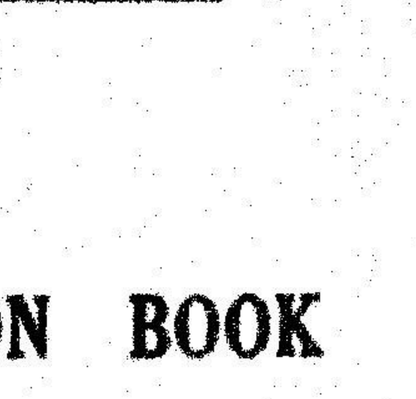
Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

MODELS
X/3 and XR/3

Supplied free with each new cycle.

Replacement Copies 1/- each



1000/11/31.

LEGAL MATTERS.—Before it is now possible to obtain an Inland Revenue Licence an Insurance Certificate must be produced. Compulsory Insurance applies to Third Party Risk only, but other risks may of course be covered on the same Policy at owners desire. In most cases, in order to avoid delay, Insurance Companies issue a temporary Certificate covering the period between date of actual Insurance and the issue of Policy and Certificate proper. This temporary Certificate, or Cover Note, as it is generally termed, will suffice for the purpose of obtaining Revenue Licence, and must be forwarded to the Licencing Authority together with Form R.F.1/2 referred to elsewhere.

& 1933

Page 4.

NOTE.—On 1932 Models the air and ignition advance and retard levers are fitted on the right and left sides of handlebar respectively.

& 1933

Page 7

OIL FILTERS.—On 1932 Models two separate filters for the oil are provided, the first consisting of a gauge screen in the filler orifice to prevent the entry of fluff or foreign matter of any description while replenishing. The second filter consists of a felt cartridge through which the oil is compelled to pass before returning into the tank via the small spout immediately underneath the filler cap. This cartridge filter can be removed upon unscrewing the hexagonally headed cap which will be observed at the side of oil tank. About once every 500 miles both filters should be removed and carefully washed in clean petrol, while, as already described, once each season the entire tank should be removed and thoroughly cleaned out prior to being filled with a supply of new oil.

& 1933

CHAIN LUBRICATION.—On 1932 Models a positive means of lubricating the primary chain is employed. This consists of a gravity feed from the oil tank controlled by means of a needle fitted to the "T" piece attached to the under side of oil tank. The correct supply is about one to two drips per minute, and any test should be made while the engine is running and preferably after a journey, when the oil is warm and thin. The chain should be examined occasionally in order that satisfactory lubrication may be verified, and under no circumstances should signs of oil shortage be ignored. Adjustment can be effected in a few seconds by screwing in or out as the need may be the hexagonal-headed needle screw referred to above. This adjustment is somewhat sensitive, but once set, no further attention is called for unless in the event of a stoppage or partial stoppage in the pipe leading from the oil tank into the path of the primary chain. Such a stoppage can be immediately cleared by unscrewing the needle valve and subsequently returning same to its previous setting.

& 1933

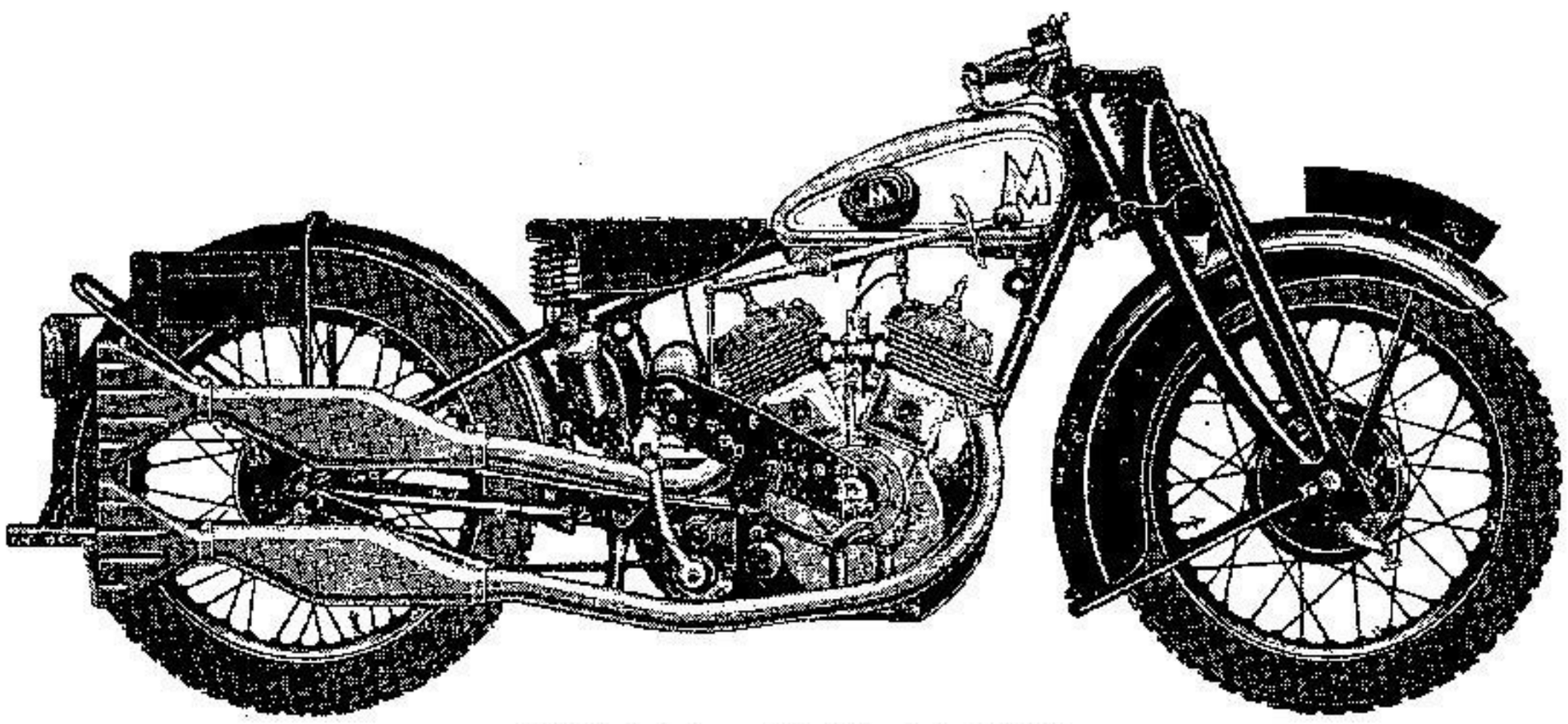
LUBRICATION.—On 1932 Models a plunger type of oil indicator is fitted in place of the sight feed bowl used earlier. Oil is fed through a by-pass on the delivery side of the pump up to this plunger indicator from whence it drains by gravity to the top bevel gear chamber the oil level in which latter is controlled by an external drain pipe to the oil tank. Oil is thrown by the revolving bevel gears into the camshaft chamber the correct level in which is maintained by means of a drain passage through which surplus passes back into the top bevel gear chamber.

& 1933

TYRE PRESSURES RECOMMENDED FOR 1932 MODELS.

	Solo.	*Single Sidecar.*	*Double Sidecar.*
Front Tyre . 26 x 3.25	. 15-16 lbs.	. . 16-17 lbs.	. . 17-18 lbs.
Front Tyre . 27 x 4.00	. 14-15 lbs.	. . 14-15 lbs.	. . 14-15 lbs.
Rear Tyre . 26 x 3.25	. 20-22 lbs.	. . 22-24 lbs.	. . 22-24 lbs.
Rear Tyre . 27 x 4.00	. 16-18 lbs.	. . 18-20 lbs.	. . 16-18 lbs.
Side Tyre . 26 x 3.25	. ——	16-17 lbs.	. . 18-20 lbs.
Side Tyre . 27 x 4.00	. ——	14-15 lbs.	. . 15-16 lbs.

DRIVING & ADJUSTMENT INSTRUCTIONS.



"Matchless" Model X/3.

MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED,

Manufacturers,

Registered Offices:

44-45, Plumstead Rd., 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 and 6th Edition*
Bentley's
and Private Code

All correspondence to:—

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

INTRODUCTION.

A Personal Message to all "Matchless" Owners.

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

A motor cycle, it must be remembered, is a highly specialised piece of engineering, and while it does not call for great engineering skill in driving, the exercise of a little mechanical sense, and the 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 wholeheartedly 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 the first notch backward from the extreme front end of gate and engine must always be started with the gear lever in this neutral position. Ignition is advanced or retarded by means of a lever on left of handlebar. To advance the spark this lever is drawn inwards, for starting it should be about three-quarters advanced.

NOTE.—When cycle is provided with twist grip control for throttle, both air and ignition levers are fixed on right handlebar, the lower and longer lever operating the ignition.

The throttle and air levers for carburettor 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 is necessary to raise same. These remarks are intended only to roughly convey some idea of the carburettor 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. 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 carburettor by depressing the tickler button on float chamber until petrol actually overflows from the vent hole, then raise the valves by lifting the left side inverted handlebar lever and at the same time with the right foot give the kickstarter pedal a sharp and vigorous push downward, releasing the valve lifter when the starter crank is about halfway down. The actual starting of engine should not require at the most more than three or four attempts and any difficulty found will most likely be due to insufficient flooding or too large throttle opening. When started allow the engine to idle for a moment or two to warm up,

Taking over a New Machine—contd.

then seated on the cycle disengage the clutch by drawing inwards the lever situated on the left side of the handlebar. Then shift gear lever into the starting gear (first notch backward from neutral) after which gently release the pressure from handlebar clutch lever, when the cycle will commence to move forward. When well under way smartly declutch and simultaneously shift gear lever into third speed position as before, releasing the clutch lever gently when the change has been made, after which repeat the operation to obtain high gear. In 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, and under no circumstances should the gears be allowed to grate (see Gear Control Adjustment).

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 third or 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 on top gear. If this practice is adopted from the first, much unnecessary gear changing will be avoided.

"DON'TS" IN DRIVING.

DO NOT race the engine unnecessarily or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth getaway.

DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.

DO NOT allow the engine to labour on high gear on a steep gradient and remember that an easier, faster, and better ascent can be made on the next lower gear.

DO NOT 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.

"Don'ts" in Driving—contd.

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 motorcycle or for that matter, any motor vehicle when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every "Matchless" owner to studiously refrain from any of the practices enumerated, or any calculated to cause annoyance to the public in general. Recollect that the degree of silence of your cycle is judged not by the actual noise it is making but by comparison with other noises present. For example, in a busy street your cycle might be inaudible, while in a quiet narrow street of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.

LUBRICATION.

ENGINE.

Proper lubrication is of vital importance and the use of only the t lubricant will be repaid many times over by long wear and good ..vice. 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 saddle and in use the level of oil in the tank should never be alowed 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 in to 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 a sight feed is arranged on the panel itself and the oil circulation can be seen at a glance during either daylight or night riding. 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, the correct delivery to each part of the engine being arranged internally by suitably dimensioned passages. It might here be explained that oil is forced direct to the timing gear chamber, which after filling same to a predetermined level, overflows into the flywheel chamber and so drains away to the sump. Oil is also forced into the timing gear side flywheel axle bearing, and thence through a drilled passage in the flywheel to the big end bearings, the splash from which passes up into the cylinder interiors. In addition to this splash the cylinders are provided with direct oil passages ensuring an adequate supply under all conditions for these, the most vital parts 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 1in. 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, this plunger must be inserted after crankcase sections have been bolted together, and before refitting the end caps the guide screw must be replaced with its relieved top 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

Notes on the Oiling System—contd.

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," while at the same time a large quantity of clean, cool oil is being forced under pressure to all working parts. A filter for the oil is provided in the supply tank immediately under the filler cap. This filter should be removed and cleaned in petrol at least once every 500 miles, while once each season or not less frequently than once every 5,000 miles, the tank should be thoroughly washed out with petrol and afterwards filled to correct level with fresh clean oil. To avoid undue waste it is 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 electric models is taken up to an illuminated sight feed from whence it drains by gravity to the engine. It is important that no air leak occurs in this system, the effect of which would tend to cause the sight feed bowl to fill up even at moderate speeds. Should the sight feed window be accidentaly broken the ends of the two pipes may be connected by a piece of rubber tubing when the oil will merely flow up one pipe and down the other.

CHAINS.

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 the link joints. The rear chain

Chains—contd.

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 10,000 and 15,000 miles of saisfactory service should be obtained from the front and rear chains respectively.

GEAR BOX.

Once every 500 miles a grease gun full of Wakefield Castrolease (Light) should be injected into 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 one-half full. If the above mentioned injections do not maintain this correct level the interval between each should be reduced accordingly.

FORK SPINDLES.

Every 500 miles the fork spindle bearings should be flooded with a good quality grease, preferably Tecalemit Grease or Wakefield Castrolease. This process takes a few seconds only by means of the special grease gun provided, which merely requires holding nozzle end against the rounded nipples on fork spindles and given a few sharp strokes.

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 through them. (Wakefield Castrolease suitable).

NOTE.—Castrolease can be obtained in special push down lid canisters for easy filling of grease gun in ½lb., 1lb., and 2lb. 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 wire casing on to and along the inner wire. All Bowden cables on the X/3 and XR/3 Models are fitted with small

Bowden Cables—contd.

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 occupyingy 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 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 heads, it is advisable to remove the cylinders each 5,000 miles in order to inspect the piston rings and remove any deposit from the grooves in which they operate.

TO DECARBONISE.

First remove sparking plugs to avoid damage and unscrew all the fixing bolts for cylinder heads, which latter will then be free to be removed. The carbon deposit should then be scraped off the piston tops and also from the interior of the heads, after which all traces of the deposit should be carefully wiped off with a clean calico rag, and the heads replaced. When fixing the cylinder heads care must be taken to see that the gaskets are clean, and after introducing all the bolts they should each be tightened down in turn finger tight only. Then going round each in turn, slightly increase the pressure to each until all are firmly and evenly tightened right home. Lastly, before leaving the job, start up engine and when warm, go over each bolt again, when it will be found that a slight extra turn will be possible.

TO GRIND IN VALVES.

During each alternate decarbonisation, it is desirable to remove the valves and grind in to restore the seatings, clean the stems and guides, etc. This must, of course, be done while the heads are removed. Having removed the heads and valve inspection covers, gently in turn force each 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 Grind in Valves—contd.

to withdraw the valve cotter. Then smear a little grinding paste on the seatings, and with a screwdriver in the slot in valve head gently move the valve to and fro (never rotate completely), raising the valves off their seatings between each few movements. When the grinding paste ceases to bite, remove the valves and wipe the seatings clean, and if necessary apply another coating of paste and repeat the process. Generally, one application only is sufficient to restore the seatings of either inlet or exhaust valves, 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 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 covers 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 gears, and a cheap set of engineers' feeler gauges will be found very useful for checking purposes. Once every season at least both cylinders should be removed in order to thoroughly clean the piston rings and the grooves in which they operate.

TO ADJUST INLET OR EXHAUST TAPPETS.

Hold the body portion of tappet requiring adjustment (bottom large hexagon) with spanner provided, and slack off nut securing tappet head. Then screw head down or up, as required, until correct clearance is obtained, after which securely lock in position with lock nut. Always check for correct adjustment after tappet head lock nut has been secured.

TO EXPOSE TIMING GEAR.

First detach rear brake rod from foot pedal by removing split pin and washer. Next detach outer half of magneto chain cover and remove the nuts securing each of the magneto chain sprockets. Then by means of a suitable lever (a motor car tyre lever will serve) applied to the rear of each sprocket in turn gently force same off their respective shafts. Next remove the special stud and screw securing the inner half of magneto chain case which may then be taken awa . Now, after removing all the screws securing the timing gear aluminium cover, same may be gently prised off exposing the timing gear.

NOTE.—Owing to the fact that normally about one half-pint of oil is maintained in the timing gear chamber, a pan or some receptacle should be provided to catch the oil as the cover is being removed. This oil need not necessarily be replaced upon refitting the cover, as immediately the engine is restarted the oiling system will commence to build up the required level. It is, however, desirable to apply oil generously to any part removed upon its replacement to provide adequate lubrication until such time as the oil level is automatically restored.

TO REMOVE CAM WHEEL.

Having exposed the timing gears as already directed, gently turn the engine until the marks on both cam wheel and small pinion coincide, when by raising the front inlet valve by means of a screwdriver or suitable lever, the cam wheel will be free to be withdrawn.

TO REPLACE CAM WHEEL.

Unless help is available to raise the inlet valve as directed above it is necessary to hold same in a raised position by inserting a block of suitable height between the cylinder base and the lower valve spring cap. Then holding all four cam levers up with the fingers gently insert the cam wheel with its marked tooth gap coinciding with the marked tooth of the small pinion. After carefully cleaning the faces of the timing gear case and cover, and smearing the latter with quick-drying gold size, gently apply the cover with screw holes in correct register, when all fixing screws should be thoroughly and evenly tightened down with a good stout screwdriver. After the cover has been fixed, the magneto chain case back, magneto sprockets and chain may be fitted and magneto retimed as described below.

TO RE-TIME MAGNETO.

Revolve the engine by hand until the back piston is approximately seven-sixteenths of an inch from the top of the compression stroke (i.e., the stroke upwards immediately after inlet has closed). Then with ignition lever in fully advanced position, and magneto sprocket loose on shaft (the other sprocket having been previously tightened) turn the magneto armature backwards until the points are just about to break on the No. 1 cam. Holding carefully in this position, tighten up the magneto sprocket nut.

NOTE.—The operation of re-timing magneto, although requiring care, does not in any way justify the alarm with which many novices view it. A good test for correct timing after the foregoing instructions have been carried out, is as follows:—

Start up the engine and fully retard ignition. With throttle fully open the engine should run at about 1,500 to 1,600 revolutions per minute, i.e., at about the same speed as 25 to 28 miles per hour. If any considerable variation to this speed is obtained an alteration in the required direction should be made. When satisfied that magneto timing is correct, securely tighten the nuts which fix magneto sprockets, commencing first with the one on the cam shaft, after which the magneto chain case outer half may be re-fixed and brake rod re-connected.

NOTE.—No. 1 cam is the one farthest from rear cylinder when looking at contact breaker end of magneto.

TO ADJUST MAGNETO CHAIN.

It will be observed that the adjustment of magneto chain is obtained by sliding the magneto platform along the engine cradle plates by means of the adjuster bolt passing through a small lug on the left side plate. To adjust chain slack off the four gear box fixing stud nuts and screw the special double-headed adjuster nut clockwise or right-hand to tighten chain or vice versa to slacken. After obtaining the correct adjustment (see note below), care must be exercised to securely tighten down the four gear box stud nuts.

NOTE.—Correct chain adjustment is such that when the top side of chain is lightly pressed up and down a whip or movement of $\frac{1}{8}$in. to $\frac{1}{4}$in. is obtained at the tightest place.

TO ADJUST FRONT CHAIN.

Adjustment of the front chain is arranged by sliding the gear box bodily forward or backward as the need may be upon the rear engine cradle plates under which it is mounted. A screwed draw bolt is provided forward of the gear box, operating through a bar fixed between the two cradle plates. To tighten the front chain first slack off the four gear box holding down nuts and also the bolt which passes through the cradle plates immediately above gear box. Then turn the adjuster bolt anti-clockwise or left-hand to tighten or vice versa to slacken the chain tension. When the correct adjustment has been obtained (see note below) all the gear box fixing bolts and nuts previously loosened must be very securely retightened, and if necessary re-adjust gear control (see Gear Control Adjustment).

NOTE.—Correct chain tension should allow a whip or movement of $\frac{3}{8}$in. to $\frac{1}{2}$in. as chain is pressed lightly up and down.

TO ADJUST REAR CHAIN.

Put down rear 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. Tension of chain should be tried in a number of places, and the correct adjustment (which should allow a whip of $\frac{3}{8}$in. to $\frac{1}{2}$in. when chain is pressed up and down), should be obtained for the tightest place.

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

IMPORTANT.—Care is necessary when tightening 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.

TO ADJUST STEERING HEAD.

The steering head should be occasionally tested for adjustment by exerting pressure upwards from the extreme tips of the handle-bars. Should any shake be apparent, the top cap nut on steering column should be slacked off and the lower nut screwed down until all traces of slackness have disappeared, when the top 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 crankcase will serve) in order that all shake may be taken up satisfactorily and the steering head left perfectly free.

TO ADJUST FORK SPINDLES.

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 the steering head is turned, first ascertain which spindle or spindles require adjustment. Then after slackening off both end 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 be best 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 tightly 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.

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 out-

To Adjust Wheel Bearings—contd.

side spindle nut be careful to securely tighten the outer of the two lock nuts inside fork end after which the axle nut must be securely tightened.

IMPORTANT NOTE.—It must be understood that taper roller bearings must not be adjusted tightly, and unless a trifling amount of slackness is observed it is possible quite unknowingly to impose an enormous crushing strain on the slightly tapered rollers without same being made apparent by undue friction. This slight slackness must therefore, always be maintained.

INCORRECT ADJUSTMENT OR MISUSE OF BRAKES.

With the highly efficient brakes fitted, harsh application is liable to result in heavy tyre wear. Particularly does this apply if the brake coupling is not correct, thereby allowing a large proportion of the braking effect to be taken by one wheel only. The instructions given hereafter regarding brake synchronisation should be carefully followed, and under no circumstances, other than emergency, should the brakes be applied sufficiently harshly to cause either of the wheels to stop revolving or to cause a squeak of protest from the tyres.

BRAKE CONTROL ADJUSTMENT.

Owing to the fact that the foot operation of the front wheel brake is effected through a Bowden cable, it is necessary in order to obtain the correct and maximum braking effect to adjust the controls so that the front brake is applied slightly before the rear. To do this both wheels should be jacked up on stands and during the process of setting the knurled adjusting nuts, the brake pedal should be lightly applied and the controls so adjusted that when it becomes difficult to move the front wheel against the action of the brake, the effect is only just noticeable on the rear wheel. When correctly adjusted, both wheels must of course turn freely when the brake pedal is released, and upon applying a moderate pressure to the brake pedal it should be observed that application of the hand brake lever does not cause any additional movement of the front brake expander lever, this indicating that the brake in question is in full engagement. Any tendency of the back wheel to squeak or skid upon a moderately strong application of the brake pedal indicates that the adjustment of the front brake foot operated cable is not sufficiently in advance of the rear, and in such a case the remedy is to either tighten up the front adjustment slightly or alternatively slacken the rear.

CLUTCH ADJUSTMENT.

In the 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 slacked off. This may either be done by screwing in the cable adjuster or alternatively the screw attached to the lever in question which operates on the thrust rod end may be unscrewed a trifle. Should this screw be disturbed it must be subsequently securely locked in position by means of the lock nut provided. Should the clutch on the other hand develop undue harshness even with correctly adjusted chains, the clutch plates should be carefully removed and smeared with a mixture of graphite powder and water mixed into a paste. Under no circumstances should oil be used.

ADJUSTMENT OF GEAR CONTROL ROD.

As already mentioned, adjustment of the primary chain may necessitate a re-adjustment of the gear control, due to the movement of the gear box bodily during the former operation. On each occasion therefore, that the position of the gear box is altered the setting of the gear control rod must be carefuly checked and corrected if necessary. To do this place the cycle on the stand and remove the split pin and washer from the top gear rod yoke end pin (i.e., the pin which passes through the end of gear lever). Also at the same time slack off the lock nut securing this top gear rod yoke end. Now place the gear lever into third gear position, and after removing the top yoke end pin from which split pin has already been withdrawn, lightly, alternatively pull and push the gear rod by hand in order to feel the action of the gear box internal spring indexing plunger. As the sliding gears move either side of the correct third gear position the resistance of the spring plunger will be plainly felt, and the exact position at which this plunger is in full engagement with the third gear notch must be accurately and definitely found. Having established this correct position, offer up the gear rod to gear lever which latter must of course, be in the third gear position, and screw the top yoke end up or down as the need may be until the pin can be quite freely inserted. Before locking the yoke end into position, it is advisable to again obtain by hand the exact position of third gear as already described, and check the rod length for correct setting, after which the yoke end may be secured by means of its lock nut and the pin refitted. It must be understood that if the correct adjustment is obtained for the third gear all the remaining gears will also be correct as regards rod adjustment.

TYRES AND SERVICE.

To obtain satisfactory life and service from the tyres is largely within the user's control, and the first essential to obtain this is proper inflation. The correct amount of pressure is governed substantially by the load to be carried, and it is therefore difficult to lay down a hard and fast ruling. Assuming the weight of driver to be normal, the pressures recommended below may be regarded as satisfactory, and we urge all users to make a practice of checking the actual pres-

sure 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 passenger.
Front wheel 26x3.25 ...	15-18lbs.	... 15-18lbs.
Rear wheel 26x3.25 ...	21-22lbs.	... 24-26lbs.
Front wheel 27x4 ...	13-15lbs.	... 13-15lbs.
Rear wheel 27x4 ...	18-20lbs.	... 22-24lbs.

CONCUSSION BURSTS.

If a tyre when travelling and bearing its share of the load, comes into contact with an obstruction, the impact, which is a product of the load carried and the velocity of the vehicle, may reach an extremely high figure and produce an excessive localised strain upon the material forming the casing, and a resultant fracture. The tread rubber, owing to its nature, may not show perceptible signs of bruising or damage as the result of even the most severe blow. An incorrectly inflated tyre is more susceptible to damage resulting from such blows than one inflated to the recommendations above.

CARBURETTOR ADJUSTMENT.

Although owners are advised to refrain from tampering without good cause with the setting of the carburettor, a rough idea how this unit functions and how adjustments may be effected is given below. The correct level of petrol is maintained by means of a float and needle valve operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers, and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the 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

Carburettor Adjustment—contd.

large jet, and the needle attached to 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 adjustments 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 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.

TO REMOVE REAR WHEEL.

First jack up the rear of cycle on to the rear stand. Then disconnect the rear brake rod cross head by withdrawing the split pin by by which it is attached to the brake shoe expander lever, and also disconnect the rear chain connecting link, after which release the wheel axle nuts. If cycle is fitted with 27x4ins. tyres it will be necessary to detach the rear portion of mudguard. The wheel is then ready to be removed by drawing same backward until the axle is free from the slotted fork ends, at the same time twisting the wheel in the fork to release the brake cover plate anchorage.

NOTE.—See instructions re wheel alignment when refitting wheel (to Adjust Rear Chain).

TO REMOVE FRONT WHEEL.

Jack both wheels up on their respective stands (front stand only is not sufficient to provide a safe balance if cycle is solo), then remove the nut securing the expander lever and gently force this lever off the splined end of the expander to which it is attached. Next withdraw the two cables from their slotted anchorage, and after slackening off both axle nuts, gently force out each washer from the recesses in the fork ends in turn with a stout lever, at the same time exerting presure downwards upon the wheel, which will then fall out of position.

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 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 the bad weather, a small hose is almost indispensable for removing mud. Care should be exercised to avoid directing water on to the engine and magneto, 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 a 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. This powder, incidentally, is obtainable at any domestic store. Reckitt's "Karpol" is also recommended for cleaning purposes.

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.

Engine Suddenly Stops:—

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

Engine Fails 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.
Contact breaker sticking.

Corrective Measures—contd.

Loss of Power :—

Valve or valves not seating properly.
Weak valve spring or springs.
No tappet clearance or excessive clearance.
Lack of oil in tank.
Brakes too closely adjusted.
Badly fitting or broken piston rings.
Punctured carburettor float.
Silencer chokes with carbon deposit.

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.
Silencer choked with carbon deposit.

Engine Misses Fire :—

Valve spring weak.
Defective or oiled plug.
Incorrectly adjusted contact breaker.
Incorrectly adjusted tappets.
Defective sparking plug cable.
Contact breaker arm sticking.

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 X/3 or XR/3 must:—

1. Hold a driver's license, which can be obtained from the Chief Constable or Corporation of a County Borough, or from the County Council. The charge for this license is 5s. yearly, and must be renewed annually from the date of issue. A Motorcar driver's license covers the driving of a Motorcycle.
2. Apply to the Taxation Department of the Local Authority of the district in which the vehicle is to be ordinarily kept, for Inland Revenue License and Registration Form RF 1/2 (Motor-cycles only). The address of the above Taxation Department can be obtained, by enquiry, at a Post Office.
3. The Form RF 1/2, when obtained, must be filled in and returned, accompanied by the requisite remittance, which varies according to the date of registation and the term to be covered. For a full year, January 1st to December 31st, the fee is £3 (solo) or £4 with sidecar attached. In some districts evidence that the vehicle to be licensed is new and has not been previously regis-tered may be demanded. Manufacturer's or Agent's invoice will serve.
4. See that his front plate is illuminated on both sides at night.
5. Never drive at a speed which is dangerous to the public.
6. Wherever necessary, give audible and sufficient warning by horn or other instrument, of the approach of his motor cycle.

For registration purposes the following particulars will be required:—

Weight of cycle unladen (with equipment required by Law), 360lbs.
Type or Model, "Matchless" Model X/3 or XR/3.
Manufacturer's horse-power, 9.9.

NOTE.—The above weight applies only to machines without electrical equipment. For equipment "De Luxe" add 25lbs.

GUARANTEE.

We give the following guarantee with our **motorcycles**, motorcycle 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 motorcycle, motorcycle 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 motorcycle, motorcycle 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 motorcycles, 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 to a motorcycle by any form of attachment not provided or supplied by the manufacturers, or to a motorcycle which is not designed for such use.

Any motorcycle, motorcycle 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 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 motorcycles, motorcycle 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, warrantee or condition shall not be enforceable.

We do not guarantee specialities such as tyres, saddles, chains, lamps, etc., or any component parts supplied to the order of the purchaser differing from standard specifications supplied with our motorcycles, motorcycle 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 cylinder base.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.