

Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

MODELS

35 & 36/F7 (FOUR-SPEED)

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new cycle

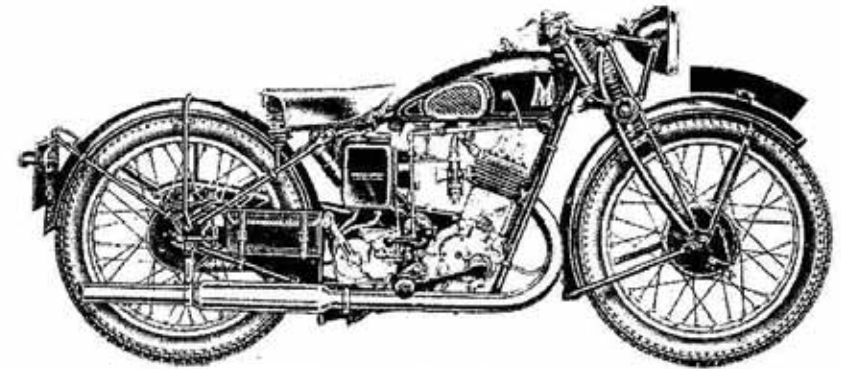
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DRIVING AND ADJUSTMENT INSTRUCTIONS



“Matchless” Model 36/F7.

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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Telephone: Woolwich 1010 (5 lines).

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

All correspondence to:—

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

INTRODUCTION.

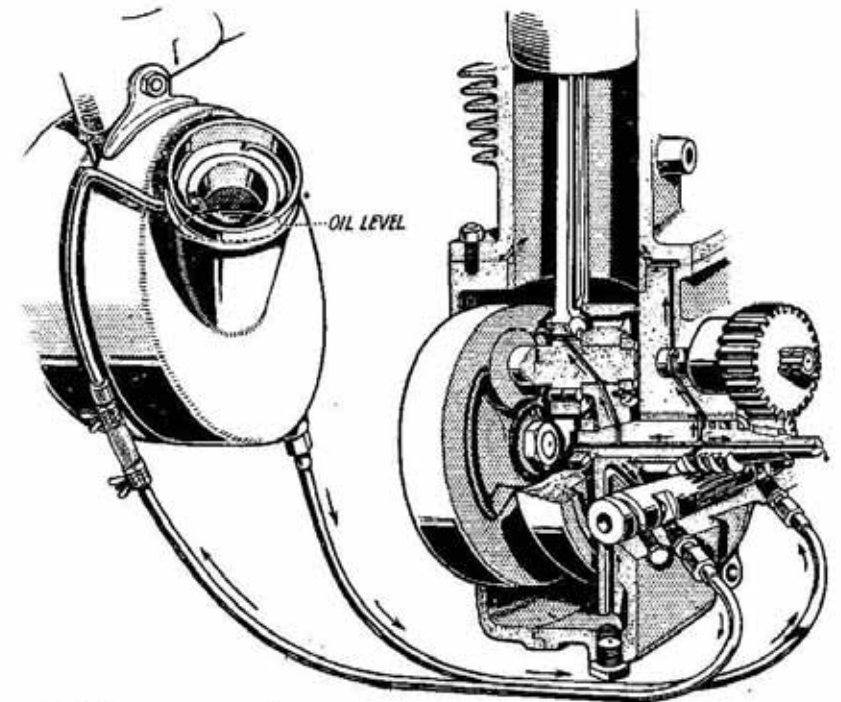
A Personal Message to all " Matchless " Owners.

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.

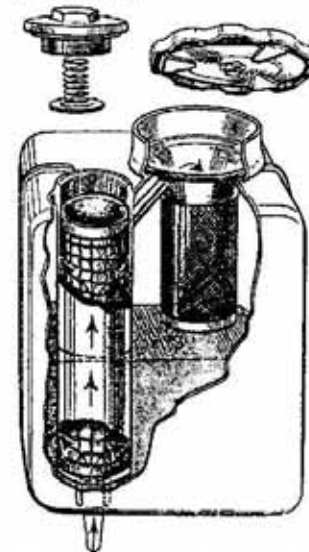
A motor cycle, it must be remembered, is a highly specialised piece of engineering, and while it does not call for great engineering skill in driving, the exercise of a little mechanical sense, and the occasion use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be 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 to its owner.

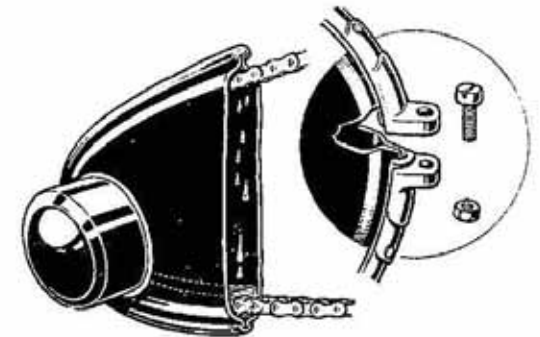
MATCHLESS MOTOR CYCLES (COLLIERS) LTD.



This diagram shows the arrangement of the dry sump lubrication system used on the 36/F7. One end of the large horizontal pump plunger sucks oil from the tank and forces it under pressure to all working parts of the engine, while the other end sucks surplus oil from the crankcase sump and returns it to the tank.



Oil tank section showing fabric oil filter.



Section of oil bath primary chaincase used on 1936 models.

GENERAL INFORMATION

STARTING.

Having filled up with petrol and oil of the recommended brand, it is advisable before starting the engine to sit astride the cycle and to become familiar with the various controls. For starting the gears must always be in neutral, and when the engine is cold, the air should be completely closed, throttle not more than one-sixth open and ignition about two-thirds advanced. On models fitted with decompressor the lever should only be turned just sufficiently to enable the engine to be pushed over compression without difficulty. Too much decompressor action will make starting difficult.

DRIVING.

In general driving it is always advisable to advance the ignition as far as possible without causing knocking. When ascending a steep hill, as the engine slows, care should be taken to retard the ignition just sufficiently to prevent knocking, and if a change of gear then be made, the ignition should be again advanced, as the speed of the engine is increased by the use of the lower gear. For descending exceptionally steep and dangerous hills, the middle or second gear, in the case of 4-speed cycles, may be engaged, enabling the frictional resistance of the engine to assist in retarding the descent. We do not, however, under any circumstances, recommend using the bottom gear for this purpose, as by doing so an abnormal and unfair strain would be imposed upon the rear driving chain under certain circumstances.

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

" DON'TS " IN DRIVING.

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

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: For summer—Castrol XXL, Mobiloil D, or Aeroshell; and for 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

Lubrication—contd.

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. On latest models, 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,

Notes on the Oiling System—contd.

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.

On early 1935 models lubrication of the primary and dynamo chains is arranged by means of a positive drip feed from the oil tank. The rate of supply is adjustable by means of a needle screw adjuster at the bottom of the oil tank. The rate of delivery when engine is cold is six to eight drops per minute and periodically the chain cover front should be removed in order to check this rate of flow, and the opportunity should be taken to adjust the chains if necessary. Failure to maintain the correct flow of oil will inevitably result in chain failure and these instructions must not, therefore, on any account be ignored.

Chains—contd.

On late 1935 and 1936 models an oil bath totally-enclosed chaincase is fitted and the only care necessary is to maintain a correct level of oil in the case, the inspection cap of which is positioned to prevent any overfilling. Ordinary engine oil is used and the level should not under any circumstances be allowed to fall below about 3-16th inch under the edge of the inspection cap orifice. 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.

Once every 1,000 miles about one to two ounces of grease should be added if necessary. It is not desirable to entirely fill the box with grease, the correct level being about two-thirds full. Remember, however, that too much is preferable to too little.

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.

To obtain efficient front fork action, adequate spindle lubrication is essential and attention is recommended weekly or at least once every 500 miles.

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.

To decarbonise, first remove the exhaust pipe and silencer. Then unscrew the carburettor mixing chamber cap and withdraw the throttle and air slides. Next remove the petrol pipe, sparking plug, valve chamber cover and also the aluminium valve caps. Then remove the three cylinder holding-down nuts, when the engine should be turned until the piston is at its lowest position in the cylinder, which latter is then free to be removed. The carbon deposit should be carefully scraped off piston top and cylinder top, after which all traces of the deposit should be carefully wiped off with a clean calico rag. Prior to refitting, both piston and cylinder interior should be generously smeared with perfectly clean engine oil. Tighten down cylinder fixing nuts evenly and firmly.

TO GRIND IN VALVES.

During each alternate decarbonisation, it is desirable to remove the valves and grind in to restore the seatings, clean the stems and guides, etc. Having removed the aluminium valve caps and valve spring inspection cover, gently force the bottom valve spring cap up with a stout lever, at the same time holding the valve head down on its seating until it is possible to withdraw the valve cotter. Then smear a little grinding paste on the seating and with a screwdriver in the slot in the valve head, gently move the valve to and fro (never rotate completely), raising the valve off its seating between each few movements. When the grinding paste ceases to bite, remove the valve and wipe the seating clean. If necessary, apply another coating of paste and repeat the process. Generally, one application only is sufficient to restore the seating of either inlet or exhaust valve, but it may happen that the latter will require a second application to remove all traces of pit marks. Having restored the valve faces, carefully clean off all traces of the grinding paste and thoroughly wipe both valve stems and valve guides, when the valves may be replaced, care being taken not to mix their respective positions. Before refitting the valve inspection cover, check the tappet clearances, which should be .012in. for the inlet and .012in. for the exhaust. These clearances should be constantly and accurately maintained to obtain the best results, and a cheap set of engineer's feeler gauges will be found very useful for checking purposes.

TO ADJUST VALVE TAPPETS.

Remove valve spring cover and with the spanner provided in tool kit, hold the tappet and slack off the lock nut securing the adjustable tappet head. Then screw the head up or down as may be required to obtain the correct clearance, after which securely tighten the locking nut. The correct clearances, as mentioned elsewhere, are .012in. for the inlet and .012in. for the exhaust.

NOTE.—Tappet clearances should be tested while the engine is warm (not hot), and if fitted with decompressor device, the lever should be in the normal running position marked "Off."

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 7.64in. before top of exhaust scavenging stroke, and closes 67 degrees, or 25.32in. up the compression stroke. Exhaust valve commences to open 75 degrees, or 31.32in. from bottom of firing stroke, and closes 28 degrees, or 7.32in. down induction stroke. To test valve timing, the tappets must first be set to provide .014in. clearance. See instructions above for normal running clearances.

IGNITION SETTING.

The correct ignition setting for Model F/7 is 7.16in. before top dead centre with ignition fully advanced.

TO RE-TIME IGNITION.

Remove the bakelite contact breaker cover 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.

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 $\frac{1}{8}$ in. to $\frac{3}{8}$ 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

To Adjust the Dynamo Chain—contd.

bodily in its mounting in a forward or clockwise direction to tighten. Always check the adjustment after the clamp bolt has been re-tightened. With the latest model it will be found that the tension of both dynamo and primary chains can be checked by the fingers passed 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 FRONT 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.

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 adjustment.)

TO ADJUST REAR CHAIN.

Put down centre prop stand, then slack off 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.

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 (Taper Roller Type), 1935 and Early 1936 Models.

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

TO ADJUST WHEEL BEARINGS (Ball and Cone Type), Late 1936 Models.

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 slight shake as with taper roller bearings. To adjust either wheel bearing, first slack off the near

To Adjust Wheel Bearings (Ball and Cone Type)—contd.

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 retighten the locking nut and lastly the outer axle nut.

STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for correct 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 domed nut on steering column should be slacked 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, 1935 and Early 1936 Models.

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 slacking off both nuts, turn the spindle bodily by means of its hexagonal end, left-hand or contra clockwise to take up slack or vice-versa to slacken. Do not turn more than half a revolution before a re-trial, and care is essential to guard against over-tightening, when the fork will become stiff in action or most probably refuse to function. The fibre washers which are fitted between the lug ends, and the spindle side plates are not provided for frictional purposes, but to prevent actual seizure, in the event of the spindle adjustment being too tight. The necessary friction damper effect is provided independently and is adjusted as follows:—

FRONT FORK SPINDLE ADJUSTMENT, Late 1936 Models.

The method of endwise adjustment is identical on this model, but for the fact that hexagonal-headed spindles are used, and it is therefore only necessary to slacken the near side nuts to permit of spindle rotation. It is unnecessary to disturb the adjustment of the spindle which carries the hand damper control on either model.

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.

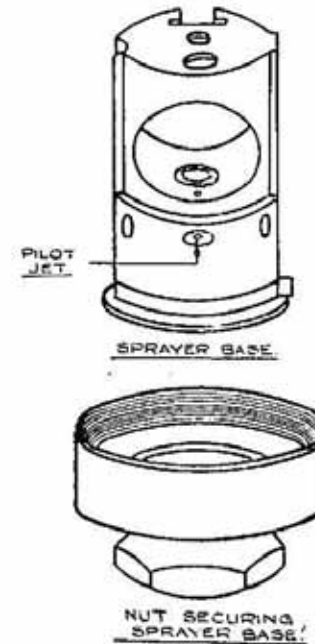
Although owners are advised to refrain from tampering without good cause with the setting of the carburettor, a rough idea how this unit functions and how adjustments may be effected is given below:—

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 $\frac{1}{4}$ 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 the Model F/7 the combination is jet size 70 and throttle slide type 4x4. 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 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

Carburettor Adjustment—contd.

and needle setting. To check the pilot jet and air control setting, warm up the engine, and with the ignition about $\frac{3}{8}$ 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 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 or incorrect tappet clearance.
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).
7. Incorrect tappet adjustment.

INSTRUCTIONS FOR THE ELECTRICAL EQUIPMENT.

The equipment comprises the Lucas Type E3A/AOA dynamo, Lucas ignition coil and contact breaker, Lucas Type DU.42C head lamp and Type MT110 tail lamp. The head lamp is fitted with a main bulb, set approximately at the focus of the reflector, which provides the main driving light, and also a pilot bulb, mounted slightly above the other, which gives a dipped anti-dazzling beam for use when meeting traffic or for town riding and parking. The head lamp also houses the switch assembly, cut-out and ammeter, together with a warning lamp which gives a red light to remind the driver to switch off the ignition while the machine is stationary. When driving, the anti-dazzle bulb is brought into use by means of a ring switch on the handlebar, the operation of which cuts off the main bulb and switches on the pilot bulb. The dynamo output is so arranged that when the head lamp 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" (night position), the charging rate is automatically increased to the maximum, which is sufficient to cover the current consumed by the lamps and still leave a balance of about 1 amp. on the charge side. With the head lamp switch on position "H" and the dimming device in operation, the charge rate recorded on the ammeter is about 4 amps. With this arrangement, over-charging is practically impossible, and with reasonable care a well-charged battery will be maintained.

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 elec-

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.

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

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.

	Front.	Rear.
Models with 26x3.00 tyres ...	14-15lbs. ...	22-23lbs.
Models with 26x3.25 tyres ...	14-15lbs. ...	20-21lbs.

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

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

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.

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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.
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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.