

1931

Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

MODEL
R/7

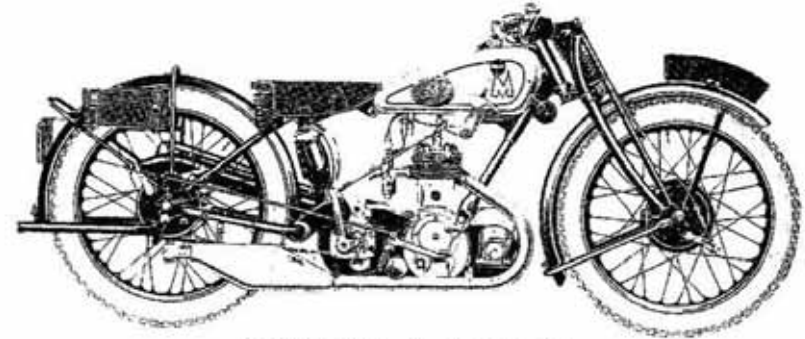
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J. R. COX & CO.,
Book Printers,
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DRIVING & ADJUSTMENT INSTRUCTIONS.



“Matchless” Model “R.7.”

MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED,

Manufacturers,

Registered Offices:

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

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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.

GENERAL DESCRIPTION.

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 machine, and may bring needless trouble and expense to its owner.

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.

TAKING OVER A NEW MACHINE.

Before describing the actual method of starting, it is perhaps advisable to describe the various lever positions which should all be mastered before taking the machine on the road. Neutral or free engine position of the gear is the first position forward from the rearmost position and is indicated by the letter N with which the gear lever will coincide. The engine must always be started with the gear lever in this neutral or free position.

Ignition is advanced or retarded by means of a lever on left side of handlebar. To advance spark this lever is drawn inwards; for starting it should be about three-quarters advanced.

The throttle and air levers for carburettor both open inwards, the top lever operating the air and the lower and longer one the throttle. 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. Owners are advised to refrain from making any adjustment without good cause, the foregoing being intended merely to convey a rough idea of the functioning of the carburettor.

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 valve by lifting the left-side handlebar lever and at the same time, with the right foot, give the kickstarter pedal a sharp and vigorous push downwards, releasing the valve lifter lever when the starter crank is about half-way down. This operation should not require at the most more than three or four attempts.

When the engine is started close the throttle slightly to check the engine speed, and seated on the cycle, disengage clutch by drawing inward the lever which is situated on the left side of handlebar. Then shift gear lever backward into first gear position, after which gently engage the clutch by releasing slowly the lever which has already been drawn inward.

When fairly under way, smartly declutch and simultaneously shift gear lever forward into second gear position, at the same time releasing clutch lever gently but smartly as engine takes up the drive, after which repeat the operation to obtain top gear. In all

Taking over a New Machine—contd.

changes of gear it is advisable to make certain that the gear lever is fairly in engagement with the notches in gear quadrant.

NOTE.—Any difficulty in starting will most probably be caused either by insufficient flooding, too liberal throttle opening, or ignition not sufficiently advanced.

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 inclines the middle gear should 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 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 25 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

"Don'ts" in Driving—contd.

- 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 "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 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. Oil is carried in the tank underneath 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 in to the sump to be returned to the tank. By removing the oil tank filler cap the oil can be observed returning via the small spout immediately underneath the cap, and it is only by this that the owner can determine at a glance that the oiling system is functioning correctly. Therefore, upon starting the engine prior to each run it is desirable to raise the oil tank filler cap in order to observe the return flow of oil. No provision is made for external adjustment of the oil supply, the correct delivery to each part of 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 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

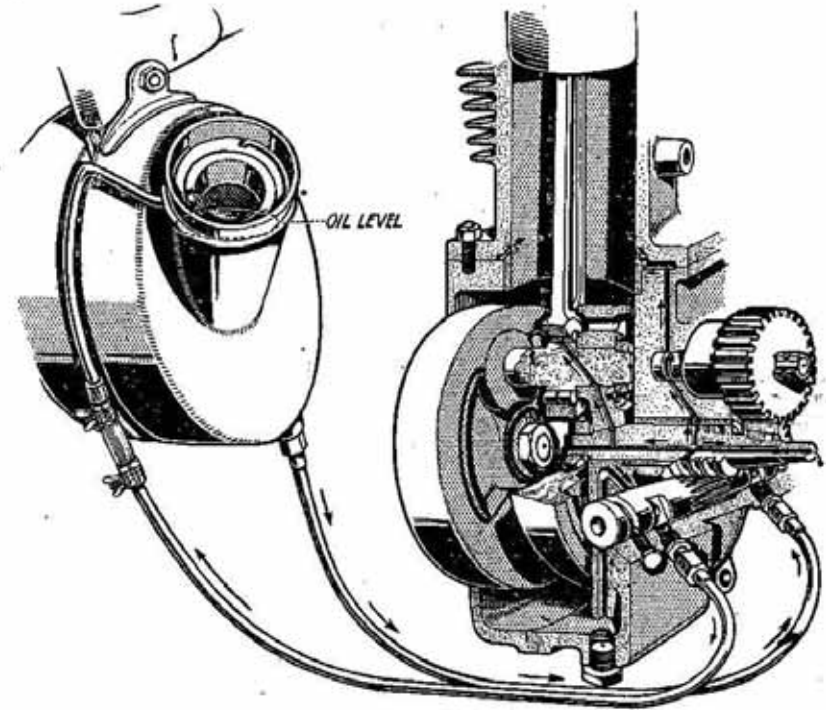
Engine—contd.

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 1 in. below the return pipe outlet.

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. Say "Castrol X.L.", not just "X.L." As an additional precaution it is advisable to buy from the branded cabinets or from sealed packages. See from where your oil is drawn.

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 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. As will be seen from the illustration opposite, 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," 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 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



Sectional view of Engine Interior showing oiling arrangement.

Notes on the Oiling System—contd.

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.

CHAINS.

The primary chain is normally lubricated by oil mist from the crankcase release valve and for all ordinary purposes this method of lubrication is entirely satisfactory. It is desirable, however, to inspect occasionally and once each 3,000 miles the chain should be removed and thoroughly washed in paraffin to remove all traces of grit. It should then be allowed to thoroughly soak in a bath of engine oil (preferably overnight to ensure penetration to all joints). Then hang up and allow the surplus oil to drain off, when the chain is ready for re-fitting. The rear chain must be similarly treated, but at more frequent intervals, say every 1,500 to 2,000 miles in summer and every 1,000 miles during the winter months. If carefully treated in this manner, and kept constantly in correct adjustment, at least 10,000 miles and 15,000 miles of satisfactory service should be obtained from the primary and rear chains respectively.

GEAR BOX.

Once every 500 miles a grease gun full of Wakefield Castrolase (light) should be injected into the gear box via the small grease nipple provided on the filling plug. Occasionally this filling plug should be removed in order to verify the level of lubricant in the box. The correct level is just above the top of the boss into which the filling plug screws. Therefore, when this plug is removed the grease should overflow, and 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 Tecaletmit Grease or Wakefield Castrolase. This flooding process is one of a few seconds only by means of the special grease gun provided. This requires merely holding the 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 Castrolase suitable).

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

BRAKE AND GEAR ROD JOINTS, ETC.

In addition to the foregoing, all parts such as brake and gear rod joints, etc., should receive a few drops of oil occasionally, particularly in bad weather. Bicycle lubricating oil or engine oil.

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 "R/7" Model 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 accelerating after rounding a corner, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, it is advisable to remove the cylinder each 5,000 miles in order to also inspect the piston rings and remove any deposit from the grooves in which they operate.

TO DECARBONISE.

First remove sparking plug to avoid damage, and unscrew all the cylinder head fixing bolts, when the head may be lifted clear. The carbon deposit should then be scraped off the piston top and also from the interior of the head, after which, all traces of the deposit

To Decarbonise—contd.

should be carefully wiped off with a clean calico rag, and the head replaced. When fixing cylinder head, care must be taken to see that the gasket is quite 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 head is removed. Having removed the head and valve 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, and if necessary apply another coating of paste and repeat the process. Generally, one application only is sufficient to restore the seating of either inlet or exhaust valve, but it may happen that the latter will require a second application to remove all traces of pit marks. Having restored the valve faces, carefully clean off all traces of the grinding paste and thoroughly wipe both valve stems and valve guides, when the valves may be replaced, care being taken not to mix their respective positions. Before re-fitting the valve inspection cover, check the tappet clearances, which should be .004 for the inlet and .006 for the exhaust. These clearances should be constantly and accurately maintained to obtain the best results as regards silence of valve gear, and a cheap set of engineers' feeler gauges will be found very useful for checking purposes.

TO ADJUST INLET OR EXHAUST TAPPETS.

Remove valve spring cover and with the spanner provided in tool kit hold the tappet head (large hexagon) and slack off lock 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. The correct clearances as mentioned previously are .004 for the inlet and .006 for the exhaust.

TO ADJUST VALVE LIFTER WIRE.

Slack off locking nut on cable adjuster stop and screw the adjuster in or out as desired. Care must be exercised when adjusting to observe that the exhaust tappet is quite clear, i.e., with slight up and down shake when valve is down.

TO RE-TIME MAGNETO.

With sprocket on magneto shaft loose, revolve engine carefully until the piston is exactly at the top of the firing stroke. (This is the topmost position of the piston at which both valves are closed). Now fully retard the magneto and taking care not to move the engine from the top of stroke position, gently turn the magneto armature in a clockwise direction (i.e., the direction of normal rotation) until the contact points are just about to break in which position the sprocket fixing bolt should be carefully tightened. It is advisable to check the setting once and this may best be done by again setting the piston to the top dead centre of explosion stroke and moving the ignition lever on handlebar to and fro from fully retard to say about one-third advance position. During this small movement the contact points should be observed to definitely part.

TO ADJUST MAGNETO CHAIN.

It will be observed that magneto chain adjustment is obtained by varying the position of the magneto upon its platform, slotted bolt holes being provided to allow of this. Correct chain adjustment is such that when the top of chain is lightly pressed up and down a movement or whip of $\frac{1}{4}$ in. is obtained. To adjust chain slack off the two nuts only on the underneath side of magneto platform and slide the magneto back or forward, as the case may be, afterwards securely tightening the nuts securing the magneto in position.

TO ADJUST FRONT CHAIN.

First remove the snap on cover over the gear box fixing bolts (this may easily be prised out of position), then slack off both of the long fixing nuts. Now turn the special double headed adjuster nut in right-hand direction to tighten or vice versa to slacken. After the correct adjustment has been obtained the fixing nuts should be firmly tightened down. NOTE.—The adjustment of chain should be tried in various places, and the correct adjustment (which should allow a whip of about $\frac{1}{4}$ in. when chain is pressed lightly up and down) should be obtained for the tightest place.

NOTE.—It is advisable to remove the outer half of front chain case to enable the correct adjustment to be readily verified.

ADJUSTMENT OF GEAR CONTROL.

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

Adjustment of Gear Control—contd.

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.

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.

CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the adjustment of the clutch operating cable should be first suspected. When correctly adjusted it should be possible to move the clutch operating arm (part to which lower end of cable is attached) to and fro with fingers slightly, and if this free movement cannot be felt the cable stop should be adjusted accordingly. Alternatively, the screw at the bottom of the clutch operating arm may be screwed out slightly to give the same effect. The lock nut securing this small screw must be carefully tightened if adjustment is made here.

TO ADJUST FRONT FORKS.

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 slacking 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

To Adjust Front Forks—contd.

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 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 STEERING HEAD.

The steering head should be occasionally tested for adjustment by exerting pressure upwards from the extreme tips of the handlebars. Should any shake be apparent the cap nut on top of fork stem must be slacked off and the underneath nut tightened down until all shake has disappeared, when carefully lock with the cap lock nut.

IMPORTANT.—To guard against unconsciously overtightening the head bearings, the effect of which is extremely difficult steering, it is advisable to jack up the front of 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.

CARBURETTOR ADJUSTMENT.

Although owners are advised to refrain from tampering with the setting of the carburettor without good cause, 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

Carburettor Adjustment—contd.

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 $\frac{1}{4}$ or $\frac{1}{2}$ -open position it would indicate a too 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. Under 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 must be clearly understood that adjustment to this screw affects the mixture only on extremely small throttle openings. Having set the throttle stop screw to give the desired idling engine speed, the pilot jet air screw is turned in the required direction to give even firing. The adjustment is not particularly sensitive, and no difficulty should be experienced in finding the correct position, when the locking nut should be tightened down to prevent any movement by vibration. Adjustment, if any, should be made to this air screw while the engine is warm and the ignition fully or nearly fully advanced. We mention this in order to remove the possible impression that the pilot jet setting is not correct should the engine stall when starting up from cold. Once correctly set the pilot jet should not require attention except perhaps in extremes of temperature.

TO ADJUST WHEEL BEARINGS.

To adjust either rear or front wheel bearings, slack off the left side spindle nut and with the thin cone spanner provided slack off the thin adjusting cone lock nut, after which with the same spanner, turn the adjusting cone in the required direction, i.e., clockwise to tighten or vice versa, after which lock the adjusting cone in position with the lock nut provided, and lastly carefully re-tighten the axle nut.

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 as 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 the stands and during the process of setting the knurled adjusting nuts, the brake 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, thus indicating that the brake in question is in full engagement. Any tendency for 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.

TYRES AND SERVICES.

To obtain satisfactory life and service from the tyres is largely within the user's control, and the first essential to obtain this is proper inflation. The correct amount of pressure is governed substantially by the load to be carried, and it is therefore difficult to lay down a hard and fast ruling. Assuming the weight of driver to be normal, the pressures recommended below may be regarded as satisfactory, and we urge all users to make a practice of checking the actual pressure by means of a low-pressure Schrader tyre gauge. This takes a few seconds only, and will amply repay the owner by reason of additional service and immunity from failures.

		Solo	With pillion passenger.
Front wheel	14-15lbs.	14-15lbs.
Rear wheel	21-22lbs.	24-25lbs.

CUTS IN TYRES.

Any but superficial rubber cuts are a menace to the whole tyre structure. The tyre casing retains its strength only so long as the

Cuts in Tyres—contd.

whole of its plies are unbroken. If two or three strands are severed, the whole tyre casing is weakened and a large burst may result. The penetration of wet and road matter results in rapid deterioration of the casing material to which it may gain access. Covers should be periodically examined, and any cuts, other than those purely superficial, efficiently repaired.

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 overleaf.

PERIODICAL INSPECTION OF NUTS, ETC.

Satisfactory service depends largely upon the necessary immediate attention to details. The old adage "A stitch in time saves nine" applies with particular force to motor cycle maintenance. Make a point of occasionally testing with a spanner the security of all nuts. There is possibly more dissatisfaction and damage caused through neglecting details than for any other reason. It must be remembered that a motor cycle is a highly specialised piece of engineering, and that while it does not call for great engineering skill in driving, the exercise of a little mechanical sense and the occasional use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be obtained with the requisite degree of satisfaction. Therefore, do not wait until to-morrow, but adjust it now.

CLEANING.

If the machine is used to any extent in bad weather a small hose is almost indispensable for mud removing. 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 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 "God-dard'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.

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 choked 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 motorcycles, 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 R/7 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 (Motorcycles 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 a remittance of 30s. (bicycle unladen not exceeding 224lbs). In some districts evidence that the vehicle to be licenced is new and has not previously been registered may be demanded. A 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), 202lbs.
 Type or Model, "Matchless" Model R/7.
 Manufacturer's horse-power, 2.46.

NOTE.—The above weight applies only to machines without electrical equipment, for which add 16lbs.

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, warranty 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.