

Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

MODELS

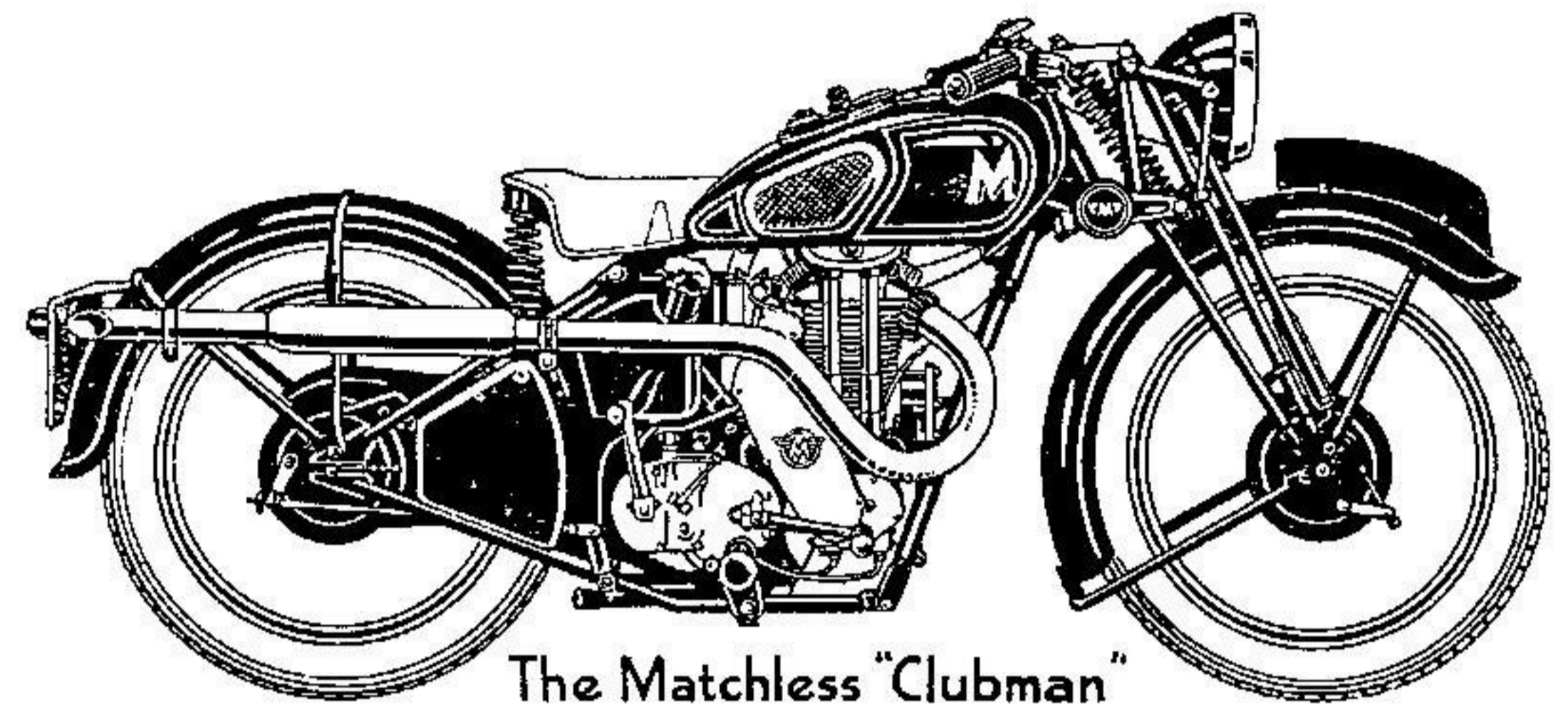
G3 and G8

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DRIVING AND ADJUSTMENT INSTRUCTIONS



The Matchless "Clubman"

MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED

Manufacturers

Registered Offices :

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

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WOOLWICH ARSENAL, S.R.

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Telegrams and Cables : "Matchless," Woolwich.

Telephone : Woolwich 1010 (5 lines).

Code } A.B.C. 5th and 6th Edition
Bentley's
and Private Code

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Offices : 44-45, Plumstead Road, LONDON, S.E.18.

INTRODUCTION.

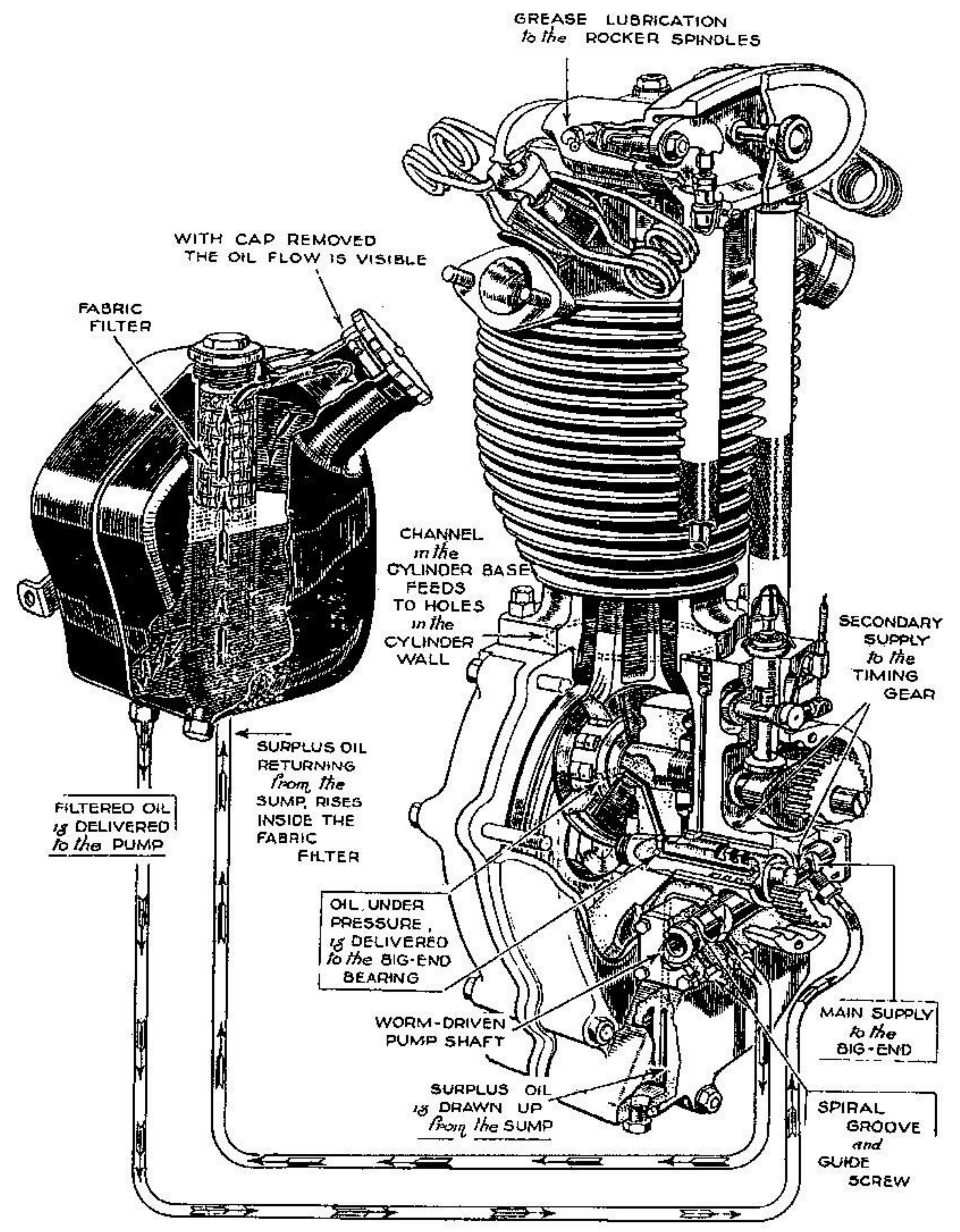
A Personal Message to all "Matchless" Owners.

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, MODELS G3 AND G8.

GENERAL INFORMATION

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. This neutral position is the first position obtained by a downward movement of the pedal from the low gear position, and is indicated by a pointer attached to the foot change pedal. The ignition is advanced or retarded by means of the 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 open 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 pull the gear change pedal upward with the right foot, after which gently release the clutch lever, when the cycle will commence to move forward. When well under way, again disengage the clutch and press the gear change pedal down simultaneously, keeping the right foot on the pedal until the clutch lever has again been released. Then release the pedal and repeat the movement until top gear is reached. For all changes of gear the clutch should be released a fraction of a second only before moving the gear pedal. When in motion it will be sufficient to move the clutch lever only just enough to

Preparation for Use—contd.

ease the drive and, with reasonable care, it will be found possible to make a change of gear without a sound. 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 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 should be checked and corrected if necessary. Subsequent to the initial settling-down process, attention to such details will only be necessary at very infrequent intervals.

"DON'TS" IN DRIVING.

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

"Don'ts" in Driving—contd.

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

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 3), 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.)

CHAINS.

The primary chain runs in oil, and should need very little attention other than occasional adjustment, and the oil kept up to the correct level in the case (verify level weekly). The inspection cap orifice is positioned to prevent over-filling. 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 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.

Every 1,000 miles a small quantity of grease should be injected into the gear box interior. This may be done either through the inspection cap on the gear box top by means of a collapsible grease container which are sold with a bent spout suitable for the purpose, or through the grease nipple on the gear box top adjacent to the inspection cover by means of a grease gun. Lubricants specially recommended are Castrolase (Medium), Mobilgrease No. 2, or Shell Motor Grease (Soft). The gear box must not be entirely filled, and under normal circumstances about one or two ounces every 1,000 miles will be found ample. The inspection cap referred to is slotted at one end to allow of its being turned round to expose the filling orifice upon merely slacking off the fixing nuts. A little grease should also be injected through the nipples on the gear box end. One nipple is provided to permit direct lubrication of the gear change mechanism and another for speedometer drive when fitted, while the one on the end of the kick-starter spindle allows grease to be injected direct to the bearings of this spindle.

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.

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 DECARBONISING.

First remove the exhaust system, petrol pipe and sparking plug. Then unscrew the cap on the carburettor mixing chamber and gently withdraw the throttle and air slides. Next remove the three petrol tank fixing bolts, and if Model G8 also drain all petrol from the tank and remove the U pipe connecting the two sides of the tank (not necessary on G3). Next slide the tank backwards until the rear end rests on the saddle nose and insert a wooden block under the forward end so as to support the tank at a sufficient height to allow free access to rocker box fixing bolts and cylinder head stay fixing. Then slack off the bolt securing the cylinder head stay to the frame tube and after removing the securing nut at the rocker box end gently spring the stay clear. Next raise the bottom portion of each push rod cover tube in turn sufficient to permit the small spring plunger on the upper portion to engage with the hole in the lower part. This engagement will retain the tubes in a telescoped position from which they are released later by merely pressing inwards the small spring plungers referred to. Next remove all the rocker box fixing bolts and gently slide the assembly, including push rods and cover tubes, over towards the timing side, whereupon it will be found possible to lift the whole assembly clear. All that remains is to remove the four cylinder head fixing bolts, when the head may be lifted off. Take care to avoid damaging the soft copper cylinder head gasket or losing the hardened steel valve end caps. All carbon deposit should be gently scraped off the piston with a blunt instrument. Do not overlook deposit in the valve recesses on piston top.

GRINDING IN VALVES.

It is advisable to grind the valves in upon each occasion that decarbonisation is undertaken, and having removed the cylinder head as already described, it will be found convenient, in order to facilitate valve removal, to rest the head of each valve in turn upon a small block (wood preferable) while the springs are being compressed to allow of the removal of the taper valve cap divided collar. It may be necessary to give the valve spring cap a sharp tap to release this taper collar. After carefully scraping all carbon deposit off the cylinder head interior and valve heads, the face of each valve 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 slight 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.

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

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

Grinding In Valves—contd.

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.

The re-assembly after decarbonising should be in the reverse order of dismantling and meticulous care must be taken to see that the cylinder head and cylinder top faces, together with the gasket, are perfectly clean before the head is applied, and also to make certain that all cylinder head bolts are tightened down evenly and firmly. Upon refixing the rocker box assembly it will be found advisable to first remove the cover in order to see that the push rod ends are correctly located encircling the rocker studs. The engine should be revolved to a position at which both tappets are down. In refixing the petrol tank it will be found most convenient to secure the rear end first. When the assembly has been completed and before starting up the engine, carefully check the rocker clearances, and if necessary, adjust the valve tappets as follows:—

TO ADJUST VALVE TAPPETS.

First remove the rocker box cover; this will expose the adjustable ends of the valve 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 end 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 $31/32$ in. from bottom of firing stroke, and closes 28 degrees, or $7/32$ in. down induction stroke. Owing to the presence of what are technically known as quietening curves on the cam flanks it is necessary before checking valve timing to first set the rockers to .014 clearance. See instructions above for normal running clearances.

IGNITION SETTING.

The correct ignition setting for Model G3 is $7/16$ in. before top dead centre, while that for the G8 Model is $9/32$ in. to $5/16$ in., in each case with the ignition fully advanced.

TO RE-TIME IGNITION.

Remove the outer portion of aluminium magneto chain cover and slack off the nut securing the lower sprocket. Then, with a stout screw-driver, or the hooked end of a stout tyre lever, gently lever the sprocket loose from the taper on the camshaft 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 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 $1/4$ in. to $3/8$ in. as the top 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.

Adjustment to the magneto chain is obtained by tilting the unit bodily on the lower crankcase bolt upon which the platform is mounted, the upper 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 crankcase 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,

To Adjust the Magneto Chain—contd.

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 adjustment should allow a whip or movement of $\frac{3}{8}$ in. to $\frac{1}{2}$ in. as the lower run of the chain is lightly pressed up and down midway between the sprockets. It is necessary to remove the inspection cover on the chaincase front to establish the adjustment, and while this cover is removed take the opportunity of checking the oil level, which, as stated elsewhere, should reach the bottom of the inspection hole with the cycle standing on level ground.

TO ADJUST 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 tighten 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 front chain should be inspected, and if attention to each is required, the latter should be treated first.

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

NOTES ON CHAIN ADJUSTMENT.

The tension of all chains should be tried in a number of places and the adjustment described obtained for the tightest position. When making any adjustment take the opportunity of generously applying lubricant if necessary.

TO 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 nut. Then loosen the outer of the two lock nuts on the inner side of the fork end 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.

CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the most likely cause is incorrect cable adjustment. When correct it should be possible to move the actuating lever (part to which lower end of cable is attached) to and fro with the fingers and if this free movement cannot be felt, the cable adjustment must be slackened. This is done by screwing down the knurled edge cable adjuster on the gear box end plate. If the cable adjustment is found satisfactory, then adjustment should be made to the clutch spring adjuster nuts, each of which should be screwed in exactly half turn, when a re-trial should be made. If necessary, repeat—but be careful to adjust each of the four nuts a similar amount. Normally, the correct adjustment of these nuts is five complete turns from right home; and after dismantling the clutch, the correct setting is obtained by screwing all four nuts right home and then slackening off five complete revolutions. Uneven or excessive tightening of these nuts will prevent the clutch releasing properly.

TO ADJUST STEERING HEAD.

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 looseness has disappeared, when the top lock 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 spindle passes, while the steering head is turned, first ascertain which spindle or spindles require adjustment. Then slack off slightly only both of the spindle end nuts, and by means of the thin cone spanner in tool kit applied to the narrow hexagonal collar, which will be observed between the right side spindle link and the fork member, turn the spindle in a clockwise direction to tighten or vice versa to slacken. Do not revolve the spindle more than about one-quarter of a turn before a re-trial with the end nuts RE-TIGHTENED and before considering the adjustment correct make certain that the fork action is perfectly free with the damper slacked off. Finally make certain that all the spindle end nuts are perfectly tight.

NOTE.—On standard models to which a fork damper is fitted only three of the fork spindles are adjustable as described, but on competition models fitted with check springs in place of the ordinary damper, all four spindles are provided with the narrow hexagonal collar referred to and all are adjustable.

TO ADJUST FORK ACTION DAMPER.

(Standard Models only.)

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 down 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.

NOTE.—Progressive action check springs are fitted to competition models in lieu of the orthodox damper. These do not require adjustment.

MIS-USE OF BRAKES.

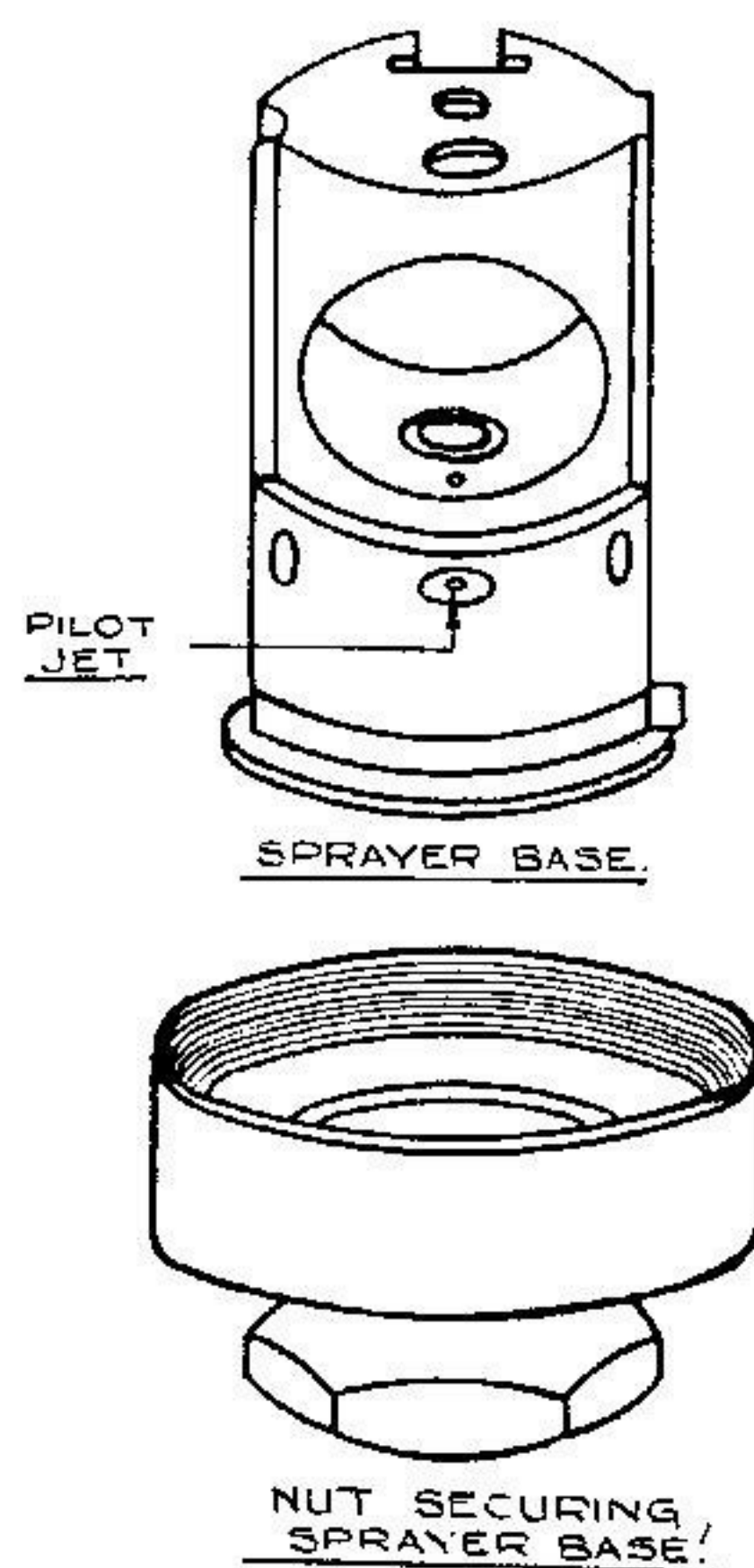
With the highly efficient brakes fitted violent application is liable to result in heavy tyre wear. Should either brake become harsh or fierce in action although not violently applied, three to four drops of ordinary engine oil should be injected into the interior. Be careful to inject only this quantity, otherwise the brake efficiency may become seriously impaired for a time. This attention is only very occasionally necessary and mostly so during and after a run on flooded roads

CARBURETTOR ADJUSTMENT.

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

The correct level of petrol is maintained by means of a float and needle valve, operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the petrol supply to the engine is obtained firstly by the main jet, and secondly by means of a taper needle attached to the throttle valve and operating in a tubular extension of the main jet. The main jet controls the mixture entirely from $\frac{3}{4}$ to full throttle, and the adjustable taper needle from $\frac{3}{4}$ down to $\frac{1}{4}$ throttle. The cut-away portion of the air intake side of throttle valve controls mixture from $\frac{1}{4}$ throttle down to about $\frac{1}{8}$ 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 Model G3 the combination is jet 150 and throttle slide 6x4, while for Model G8 a jet size 180 is used with a throttle slide 29x4. With these combinations 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 a misfire, but upon a sudden opening of the throttle again with fully retarded ignition and about $\frac{3}{4}$ air, it should splutter and stop. This is, of course, only a rough test, but is, nevertheless, a fairly accurate guide to correct main jet and needle setting. To check the pilot jet and air control setting, warm up the engine, and with the ignition about $\frac{2}{3}$ 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

Carburettor Adjustment—contd.



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 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.

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).

CARE OF ELECTRICAL EQUIPMENT.

The dynamo current output 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). When the switch is at position marked "OFF" no current is generated. 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.

DYNAMO.

The dynamo bearings are packed with grease during assembly and lubricators are therefore not provided. After the 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. 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.

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.

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.

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 Sidecar.
Front tyre, 26x3.25 ...	14-15lbs. ...	16-17lbs.
Rear tyre, 26x3.25 ...	20-22lbs. ...	22-24lbs.
Sidecar tyre, 26x3.25	14-15lbs.

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.

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.
- 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.

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.

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.