

Matchless
IN NAME & REPUTATION

INSTRUCTION BOOK

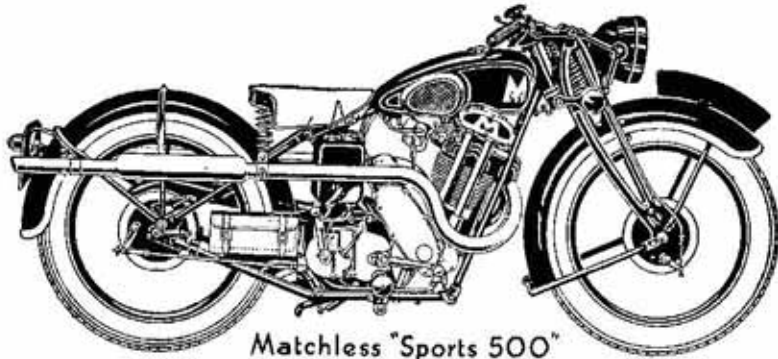
MODELS
35/D80 and D90

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DRIVING & ADJUSTMENT INSTRUCTIONS



Matchless "Sports 500"
Matchless Model 35 D80

MATCHLESS MOTOR CYCLES

(COLLIERS) LIMITED,

Manufacturers,

Registered Offices:

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

Nearest Station:

WOOLWICH ARSENAL, S.R.

Factories:

BURRAGE GROVE and MAXEY ROAD,
PLUMSTEAD, S.E.

And MAST POND WHARF, WOOLWICH.

Telegrams and Cables: "Matchless," Woolwich.

Telephone: Woolwich 1010 (5 lines).

Code $\left\{ \begin{array}{l} \text{A.B.C. 5th and 6th Edition} \\ \text{Bentley's} \\ \text{and Private Code} \end{array} \right.$

All correspondence to:—

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

INTRODUCTION.

A Personal Message to all "Matchless" Owners.

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

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

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

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.

GENERAL INFORMATION

PREPARATION FOR USE.

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 gears must always be engaged before starting up. This neutral position is the first position obtained by a downward movement of the pedal from the low gear position, and is indicated by a pointer attached to the foot change pedal. The ignition is advanced or retarded by means of the small lever on the left side of handlebar. To advance the spark this lever is pushed inwards, and for starting it should be in about the midway position. The throttle is controlled by a twist grip on the right handlebar and the air b, means of a small lever, also on the right handlebar. Both controls open by an inward movement. For starting, the throttle should be only about one-sixth open, and the air must be completely closed. The petrol is turned on by pulling out the tap plunger as far as possible without twisting. To operate the drain cock the plunger is pulled out as above, then given a twist, and again pulled out. Assuming that the tanks have been filled and all levers set as above, to start the engine first flood the carburettor until petrol actually overflows from the vent hole in the float chamber cap. Then raise the exhaust valve by means of the handlebar lever and turn the engine over two or three revolutions, keeping the valve raised. Then give the kickstarter pedal a vigorous push downward, releasing the handlebar valve lifter lever when the pedal is nearly at the bottom of its travel so as to take the maximum possible advantage of the flywheel momentum. Immediately the engine starts, open up the air slightly and reduce the throttle opening to check the engine speed. Do not, under any circumstances, race the engine up from cold, but allow it to idle at a fair speed for a moment or two to warm up, and while doing so, take the opportunity of observing that the oil is circulating properly. Then sitting astride the cycle, gently move same forward until the stand is released, after which, disengage the clutch by drawing inwards the large lever on the left handlebar. Then smartly pull the gear change pedal upward with the right foot, after which gently release the clutch lever, when the cycle will commence to move forward. When well under way, again disengage the clutch and press the gear change pedal down simultaneously, keeping the right foot on the pedal until the clutch lever has again been released. Then release the pedal and repeat the movement until top gear is reached. For all changes of gear the clutch should be released a fraction of a second only before moving the gear pedal. When in motion it will be sufficient to move the clutch lever only just enough to

Preparation for Use—contd.

ease the drive and, with reasonable care, it will be found possible to make a change of gear without a sound. Do not forget the necessity for holding the gear pedal with the foot until the gear change has actually been made. It is not sufficient to merely jab the pedal and then engage the clutch. Always avoid racing the engine when changing gear. With ordinary care the movements of the clutch lever and change pedal are too quick to permit of any appreciable rise in engine revolutions, but until quite conversant with rapid gear changing, it will be found desirable to close the throttle down while making a change. By suddenly engaging the clutch while the engine is racing, an enormous load is imposed on the gears and chains.

IMPORTANT NOTE.—Always turn the petrol off upon leaving the cycle idle. Owing to the down-swept inlet port, there is a possibility of neat petrol entering the cylinder, should the carburettor flood while cycle is stationary, and in addition to a risk of fire, there is a real danger of oil thinning and consequently, engine seizure if this simple precaution is not taken. **Therefore, turn the petrol off after each run.**

RUNNING IN.

For the first 500 miles at least, full throttle driving should be studiously avoided. Although mention is made elsewhere of the desirability of not exceeding 30 miles per hour during this running-in process, what is meant actually is "keep the engine well within its limits." At the conclusion of the first 100 miles' and 500 miles' running, the adjustment of tappets and chains should be checked and corrected if necessary. Subsequent to the initial settling-down process, attention to such details will only be necessary at very infrequent intervals.

"DON'TS" IN DRIVING.

- DO NOT race the engine unnecessarily or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth getaway.
- DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.
- DO NOT allow the engine to labour on high gear on a steep gradient and remember that an easier, faster, and better ascent can be made on the next lower gear.
- DO NOT 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.

"Don'ts" in Driving—contd.

- DO NOT** force the engine or drive above the 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 open throttle, etc., when in a residential district. Any motor cycle, or for that matter, any motor vehicle when so driven creates abnormal noise, and in the interests of all motorists we earnestly implore every "Matchless" owner to studiously refrain from any of the practices enumerated, or any calculated to cause annoyance to the public in general. Recollect that the degree of silence of your cycle is judged not by the actual noise it is making, but by comparison with other noises present. For example, in a busy street your cycle might be inaudible, while in a quiet narrow street of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.
- DO NOT** forget to shut the petrol off after a run.

LUBRICATION

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. The following makes and grade are specially recommended: Summer, Castrol XXL, Mobiloil D, or Aeroshell; and Winter, Castrol XL, Mobiloil D or Aeroshell.

Oil is carried in the tank underneath the saddle, and in use the level of oil in the tank should never be allowed to fall below the half-full mark. The integral oil pump is of the single-plunger double-diameter type, the larger diameter being used for exhausting the crankcase sump, and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to the tank. Provision is made on all models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run. On instrument-panel equipped models an oil indicator is arranged on the panel itself, and

Lubrication—contd.

the oil circulation can be seen at a glance. On all other models it is necessary to raise the oil tank filler cap, when the returning oil may be observed running from the small spout immediately underneath the cap. This check should be made preferably upon starting up the engine from cold, as, owing to the fact that when stationary, oil from all parts of the engine interior drains back into the sump, and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than that delivering fresh oil, and partly to the variations in the amount of oil in suspense in the crankcase, according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time, only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for external adjustment of the oil supply, other than that for inlet valve lubrication 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 predetermined level, overflows into the flywheel chamber, and so drains away to the sump. Oil is also forced into the timing gear side flywheel axle bearing, and thence through a drilled passage in the flywheel to the big end bearing, the splash from which passes up into the cylinder interior. In addition to this splash, the cylinder receives oil via a direct ball valve controlled oil passage, which ensures a very adequate supply under all conditions for this, the most vital part of the engine. No attention to this oiling system is required other than observing the return of oil to the tank prior to a run, and the continual replenishment of the supply tank, the level of oil in which, as mentioned above, must be above the half-full mark, and must not be filled when the engine is cold to a level higher than one inch below the return pipe outlet.

NOTES ON THE OILING SYSTEM.

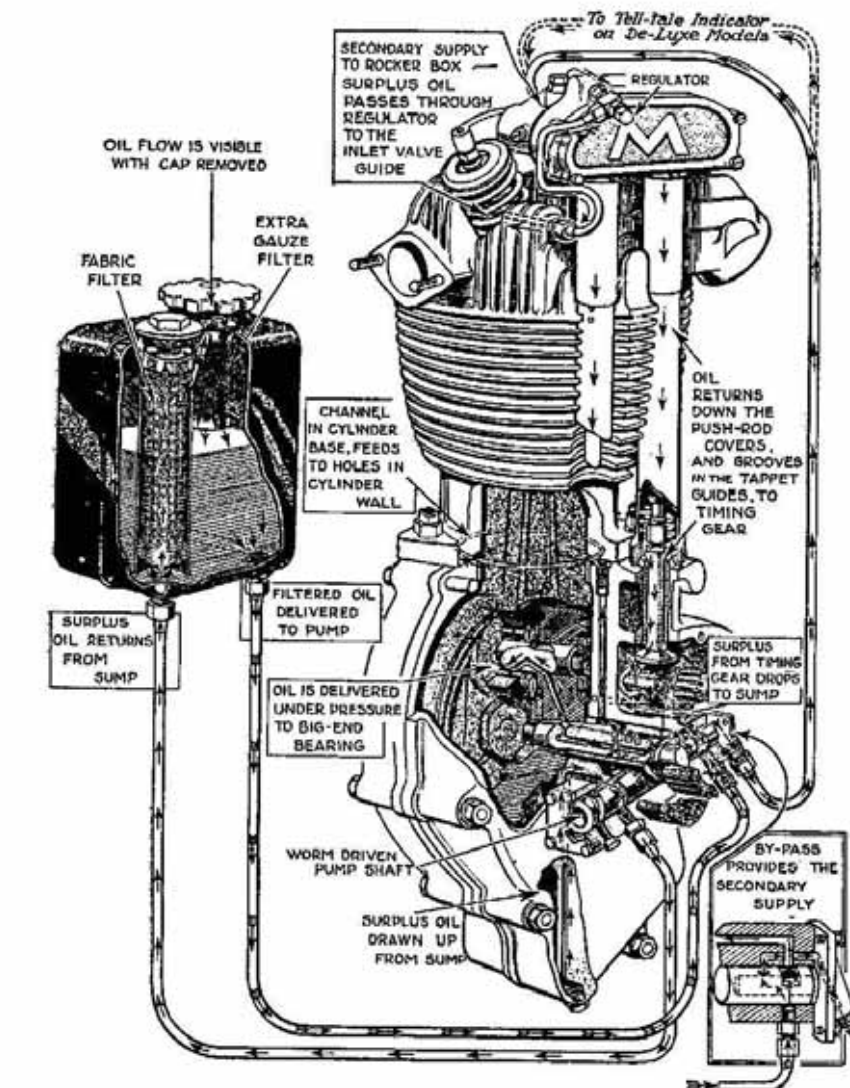
If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps, and also the guide screw, when the plunger can be pushed out large end first. When re-assembling, the plunger must be inserted after the crankcase sections have been bolted together, and before refitting the end caps, the guide screw must be replaced with its relieved tip engaging the profiled cam groove in the plunger. By moving the plunger to and fro while this screw is being introduced, the correct location of the groove can be easily felt, and the screw in question must be finally firmly screwed home. The entire oiling system is simplicity itself (see oiling system illustration overleaf), 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,

Notes on the Oiling System—contd.

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 oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhausting end of the plunger is the larger, the engine sump is always kept clear of oil, hence the term "dry sump." At the same time a large quantity of clean, cool oil is being forced under pressure to all working parts. A double system of filtering the oil is provided in the oil tank. The first consists of a gauze screen in the filter cap orifice to prevent the admission of fluff or foreign matter when replenishing, and the second consists of a felt cartridge through which the returning oil is compelled to pass before emerging from the spout immediately underneath the tank filler cap. This cartridge filter can be removed upon unscrewing the hexagonally-headed cap on the top of the oil tank. About once every 1,000 miles both filters should be removed and carefully washed in clean petrol, while once each season, or not less frequently than once every 5,000 miles, the entire tank should be removed, thoroughly washed out with petrol, and, after refitting, filled to correct level with fresh, clean oil. To avoid undue waste, it is quite permissible to arrange for this clean-out when the oil is at the lowest recommended level, although it must be pointed out that normally it is highly desirable to add fresh oil frequently in small quantities in preference to allowing the supply to become almost exhausted before refilling, the reason for this being that the more oil there is in the tank, the cooler it will keep in circulation. As already mentioned, a part of the oil pump delivery on panel-equipped models is by-passed through an oil indicator and returned to the engine. The adjustment for inlet valve lubrication referred to earlier consists of a pointed screw fitted to the oil "T" piece attached to the cylinder head. 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. The approximate correct setting for this screw is one-third to one-half turn from the fully-home position.

SPECIAL WARNING.

- 1.—Never mix oils of different make or grade.
- 2.—A dirty or choked oil filter cartridge will inevitably cause heavy oil consumption. If thoroughly soaking and washing in petrol does not effect a cure, fit a new cartridge. (Serial No. 3765, price 2s. 6d.)



Oiling System, Models D80 and D90

CHAINS.

The primary chain runs in oil, and should need very little attention other than occasional adjustment, and the oil kept up to the correct level in the case (verify level weekly). The inspection cap orifice is positioned to prevent over-filling. The rear chain should be removed every 1,500 to 2,000 miles in summer and every 1,000 miles during winter, and thoroughly washed in paraffin. After carefully wiping it should be immersed in a bath of molten tallow, or as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in 'soak overnight in order to ensure penetration to all link joints. If treated in this manner, at least 8,000 to 10,000 miles of satisfactory service should be obtained.

GEAR BOX.

Once every 1,000 miles about two ounces of good quality grease should, if necessary, be injected via the aperture in the gear box top covered by an oval metal cap. Lubricants specially recommended are Castrolase (Medium), Mobilgrease No. 2, or Shell Motor Grease (Soft). The gear box must not be entirely filled, and under normal circumstances, the amount mentioned above will be found ample.

NOTE.—The greases recommended can be obtained in collapsible tubes provided with a suitable bent spout to facilitate injection into the gear box interior.

The oval metal filler cap referred to is slotted at one end to allow of its being turned round to expose the filling orifice upon merely slacking off the fixing nuts.

HUBS.

Every 500 miles (or more frequently in continuous bad weather) the lubricators in the centre of both front and rear hubs should have a small quantity of grease forced into them.

FORK SPINDLES, BRAKE SPINDLES, ETC.

To obtain efficient front fork action adequate spindle lubrication is essential, and attention is recommended weekly or at least once every 500 miles. Occasionally grease should be injected into the various brake spindle bearings via the grease nipples provided.

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, usually 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

Bowden Cables—contd.

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

ADJUSTMENTS & MAINTENANCE.**DECARBONISATION.**

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. At all times excessive pinking should be avoided and if retarding the ignition slightly, fails, then an anti-pinking fuel should be used. This applies particularly to the high compression Model D90, for which a petrol benzole mixture, or Ethyl will be found most suitable.

TO REMOVE CYLINDER HEAD FOR DECARBONISING.

First remove the sparking plug and drain all petrol from the tank. Then remove the U petrol pipe connecting the two halves of tank, and after removing the three bolts by which the tank is secured (two at front end and one at rear) and detaching petrol feed pipe, gently lift same off. Next, unscrew the two nuts securing the carburettor body to the cylinder head and lay the entire carburettor well out of the way. Then disconnect the oil feed pipe to inlet valve and also the oil feed pipe to the rocker box. Next, raise the bottom position of each push rod cover tube in turn, sufficient to permit the small spring plunger on the upper portion to engage with the hole in the lower part, which engagement will retain the tubes in a telescoped position. Then unscrew the four bolts securing the rocker box to the cylinder head,

To Remove Cylinder Head for Decarbonising—contd.

when the entire rocker box with push rods and cover tubes may be lifted clear. Next, remove both exhaust pipes and silencers when, upon unscrewing the four cylinder head fixing bolts, the head can be lifted off. Care must be exercised to avoid damaging the soft copper cylinder head gasket. All carbon deposit should be gently scraped off the piston with a blunt instrument. Do not overlook deposit in the valve recesses on piston top.

GRINDING IN VALVES.

It is advisable to grind the valves in upon each occasion that decarbonisation is undertaken, and having removed the cylinder head as already described, it will be found convenient, in order to facilitate valve removal, to rest the head of each valve in turn upon a small block (wood preferable) while the springs are being compressed to allow of the removal of the taper valve cap divided collar. It may be necessary to give the valve spring cap a sharp tap to release this taper collar. After carefully scraping all carbon deposit off the cylinder head interior and valve heads, the face of each valve should be smeared with a good grinding paste (this may be obtained already mixed) and the valve revolved slightly backward and forward (never revolve completely) while slight pressure is applied to the head.

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.

NOTE.—A small clamp tommy wrench to facilitate valve grinding can be supplied at a cost of sixpence.

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

The re-assembly after decarbonising should be in the reverse order of dismantling and meticulous care must be taken to see that the cylinder head and cylinder top faces, together with the gasket, are perfectly clean before the head is applied, and also to make certain that all cylinder head bolts are tightened down evenly and firmly. When the re-assembly has been completed and before starting up the engine, carefully check the rocker clearances, and if necessary, adjust the valve tappets as follows:—

TO ADJUST VALVE TAPPETS.

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

To Adjust Valve Tappets—contd.

head up or down as may be required to obtain correct clearance, which it must be noted, is checked at the valve end, after which securely tighten the lock nut against the tappet end.

NOTE.—Correct clearance between rocker ends and valve stems when valves are down on their seatings and engine cold is the nearest approach to nil obtainable. It should be observed that the hardened steel valve stem caps are free to be revolved with the fingers while at the same time no perceptible up and down movement of the rocker is possible.

VALVE TIMING.

The correct setting for the closing and opening of valves is as follows: Inlet commences to open 20 degrees, or $\frac{1}{2}$ in. before top of exhaust scavenging stroke, and closes 67 degrees, or 13-16 in. up the compression stroke. Exhaust valve commences to open 75 degrees, or 1 1-16 in. from bottom of firing stroke, and closes 28 degrees, or $\frac{1}{4}$ in. down induction stroke. Owing to the presence of what are known as quietening curves on the cam flanks, it is necessary when checking valve timing to first of all set the overhead valve rockers to .014 clearance with engine cold. The correct running clearance described above must, of course, be reverted to before the engine is started.

IGNITION SETTING.

With the ignition lever in the full advanced position, the contact breaker points should commence to break when the piston is travelling upward on the compression stroke, and between 9-32 in. and 5-16 in. before it reaches the top. Not less than 9-32 in. and not more than 5-16 in. Ignition setting can be most accurately established while the cylinder head is off for decarbonising, when the exact position of the piston can be easily and exactly checked.

TO RE-TIME THE MAGNETO.

Remove the outer portion of the aluminium magneto chain cover and slack off only the nut which secures the chain sprocket at the engine end (i.e., the sprocket fixed to the inlet camshaft). Then with a stout screwdriver, or the hooked end of a large tyre lever, gently apply pressure to the rear of the sprocket until it is released from the taper on the end of the shaft to which it is attached. Now carefully revolve the engine until the piston is exactly 9-32 in. from the top of the compression stroke (i.e., before it reaches the top of the stroke at which both valves are closed). Then place the handlebar ignition lever in the fully-advanced position, and remove the contact breaker cover from the magneto. Now carefully turn the magneto with the fingers in its ordinary direction of rotation until the contact points are just about to break, taking care to avoid revolving the engine while doing so. Now gently press home the sprocket which has been loosened, and securely

To Re-time the Magneto—contd.

tighten the fixing nut. It is very necessary in this timing operation to accurately obtain the described piston position, and it is always advisable, if possible, to undertake the operation at a time when the cylinder head is removed, when, of course, the exact position of the piston can be very easily verified. If this is not possible, then a stout piece of wire should be passed through the sparking plug hole, and a notch filed to indicate the topmost position of the piston with another notch exactly 9-32in. lower down. These notches can be made to register with the top edge of the sparking plug hole in cylinder head as a convenient register. Prior to refitting the chain cover, generously smear the magneto driving chain with grease and adjust if necessary.

TO ADJUST MAGNETO CHAIN.

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

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

TO ADJUST PRIMARY CHAIN.

To obtain adjustment for the primary chain provision is made to swing the gear box bodily upon its lower fixing bolt. It will be observed that the upper fixing bolt operates in slotted holes to permit of the necessary movement. To make adjustment, the offside 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 furthest from engine clockwise, until the correct chain adjustment is obtained, when retighten the nut nearest engine and also the top gear box fixing bolt nut. Correct adjustment should allow a whip or movement of $\frac{1}{8}$ in. to $\frac{1}{4}$ in. as the lower run of the chain is lightly pressed up and down midway between the sprockets. It is necessary to remove the inspection cover on the chaincase front to establish the adjustment, and while this cover is removed take the opportunity of checking the oil level, which, as stated elsewhere, should reach the bottom of the inspection hole with the cycle standing on level ground.

TO ADJUST REAR CHAIN.

Put down centre prop stand, then slack off rear wheel spindle nuts. Then adjust chain as required by means of the bolts which pass through each of the fork ends, after which securely tighten spindle nuts. The correct adjustment (which should allow a whip of $\frac{1}{8}$ in to $\frac{1}{4}$ in. when chain is pressed up and down) should be obtained for the tightest place.

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

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

NOTES ON CHAIN ADJUSTMENT.

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

TO ADJUST WHEEL BEARINGS.

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

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

CLUTCH ADJUSTMENT.

In the event of clutch slip being experienced, the most likely cause is incorrect cable adjustment. When correct it should be possible to move the actuating lever (part to which lower end of cable is attached) to and fro with the fingers and if this free movement cannot be felt, the cable adjustment must be slackened. This is done by screwing down the knurled edge cable adjuster on the gear box end plate. If the cable adjustment is found satisfactory, then adjustment should be

Clutch Adjustment—contd.

made to the clutch spring adjuster nuts, each of which should be screwed in exactly half turn, when a re-trial should be made. If necessary, repeat—but be careful to adjust each of the four nuts a similar amount. Normally, the correct adjustment of these nuts is five complete turns from right home; and after dismantling the clutch, the correct setting is obtained by screwing all four nuts right home and then slackening off five complete revolutions. Uneven or excessive tightening of these nuts will prevent the clutch releasing properly.

TO ADJUST STEERING HEAD.

The steering head should be occasionally tested for adjustment by exerting pressure upwards from the extreme tips of the handlebars, while the steering damper 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 looseness has disappeared, when the top lock nut should be again tightened down.

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

FRONT FORK SPINDLE ADJUSTMENT.

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 slack off the left side nut of the spindle requiring adjustment and revolve the spindle bodily by means of a spanner applied to the hexagonal head, in a right-hand or clockwise direction to tighten, or vice versa to slacken. Do not adjust any spindle more than about one-half of a revolution before re-trial with the spindle nut **re-tightened** and before considering the adjustment correct make certain that the fork action is perfectly free with the damper slacked off. Finally, make certain that all three left side spindle nuts are securely tightened and make a point of checking them occasionally.

TO ADJUST FORK ACTION DAMPER.

The fork action damper can best be adjusted while the cycle is actually in motion, and a badly corrugated surface such as may be found on many bus routes provides the best condition for the purpose. The ebonite damper hand nut should be screwed down 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.

MIS-USE OF BRAKES.

With the highly efficient brakes fitted violent application is liable to result in heavy tyre wear. Should either brake become harsh or fierce in action although not violently applied, three to four drops of ordinary engine oil should be injected into the interior. Be careful to inject only this quantity, otherwise the brake efficiency may become seriously impaired for a time. This attention is only very occasionally necessary and mostly so during and after a run on flooded roads.

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.

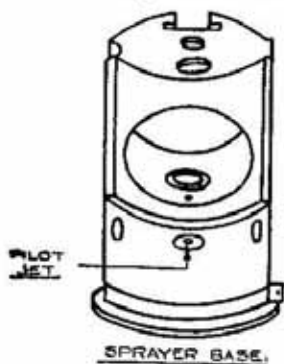
The correct level of petrol is maintained by means of a float and needle valve, operating in much the same manner as the ball float and valve of an ordinary domestic water cistern. The correct level is obtained by the carburettor manufacturers, and no alteration under any circumstances should be made. In the event of a leaky float or worn needle valve, the part in question should be replaced. Control over the petrol supply to the engine is obtained firstly by the main jet, and secondly by means of a taper needle attached to the throttle valve and operating in a tubular extension of the main jet. As the throttle valve is opened or raised so the thick end of the needle emerges from the jet extension, thereby allowing an increased passage for the petrol. As the needle extension is adjustable a fairly wide range of control is possible without actual alteration to the jet size. A pilot or slow running jet with individual air adjustment is provided to take care of slow running or idling, while an adjustable throttle stop controls the speed at which the engine runs when the throttle is closed to the maximum extent possible, in which position the engine should "tick over," to use an expression favoured by motor-cyclists, slowly but positively. The correct main jet setting permits of full air being used only when the engine is running at full speed on full throttle. To test for correct setting proceed as follows: First make certain that the ignition setting is as recommended, then start up the engine, and after allowing it to run for a moment or so to warm up, fully retard the ignition and with the air completely closed, open the throttle to its maximum. If everything is correct the engine should turn over at about the same speed as at 30 m.p.h. on top gear, and upon opening the air it should immediately commence to falter and should stop before half air is given, although as indicated, perfectly even firing should be possible with the air fully closed. A word of warning is advisable here. Do not run the engine for more than a few seconds at a time on full throttle and full

Carburettor Adjustment—contd.

retard. If the above running is not obtainable although the correct jet (size 180) is in use, then the position of the jet needle requires altering, i.e., lengthen to weaken and shorten to enrich. This needle, it will be observed, is fixed to the throttle valve by means of a flat strip cotter operating in one of a number of grooves machined in the needle top. Having obtained the behaviour described it may be taken for granted that the best adjustment for all-round performance on the road has been arrived at, and the only other detail to be checked is that of idling. To check this, the engine should be well warm, the air about three quarters open, the ignition nearly fully advanced, and the throttle valve down on its adjustable stop, which latter can be set to give the idling speed considered most suitable by the individual owner. The engine should fire regularly and evenly while idling, and if it fails to do so with the levers set as described, the small lock nut securing the pilot jet air screw, which will be observed at the base of the mixing chamber, should be loosened, and the screw adjusted until a position is found at which even firing is possible, in which position the lock nut should be carefully tightened down. The setting of this air screw is not unduly sensitive, and once the correct adjustment has been obtained it should not be disturbed. We mention this in order to prevent the possible impression that the setting is incorrect should the engine stall when starting up from cold. Such tendency cannot be entirely avoided and although the tests described above are of a rough and ready nature,

they are, nevertheless, very exacting, and should be closely followed should necessity arise, and only then.

In the event of adjustment of the air screw failing to affect slow running in the manner described, it may be reasonably assumed that the minute passage for petrol has become choked. This is always a possible danger unless meticulous care is taken to prevent the entry of dust or foreign matter of any description into the petrol tank. The jet or petrol passage in question consists of a small hole drilled in the side of the sprayer base. This sprayer base may be pushed out of the mixing chamber upon removing the float chamber and the large nut at the bottom of the mixing chamber. To make the location of the petrol passage in question quite clear, a line illustration is shown, and in the event of difficulty being experienced, a fine piece of steel wire (a strand of Bowden cable will do) should be passed through the very small hole indicated by an arrow.



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 Sidecar.
Front tyre, 26x3.25	... 14-15lbs.	... 16-17lbs.
Rear tyre, 26x3.25	... 20-22lbs.	... 22-24lbs.
Sidecar tyre, 26x3.25 14-15lbs.

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

PERIODICAL INSPECTION OF NUTS.

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

CLEANING.

If the machine is used to any extent in bad weather, for mud removing a small hose is almost indispensable, but when using same care should be exercised not to direct water on to the engine or 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.

CORRECTIVE MEASURES.

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

Engine Suddenly Stops :—

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

Engine Fails to Start, or Difficult to Start :—

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

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.
Creeping ignition lever. (Watch for this.)

Engine Overheats :—

Lack of proper lubrication.
Weak valve springs.
Pitted valve seats.
Worn piston rings.
Late ignition setting.
Punctured float, causing rich mixture.
Air control to carburettor out of order.
Creeping ignition lever. (Watch for this.)

Engine Misses Fire :—

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

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 must first obtain a licence covering the driving of a motor cycle.
1. Hold a driver's licence, which can be obtained from the Chief Constable or Corporation of a County Borough, or from the County Council. The charge for this licence is 5s. yearly, and must be renewed annually from the date of issue. A motor car driver's licence covers the driving of a motor cycle.
 2. Insure against Third Party Risks (other risks may also be embodied in the Insurance Policy as owner may desire, but are not compulsory by law), and obtain from the Insurance Company decided upon either a Certificate of Insurance covering the full period of twelve months, or alternatively, as is most general, a temporary Certificate, which must be produced when applying for Revenue Licence.
 3. Apply to the Taxation Department of the Local Authority of the district in which the vehicle is to be ordinarily kept, for Inland Revenue Licence and Registration Form R.F.1/2 (motor cycles only). The address of the above Taxation Department can be obtained by enquiry at a Post Office.
 4. The Form R.F. 1/2, when obtained, must be filled in and returned, accompanied by the Insurance Certificate referred to above, and the requisite remittance, which varies according to the date of registration and the term covered. For a full year, January 1st to December 31st, the fee chargeable is £2 5s. if the cycle is to be used solo, or £3 if a sidecar is attached.
 5. See that his rear number plate is illuminated at night.
 6. Never drive at a speed which is dangerous to the public.
 7. Wherever necessary, give audible and sufficient warning by horn, or other instrument, of the approach of his motor cycle.

For registration purposes the following particulars will be required :—

Type of Model : " Matchless " 35/D80, or D90.
Manufacturer's horse-power : 4.98.
Engine Number : Stamped on crankcase (left side) adjoining cylinder base.
Frame Number : Stamped on seat lug immediately underneath the saddle.

GUARANTEE

We give the following guarantee with our motor cycles, motor cycle combinations and sidecars, which is given in place of any implied conditions, warranties or liabilities whatsoever, statutory or otherwise, all such implied conditions, warranties and liabilities being in all cases excluded. Any statement, description, condition, or representation contained in any Catalogue, advertisement, leaflet or other publication shall not be construed as enlarging, varying or over-riding this guarantee. In the case of machines which have been used for "hiring out" purposes, or racing, or from which the trade mark name or manufacturing number has been removed, no guarantee of any kind is given or is to be implied.

WE GUARANTEE, subject to the conditions mentioned below, that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, but this guarantee is to extend and be in force for six months only from date of purchase, and damages for which we make ourselves responsible under this guarantee are limited to the free supply of a new part in exchange for the part of the motor cycle, motor cycle combination, or sidecar which may have proved defective. We do not undertake to replace or refix, or bear the cost of replacing or refixing, such new part in the motor cycle, motor cycle combination or sidecar. We undertake, subject to the conditions mentioned below, to make good at any time within six months any defects in these respects. As motor cycles, motor cycle combinations and sidecars are liable to derangement by neglect or misuse, this guarantee does not apply to defects caused by wear and tear, misuse or neglect.

The term "misuse" shall include amongst others the following acts:—

1. The attaching of a sidecar to the motor cycle in such a manner as to cause damage or calculated to render the latter unsafe when ridden.
2. The use of a motor cycle or motor cycle and sidecar combined, when carrying more persons or a greater weight than for which the machine was designed by the manufacturers.
3. The attaching of a sidecar by any form of attachment not provided, supplied or approved by us.

Any motor cycle, motor cycle combination or sidecar sent to us to be plated, enamelled or repaired will be repaired upon the following conditions, i.e., we guarantee that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, such guarantee to extend and be in force for three

Guarantee—contd.

months only from the time such work shall have been executed or until the expiration of the six months above referred to, and this guarantee is in lieu and in exclusion of any common law or statute warranty or condition and the damages recoverable are limited to the cost of any further work which may be necessary to amend and make good the work found to be defective.

CONDITIONS OF GUARANTEE.

If a defective part should be found in our motor cycles, motor cycle combinations or sidecars, or in any part supplied by way of exchange before referred to, it must be sent to us CARRIAGE PAID, and accompanied by an intimation from the owner that he desires to have it repaired or exchanged free of charge under our Guarantee, and he must also furnish us at the same time with the number of the machine, the date of the purchase, or the date which the alleged defective part was exchanged, as the case may be.

Failing compliance with the above, such articles will lie here AT THE RISK OF THE OWNER, and this guarantee and any implied guarantee, warranty or condition shall not be enforceable.

We do not guarantee specialities such as tyres, saddles, chains, magretos, lamps, etc., or any component parts supplied to the order of the purchaser differing from standard specifications supplied with our motor cycles, motor cycle combinations, sidecars or otherwise.

IMPORTANT NOTE.—Any part sent to us for any reason whatsoever must bear distinctly the sender's name and address and instructions or requests relative to parts must be sent separately by letter post.

MACHINE NUMBERS.

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

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

MATCHLESS MOTOR CYCLES (COLLIERS) LTD.
 PLUMSTEAD,
 LONDON, S.E.18.