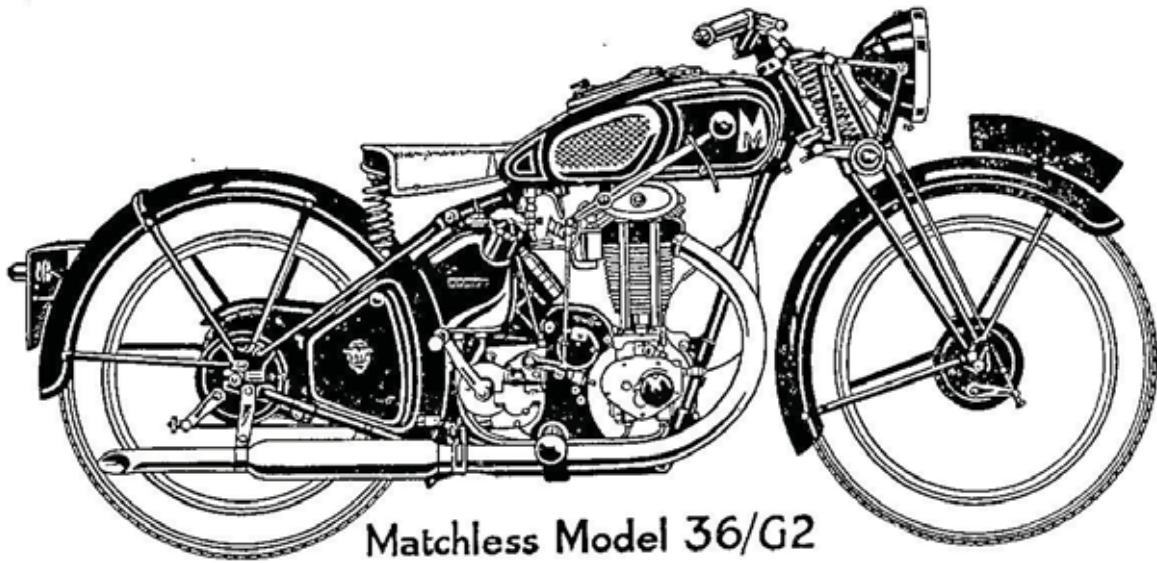
**Clubman Models**  
**G/2 and G/2M**

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# DRIVING AND ADJUSTMENT INSTRUCTIONS



Matchless Model 36/G2

## MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED

*Manufacturers*

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## INTRODUCTION.

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

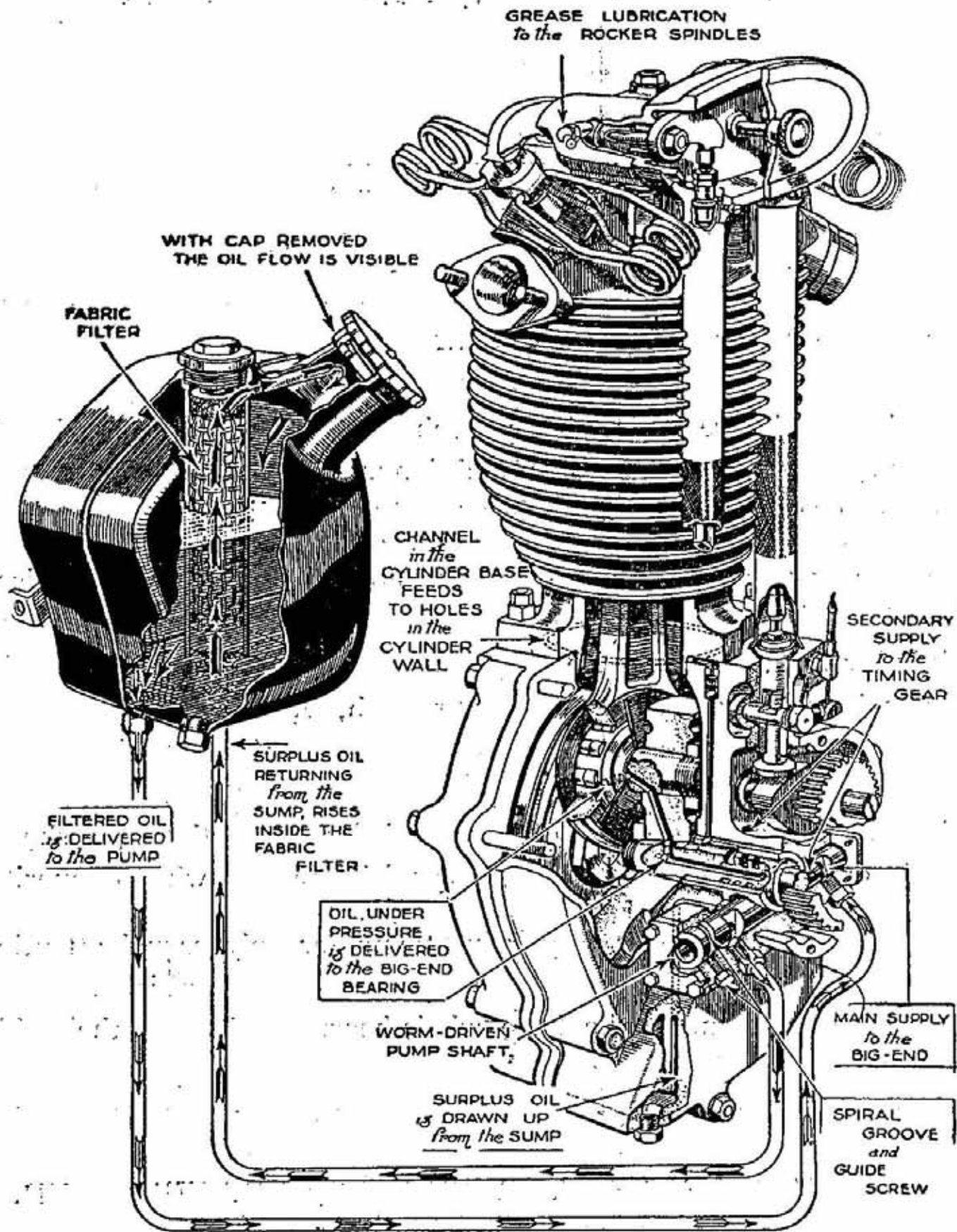
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It is our sincere desire that you obtain from your " Matchless " the service, comfort, enjoyment and innumerable miles of low cost travel that we have earnestly endeavoured to build into it.

A motor cycle, it must be remembered, is a highly specialised piece of engineering, and while it does not call for great engineering skill in driving, the exercise of a little mechanical sense, and the occasional use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be obtained with the requisite degree of satisfaction. In the following pages we give, without going into intricate technical detail, much valuable information that you should have, in order to give your cycle the careful attention which it merits.

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

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.



## OILING SYSTEM.

NOTE.—Hairpin valve springs illustrated are not used on Model G/2 and G/2M.

# GENERAL INFORMATION

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## PREPARATION FOR USE.

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 gears must always be engaged before starting up. If the gears are hand controlled, neutral position of the gear lever is indicated by "O" stamped on the gear quadrant on tank. If foot change is fitted, neutral is the first position reached by an upward movement of the pedal from low or first gear. On latest models with enclosed foot change gear boxes, neutral is indicated by a pointed finger attached to foot change pedal. The ignition is advanced or retarded by means of a small lever on the left side of handlebar. To advance the spark this lever is pushed inwards, and for starting it should be in about the midway position. The throttle is controlled by a twist grip on the right handlebar and the air by means of a small lever, also on the right handlebar. Both controls are opened by an inward movement. For starting from cold, the throttle should be only about one-sixth open, and the air must be completely closed. The petrol is turned on by pressing inward the end of the tap sliding plunger marked "ON." Assuming that the tanks have been filled and all levers set as above, to start the engine first flood the carburettor until petrol actually overflows from the vent hole in the float chamber cap. Then raise the exhaust valve by means of the handlebar lever and turn the engine over two or three revolutions, keeping the valve raised. Then give the kickstarter pedal a vigorous push downward, releasing the handlebar valve lifter lever when the pedal is nearly at the bottom of its travel so as to take the maximum possible advantage of the flywheel momentum. Immediately the engine starts, open up the air and reduce the throttle opening to check the engine speed. Do not, under any circumstances, race the engine up from cold but allow it to idle at a fair speed for a moment or two to warm up, and while doing so, take the opportunity of observing that the oil is circulating properly. Then, sitting astride the cycle, gently move same forward until the stand is released, after which, disengage the clutch by drawing inwards the large lever on the left handlebar. Then smartly engage low or first gear, after which gently release the clutch lever when the cycle will commence to move forward. When well under way, again disengage the clutch and simultaneously engage second gear, afterwards again gently releasing the clutch lever. Repeat the operation until top gear is reached, and remember if foot change is

### Preparation for Use—contd.

fitted to keep the right foot on the change pedal until the clutch lever has been released. For all changes of gear the clutch should be released a fraction of a second only before moving the gear lever or pedal as the case may be. When in motion it will be sufficient to move the clutch lever only just enough to ease the drive and, with reasonable care, it will be found possible to make a change of gear without a sound. If the cycle is a foot change model do not forget the necessity for holding the gear pedal with the foot until the gear change has actually been made. It is not sufficient to merely jab the pedal and then engage the clutch. Always avoid racing the engine when changing gear. With ordinary care the movements of the clutch lever and change pedal or hand lever are too quick to permit of any appreciable rise in engine revolutions, but until quite conversant with rapid gear changing, it will be found desirable to close the throttle down while making a change. By suddenly engaging the clutch while the engine is racing, an enormous load is imposed on the gears and chains.

**IMPORTANT NOTE.**—Always turn the petrol off upon leaving the cycle idle. Owing to the down-swept inlet port, there is a possibility of neat petrol entering the cylinder, should the carburettor flood while cycle is stationary, and in addition to a risk of fire, there is a real danger of oil thinning and consequently, engine seizure if this simple precaution is not taken. **Therefore, turn the petrol off after each run.**

### RUNNING IN.

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

### "DON'TS" IN DRIVING.

- DO NOT race the engine unnecessarily or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth getaway.
- DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.
- DO NOT allow the engine to labour on high gear on a steep gradient and remember that an easier, faster, and better ascent can be made on the next lower gear.

**“Don'ts” in Driving—contd.**

- DO NOT attempt to start the engine with ignition on full advance or with throttle more than slightly open.
- DO NOT under any circumstances allow the chains to run very slack or very dry. Either will soon cause trouble, and adjustments are easy. Slack chains will inevitably cause harshness of transmission.
- DO NOT force the engine or drive above the maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount's maximum capabilities. However, until all bearings are well run in, it is advisable to refrain from speed bursts and the accompanying possibility of seized bearings, piston rings, etc. The first 500 miles of an engine's existence is far more important than the next 5,000.
- DO NOT race the engine in neutral gear position, violently accelerate from a standstill, or drive at full speed on open throttle, etc., when in a residential district. Any motor cycle, or for that matter, any motor vehicle when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every “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.
- DO NOT forget to shut the petrol off after a run.

# LUBRICATION

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Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. The following makes and grade are specially recommended: Summer—Castrol XXL, Mobiloil D, or Aeroshell; and Winter—Castrol XL, Mobiloil D, or Aeroshell.

Oil is carried in the tank underneath the saddle, and in use the level of oil in the tank should never be allowed to fall below the half-full mark. The integral oil pump is of the single-plunger double-diameter type, the larger diameter being used for exhausting the crankcase sump, and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to the tank. Provision is made on all models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run. It is necessary to remove the oil tank filler cap when the returning oil may be observed running from the small spout immediately underneath the cap. This check should be made preferably upon starting up the engine from cold, as, owing to the fact that when stationary, oil from all parts of the engine interior drains back into the sump, and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than that delivering fresh oil, and partly to variations in the amount of oil in suspense in the crankcase, according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time, only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for external adjustment of the oil supply, the correct delivery to each part of the engine being arranged internally by suitably dimensioned passages. It might here be explained that oil is forced direct to the timing gear chamber, which, after filling same to a predetermined level, overflows into the flywheel chamber, and so drains away to the sump. Oil is also forced into the timing gear side flywheel axle bearing, and thence through a drilled passage in the flywheel to the big end bearing, the splash from which passes up into the cylinder interior. In addition to this splash, the cylinder receives oil via a direct ball valve controlled oil passage, which ensures a very adequate supply under all conditions for this, the most vital part of the engine. No attention to the oiling system is required other than observing the return of oil to the tank prior to a run, and the continual replenishment of the supply tank, the level of oil in which, as mentioned above, must be above the half-full mark, and must not be filled when the engine is cold to a level higher than one inch below the return pipe outlet.



## NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps, and also the guide screw, when the plunger can be pushed out large end first. When re-assembling, the plunger must be inserted after the crankcase sections have been bolted together, and before refitting the end caps, the guide screw must be replaced with its relieved tip engaging the profiled cam groove in the plunger. By moving the plunger to and fro while this screw is being introduced, the correct location of the groove can be easily felt, and the screw in question must be finally firmly screwed home. The entire oiling system is simplicity itself (see oiling system illustration on Page 4), only one moving part being employed, viz., the double-diameter plunger. This plunger is rotated by the engine shaft, and moves backward and forward while rotating, under the influence of the small guide screw which engages with the profiled annular groove cut in the plunger end. As the plunger moves in its housing in one direction, the large end draws oil from the sump, while at the same time the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement of the plunger the large end returns to the tank oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhausting end of the plunger is the larger, the engine sump is always kept clear of oil, hence the term "dry sump." At the same time a large quantity of clean, cool oil is being forced under pressure to all working parts. An efficient filter for the oil is provided in the tank consisting of a felt cartridge through which the returning oil is compelled to pass before emerging from the spout immediately underneath the tank filler cap. This cartridge filter can be removed upon unscrewing the hexagonally-headed cap on the top of the oil tank. About once every 1,000 miles this filter should be removed and carefully washed in clean petrol, while once each season, or not less frequently than once every 5,000 miles, the entire tank should be drained, thoroughly washed out with petrol, and afterwards filled to the correct level with fresh, clean oil. To avoid undue waste, it is quite permissible to arrange for this clean-out when the oil is at the lowest recommended level, although it must be pointed out that normally it is highly desirable to add fresh oil frequently in small quantities in preference to allowing the supply to become almost exhausted before refilling, the reason for this being that the more oil there is in the tank, the cooler it will keep in circulation.

## SPECIAL WARNING.

- 1.—Never mix oils of different make or grade.
- 2.—A dirty or choked oil filter cartridge will inevitably cause heavy oil consumption. If thoroughly soaking and washing in petrol does not effect a cure, fit a new cartridge. (Serial No. 3765; price 2s. 6d.)

## O.H.V. ROCKER LUBRICATION.

Four grease points will be observed on the aluminium casing for the O.H.V. rockers. Two of these direct grease to the rockers themselves and the other two direct grease on to the push rod ball ends. Grease should be regularly injected at least once every 300 miles or weekly.

## CHAINS.

The primary chain and the dynamo chain both run in an oil bath case and provided that the oil level is correctly maintained will require no attention other than occasional adjustment. The inspection cap orifice on the chain case determines the correct level and it is imperative that the level is not allowed to fall more than about  $3/16$ in. below the height of the bottom edge of this orifice. Failure to maintain this level will result in rapid chain wear and possibly destruction. It is, therefore, advisable to make a practice of verifying the level weekly. The rear chain should be removed every 1,500 to 2,000 miles in summer and every 1,000 miles during winter, and thoroughly washed in paraffin. After carefully wiping it should then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used, the chain should be laid in soak overnight in order to ensure penetration to all link joints. If treated in this manner, at least 8,000 to 10,000 miles of satisfactory service should be obtained.

## GEAR BOX.

About once every 1,000 miles a small quantity of grease should be added, if necessary, via the aperture on the gear box top covered by an oval metal cap. This cap is slotted at one end to allow of it being twisted round to uncover the aperture. The gear box must not be entirely filled and under normal conditions the addition of about two ounces of grease every 1,000 miles will be found ample. WEEKLY inject a little grease at all grease gun points.

NOTE.—The greases recommended for gear box lubrication are supplied in collapsible tube containers with a suitable bent spout to facilitate injection into the gear box interior. Castrolase (Medium), Mobilgrease No. 2 or Shell Motor Grease (Soft).

## DYNAMO LUBRICATION (Model G/2 only).

Use oil very sparingly. A few drops of oil should be inserted through the lubricator on the driving end once every 500 miles, and a small quantity of grease should be pressed into the hole to be seen on the commutator end once every 1,000 miles. Avoid using too much grease or pressure, otherwise it may be forced through the bearing on to the commutator and cause trouble.

## DYNAMO LUBRICATION (Model G/2M only).

The dynamo bearings on this model are packed with grease before leaving the works and lubricators are not, therefore, provided. After the motor cycle has run several thousand miles, the dynamo should be dismantled for cleaning, adjustment and re-packing the bearings with grease. This is carried out preferably at the nearest Lucas Service Depot.

## 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 into them.

## FORK SPINDLES, BRAKE SPINDLES, ETC.

To obtain efficient front fork action adequate spindle lubrication is essential, and attention is recommended weekly or at least once every 500 miles. Occasionally grease should be injected into the various brake spindle bearings via the grease nipples provided.

## BOWDEN CABLES.

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

# ADJUSTMENTS & MAINTENANCE.

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## DECARBONISATION.

The period for which an engine will run satisfactorily without being decarbonised depends to a great extent upon driving conditions. Generally, however, this process should be carried out every 1,500 to 2,000 miles. The need for decarbonising will be indicated by a tendency to pink or knock when ascending hills, or upon accelerating after rounding a corner, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, it is advisable to remove the cylinder each 5,000 miles in order to also inspect the piston rings and remove any deposit from the grooves in which they operate.

### TO REMOVE CYLINDER HEAD FOR DECARBONISATION.

First remove the silencer and exhaust pipe, also the sparking plug and petrol pipe. Then unscrew the mixing chamber cap and gently withdraw throttle and air slides. Then remove the two nuts securing the carburettor to the cylinder head, when this unit can be taken away to avoid damage. Next unscrew the four bolts securing the O.H. rocker housing to the extended cylinder head fixing bolts, when the entire rocker box with push rods and tubes can be taken away. It then only remains to unscrew the four cylinder head fixing bolts when the head can be lifted off. It will be observed that a copper and asbestos gasket is used for the head joint and upon removal every care must be exercised to avoid damage. In the event of any signs of leakage being observed the gasket should be renewed. No jointing mixture or compound of any description is recommended. During the removal and refixing process care must be taken to avoid losing the small hardened steel valve caps, and should the valves be removed for grinding-in purposes, they should not be interchanged. After carefully removing all carbon deposit from both piston top and cylinder head the interior of cylinder should be carefully wiped out with a clean calico rag and smeared with fresh engine oil. In re-assembling, all cylinder head fixing bolts must be uniformly tightened and the best method to ensure this is to tighten down finger-tight only and then go over each bolt in turn, giving a little extra pressure.

## TO GRIND IN VALVES.

Valve grinding is advised upon each occasion of decarbonising. After the cylinder head has been removed as already described, to remove the valves it will be found convenient to rest the head of each in turn on a small block of wood while the springs are being compressed to allow of the removal of the taper valve cap split collar. It may be necessary to give the valve spring cap a sharp tap to release this taper collar. After removing all carbon deposit, the face of each valve seating should be smeared with a good grinding paste (this may be obtained already mixed) and the valve revolved slightly backward and forward (never revolve completely) while light pressure is applied to the head. During this operation it is advisable to occasionally raise the valve off its seating and turn in the guide slightly, afterwards repeating the backward and forward movement.

Generally, one application only of grinding paste will be ample for the inlet, but two or three applications may be necessary to entirely restore the exhaust valve seating. After this grinding in has been satisfactorily accomplished, all traces of the grinding mixture should be carefully washed off with petrol, and both valve stems and guides cleaned thoroughly. Prior to refitting, it is advisable to smear each valve stem with graphite grease.

A special tool for compressing valve springs can be supplied at 6s. 6d. (Part No. TTK8).

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

## TO ADJUST VALVE CLEARANCE.

First remove the O.H. rocker box cap secured by means of a large knurled edge thumb nut. This will expose the adjustable ends of the push rods. Next revolve the engine until the valve which requires adjustment is open, and with the spanners provided in the tool kit, loosen the lock nut securing the adjustable rod end. Then revolve the engine until the valve is completely closed and unscrew the adjustable push rod until the correct clearance is obtained, after which once more revolve the engine until the valve is fully open, and taking care not to disturb the adjustment obtained, carefully secure the lock nut. Always make a point of checking the adjustment obtained after the lock nut has been re-tightened.

NOTE.—The correct clearance between the rocker ends and the valve ends when valves are completely closed and the engine cold is the nearest approach to nil possible. It should be observed that the hardened steel valve end caps are free to be revolved with the fingers while at the same time no perceptible up and down movement of the rocker is possible.

## VALVE TIMING.

The timing gears are marked for re-setting purposes, and the correct opening of the valves is as follows: the inlet commences to open 20 degrees, or  $7/64$ in. before top of exhaust scavenging stroke, and closes 67 degrees, or  $25/32$ in. up the compression stroke. Exhaust valve commences to open 75 degrees, or  $31/23$ in. from bottom of firing stroke, and closes 28 degrees, or  $7/32$ in. down induction stroke. To test valve timing, the tappets must first be set to provide  $.014$ in. clearance. See instructions above for normal running clearances.

## IGNITION SETTING.

The correct ignition setting for the Coil Ignition Model G/2, is  $5/16$ in. before top dead centre on full advance, and for the Magneto Ignition Model G/2M,  $7/16$ in. before top dead centre also on full advance.

### TO RE-TIME IGNITION (Model G/2).

Remove the bakelite contact breaker cap and slacken the screw securing the contact breaker cam. Then with a small punch operating in one of the slots on this cam, give a sharp but light tap. This will loosen the cam on the taper end of the shaft to which it is fitted. Now set the piston and the ignition lever in the position mentioned above, after which gently turn the cam with the fingers in an anti-clockwise direction until the contact points are just about to part, in which position carefully re-tighten the cam fixing screw and replace the bakelite cap. It is essential, in this ignition setting operation, to obtain exactly the prescribed piston setting on the compression stroke, i.e., the stroke at the top of which both valves are closed.

NOTE.—Check contact breaker gap before setting timing ( $.018$  to  $.020$ ).

### TO RE-TIME IGNITION (Model G/2M).

Remove the outer portion of aluminium magneto chain cover and slack off the nut securing the lower sprocket. Then with a stout screwdriver, or the hooked end of a stout tyre lever, gently lever the sprocket loose from the taper on the cam shaft to which it is attached. Then carefully turn the engine until the piston is at the exact position described above (according to model), observing that it is on the stroke at which both valves are closed. Now fully advance the ignition and remove the contact breaker cap, after which gently turn the magneto with the fingers in its ordinary direction, (i.e., contra-clockwise when looking at the sprocket end) until the contact points are just about to break, in which position the sprocket fixing nut must be carefully re-tightened. Needless to add, it is of vital importance to correctly obtain

### To Re-time Ignition (Model G/2M)—contd.

the prescribed piston position and to secure the chain sprocket at the exact position at which the contact points commence to part. To find the exact point of break, place a piece of cigarette paper between the points and turn the magneto armature until the paper is just released, and no more, upon a gentle pull.

### TO ADJUST THE DYNAMO CHAIN.

Adjustment is arranged by revolving the dynamo unit in its cradle mounting, and the correct adjustment should permit a movement of about  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in. as the bottom run of the chain is lightly pressed up and down midway between the sprockets. When checking, try a number of positions and obtain the described adjustment at the tightest place. To adjust, first slacken the dynamo clamp bolt and then twist the unit bodily in its mounting in a forward or clockwise direction to tighten. Always check the adjustment after the clamp bolt has been re-tightened. It will be found that the tension of both dynamo and primary chains can be checked by the fingers through the inspection cap orifice, it being, of course, necessary to remove the cap for the purpose. This cap is released upon unscrewing the knurled-edge screw.

### TO ADJUST THE MAGNETO CHAIN (Model G/2M).

Adjustment to the magneto chain is obtained by tilting the unit bodily on the rear supporting bolt upon which the platform is mounted, the forward fixing bolt holes being slotted for the purpose. To adjust the chain, first remove the outer cover of the chaincase, then slack off slightly only the two supporting bolts by which the magneto platform is fixed and insert a lever or screwdriver under the front edge and tilt the magneto backwards until the correct chain adjustment is obtained, when securely tighten the two fixing bolts, and before replacing the outer chain cover smear the chain with grease if necessary.

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

### TO ADJUST THE PRIMARY CHAIN.

To obtain adjustment for the primary chain provision is made to swing the gear box bodily upon its lower fixing bolt. It will be observed that the upper fixing bolt operates in slotted holes to permit of the necessary movement. To make adjustment, the offside nut of the top gear box fixing bolt must first be slackened. Then to tighten the chain adjustment, first slack off the nut on adjuster bolt nearest the engine and turn the nut furthest from engine clockwise, until the correct chain adjustment is obtained, when retighten the nut nearest engine and also the top gear box fixing bolt nut. Correct chain adjustment should allow a whip or movement of  $\frac{3}{8}$  in. to  $\frac{1}{2}$  in. as the top run of the chain is pressed up and down midway between the sprockets.

## To Adjust the Primary Chain—contd.

NOTE.—Owing to the movement of the gear box necessary for correcting chain adjustments, some small alteration to the gear rod adjustment may be necessary; therefore, upon completion of the former, the adjustment of the gear control must always be checked and corrected if necessary. (See gear control control adjustment, hand only.)

## TO ADJUST THE REAR CHAIN.

Put down centre prop stand, then slack off the rear wheel spindle nuts. Then adjust chain as required by means of the bolts which pass through each of the fork ends, after which securely retighten spindle nuts. The correct adjustment (which should allow a whip of  $\frac{3}{8}$  in. to  $\frac{1}{2}$  in. when chain is pressed up and down) should be obtained for the tightest place.

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

IMPORTANT.—Care is necessary when tightening the rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, about four inches from and parallel to the ground, should be observed to just touch each tyre at both sides of wheel centre simultaneously. Alternatively, a straight wooden batten about five feet long is a very handy article to be used for the purpose of checking wheel alignment, applied as in the case of string, parallel to and about four inches from the ground.

## ADJUSTMENT OF GEAR CONTROL (Hand Change only).

To test for correct gear rod adjustment, proceed as follows: Place cycle on the stand and remove the split pin from the top gear rod yoke end pin (i.e., the pin which passes through the end of the gear lever). Also, at the same time, slack off the lock nut securing this top gear rod yoke end. Now place the gear lever into third 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 in 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.



## TO ADJUST WHEEL BEARINGS.

The wheel bearings on this model are of the ball, cup and cone type, and although care in adjustment to avoid over-tightening is necessary, it is not necessary to adjust with a shake as with taper roller bearings. To adjust either wheel bearing, first slack off the near side axle nut and also the thin lock nut on the inner side of the fork end, then with the special spanner provided, turn the cone in a clockwise direction until all shake is taken up, after which slack off a trifle and re-tighten the locking nut and lastly the outer axle nut.

## CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the most likely cause is incorrect cable adjustment. When correct it should be possible to move the actuating lever (part to which lower end of cable is attached) upward and downward with the fingers and if this free movement cannot be felt, the cable adjustment must be slackened. This is done by screwing down the cable adjuster on the gear box end plate.

## STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for adjustment by exerting pressure upwards from the extreme tips of the handlebars, while the steering damper is completely slacked off. Should any shake be apparent, the top lock nut on steering column should be slacked off and the lower nut screwed down until all trace of slackness has disappeared, when the top domed nut should be again tightened down.

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

## FRONT FORK SPINDLE ADJUSTMENT.

Provision is made for taking up side or end wear of the various fork spindle bearings. The need for adjustment will be made apparent by a click or creaking noise when the steering head is abruptly turned. By placing the fingers partly over the spindle link end and partly upon the lug through which the spindle passes, while turning the steering head, first ascertain which spindle or spindles require adjustment, then after slackening off the right side nut on the spindle to be adjusted, carefully turn the spindle bodily, by means of its hexagonal head, in a clockwise direction to tighten, or vice versa to slacken. Do not adjust more than one half a revolution at a time before a re-trial with the nut again tightened. Care is essential to avoid tight adjustment,

### Front Fork Spindle Adjustment—contd.

which will make the fork stiff in action or entirely prevent it functioning. The necessary friction damper effect is provided independently and is adjusted as follows:—

#### TO ADJUST FORK ACTION DAMPER.

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

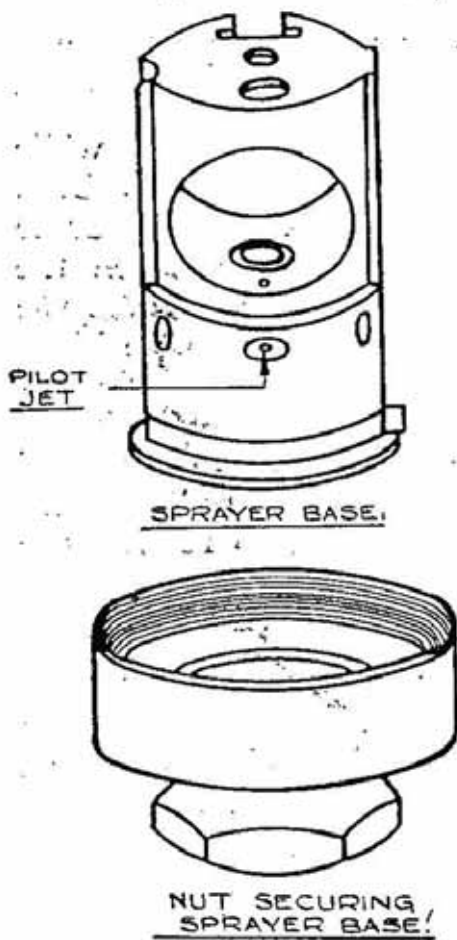
#### CARBURETTOR ADJUSTMENT.

Although owners are advised to refrain from tampering without good cause with the setting of the carburettor, a rough idea how this unit functions and how adjustments may be effected is given below:—

The correct level of petrol is maintained by means of a float and needle valve, operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the petrol supply to the engine is obtained firstly by the main jet, and secondly by means of a taper needle attached to the throttle valve and operating in a tubular extension of the main jet. The main jet controls the mixture entirely from  $\frac{3}{4}$  to full throttle, and the adjustable taper needle from  $\frac{3}{4}$  down to  $\frac{1}{4}$  throttle. The cut-away portion of the air intake side of throttle valve controls mixture from  $\frac{1}{2}$  throttle down to about  $\frac{1}{8}$  open, and a pilot jet with independently adjusted air supply takes care of idling on nearly closed throttle up to about  $\frac{1}{8}$  open. These various stages of control must be borne in mind when any adjustment is contemplated. The correct jet size and throttle cut-away is selected for each model and should not be altered without some very good reason. For either Model G/2 or G/2M the combination is jet size 120 and throttle slide 5x3. With this combination it is possible to use full or nearly full air under all conditions, except perhaps when the engine is pulling hard up hill on full throttle, when some benefit may be obtained by closing the air down a trifle. Weak mixture is always indicated by popping or spitting at the air intake, whilst a rich mixture usually causes bumpy or jerky running in extreme cases, accompanied by black smoke from the exhaust. A rough test for correct setting is to warm the engine up and then fully retard the ignition, and with the air about  $\frac{3}{4}$  open, slowly open up the throttle to full open, during which the engine should respond without misfire, but upon a sudden

## Carburettor Adjustment—contd.

opening of the throttle again with fully retarded ignition and about  $\frac{3}{4}$  air, it should splutter and stop. This is, of course, only a rough test, but is, nevertheless, a fairly accurate guide to correct main jet and needle setting. To check the pilot jet and air control setting, warm up the engine, and with the ignition about  $\frac{2}{3}$  advanced and air about  $\frac{3}{4}$  open, with throttle almost closed, the engine should idle positively and evenly. If it fails to do so, slacken the lock nut securing the pilot jet air screw, which will be observed at the base of the mixing chamber, and find a position at which even firing is obtained. The adjustment of this screw is not unduly sensitive and it should be possible to obtain the correct adjustment in a few seconds. Before concluding that incorrect



carburation is responsible for heavy consumption, and before carrying out any of the tests described, make quite certain that the ignition is set correctly. This is most important. In the event of adjustment of the air screw failing to affect slow running in the manner described, it may be reasonably assumed that the minute passage for petrol has become choked. This is always a possible danger unless meticulous care is taken to prevent the entry of dust or foreign matter of any description into the petrol tank. The jet or petrol passage in question consists of a small hole drilled in the side of the sprayer base. This sprayer base may be pushed out of the mixing chamber upon removing the float chamber and the large nut at the bottom of the mixing chamber. To make the location of the petrol passage quite clear, a line illustration is shown, and in the event of difficulty being experienced, a fine piece of steel wire (a strand of Bowden cable will do) should be passed through the very small hole indicated by an arrow.

**IMPORTANT.**—Never run the engine on full retard and full throttle for more than a few seconds at a time.

**Failure to obtain good idling may be due also to:—**

1. Air leaks, either at the junction of the carburettor and engine, or by reason of a badly worn inlet valve stem or guide.
2. Faulty valve seatings.
3. Sparking plug faulty or points too close.
4. Too much ignition advance.
5. Contact points dirty or setting too close.
6. Defective sparking plug cable.

## Carburettor Adjustment—contd.

**Failure to obtain satisfactory petrol consumption may be due to:—**

1. Late ignition setting (carefully follow instructions).
2. Bad air leaks (most likely distorted flange).
3. Weakened valve springs (renew).
4. Leaky float, causing flooding (renew).
5. Taper needle extension insufficient (note position before altering).
6. Compression poor, due to worn piston rings, or defective valve seatings (test compression with wide open throttle).

## INSTRUCTIONS FOR THE ELECTRICAL EQUIPMENT.

Miller equipment is used on the Coil Ignition Model G/2, while Lucas equipment is utilised on the Magneto Ignition Model G/2M. Both systems are very similar, the only differences being that a detachable panel and inspection lamp is used on the G/2M, while that on the G/2 is fixed, and a voltage control unit is used on the G/2, while the control of charging rate on the G/2M is arranged by switch position. In each case the head lamp is fitted with a double filament driving light bulb and also a parking light bulb, the dipped filament being brought into instant use as and when required by means of a knurled switch ring on the left handlebar. As in car practice, a red warning light is provided on the panel of coil ignition models to remind the driver to switch off the ignition when cycle is stationary. The dynamo current on Model G/2M is so controlled that when the panel switch is at position "C" (daylight position) only half its normal output passes to the battery (about 2 amps.). When the switch is turned to position "H" or "L" the charging rate is automatically increased to its maximum, which is sufficient to cover the consumption of the lamps and still leave a balance of 1 amp. on position "H" and 4 amps. on position "L" (for town riding). By this combination it is within the rider's control to maintain a fully charged battery under all circumstances and over-charging is practically impossible. On Model G/2 the rate of charge is automatically controlled by the voltage control unit, the function of which is to permit a heavy charge while the battery is low with a gradually diminishing rate as the battery becomes charged.

## CARE OF BATTERY.

**Topping Up.**—At least once a month, the vent plugs in the top of the battery should be removed and the level of the acid solution examined. If necessary, distilled water, which can be obtained at all chemists and most garages, should be added to bring the level above the top of the plates, but well short of the bottom of the vent plugs. When examining the cells, do not hold a naked light near a vent, as there is a danger of igniting the gas coming from the plates.

## Care of Battery—contd.

**Storage.**—If the equipment is laid by for several months, the battery must be given a small charge from a separate source of electrical energy about once a fortnight, in order to obviate any permanent sulphation of the plates. In no circumstances must the electrolyte be removed from the battery and the plates allowed to dry, as certain changes take place which result in loss of capacity.

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

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

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

## DYNAMO.

The only parts of the dynamo calling for occasional attention are the brushes and the commutator, which are readily accessible when the end cover is removed. The brushes should slide freely in their holders. They should be clean and the face in contact with the commutator should appear uniformly polished. Dirty brushes may be cleaned with a cloth moistened with petrol. The commutator surface must be kept clean and free from oil or brush dust.

See earlier instructions re dynamo lubrication.

## CONTACT BREAKER (Coil Ignition).

Occasionally remove the bakelite contact breaker cover and examine the contacts. If they are burned or blackened, clean with a very fine emery cloth and afterwards with a cloth moistened with petrol. Take care to wipe away all particles of dirt or metal dust.

## ADJUSTMENT (Coil Ignition).

The contact breaker gap is carefully set and should not be altered unless it varies considerably from the correct setting. If adjustment is necessary, proceed as follows:—

Turn the engine until it is seen that the contacts are fully opened, then slacken the nut securing the stationary contact screw and adjust this screw until the gap is about .018 to .020. After making the adjustment, care must be taken to tighten the locking nut by which the stationary contact screw is secured.

**NOTE.**—Check contact breaker gap at 100 and 300 miles. Owing to an initial settling down, there is a tendency for the gap to decrease in the first few hundred miles of use. This may seriously affect ignition setting. Subsequently, adjustment will only be necessary at long intervals, but should be checked every 1,000 miles.

## 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 with a spanner 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 service is to be obtained with the requisite degree of satisfaction. Therefore, do not wait until tomorrow, but adjust it now.

## CLEANING.

If the machine is used to any extent in bad weather, a small hose is almost indispensable for removing mud. Care should be exercised to avoid directing water on to the engine, carburettor or other such parts. 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 pot of petrol is preferable.

## TYRES AND SERVICE.

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

	Solo.	With Pillion.
Front tyre, 26x3.25	... 14-15lbs.	... 14-15lbs.
Rear tyre, 26x3.25	... 20-21lbs.	... 21-22lbs.

The above recommended pressures apply to average weight drivers. For abnormal weight drivers, or for carrying a pillion passenger, add 2 lbs. per square inch to rear tyre only.

## CORRECTIVE MEASURES.

No adjustments should be made or any part tampered with until the cause of the trouble is known. Otherwise adjustments which are correct may be destroyed.

### Engine Suddenly Stops :—

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

### Engine Fails to Start, or Difficult Starting :—

- Lack of fuel, or insufficient flooding if cold.
- Excessive flooding, allowing neat petrol to enter cylinder.
- Oiled-up sparking plug.
- Stuck-up valve, or valve stem sticky.
- Weak valve spring, or valve not seating properly.
- Too liberal throttle opening.
- Pilot jet choked.
- Contact breaker points dirty, or gap incorrect.

### Loss of Power :—

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

### Engine Overheats :—

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

## Corrective Measures—contd.

### Engine Misses Fire:—

- Valve spring weak.
- Defective or oiled plug.
- Incorrectly adjusted contact breaker
- Incorrectly adjusted tappets.
- Defective sparking plug cable.
- Oil on contact breaker points.

### Excessive Oil Consumption:—

- Stoppage or partial stoppage in pipe returning oil from engine to tank.
- Clogged or partially clogged cartridge filter in oil tank. (Drain sump and test with filter removed).
- Badly worn or stuck-up piston rings, causing high pressure in engine crankcase.
- Air leak at rear oil pump end cap.



## LEGAL MATTERS.

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

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

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

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

## GUARANTEE

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

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

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

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

Any motor cycle, motor cycle combination or sidecar sent to us to be plated, enamelled or repaired will be repaired upon the following conditions, i.e., we guarantee that all precautions which are usual and reasonable have been taken by us to secure excellence of materials

**Guarantee—contd.**

and workmanship, such guarantee to extend and be in force for three months only from the time such work shall have been executed or until the expiration of the six months above referred to, and this guarantee is in lieu and in exclusion of any common law or statute warranty or condition and the damages recoverable are limited to the cost of any further work which may be necessary to amend and make good the work found to be defective.

**CONDITIONS OF GUARANTEE.**

If a defective part should be found in our motor cycles, motor cycle combinations or sidecars, or in any part supplied by way of exchange before referred to, it must be sent to us CARRIAGE PAID, and accompanied by an intimation from the owner that he desires to have it repaired or exchanged free of charge under our Guarantee, and he must also furnish us at the same time with the number of the machine, the date of the purchase, or the date at which the alleged defective part was exchanged, as the case may be.

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

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

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

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.  
PLUMSTEAD,  
LONDON, S.E.18.

DINGLE'S PRINTERS  
COUNCIL SPECIALISTS  
PLUMSTEAD SE 16.

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