



INSTRUCTION BOOK

MODELS

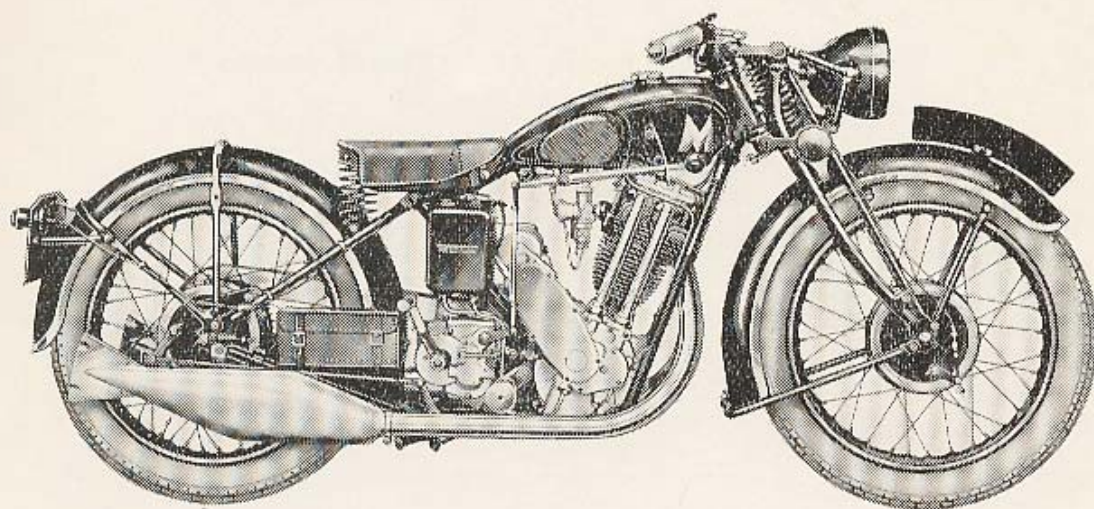
33/D2 33/D3 33/D5 33D/6
and 33/D7

Supplied free with
each new cycle.

Replacement Copies
1/-.



DRIVING & ADJUSTMENT INSTRUCTIONS



"Matchless" Model 33/D3.

MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED,

Manufacturers.

Registered Offices :

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

Nearest Station :

WOOLWICH ARSENAL, S.R.

Factories :

BURRAGE GROVE and MAXEY ROAD,
PLUMSTEAD, S.E.
And MAST POND WHARF, WOOLWICH.

Telegrams and Cables : "Matchless," Woolwich."

Telephone : Woolwich 1010 (4 lines)

Code { A.B.C. 5th & 6th Edition
Bentley's
& 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 desire that you obtain from your " Matchless " the service, comfort, enjoyment, and innumerable miles of low-cost travel that we have earnestly endeavoured to build into it.

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

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

MATCHLESS MOTOR CYCLES

(COLLIERS) LTD.

GENERAL INFORMATION

TAKING OVER A NEW MACHINE.

Having filled up with petrol and oil of the recommended brand, it is advisable before starting the engine to sit on the cycle and to become familiar with the controls. Neutral or free engine position of the gear lever is about midway between the rear of gate and the centre notch. No step in the gate is provided to indicate this neutral position, which will, however, be easily felt by reason of the action of the spring-loaded indexing plunger fitted. The engine must always be started with the gear in this neutral position. Ignition is advanced or retarded by the small lower lever on left side of handlebar. To advance the spark, this lever is drawn inwards; for starting it should be about two-thirds advanced only.

NOTE.—When cycle is provided with twist grip throttle control, the air lever is alone fixed to right side of handlebar, while the ignition remains fitted to the left side as before.

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

The petrol is turned on when the sliding petrol tap plunger is pulled out as far as possible without twisting. To open the drain passage, the plunger is revolved as far as possible, and again pulled outwards to the farthest extent possible. Assuming that the tanks have been filled with petrol and oil of the recommended brand, and that all levers have been set as above, to start the engine firstly flood the carburetter by depressing the tickler button on float chamber until petrol actually overflows from the vent hole, then turn the decompressor lever on the top of the timing gear case to the "on" position, and with the right foot give the kick-starter pedal a sharp and vigorous push downward.

IMPORTANT.—When using decompressor for starting, do not set decompressor lever further back than is necessary just to relieve compression—with lever too far back starting will be difficult.

Taking Over a New Machine—contd.

Repeat if necessary. Immediately the engine has started turn the decompressor to the "off" position and reduce the throttle opening to check the engine speed. Do not under any circumstances race the engine while cold, but allow it to idle for a moment or two in order to warm up, and see that the oil is circulating properly. Then, seated on the cycle, disengage the clutch by drawing inwards the lever situated on the left side of the handle-bar. Then shift gear lever back (on Models 33/D5, 33/D2, 33/D3, and 33/D6), and forward on (Model 33/D7), into the first or low gear position, after which gently release the pressure from handle-bar clutch lever, when the cycle will commence to move forward. When well under way, smartly declutch and simultaneously shift the gear lever into middle gear position as before, releasing the clutch lever gently, when the change has been made, after which repeat the operation to obtain 3rd or top gear.

For all changes of gear the clutch should be released a fraction of a second only before shifting the gear lever, and with reasonable care a change of gear can be made without a sound.

The movements of gear lever must be made slowly and firmly; under no circumstances should the gears be allowed to grate (see Gear Control Adjustment). On making a change of gear, particularly from middle to top, or 3rd, it is desirable to hold the gear lever in position until the clutch is engaged.

IMPORTANT NOTE RE FOOT-CHANGE GEAR CONTROL.

With a foot change a totally different method of operation should be observed from that described above for hand control.

The effort obtained with the foot and the leverage on the control is very much greater than with hand change, and certain precautions must be observed to avoid damage to the gears and control mechanism.

Under no circumstances should a violent kick be given to the pedal, a steady pressure being all that is required. It must be clearly understood that under certain conditions the layshaft and mainshaft gears may be rotating at equal speeds, and the dogs on the gears may be positioned against each other. Therefore, if undue force is used, breakage of the gear selectors or control mechanism could result from violent pressure on the pedal.

In making a change of gear, the clutch should be released and the pedal simultaneously moved with a steady toe movement. When the end of the pedal travel has been reached, the pedal must be held firmly with the foot until the clutch has been re-engaged. It is not sufficient to just press the pedal and remove the foot when the end of the travel has been reached.

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

Driving—contd.

the speed of the engine is increased by the use of the lower gear. For descending exceptionally steep and dangerous hills, the middle or 2nd 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 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 engine or drive above a maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount's maximum capabilities. However, until all bearings are well run in, it is advisable to refrain from speed bursts, and the accompanying possibility of seized 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 full throttle, etc., when in a residential district. Any motor-cycle (or, for that matter, any motor vehicle) when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every “ MATCH-LESS ” 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

" Don'ts " in Driving—contd.

be inaudible, while in a quiet, narrow street of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.

LUBRICATION.

ENGINE.

Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. After extensive tests we have decided to recommend Wakefield Castrol X.L. as the most suitable 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 X.L., and not just X.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 on all Models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run. On instrument panel equipped models an oil indicator is arranged on the panel itself and the oil circulation can be seen at a glance. On all other Models it is necessary to raise 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 the 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, other than that for inlet valve lubrication (Models 33/D2, 33/D3, and 33/D6) referred to later, 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 pre-determined level, overflows into the flywheel

Engine—contd.

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 is provided with a direct oil passage ensuring an 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.

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 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 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 plunger is the larger one, 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 500 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

Notes on the Oiling System—contd.

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-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. As already mentioned, a part of the oil pump delivery on panel equipped models, is by-passed through an oil indicator and returned to the engine. The adjustment for inlet valve lubrication referred to earlier consists of a pointed screw fitted to the oil " T " piece attached to the overhead rocker housing. Turning the screw clockwise reduces the quantity of oil allowed to pass, and adjustment should only be made in the event of any shortage or excess being made apparent by squeaking, or alternatively excess leakage.

CHAINS.

The Primary chain on Models 33/D5, 33/D3, 33/D2, and 33/D6, runs in oil, and should need very little attention, other than an occasional adjustment, and the oil kept up to the correct level in the case. The inspection cap orifice is positioned to prevent overfilling. On the Model D/7 the primary chain is normally kept well lubricated by oil mist from the crankcase release valve, which mist settles out in the chain cover and is led by means of a suitable duct into the path of the chain. Although for all ordinary purposes this method of lubrication is quite satisfactory, if the maximum degree of service is desired, it is advisable to entirely remove the chain once every 3,000 miles and thoroughly wash in paraffin. After carefully wiping it should then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in soak overnight in order to ensure penetration to all link joints. The rear chain on all Models should be similarly treated, but at rather more frequent intervals, not more than 1,500 to 2,000 miles in Summer, and 1,000 miles in Winter.

If treated in this manner at least 8,000 to 10,000 miles of satisfactory service should be obtained.

MODEL 33/D7 ONLY.

To obtain satisfactory transmission smoothness and the maximum chain life, it is essential to maintain continuous lubrication of the engine shaft shock absorber. A grease nipple is provided, and an injection of grease is recommended every 300 miles, or even more frequently if transmission harshness develops. Wakefield Castrolase (Medium) recommended. On other Models fitted with oil bath chain case no external application of lubricant for the shock absorber is necessary.

GEAR BOX.

Once every 1,000 miles about two or three ounces of Wakefield

Gear Box—contd.

Castrolase (Medium) should be added if necessary. It is not desirable to entirely fill the box with grease, the correct level being about two-thirds full.

NOTE.—Wakefield Castrolase is conveniently supplied in collapsible tubes provided with a suitable bent spout to facilitate injection into the gearbox interior.

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 $\frac{1}{2}$ lb., 1 lb., and 2 lb. sizes.

BRAKE AND GEAR-ROD JOINTS, ETC.

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

BOWDEN CABLES.

To lubricate Bowden inner cables has hitherto meant the entire removal of the cable, unsoldering one end nipple, etc., altogether a difficult and expensive job and one consequently mostly neglected. By means of a specially designed oil gun it is now possible to flood the inner wire with lubricant in a few seconds, and we can only state that the effect of this on a dry cable has to be tried to be believed. Oil is injected through a small bared patch on the outer casing and is forced through the spiral casing on to and along the inner wire. All Bowden cables on the Models 33/D7, 33/D5, 33/D2, 33/D6, and 33/D3 are fitted with small metal clips which will be observed fitted approximately to the centre of each. These clips cover the small bared patch referred to above, and to apply the gun it is only necessary to slide the clip along the casing to enable the specially constructed gun to be clamped with the bared patch occupying a central position on the rubber pad on the gun nozzle. A few turns of the screwed plunger is then all that is required to efficiently flood the entire length of the cable with lubricant. The cost of this special gun is 6s. 6d., and we recommend every owner to have one in his home tool kit.

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

Decarbonisation—contd.

accelerating after rounding a corner, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, Models 33/D2, 33/D3, and 33/D6, it is advisable to remove the cylinder each 5,000 miles in order also to inspect the piston rings and remove any deposit from the grooves in which they operate.

TO DECARBONISE MODELS 33/D7 AND 33/D5.

First remove exhaust pipe and silencer. Then unscrew carburetter mixing chamber cap and withdraw throttle and air slides. Next remove petrol pipe, sparking plug, valve chamber cover, and also 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 cylinder, which latter is then free to be removed. The carbon deposit should then 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 MODELS 33/D3 33/D2, AND 33/D6.

First remove silencer and exhaust pipe (both sides in case of Models 33/D2 and 33/D3), also sparking plug and petrol pipe. Then unscrew the top cap of carburetter mixing chamber and withdraw throttle and air valves. Next disconnect the three oil pipes connected to the overhead rocker housing. Then raise the lower portion of each tappet rod cover tube sufficiently to permit the small spring plunger on the upper portion to engage with the hole in the lower part, which engagement will maintain this telescoped position. Now remove the two front tank fixing bolts and raise the front end of tank as far as permissible. Next unscrew the three bolts by which the rocker assembly is fixed, and withdraw the assembly complete with tappet rods and cover tubes. It now only remains to remove the various cylinder head fixing bolts, when the head will be free to be withdrawn. It may be necessary to give the head a sharp jolt upwards to release the spigoted joint, which occasionally becomes somewhat firmly fixed with carbon deposit. During the removal and refixing process care must be taken to avoid losing the small hardened steel valve end caps, and should the valves be removed for grinding-in purposes, they must on no account be interchanged. After carefully removing all carbon deposit from both piston top and cylinder head, the interior of the 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 each down finger-tight only, and then go over each bolt in turn, giving a little extra pressure. Should the head joint when dismantled show any signs of leakage it should be "ground in" in exactly the same manner as prescribed for grinding-in valves, great care, of course, being

To Decarbonise Models 33/D3, 33/D2 and 33/D6—contd.

necessary to prevent the admission of any grinding mixture into the cylinder interior, and to remove all traces of the grinding paste from the joint faces prior to finally placing the head in position.

TO GRIND-IN VALVES MODELS 33/D5 AND 33/D7.

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 cap 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 pitmarks. 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 clearance, which should be .006 for both inlet and exhaust. These clearances should be constantly and accurately maintained to obtain the best results as regards silence of valve gear, and a cheap set of engineer's feeler gauges will be found very useful for checking purposes.

TO GRIND-IN VALVES MODELS 33/D3, 33/D2, AND 33/D6.

In the case of Models as above, 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 slight pressure is applied to the head.

NOTE.—A small clamp tommy wrench to facilitate valve grinding can be supplied at a cost of sixpence. During this operation it is advisable occasionally to 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

To Grind-in Valves Models 33/D3, 33/D2 and 33/D6—contd.

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).

TO ADJUST INLET OR EXHAUST TAPPETS, MODELS 33/D7 AND 33/D5.

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 .006 for both inlet and exhaust.

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

TO ADJUST INLET OR EXHAUST TAPPETS, MODELS 33/D2, 33/D3, AND 33/D6.

First expose the tappet requiring adjustment by telescoping the tappet rod cover tube, as already described. Then with the spanners provided in the tool kit hold the tappet and at the same time slack off the lock nut securing the adjustable tappet head. Then screw the head up or down as may be required to obtain correct clearance, which it must be noted is checked at the valve end, after which securely tighten the lock nut against the tappet end.

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 correct setting for the closing and opening of valves is as follows: Inlet commences to open 20 degrees or $\frac{1}{2}$ in. before top of exhaust scavenging stroke, and closes 67 degrees or $\frac{13}{16}$ in. up the compression stroke. Exhaust valve commences to open 75 degrees or 1 and $\frac{1}{16}$ in. from bottom of firing stroke and closes 28 degrees or $\frac{1}{4}$ in. down induction stroke. To test these settings the rockers should be set at .014 for the Models 33/D3, 33/D2, and 33/D6 and .014 tappet clearances for Models 33/D5 and 33/D7. See instructions for normal running clearances.

IGNITION SETTING.

With ignition full retarded the contact points of magneto should commence to break approximately $\frac{1}{16}$ in. before top dead

Ignition Setting—contd.

centre of compression stroke (Model D/7 only), $1/16$ in. after top dead centre for Models 33/D2, 33/D3, 33/D5, and 33/D6.

TO RE-TIME MAGNETO, MODEL D/7.

Remove the front chain guard, then detach the magneto or maglita chain sprocket. Then carefully turn the engine in the ordinary direction of rotation until the piston has nearly reached the top dead-centre of compression stroke—*i.e.*, the stroke during which piston moves upwards, while both valves are closed. In order to determine the exact position of the piston, which should be about $1/16$ in. down the compression stroke, it is desirable in the case of the D/7 Model to remove one or both of the aluminium valve caps when the piston is visible. In the case of the overhead valve Models the piston position can be best determined by passing through the sparking plug hole a piece of stout wire of sufficient length to reach the piston with an inch or two projection outside. Having obtained the exact piston position, remove the magneto or maglita contact breaker cover and place the ignition lever in the fully retard position. (NOTE.—In the case of the maglita, the spring control of the contact breaker automatically provides the retard position when the cable is released by the removal of the bakerlite cover.) Now gently turn the magneto or maglita armature in the normal direction of rotation until the contact points have just parted. This exact position can best be determined by inserting between the contact points a strip of very thin paper. When this strip can just be removed is the correct setting. All that now remains is to refix the magneto sprocket and chain without disturbing the positions of either engine shaft or magneto shaft. It will be observed that the magneto sprocket is provided with five keyways which in conjunction with the twelve chain teeth provided make it possible to couple up with very fine limits of error. Before finally tightening the sprocket fixing nut, it is advisable to carefully check the setting obtained. To do this, revolve the engine until the piston is again $1/16$ in. before the top dead centre of the compression stroke, and again insert a piece of very thin paper between the contact points. Now gently move the contact breaker slightly towards the advanced position and observe that the paper strip can be freely withdrawn immediately the contact breaker is moved from the fully retard position, although held firmly by the contact points when the breaker is at full retard. If correctly set the paper strip will be free immediately the contact breaker is moved, and if this is not observed, a correction is necessary. Having made certain of this point, carefully tighten the magneto sprocket fixing nut.

NOTE.—A special locking washer is used for the sprocket fixing nut of the maglita unit. Also two flats are machined on the sprocket itself, the object of which is to permit the sprocket to be held securely while the fixing nut is being tightened or slackened, thereby relieving the armature shaft from any strain. Under no circumstances should an endeavour be made to slacken or tighten this nut without holding the sprocket stationary by means of the

To Re-time Magneto, Model D/7—contd.

flats referred to, and a suitable spanner which is provided in the tool kit. It is easily possible to bend the armature shaft if these precautions are not taken. The locking washer, it will be observed, is held against the face of the sprocket by means of a spring ring encircling the nut. To release this locking washer, carefully remove the spring ring by means of a sharp implement such as the tip of a penknife blade, when the locking washer is free to be drawn off the fixing nut.

TO RE-TIME MAGNETO, MODELS 33/D2, 33/D3, 33/D5 AND 33/D6.

Remove the outer portion of the aluminium magneto chain cover and slack off the nut securing the chain sprocket at magneto end. Then with a stout screwdriver gently lever this sprocket off the taper end of the magneto shaft, and when loose carefully revolve the engine until the piston is at exact top dead centre on the firing stroke (that is the topmost position of piston with both valves closed). Now fully retard the ignition, and taking care not to revolve the engine, gently turn the magneto armature backward or anti clockwise until the contact points are just about to break, in which position the sprocket fixing nut should be carefully and firmly tightened. To check for correct setting, again turn the engine until T.D.C. of firing stroke is obtained, and while carefully watching the contact points, move the ignition lever from full retard to about $1/3$ in. advanced. In this small movement the contact points should be observed to definitely separate.

TO ADJUST MAGNETO CHAIN.

Adjustment of the magneto driving chain is obtained by tilting the magneto bodily by means of its hinged platform, a screwed adjuster bolt, easily accessible, being provided for the purpose. When making adjustments it is desirable to first remove the chain cover, then slacken the crankcase bolt upon which the platform pivots and also the crankcase bolt upon which the adjuster screw is mounted. Now, to tighten the chain adjustment, unscrew the upper adjuster nut about half a turn and tighten the lower one a corresponding amount. Repeat as necessary, but be careful to leave the two adjustment nuts tightly secured. Lastly, re-tighten the two crankcase bolts and refix chain cover.

NOTE.—The correct chain adjustment should allow a whip of movement of $\frac{1}{8}$ in. to $\frac{1}{4}$ in. as the top run of the chain is lightly pressed up and down midway between the sprockets.

TO ADJUST FRONT CHAIN.

To obtain adjustment for the primary chain provision is made to swing the gearbox 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 gearbox 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

To Adjust Front Chain—contd.

engine clockwise, until the correct chain adjustment is obtained, when re-tighten the nut nearest engine and also the top gearbox 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 gearbox, 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. To correct adjustment (which should allow a whip of $\frac{3}{8}$ in. to $\frac{1}{2}$ in. when chain is pressed up and down) should be obtained for the tightest place.

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

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

NOTES ON CHAIN ADJUSTMENT.

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

TO ADJUST WHEEL BEARINGS.

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

To Adjust Wheel Bearings—contd.

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.

ADJUSTMENT OF GEAR CONTROL (HAND).**Applying to Models 33/D2, 33/D3, 33/D5 and 33/D6.**

After adjustment has been made to the primary chain, the gear lever adjustment should be checked and corrected if necessary. To do this, jack the back wheel up on the stand. Then work the gear lever into middle gear position while rocking the rear wheel to and fro. Then carefully examine the position occupied by the gear lever in the wide central notch of gear quadrant. The correct position is exactly central and if any adjustment is necessary it is obtained by disconnecting the operating rod at either end and screwing the ball-jointed end connection up or down the rod as may be necessary. It should be noted that a coarse thread is provided on one end of the rod and a fine thread on the other. Should a complete turn of the coarse threaded end therefore provide more adjustment than is necessary, then the adjustment must be obtained from the fine threaded end. Incorrect adjustment will cause the lever to rattle in the quadrant in middle gear position and the need for adjustment may be assumed if this rattle is experienced.

ADJUSTMENT OF GEAR CONTROL (HAND), MODEL 33/D7.

After an adjustment has been made to the primary chain, the gear lever adjustment should be checked and corrected, if necessary. To do this, jack the back wheel up on the stand, and while gently rocking the rear wheel to and fro, move the gear lever in the gate sufficiently either side of the neutral notch to feel the dogs on gears grating, carefully noting at the same time the distance the gear lever travels past the neutral position. The movement either side should be exactly similar, and adjustment to the length of the rod should be made to correct if necessary. This adjustment is obtained by removing the yoke end pin which passes through the lever end, and after unscrewing the locking nut, screw the yoke end down or, up the rod as may be required. It is important that this checking be carefully carried out, and in practice, the operation as described above will be found extremely simple.

CLUTCH ADJUSTMENT.

ALL MODELS. In event of clutch slip being experienced, the adjustment of the clutch-operating cable should first be inspected. When correctly adjusted it should be possible to move the actuating lever (part to which lower end of cable is attached) to and fro slightly with the fingers, and if this free movement cannot be felt the adjustment must be slackened off. This is done by screwing down the cable adjuster fixed on the gear box end plates.

MODELS 33/D2, 33/D3, 33/D5 and 33/D6 only. If the cable

Clutch Adjustment—contd.

adjustment is found satisfactory, then adjustment should be made to the clutch spring adjuster nuts, each of which should be screwed in exactly $\frac{1}{2}$ turn, when a retrial should be made. If necessary, repeat—but be careful to adjust each of the four nuts a similar amount. Normally, the correct adjustment of these nuts is seven complete turns from right home; and after dismantling the clutch, the correct setting is obtained by screwing all four nuts right home and then slackening off seven complete revolutions. Uneven or excessive tightening of these nuts will prevent the clutch releasing properly.

TO ADJUST STEERING HEAD.

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

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

FRONT FORKS, SPINDLE ADJUSTMENTS.

Provision is made for taking up side or end wear of the various fork spindle bearings. The need for adjustment will be made apparent by a click or creaking noise when the steering head is abruptly turned. By placing the fingers partly over the spindle link end and partly upon the lug through which spindle passes, while the steering head is turned, first ascertain which spindle or spindles require adjustment. Then 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:—

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 conditions for the purpose. The ebonite damper hand nut should be screwed sufficiently tight to make the fork action sluggish under such cir-

To Adjust Fork Action Damper.—contd.

cumstances as those described, and will subsequently require very little variation for other conditions of road surface to provide the maximum degree of comfort.

CARBURETTER ADJUSTMENT.

Although owners are advised to refrain from tampering without good cause with the setting of the carburetter, 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 carburetter 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 now possible to open the air beyond the one-third or half-open position it would indicate a too large jet, 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 one-third, but should run satisfactorily on the fully closed air position. In no circumstances should the engine be run for more than a few seconds in this fully retarded, fully opened throttle position. The only other adjustments are the air supply to the pilot jet and the throttle stop. The adjusting screw for the pilot jet air supply will be observed at the base of the mixing chamber. Screwing-in enriches the mixture and vice versa, unscrewing weakens it. 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

Carburettor Adjustment.—contd.

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, and air lever one-third open. 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.

PERIODICAL INSPECTION OF NUTS.

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 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.

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 Sidecar.

Front	tyre—25 x 3.00	...	...	15-16	...	15-16
Front	tyre—26 x 3.25	...	...	14-15	...	14-15
Rear	tyre—25 x 3.00	...	...	20-22	...	22-24
Rear	tyre—26 x 3.25	...	...	16-18	...	20-22
Side	tyre—25 x 3.00	...	...	—	...	15-16
Side	tyre—26 x 3.25	...	...	—	...	14-15

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

CORRECTIVE MEASURES.

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

Corrective Measures—contd.

ENGINE SUDDENLY STOPS.

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

ENGINE FAILS TO START, OR DIFFICULT TO START.

- Lack of fuel, or insufficient flooding if cold.
- Oiled-up sparking plug.
- Stuck-up valve, or valve-stem sticky.
- Weak valve-spring or valve not seating properly.
- Too liberal throttle opening.
- Pilot jet choked.

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 carburetter float.
- Silencer choked with carbon deposit.
- 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 carburetter out of order.
- Silencer choked with carbon deposit.
- Creeping ignition lever.

ENGINE MISSES FIRE.

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

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

Legal Matters—contd.

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 studiously to refrain from any of the practices enumerated.

To comply with the Law relating to motor-cycles, the owner of a “MATCHLESS” Model, 33/D5, 33/D7, 33/D2, 33/D3 and 33/D6, 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 of 30/- for Models 33/D2 and 33/D7, with or without electrical equipment. For Models 33/D3, 33/D5 and 33/D6, the fee is £3 for a full year with or without electrical equipment. For the attachment of a sidecar to the Model 33/D5, and additional fee of £1 is chargeable.
5. See that his front plate is illuminated on both sides 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 requested:—

Type or Model—“MATCHLESS” 33/D7, 33/D5, 33/D2, 33/D3 and 33/D6, as the case may be.

Manufacturer's horse-power—“MATCHLESS” Models 33/D7 and 33/D2, 2.46; Models 33/D3 and 33/D6, 3.49; Model 33/D5, 4.98.

GUARANTEE.

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 been 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 sidecar 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 other 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 this manufacturers.
3. The attaching of a sidecar by any form of attachment not provided, supplied or approved by us.

NOTE.—We have designed and produced a special sidecar chassis for use on Models 33/D5, 33/D6 and 33/D3, which we have proved by prolonged tests extending over enormous mileages to give satisfaction, but we are not prepared to approve the fitting of any other type of sidecar chassis on the above "light" models. Any motor-cycle, motor-cycle combination, or sidecar sent to us to be plated, enamelled or

Guarantee—contd.

repaired will be repaired upon the following conditions—*i.e.*, we guarantee that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, such guarantee to extend and be in force for three months only from the time such work shall have been executed or until the expiration of the six months above referred to, and this guarantee is in lieu and in exclusion of any common law or statute warranty or condition, and the damages recoverable are limited to the cost of any further work which may be necessary to amend and make good the work found to be defective.

CONDITIONS OF GUARANTEE.

If a defective part should be found in our motor-cycles, motor-cycle combinations or sidecar, 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 beneath the cylinder base.

MATCHLESS MOTOR CYCLES
(COLLIERS) LTD.

