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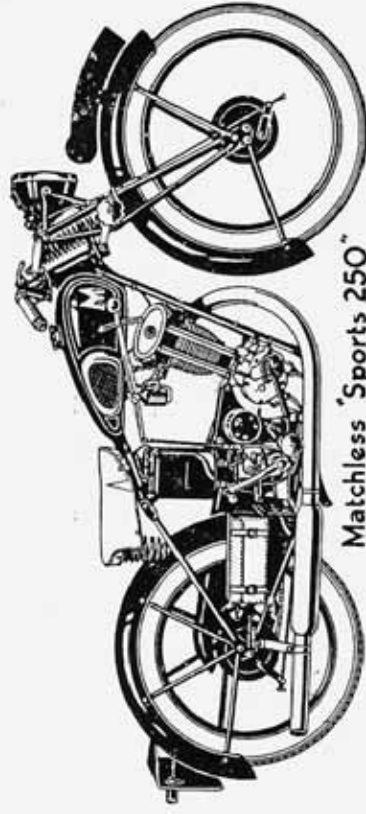
MODELS
34/F and 34/F7

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DRIVING & ADJUSTMENT INSTRUCTIONS



Matchless "Sports 250"

MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED,

Manufacturers,

Registered Offices:

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

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INTRODUCTION.

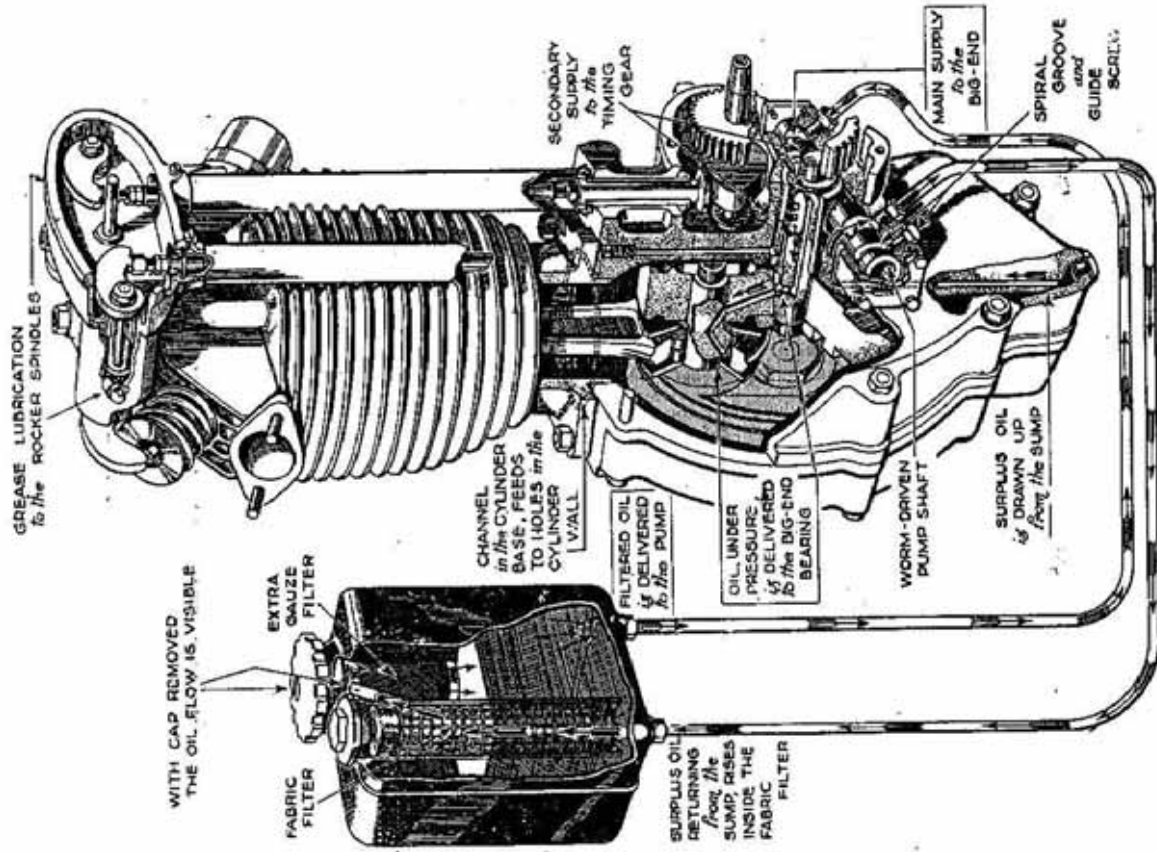
A Personal Message to all "Matchless" Owners.

It is our 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 your cycle, and may bring needless trouble and expense to you, its owner.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.



Engine Unit Model 34/F. Showing Oiling System.

GENERAL INFORMATION

TAKING OVER A NEW MACHINE.

Having filled up with petrol and oil of the brand recommended it is advisable before starting the engine to sit on the cycle and memorise the various controls. Neutral position of the gears must always be engaged before starting up. This neutral or free engine position is the first notch back from the extreme forward or rather downward movement of the gear lever. The ignition is advanced or retarded by means of the small lower lever on the left handlebar. The throttle is operated by a twist grip on the right handlebar and the air by means of a small lever also on the right handlebar. All controls advance or open by an inward movement. For starting, the ignition should be about half advanced, the throttle about one-quarter open, and the air completely closed. The petrol is turned on by pushing in the end of the plunger on the tap marked "On" (Model F) or by pulling out the plunger (Model F/7). To operate the drain tap of this model give the plunger a slight twist and again pull outward.

A decompressor device is provided to facilitate starting and is controlled by a twisting movement of the handle projecting from the top of the timing gear cover. The ignition is switched on by turning the handle on the head-lamp to the position marked "C" for daylight running or to "H" for night riding. A red light will be observed through the ammeter window when the switch is at either of these positions and the engine idle. The object of this red light is to indicate that current is passing to the ignition coil and unless the switch is turned to the "Off" position in daylight or to the "L" position at night-time if parking lights are required, a quickly run-down battery will inevitably result. The red light must, therefore, be regarded as a warning indicator and is actually provided to guard against such an oversight. A separate dimming switch is fitted on the left handlebar to enable the head light to be dimmed when required as a matter of courtesy to passing vehicles or to conserve current consumption from the battery. This dimming switch cuts out of circuit the main head lamp bulb and brings into circuit a smaller bulb. Assuming that all levers, etc., have been set as described, to start the engine first flood the carburettor until petrol actually overflows from the vent hole. Then having turned the decompressor handle to the position marked "On," give the kickstarter a vigorous push downwards, when the engine should immediately start. As soon as the engine starts, turn the decompressor handle to the "Off" position and close the throttle slightly to reduce the speed. Then while the engine is idling, raise

Taking Over a New Machine—contd.

the oil tank filler cap in order to check the circulation of oil (see later notes). After allowing the engine to run for a moment or two to warm up, sit over the cycle and give a gentle push forward to release the prop stand, then release the clutch by pulling inward the large lever on the left handlebar and place the gear in first or low gear position (downward from neutral). Then gently release the pressure on the clutch lever, when the cycle will commence to move forward. When under way, again release the clutch and simultaneously shift the gear lever into middle gear position, releasing the pressure off the clutch lever gently, immediately the change of gear has been made. Repeat the movement to obtain top gear. Do not under any circumstances race the engine while cold and remember that for all changes of gear the clutch should be released a fraction of a second only before moving the gear-lever. When in motion it will be found sufficient to move the clutch lever only just enough to ease the drive and with reasonable care it will be found possible to make changes of gear without a sound.

Important Note re Decompressor.—To facilitate the movement of the decompressor lever it will be found beneficial to gently move engine by means of the kickstarter pedal as the lever is turned to the "On" position, and it will be found advisable to only move the decompressor handle just sufficiently far to relieve the compression partly. With the handle too far back starting may be 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 second gear may be engaged, enabling the frictional resistance of the engine to assist in retarding the descent. We do not, however, under any circumstances, recommend using the bottom gear for this purpose, as by so doing, 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 in top gear. If this practice is adopted from the first, much unnecessary gear changing will be avoided.

Important Note.—Always turn the petrol off after a run (Model 34/F only). Owing to the down-swept inlet port there is 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 consequent engine seizure, if this simple precaution is not taken. Therefore, turn the petrol off after every run.

"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 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** make a practice of starting on second speed.
- 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 a maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount's maximum capabilities. However, until all bearings are well run in, etc., 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, or to see that the red light in head lamp is not showing after a run.

LUBRICATION

ENGINE.

Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. After extensive tests we have decided to recommend Wakefield Castrol N.L. as the most suitable oil, and advise all owners to use this and no other. The identifying letters used by most oil firms, denoting the different grades in which that oil is supplied, are imitated, so that it is essential when ordering oil to specify the brand as well as the grade, for example: Wakefield Castrol N.L., and not just N.L. As an additional precaution, it is advisable to buy from the branded cabinets or from sealed tins. See where your oil is drawn from.

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 to observe the oil in circulation, and a practice should be made of checking this before each run. To do so it is necessary to raise the oil tank filler cap while the engine is warming up, when the returning oil will be observed running from the small spout immediately underneath the cap. No provision is made for external adjustment of the oil supply, the correct delivery to each part 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 this 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 engine is cold to a level higher than one inch below the return pipe outlet. (See Oil Circulation Illustration).

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, 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 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 the 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. A double system of filtering the oil is provided in the oil tank. The first consists of a gauze screen in the filler cap orifice to prevent the admission of fluff or foreign matter when replenishing, and the second consists 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 both filters 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 removed, thoroughly washed out with petrol, and after refitting, filled to correct level with fresh clean oil. To avoid undue waste it is quite permissible to arrange for this clean-cut 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.

CHAINS (MODEL 34/F).

The primary chain and the dynamo chain both run in an oil bath case and provided that the oil level is correctly maintained will require no attention other than occasional adjustment. The inspection cap

Chains (Model 34/F)—contd.

orifice on the chain case determines the correct level and it is imperative that the level is not allowed to fall more than about $3/16$ ins. below the height of the bottom edge of this orifice. Failure to maintain this level will result in rapid chain wear and possibly destruction. It is, therefore, advisable to make a practice of verifying the level weekly. The rear chain should be removed every 1,500 to 2,000 miles in summer and every 1,000 miles during winter, and thoroughly washed in paraffin. After carefully wiping it should then be immersed in a bath of molten tallow or, as a poorer substitute, ordinary engine oil. If the latter is used, the chain should be laid in soak overnight in order to ensure penetration to all link joints. If treated in this manner, at least 8,000 to 10,000 miles of satisfactory service should be obtained.

CHAINS (MODEL 34/F7).

This model is not fitted with an oil bath case for the primary and dynamo drive, but lubrication 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 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. The rear chain of this model (F/7) should be treated in exactly the same manner as described above for the Model F.

GEAR BOX.

Once every 500 miles a grease-gun-full of Wakefield Castrolase (light) should be injected in the gear box via the small grease nipple provided. Occasionally the filling plug should be removed in order to verify the level of lubricant in the box, which should be from one-third to half-full. If the above-mentioned injections do not maintain this correct level, the interval between each should be reduced accordingly.

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. (Wakefield Castrolase [Medium] suitable.)

NOTE.—Castrolase can be obtained in special push-down lid canisters for easily filling the grease gun in $\frac{1}{4}$ lb., 1 lb. and 2 lb. sizes

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. On the Model F the nipples are fitted to the various lugs, but on the F/7 they are located on the ends of the spindles.

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

ADJUSTMENTS & MAINTENANCE

DECARBONISATION.

TO DECARBONISE MODEL F/7.

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 DECARBONISE MODEL F.

First remove the silencer and exhaust pipe, also the sparking plug and petrol pipe. Then unscrew the mixing chamber cap and gently withdraw throttle and air slides. Then remove the two nuts securing the carburettor to the cylinder head, when this unit can be taken away to avoid damage. Next unscrew the four bolts securing the O.H. rocker housing to the extended cylinder head fixing bolts, when the entire rocker box with push rods and tubes can be taken away. It then only remains to unscrew the four cylinder head fixing bolts when the head can be lifted off. It will be observed that no cylinder head gasket is used, the joint being made by grinding the head-on to the cylinder spigot in exactly the same manner as prescribed for grinding in a valve. If, upon dismantling, the head joint shows any signs of leakage it should be carefully ground in prior to re-assembly, and needless to add every care must be taken to prevent the admission of grinding paste into the cylinder interior during the process. During the removal and refixing process care must be taken to avoid losing the small hardened steel valve caps, and should the valves be removed for grinding-in purposes, they should not be interchanged. After carefully removing all carbon deposit from both piston top and cylinder head the interior of cylinder should be carefully wiped out with a clean calico rag and smeared with fresh engine oil. In re-assembling, all cylinder head fixing bolts must be uniformly tightened and the best method to ensure this is to tighten down finger-tight only and then go over each bolt in turn, giving a little extra pressure.

TO GRIND IN VALVES MODEL F/7.

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 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 .004 for the inlet and .006 for the exhaust. These clearances should be constantly and accurately maintained to obtain the best results as regards silence of valve gear,

To Grind in Valves Model F/7—contd.

and a cheap set of engineers' feeler gauges will be found very useful for checking purposes.

TO GRIND IN VALVES MODEL F.

In the case of the Model F, valve grinding is advised upon each occasion when decarbonisation is undertaken. After cylinder head has been removed as described, to remove valve springs it will be found convenient to rest the head of valve on a small block (wood preferably) while the spring is 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 removing all carbon deposit, the face of each valve seating should be smeared with a good grinding paste (this may be obtained already mixed) and the valve revolved slightly backward and forward (never revolve completely) while light pressure is applied to the head. During this operation it is advisable to occasionally raise the valve off its seating and turn in the guide slightly, afterwards repeating the backward and forward movement.

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

A special tool for compressing valve springs can be supplied at 6s. 6d. (Part Number TTK.8). A small clamp tommy wrench to facilitate valve grinding can also be supplied at a cost of sixpence.

TO ADJUST VALVE TAPPETS MODEL F/7.

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 .004 for the inlet and .006 for the exhaust.

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

TO ADJUST VALVE CLEARANCE MODEL F.

Remove the O.H. rocker cover secured by a large knurled-edge hand nut which will expose the adjustable ends on the valve push rods. Then with the spanners provided, hold the hexagonal end of the push rod and unscrew the lock nut securing the adjustable end. Then screw

To Adjust Valve Clearance Model F.—contd.

the adjustable cup end up or down as required until the correct setting is obtained, after which securely lock in position by means of the lock nut provided.

NOTE.—Correct clearance between rocker ends and valve stems when valves are down on their seatings and engine cold, is the nearest approach to nil obtainable. It should be observed that the hardened steel valve stem 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. The decompressor lever must necessarily be set to the "Off" position while checking valve clearances.

VALVE TIMING.

The timing gears are marked for resetting 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 (Model F/7) is top dead centre with ignition lever fully retarded. On the Model F the recommended setting is 1/4in. before top dead centre with ignition lever fully advanced.

TO RETIME 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 in 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 retighten 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 1/4in. to 1/2in. 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 the Dynamo Chain—contd.

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 retightened. With the Model F 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. With the Model F/7 the adjustment of either chain can be felt through the open back of the chain guard.

TO ADJUST 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 off-side 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 farthest 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 $\frac{3}{16}$ 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. Hand only.)

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 tighten spindle nuts. The correct adjustment (which should allow a whip of $\frac{3}{16}$ 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 rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, and about four inches from and parallel to the ground, should be observed to just touch each tyre at both sides of 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 adjustments described obtained for the tightest position. When making any adjustment take the opportunity of generously applying lubricant if necessary.

TO ADJUST WHEEL BEARING MODEL F.

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 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.

TO ADJUST WHEEL BEARINGS MODEL F/7.

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.

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) inward and outward slightly with the fingers, and if this free movement cannot be felt, the cable adjustment must be slackened. This is done by screwing down the cable adjuster on the gear box end plate.

STEERING HEAD ADJUSTMENT.

The steering head should be occasionally tested for correct adjustment by exerting pressure upwards from the extreme tips of the handlebars, while the steering damper is completely slackened off. Should any shake be apparent, the top domed nut on steering column should be slackened and the lower nut screwed down until all trace of slack-

Steering Head Adjustment—contd.

ness 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 FORKS, SPINDLE ADJUSTMENT MODEL F/7.

Provision is made for taking up side or end wear of the various fork spindle bearings. The need for adjustment will be made apparent by a click or creaking noise when the steering head is abruptly turned. By placing the fingers partly over the spindle link end and partly upon the lug through which the spindle passes, while turning the steering head, first ascertain which spindle or spindles require adjustment, then, after slackening off 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 FORKS, SPINDLE ADJUSTMENT MODEL F.

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 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.

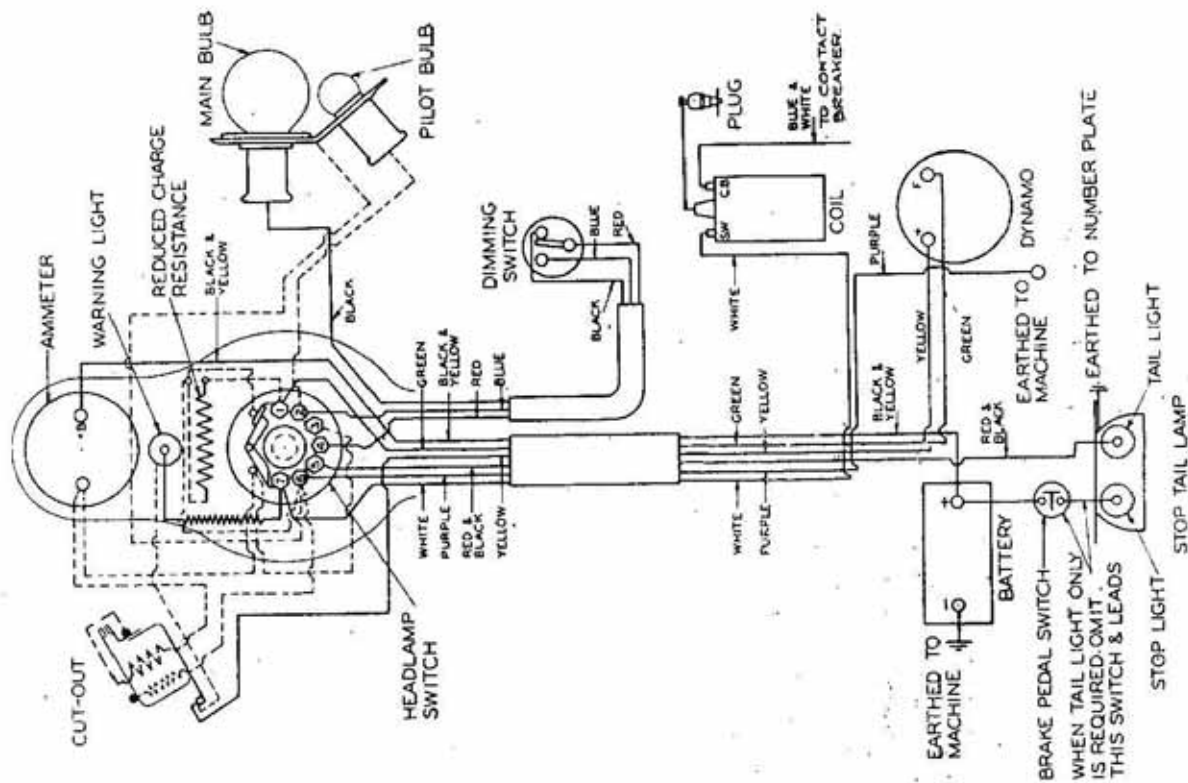
CARBURETTOR ADJUSTMENT.

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.

Carburettor Adjustment—contd.

The correct level of petrol is maintained by means of a float and needle valve operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers, and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the main petrol supply to the engine is obtained firstly by the jet or orifice, and secondly by a taper needle passing through the jet and attached to the throttle valve. As the throttle valve is opened a smaller part of the taper needle comes into operation, thereby increasing the passage for the petrol. This needle being adjustable in length provides a fairly wide range of control without actual alteration to the jet size. A pilot or slow running jet is provided to take care of slow running or idling, and a throttle stop controls the actual speed at which the engine runs when the throttle is closed to the maximum extent possible, in which position the engine should run or "tick over," to use an expression favoured by motor cyclists, slowly but positively. The correct setting of the main jet should permit of full air being used when running fast on full throttle. To test for correct setting, start up engine, and after allowing a few seconds to warm up, fully retard the ignition and fully open throttle. If it is then possible to open the air beyond the $\frac{3}{4}$ or $\frac{1}{2}$ open position, too large a jet is indicated and the needle attached to the throttle valve must be lowered or lengthened. This needle, it should be explained, is secured by a flat strip cotter engaging with a small notch in the needle. Several of these notches are provided to permit adjustment. When correct, the engine should commence to splutter immediately the air lever is opened more than about $\frac{1}{4}$, but should run satisfactorily on the fully closed air position. In no circumstances should the engine be run for more than a few seconds with the throttle fully open and ignition fully retarded. The only other adjustments are the air supply to the pilot jet and the throttle stop. The adjusting screw for the pilot jet air supply will be observed at the base of the mixing chamber. Screwing in enriches the mixture and, vice versa, unscrewing weakens it. It must be clearly understood that adjustment to this screw affects the mixture only on extremely small throttle openings. Having set the throttle stop screw to give the desired idling engine speed, the pilot jet air screw is turned in the required direction to give even firing. The adjustment is not particularly sensitive, and no difficulty should be experienced in finding the correct position, when the locking nut should be tightened down to prevent any movement by vibration. Adjustment, if any, should be made to this air screw while the engine is warm and the ignition fully or nearly fully advanced. We mention this in order to remove the possible impression that the pilot jet setting is not correct should the engine stall when started up from cold. Once correctly set the pilot jet should not require attention except perhaps in extremes of temperature.

WIRING DIAGRAM.



INSTRUCTION FOR THE ELECTRICAL EQUIPMENT.

The equipment comprises the Lucas Type E3AS Dynamo, Lucas Ignition Coil and Contact Breaker, Lucas Type DU2C Head Lamp and Type M110 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, overcharging 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 naked lights near 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.

DYNAMO.

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

Lubrication.—As the bearings are packed with grease before leaving the works lubricators are not provided. After the motor cycle has run several thousand miles, the dynamo should be dismantled for cleaning, adjustment and repacking the bearings with grease. This is carried out preferably at the nearest Lucas Service Depot.

CONTACT BREAKER.

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

ADJUSTMENT.

The contact breaker gap is carefully set and should not be altered unless it varies considerably from the gauge on the ignition screw-driver. If adjustment is necessary, proceed as follows:—

Turn the engine until it is seen that the contacts are fully opened, then slacken the screw securing the stationary contact arm and move this arm until the gap is set to the thickness of the gauge. After making the adjustment, care must be taken to tighten the fixing screw by which the stationary contact plate or arm is secured.

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 to-morrow, but adjust it now.

CLEANING.

If the machine is used to any extent in bad weather, a small hose is almost indispensable for removing mud. Care should be exercised to avoid directing water on to the engine, 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. Reckitt's "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 may be regarded as satisfactory, and we urge all users to make a practice of checking the actual pressure by means of a low-pressure Schrader tyre gauge. This takes a few seconds only, and will amply repay the owner by reason of additional service and immunity from failures.

	Solo.	With Pillion.
Model F.—Front, 26x3.25	... 14-15lbs.	... 14-15lbs.
Model F.—Rear, 26x3.25	... 18-20lbs.	... 20-22lbs.
Model F/7.—Front, 25x3.00	... 14-15lbs.	... 14-15lbs.
Model F/7.—Rear, 25x3.00	... 20-22lbs.	... 22-24lbs.

CORRECTIVE MEASURES.

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

Engine Suddenly Stops:—

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

Corrective Measures—contd.

Engine Fails to Start, or Difficult to Start:—

- 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.
- Decompressor action excessive.
- Run-down battery (no red light showing).

Loss of Power:—

- Decompressor in "on" position.
- 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. (Watch for this).

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. (Watch for this).

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.

LEGAL MATTERS.

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

To comply with the Law relating to motor cycles, the owner of a "Matchless" Model 34/F or 34/F7 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 5/- 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 R.F.1/2 (motor cycles only). The address of the above Taxation Department can be obtained by enquiry at a Post Office.
4. The Form R.F. 1/2, 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. For a full year, January 1st to December 31st, the fee chargeable is 30s.
5. See that his 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 cycle.

For registration purposes the following particulars will be required:—

Type of Model—"Matchless" 34/F or 34/F7.

Manufacturer's horse-power—2.46.

Engine Number—Stamped on crankcase (left side) adjoining cylinder base.

Frame Number—Stamped on seat lug immediately underneath the saddle.

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 and workmanship, such guarantee to extend and be in force for three

Guarantee—contd.

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 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.

MACHINE NUMBERS.

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

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

Always quote these numbers when corresponding or ordering spare parts.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.