

Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

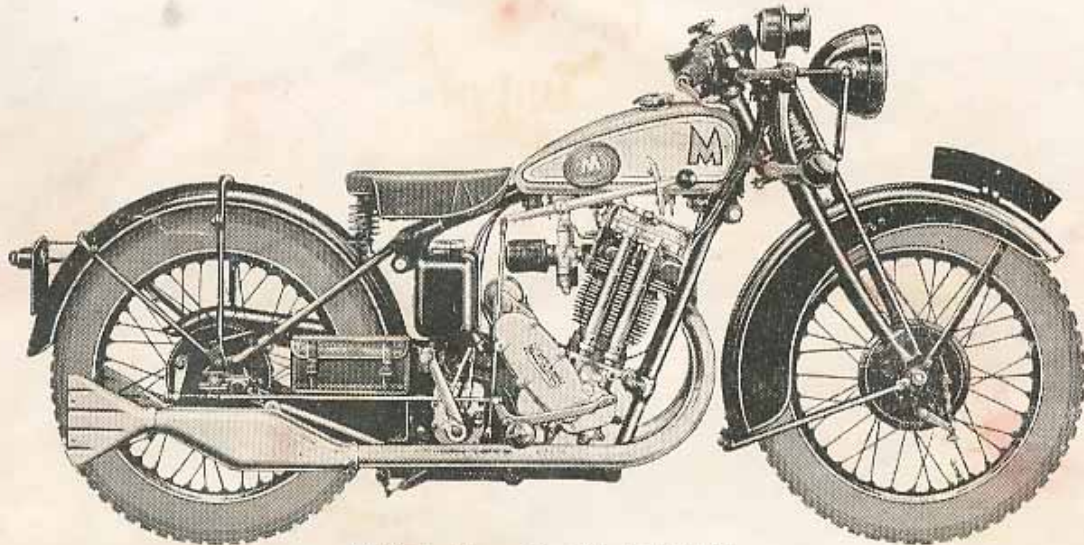
MODELS
C and C/S

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DRIVING & ADJUSTMENT INSTRUCTIONS.



“ Matchless ” Model C/S.

MATCHLESS MOTOR CYCLES (COLLIERS) LIMITED,

Manufacturers,

Registered Offices :

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

Nearest Station :
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INTRODUCTION.

A Personal Message to all "Matchless" Owners.

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

A motor cycle, it must be remembered, is a highly specialised piece of engineering, and while it does not call for great engineering skill in driving, the exercise of a little mechanical sense, and the occasional use of a spanner, cleaning cloth, etc., is very necessary if the maximum service is to be obtained with the requisite degree of satisfaction. In the following pages we give, without going into intricate technical detail, much valuable information that you should have, in order to give your cycle the careful attention which it merits. Neglect to make necessary adjustments, or only casual attention to the lubrication of important parts, will soon neutralise the best efforts of the designers who have 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 forward from the extreme rear 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 turn the decompressor lever on the top of the timing gear case to the "on" position and with the right foot give the kickstarter pedal a sharp and vigorous push downward. Repeat if necessary. Immediately the engine has started turn the decompressor to the "off" position and reduce the throttle opening to check the engine speed. Allow the engine to idle for a moment or two in order to warm up and see that the oil is circulating properly. Then seated on the cycle disengage the clutch by drawing inwards

Taking over a New Machine—contd.

the lever situated on the left side of the handlebar. Then shift gear lever into the starting gear (first notch forward 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 the 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, 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 doing so, an abnormal and unfair strain would be imposed upon the rear driving chain under certain circumstances.

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

"DON'TS" IN DRIVING.

- DO NOT race the engine unnecessarily or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth, getaway.
- DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.
- DO NOT allow engine to labour on high gear on a steep gradient and remember that an easier, faster, and better ascent can be made on the next lower gear.
- DO NOT 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 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. (or Castrol R: for C/S Model if cycle is to be used for competition purposes) 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 allowed to fall below the half-full mark. The integral oil pump is of the single plunger double diameter type, the larger diameter being used for exhausting the crankcase sump and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to

Engine—contd.

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 drain back into the sump and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than that delivering fresh oil and partly to the variations in the amount of oil in suspense in the crankcase, according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for external adjustment of the oil supply, other than that for inlet valve lubrication referred to later, the correct delivery to each part of the engine being arranged internally by suitably dimensioned passages. It might here be explained that oil is forced direct to the timing gear chamber, which after filling same to a pre-determined level, overflows into the flywheel chamber and so drains away to the sump. Oil is also forced into the timing gear side flywheel axle bearing, and thence through a drilled passage in the flywheel to the big end bearing, the splash from which passes up into the cylinder interior. In addition to this splash the cylinder is provided with a direct oil passage ensuring an adequate supply under all conditions for this, the most vital part of the engine. No attention to this oiling system is required other than observing the return of oil to the tank prior to a run, and the continual replenishment of the supply tank, the level of oil in which, as mentioned above, must be above the half-full mark and must not be filled when engine is cold to a level higher than one inch below the return pipe outlet.

NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps and also the guide screw, when the plunger can be pushed out large end first. When re-assembling, this plunger must be inserted after crankcase sections have been bolted together, and before re-fitting 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

Notes on the Oiling System—contd.

screwed home. The entire oiling system is simplicity itself, only one moving part being employed, viz., the double diameter plunger. This plunger is rotated by the engine shaft, and moves backward and forward while rotating, under the influence of the small guide screw which engages with the profiled annular groove cut in the plunger end. As the plunger moves in its housing in one direction, the large end draws oil from the sump, while at the same time the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement of the plunger the large end returns to the tank the oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhausting plunger is the larger one, the engine sump is always kept clear of oil, hence the term "dry sump," 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 re-fitting, filled to correct level with fresh, clean oil. To avoid undue waste it is quite permissible to arrange for this clean-out when the oil is at the lowest recommended level, although it must be pointed out that normally it is highly desirable to add fresh oil frequently in small quantities in preference to allowing the supply to become almost exhausted before re-filling, 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 when it drains by gravity to 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 accidentally 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.

The adjustment for inlet valve lubrication referred to above consists of a pointed screw fitted to the oil "T" piece attached to the overhead rocker housing. Turning the screw clockwise reduces the quantity of oil allowed to pass, and adjustment should only be made in the event of any shortage or excess being made apparent by squeaking or alternatively excess leakage.

CHAINS.

The primary chain 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.

Chains—contd.

Although for all ordinary purposes this method of lubrication is quite satisfactory, if the maximum degree of service is desired, it is advisable to entirely remove the chain once every 3,000 miles and thoroughly wash in paraffin. After carefully wiping it should then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in soak overnight in order to ensure penetration to all link points. The rear chain 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 satisfactory service should be obtained from the front 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. Occasionally the filling plug should be removed in order to verify the level of lubricant in the box which should be from one-third to half full. If the above-mentioned injections do not maintain this correct level the interval between each should be reduced accordingly.

FORK SPINDLES.

Every 500 miles the fork spindle bearings should be flooded with a good quality grease, preferably Tecalemit 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 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 most neglected.

Bowden Cables—contd.

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 "C" and "C/S" Models 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 MODEL "C."

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 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 DECARBONISE MODEL "C/S."

First remove both exhaust pipes and silencers. Then unscrew the top cap of carburettor mixing chamber and withdraw air and throttle valves. Next unscrew the nut securing petrol pipe to petrol tap and after removing the two nuts securing carburettor to cylinder head flange withdraw the entire unit with pipe attached. Now remove the small tie bar attached to the overhead rocker housing support bolt and frame lug. Then raise the lower portion of each tappet rod cover tube sufficiently to permit the small spring plunger on the top portion to engage with the hole in the lower portion, which engagement will retain the tubes in this telescoped position. Next unscrew the three bolts by which the overhead aluminium rocker housing is fixed and after disconnecting the three oil pipe unions withdraw the housing together with the tappet rods and their covering tubes. Next remove all cylinder head fixing bolts when same is free to be lifted clear. It may perhaps be necessary to give the head a sharp jolt upwards to release the spigoted joint which occasionally becomes somewhat firmly fixed with carbon deposit. During the dismantling and re-assembling process care must be taken to avoid losing the small hardened end caps for the valve stems, and should the valves be removed for grinding-in purposes they must on no account be mixed. In re-assembling, as in the case of Model "C," all cylinder head bolts must be uniformly tightened (see Instructions), and the joint faces must be scrupulously clean. Should the head joint when dismantled show any sign of leakage, it should be ground-in in exactly the same manner prescribed for grinding-in valves, great care, of course, being necessary to prevent the admission of any grinding mixture into the cylinder interior, and to remove all traces of the grinding mixture from the joint faces prior to finally placing the head in position.

NOTE.—It should be observed that the front bolt securing the overhead rocker housing is provided with a somewhat coarser pitch thread than the others and must, therefore, be replaced in its correct position.

TO GRIND IN VALVES, MODEL "C."

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

To Grind in Valves, Model "C."—contd.

either inlet or exhaust valve, but it may happen that the latter will require a second application to remove all traces of pit marks. Having restored the valve faces, carefully clean off all traces of the grinding paste and thoroughly wipe both valve stems and valve guides, when the valves may be replaced, care being taken not to mix their respective positions. Before refitting the valve inspection cover, check the tappet clearances, which should be .004 for the inlet and .006 for the exhaust. These clearances should be constantly and accurately maintained to obtain the best results as regards silence of valve gear, and a cheap set of engineers' feeler gauges will be found very useful for checking purposes.

TO GRIND IN VALVES, MODEL "C/S."

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

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

A special tool for compressing valve springs can be supplied at 6s. 6d.

TO ADJUST INLET OR EXHAUST TAPPETS, MODEL "C."

Remove valve spring cover and with the spanner provided in tool kit, hold the tappet and slack off the lock nut securing the adjustable tappet head. Then screw the head up or down as may be required to obtain the correct clearance, after which securely tighten the locking nut. The correct clearances, as mentioned elsewhere, are .004 for the inlet and .006 for the exhaust.

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

TO ADJUST INLET OR EXHAUST TAPPETS, MODEL "C/S."

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

NOTE.—Correct clearance between rocker end and exhaust valve stem when valve is down on its seating is .004, while that for the inlet is .002. To obtain the best results as regards the silence of valve gear, these clearances should be accurately maintained, and a cheap set of engineers' feeler gauges will be found very useful for checking purposes. Tappet clearances should be tested when engine is warm (not hot), and the decompressor lever should be in the normal running position marked "OFF."

VALVE TIMING.

The correct setting for the closing and opening of valves is as follows:—Inlet commences to open 20 degrees, or $\frac{1}{8}$ in. before top of exhaust scavenging stroke, and closes 67 degrees or $\frac{55}{64}$ in. up the compression stroke. Exhaust valve commences to open 75 degrees or $1\frac{1}{16}$ in. from bottom of firing stroke and closes 28 degrees or $\frac{15}{64}$ in. down induction stroke. To test these settings the rockers should be set at .007 for the Model "C/S" and .007 tappet clearances for Model "C." (See instructions for normal running clearances.)

IGNITION SETTING.

With ignition fully advanced, the contact points of magneto should break 40 degrees or approximately half-inch before the top of compression stroke. To obtain maximum power and speed this setting should be accurately obtained and preferably, for ease, any alteration made while cylinder head is removed, when exact position of piston may be checked instantly.

NOTE.—A greater amount of advance than described above is not recommended under any circumstances.

TO RE-TIME MAGNETO.

With sprocket on magneto armature shaft loose, revolve engine carefully until the piston has just passed the top dead centre of firing stroke (this is the top-most position of piston at which both valves are closed). Now fully retard the magneto, and taking care not to move the engine from slightly past top centre position (about $\frac{1}{16}$ in. down is the correct position of piston), gently turn the magneto armature in the normal direction of rotation until the contact points are just about to part, in which position the sprocket fixing nut should

To Retime Magneto—contd.

be carefully and firmly tightened. It is advisable to check the setting after fixing sprocket by again placing the piston in the position of $1/16$ in. down firing stroke or past top dead centre and moving the ignition lever backward and forward from fully retard to about one-third advanced. During this small movement the contact points should be observed to definitely part.

TO ADJUST MAGNETO CHAIN.

Adjustment of the magneto driving chain is obtained by tilting the magneto bodily by means of its hinged platform, a screwed adjuster bolt easily accessible being provided for the purpose. When making adjustments it is desirable to first remove the aluminium chain case cover, then, to tighten the adjustment, unscrew the upper adjustment nut about half turn and tighten the underneath nut a corresponding amount. If necessary repeat but be careful to leave the two nuts tightly secured. The correct adjustment should allow a whip or movement of $\frac{1}{8}$ to $\frac{1}{4}$ in. as the top run of the chain is lightly pressed up and down midway between the sprockets. See that the faces of chain cover are perfectly clean before refitting same.

TO ADJUST FRONT CHAIN.

To obtain adjustment for the primary chain, provision is made to swing the gear box bodily upon its lower fixing bolt. It will be observed that the upper fixing bolt operates in slotted holes to permit of the necessary movement. To make adjustment, the off side nut of the top gear box fixing bolt must first be slackened. Then to tighten the chain adjustment first slack off the nut on adjuster bolt nearest the engine and turn the nut farthest from engine in the same direction—i.e., anti-clockwise until the correct chain adjustment is obtained, when re-tighten the nut nearest engine and also the top gear box fixing bolt nut. Correct chain adjustment should allow a whip or movement of $\frac{3}{8}$ to $\frac{1}{2}$ in. as the top run of the chain is pressed up and down midway between the sprockets.

NOTE.—Owing to the movement bodily of the gear box, necessary for correcting chain adjustment, some small alteration to the gear adjustment may be necessary; therefore, upon completion of the former the adjustment of the gear control must always be checked and corrected if necessary (see Gear Control Adjustment).

TO ADJUST 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.

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.

ADJUSTMENT OF GEAR CONTROL.

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 during the former operation. On each occasion, therefore, that the position of the gear box is altered, the setting of the gear control must subsequently be checked. To do this, place cycle on the stand and remove the split pin securing the gear rod to gear lever, then while rocking the rear wheel gently to and fro, place the lever into low gear position. Then remove the gear rod yoke end pin from which the securing split pin has already been withdrawn, and while still rocking the rear wheel to and fro, apply pressure to the gear rod by hand to make certain that the low gear is fully in engagement. Now slack off the locking nut securing the top gear rod yoke end, and screw this yoke end up or down the rod as the need may be, until while holding the gear lever back against the rearmost end of the low gear notch in the quadrant, the rod is about $1/16$ in. too long to permit of the insertion of the pin. Now insert this pin, and while rocking rear wheel to and fro, work the gear lever through the gate

Adjustment of Gear Control—contd.

until high gear position is reached. Now again remove the yoke end pin, and while still gently moving the rear wheel to and fro, pull the gear rod upwards this time to make quite certain that the high gear is in full engagement. Then while holding the gear lever against the foremost end of the high gear notch in the quadrant, offer up the gear rod end and take careful note as to whether the rod is as much too short to permit of the entry of the yoke end pin as it was too long at the low gear position. If this is not the case the length of gear rod must be suitably adjusted. It may be explained here that the movement of the gear lever between the extreme ends of the gate is purposely made greater than is necessary in order to provide for wear that may in time develop in the various gear joints. It is imperative therefore that at all times this excess movement should be equally divided at each end of the gate, that is to say, the gear rod must be adjusted to length to be exactly as much too long in the low gear position as it is too short in high gear position in each case while the lever is held against the respective extreme ends of the gate. This adjustment is most important.

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.

TO ADJUST STEERING HEAD.

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

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

FRONT FORKS, SPINDLE ADJUSTMENTS.

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

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."

Carburettor Adjustment—contd.

to use an expression favoured by motor cyclists, slowly but positively. The correct setting of the main jet should permit of full air being used when running fast on full throttle. To test for correct setting, start up engine, and after allowing a few seconds to warm up, fully retard the ignition and fully open throttle. If it is now possible to open the air beyond the one-third or half open position it would indicate a too large jet, and the needle attached to throttle valve must be lowered or lengthened. This needle, it should be explained, is secured by a flat strip cotter engaging with a small notch in the needle. Several of these notches are provided to permit adjustment. When correct, the engine should commence to splutter immediately the air lever is opened more than about one-third, but should run satisfactorily on the fully closed air position. In no circumstances should the engine be run for more than a few seconds in this fully retarded, fully opened throttle position. The only other adjustments are the air supply to the pilot jet and the throttle stop. The adjusting screw for the pilot jet air supply will be observed at the base of the mixing chamber. Screwing in enriches the mixture and, vice versa, unscrewing weakens it. It must be clearly understood that adjustment to this screw affects the mixture only on extremely small throttle openings. Having set the throttle stop screw to give the desired idling engine speed, the pilot jet air screw is turned in the required direction to give even firing. The adjustment is not particularly 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.

TYRES AND SERVICE.

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

		Solo	With pillion passenger.
Front wheel	15-16lbs.	... 15-16lbs.
Rear wheel	21-22lbs.	... 26-28lbs.

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 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.

PERIODICAL INSPECTION OF NUTS.

Satisfactory service depends largely upon the necessary immediate attention to details. The old adage "A stitch in time saves nine" applies with particular force to motor cycle maintenance. Make a point of occasionally testing with a spanner the security of all nuts. There is possibly more dissatisfaction and damage caused through neglecting details than for any other reason. It must be remembered that a motor cycle is a highly specialised piece of engineering, and 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.

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 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 C and C/S 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 the requisite remittance, which varies according to the date of registration 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 registered 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 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) 330lbs.

Type or Model, "Matchless" Model C or C/S.

Manufacturer's horse-power, Model C—5.86; Model C/S—4.95.

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

DINGLE'S PRINTERS
CATALOGUE SPECIALISTS
PEUMBERT, SL.19.

2000/11/30.