



INSTRUCTION BOOK

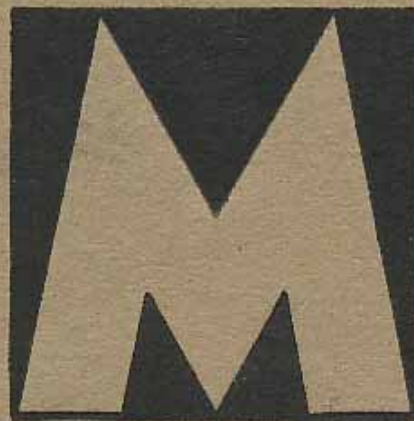
MODEL 33/D80

Sports 500

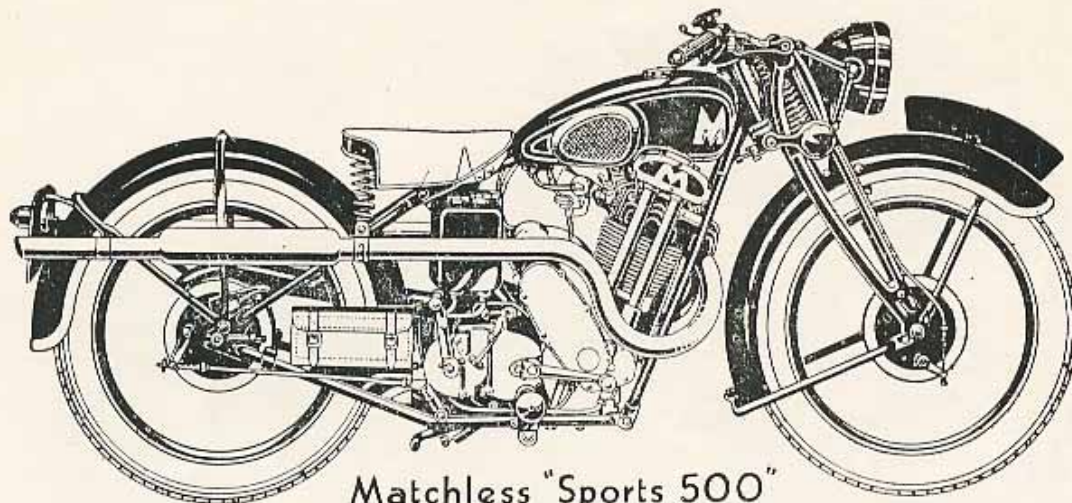
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DRIVING & ADJUSTMENT INSTRUCTIONS



Matchless "Sports 500"
"Matchless" Model 33/D80.

MATCHLESS MOTORCYCLES

(COLLIERS) LIMITED,

Manufacturers.

Registered Offices :

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

Nearest Station :

WOLWICH ARSENAL, S.R.

Factories :

BURRAGE GROVE and MAXEY ROAD,
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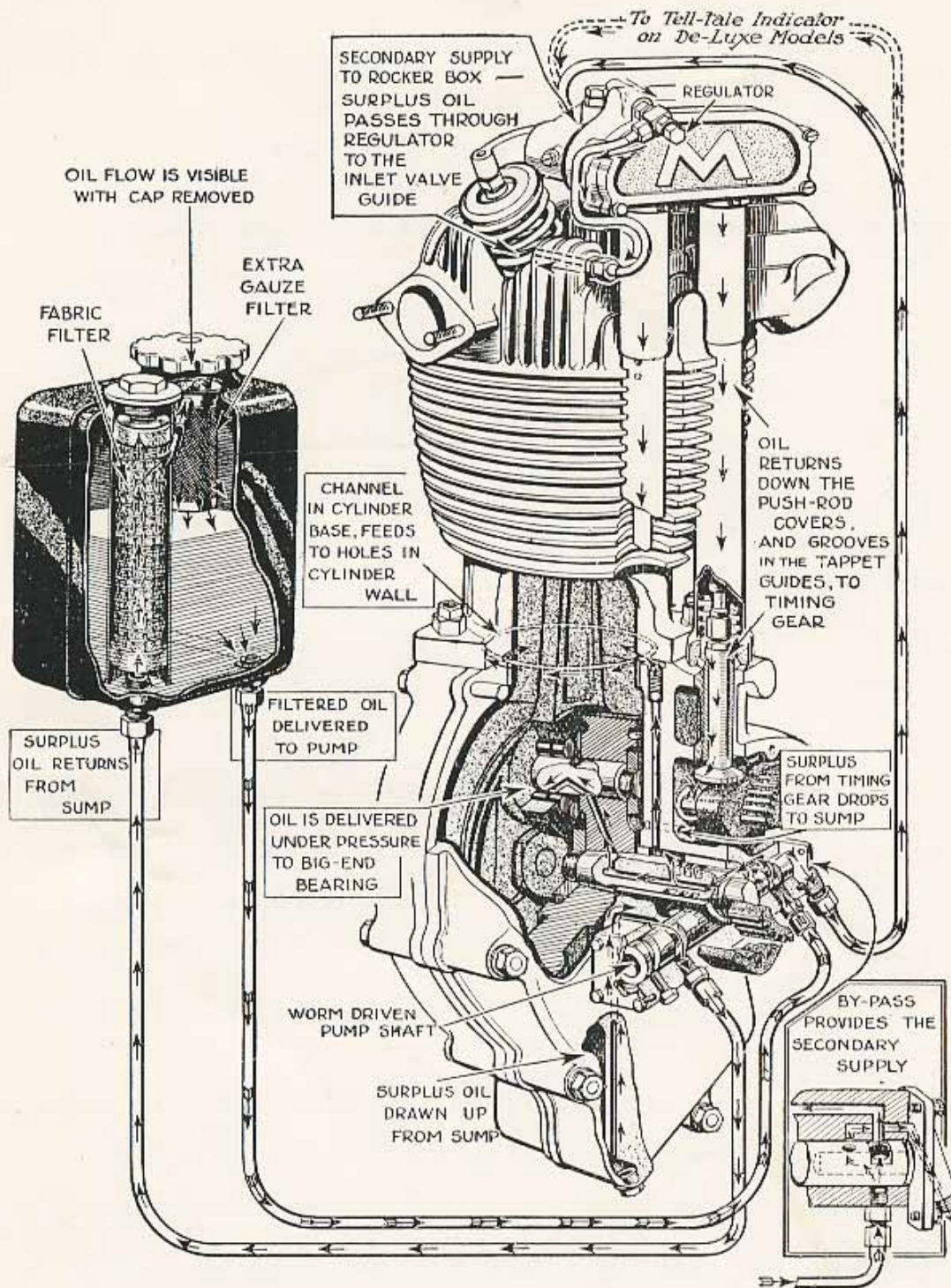
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Engine Unit Model 33/D80

Shewing Oiling System

INTRODUCTION.

A Personal Message to all "Matchless" Owners.

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

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

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

MATCHLESS MOTOR CYCLES

(COLLIERS) LTD.

GENERAL INFORMATION.

TAKING OVER A NEW MACHINE.

Having filled up with petrol and oil of the recommended brand, it is advisable before starting the engine to sit on the cycle, and to become familiar with the controls. Neutral or free engine position of the 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 to make certain that it is correctly engaged it is advisable to pull the gear change pedal up by hand while at the same time rocking the rear wheel to and fro when a gear will be felt to engage. Release the pedal and repeat the movements until the low gear position is reached when as mentioned above, a downward movement will engage neutral, when, of course, the rear wheel will be free to revolve independent of the engine. The ignition is advanced or retarded by means of the small lower 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 by 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. To provide ease of starting a decompressor device is fitted, and is operated by a handle on the timing gear cover. The petrol tap is turned on by pulling the plunger out as far as possible without twisting same. To open the drain cock it is necessary to revolve the plunger after pulling out as above, and again pull out to the farthest extent possible. Assuming that the tanks have been filled with petrol and oil of the recommended brand, and that all levers have been set as above, to start the engine, firstly flood the 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.

IMPORTANT NOTE RE DECOMPRESSOR.

To facilitate the movement of the decompressor lever it will be found beneficial to gently move engine by means of the kickstarter pedal as the decompressor lever is turned to the "on" position, and it will be found advisable to only revolve the decompressor handle just sufficiently far to relieve the compression partly. With the handle too far back starting may be difficult.

Immediately the engine has started, turn the decompressor to the "off" position, open the air slightly and reduce the throttle opening. Do not under any circumstances race the engine

Important Note Re Decompressor.—contd.

while cold, but allow it to idle a moment or two to warm up, and while doing so observe that the oil is circulating properly. Then, while sitting on 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 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.

IMPORTANT NOTE.

Always turn the petrol off upon leaving the cycle idle.

Owing to the downswept 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 consequent engine seizure, if this simple precaution is not taken. Therefore turn the petrol off after every run.

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

"DON'TS" IN DRIVING.

- DO NOT race the engine unnecessarily, or let the clutch in sufficiently suddenly to cause the wheel to spin. Take a pride in a silent, smooth getaway.
- DO NOT use the brakes with violence. Brake early and drive on the throttle instead of the brakes.
- DO NOT allow engine to labour on high gear on a steep gradient, and remember that an easier, faster, and better ascent can be made on the next lower gear.
- DO NOT make a practice of starting on second speed.
- DO NOT under any circumstances allow the chains to run very slack or very dry. Either will soon cause trouble, and adjustments are easy. Slack chains will inevitably cause harshness of transmission.
- DO NOT force engine or drive above a maximum speed of 30 m.p.h. for the first 500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his mount's maximum capabilities. However, until all bearings are well run in, it is advisable to refrain from speed bursts, and the accompanying possibility of seized bearings, piston rings, etc. The first 500 miles of an engine's existence is far more important than the next 5,000.
- DO NOT race the engine in neutral gear position, violently accelerate from a standstill, or drive at full speed on 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.

ENGINE.

Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. After extensive tests we have decided to recommend Wakefield Castrol X.L. as the most suitable oil, and advise all owners to use this and no other. The identifying letters used by most oil firms, denoting the different grades in which that oil is supplied, are imitated, so that it is essential when ordering oil to specify the brand as well as the grade: for example: Wakefield Castrol X.L., and not just X.L. As an additional precaution it is advisable to buy from the branded cabinets or from sealed tins. See where your oil is drawn from.

Oil is carried in the tank underneath the saddle, and in use the level of oil in the tank should never be allowed to fall below the half-full mark. The integral oil pump is of the single plunger double diameter type, the larger diameter being used for exhausting the crankcase sump, and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to the tank. Provision is made on all models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run. On instrument panel equipped models an oil indicator is arranged on the panel itself, and the oil circulation can be seen at a glance. On all other models it is necessary to raise the oil tank filler cap, when the returning oil may be observed running from the small spout immediately underneath the cap. This check should be made preferably upon starting up the engine from cold, as, owing to the fact that when stationary, oil from all parts of the engine interior drains back into the sump, and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than that delivering fresh oil, and partly to the variations in the amount of oil in suspense in the crankcase, according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time, only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for external adjustment of the oil supply, other than that for inlet valve lubrication 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

Engine—contd.

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 engine is cold to a level higher than one inch below the return pipe outlet.

NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps, and also the guide screw, when the plunger can be pushed out large end first. When re-assembling, the plunger must be inserted after the crankcase sections have been bolted together, and before refitting the end caps, the guide screw must be replaced with its relieved tip engaging the profiled cam groove in the plunger. By moving the plunger to and fro while this screw is being introduced, the correct location of the groove can be easily felt, and the screw in question must be finally firmly screwed home. The entire oiling system is simplicity itself, only one moving part being employed, viz., the double diameter plunger. This plunger is rotated by the engine shaft, and moves backward and forward while rotating, under the influence of the small guide screw which engages with the profiled annular groove cut in the plunger end. As the plunger moves in its housing in one direction, the large end draws oil from the sump, while at the same time the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement of the plunger the large end returns to the tank the oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhausting 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 filler cap orifice to prevent the admission of fluff or foreign matter when replenishing, and the second consists of a felt cartridge through which the returning oil is compelled to pass before emerging from the spout immediately underneath the tank filler cap. This cartridge filter can be removed upon unscrewing the hexagonally headed cap on the top of the oil tank. About once every 500 miles both filters should be removed and carefully washed in clean petrol, while once each season, or not

Notes on the Oiling System—contd.

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 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. The approximate correct setting for this screw is one half turn from the fully home position.

CHAINS.

The primary chain on the 33 D/80 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 overfilling. 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 then be immersed in a bath of molten tallow, or, as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in soak overnight in order to ensure penetration to all link joints. 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 or three ounces of Wakefield Castrolase (Medium) should be added if necessary via the aperture in the top of the gear box covered by a black oval metal cap secured with two nuts. The gearbox must not be entirely filled, and under normal circumstances, the amount mentioned above will be found ample.

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

The oval metal filler cap referred to is slotted at one end to allow of it being turned round to expose the filling orifice upon merely slacking off the fixing nuts. Some models have an extended sleeve nut on the right hand end of the top gearbox fixing bolt, and it will be found necessary to remove this long nut to permit application of the bent spout of the collapsible grease container.

HUBS.

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

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

FORK SPINDLES AND BRAKE SHAFT BEARINGS.

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 also 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 mostly neglected. By means of a specially designed oil gun, it is now possible to flood the inner wire with lubricant in a few seconds, and we can only state that the effect of this on a dry cable has to be tried to be believed. Oil is injected through a small bared patch on the outer casing, and is forced through the spiral casing on to and along the inner wire. All Bowden cables on the 33 D/80 model are fitted with small metal clips which will be observed fitted approximately to the centre of each. These clips cover the small bared patch referred to above, and to apply the gun it is only necessary to slide the clip along the casing to enable the specially constructed gun to be clamped with the bared patch occupying a central position on the rubber pad on the gun nozzle. A few turns of the screwed plunger is then all that is required to efficiently flood the entire length of the cable with lubricant. The cost of this special gun is 6s. 6d., and we recommend every owner to have one in his home tool kit.

ADJUSTMENTS & MAINTENANCE

DECARBONISATION.

The period for which an engine will run satisfactorily without being decarbonised depends to a great extent upon driving conditions. Generally, however, this process should be carried out every 1,500 to 2,000 miles. The need for decarbonising will be indicated by a tendency to pink or knock when ascending hills, or, upon accelerating after rounding a corner, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, it is advisable to remove the cylinder each 5,000 miles in order to also inspect the piston rings and remove any deposit from the grooves in which they operate.

TO REMOVE CYLINDER HEAD FOR DECARBONIZING.

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 portion 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, 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. The re-assembly after decarbonising should be made in the reverse order, and particular care is necessary to see that the cylinder head joints and the gasket are perfectly clean before the head is applied, and also to make certain that the cylinder head bolts are evenly tightened down.

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 removing all carbon deposit, the face of each valve seating should be smeared with a good grinding paste (this may be obtained already mixed) and the valve revolved slightly backward and forward (never revolve completely), while slight pressure is applied to the head.

NOTE.—A small clamp tommy wrench to facilitate valve grinding can be supplied at a cost of sixpence. During this operation it is advisable occasionally to raise the valve off its seating and turn in the guide slightly, afterwards repeating the backward and forward movement.

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

A special tool for compressing valve springs can be supplied at 6s. 6d. (Part Number T.T.K.8.)

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

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

VALVE TIMING.

The correct setting for the closing and opening of valves is as follows: Inlet commences to open 20 degrees, or $\frac{1}{8}$ in., before top of exhaust scavenging stroke, and closes 67 degrees, or $\frac{13}{16}$ in., up the compression stroke. Exhaust valve commences to open 75 degrees, or 1 and $\frac{1}{16}$ in., from bottom of firing stroke, and closes 28 degrees, or $\frac{1}{4}$ in., down induction stroke. To test valve timing the tappets must first be set to provide .014 clearance between the overhead rocker pads and the valve ends. See instructions above for normal running clearance.

IGNITION SETTING.

With the ignition lever in the full advance position, the contact breaker points should commence to break when the piston is travelling upward on the compression stroke, and between $\frac{9}{32}$ in. and $\frac{5}{16}$ in. before it reaches the top. Not less than $\frac{9}{32}$ in. and not more than $\frac{5}{16}$ in.

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 $\frac{9}{32}$ 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 finger 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

To Re-time the Magneto—contd.

securely 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 $9/32$ in. lower down. These niches 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 of movement of $\frac{1}{4}$ in. to $\frac{1}{2}$ in., as the top run of the chain is lightly pressed up and down midway between the sprockets.

TO ADJUST FRONT CHAIN.

To obtain adjustment for the primary chain provision is made to swing the gearbox bodily upon its lower fixing bolt. It will be observed that the upper fixing bolt operates in slotted holes to permit of the necessary movement. To make adjustment, the offside nut of the top gearbox fixing bolt must first be slackened. Then to tighten the chain adjustment, first slack off the nut on adjuster bolt nearest the engine and turn the nut farthest from engine clockwise, until the correct chain adjustment is obtained, when re-tighten the nut nearest engine and also the top gearbox fixing bolt nut. Correct chain adjustment should allow a whip or movement of $\frac{3}{4}$ in. to $\frac{1}{2}$ in., as the top run of the chain is pressed up and down midway between the sprockets.

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

To Adjust Rear Chain—contd.

whip of $\frac{3}{8}$ in. to $\frac{1}{2}$ in. when chain is pressed up and down) should be obtained for the tightest place.

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

IMPORTANT.—Care is necessary when tightening the rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, about four inches from and 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 tighten securely the outer of the two lock nuts inside the 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 gearbox end plate. If the cable adjustment is found satisfactory, then adjustment should be made to the clutch spring adjuster nuts, each of which should be screwed in exactly half turn, when a retrial should be made. If necessary, repeat—but be careful to adjust each of the four nuts a similar amount.

Clutch Adjustment—contd.

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 slackened off and the lower nut screwed down until all trace of slackness has disappeared, when the top lock nut should be again tightened down.

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

FRONT FORKS, SPINDLE ADJUSTMENTS.

Provision is made for taking up side or end wear of the various fork spindle bearings. The need for adjustment will be made apparent by a click or creaking noise when the steering head is abruptly turned. By placing the fingers partly over the spindle link end and partly upon the lug through which spindle passes, while the steering head is turned, first ascertain which spindle or spindles require adjustment. Then, after slacking off both nuts, turn the spindle bodily by means of its hexagonal end, left-hand or contra-clockwise to take up slack, or vice versa to slacken. Do not turn more than half a revolution before a retrial, 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," to use an expression favoured by motor cyclists, slowly but positively. The correct setting of the main jet should permit of full air being used when running fast on full throttle. To test for correct setting, start up engine and, after allowing a few seconds to warm up, fully retard the ignition and fully open throttle. If it is now possible to open the air beyond the one-third or half-open position, it would indicate a too large jet, and the needle attached to the throttle valve must be lowered or lengthened. This needle, it should be explained, is secured by a flat strip cotter engaging with a small notch in the needle. Several of these notches are provided to permit adjustment. When correct, the engine should commence to splutter immediately the air lever is opened more than about one-third, but should run satisfactorily on the fully closed air position. In no circumstances should the engine be run for more than a few seconds in this fully retarded, fully opened throttle position. The only other adjustments are the air supply to the pilot jet and the throttle stop. The adjusting screw for the pilot jet air supply will be observed at the base of the mixing chamber. Screwing-in enriches the mixture and, vice versa, unscrewing weakens it. It must be clearly understood that adjustment to this screw affects the mixture only on extremely small throttle openings. Having set the throttle stop screw to give the desired idling engine speed, the pilot jet air screw is turned in the required direction to give even firing. The adjustment is not particularly 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. Adjust-

Carburettor Adjustment—contd.

ment, if any, should be made to this air screw while the engine is warm and the ignition fully or nearly advanced, and air lever one-third open. We mention this in order to remove the possible impression that the pilot jet setting is not correct should the engine stall when started up from cold. Once correctly set, the pilot jet should not require attention, except perhaps in extremes of temperature.

PERIODICAL INSPECTION OF NUTS.

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

CLEANING.

If the machine is used to any extent in bad weather, a small hose is almost indispensable for removing mud. Care should be exercised to avoid directing water on to the engine and magneto, or other such parts. If a hose is not available, soak dirt with paraffin before removing. Do not attempt to rub or brush mud off an enamel surface when dry, or the polish will soon be destroyed. For the engine, magneto, etc., a good stiff paint brush and a pot of petrol is preferable.

IMPORTANT NOTE.—Upon no account should ordinary metal polishes be used upon chromium plated parts, as almost without exception such polishes contain oleic acid, which attacks chromium. Should the chromium plating become dirty or lacking in lustre, a little "Goddards Silver Plate Powder" should be used. This powder, incidentally, is obtainable at any domestic store. Reckitt's "Karpol" is also recommended for cleaning purposes.

TYRES AND SERVICE.

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

Tyres and Service—contd.

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.

		<i>Solo.</i>	<i>With Sidecar.</i>
Front tyre—26 x 3.25	...	14-15lbs.	16-17lbs.
Rear tyre—26 x 3.25	...	20-22lbs.	22-24lbs.
Sidecar tyre—26 x 3.25	14-15lbs.

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

CORRECTIVE MEASURES.

No 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.
- Decompressor action excessive.

LOSS OF POWER.

- Decompressor in "on" position.
- Valve or valves not seating properly.
- Weak valve spring or springs.
- No tappet clearance or excessive clearance.
- Lack of oil in tank.
- Brakes too closely adjusted.
- Badly fitting or broken piston rings.
- Punctured carburettor float.
- Creeping ignition lever. (Watch for this.)

Corrective Measures—contd.

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 studiously to refrain from any of the practices enumerated.

To comply with the law relating to motor cycles the owner of a Matchless Model D/80 must:

1. Hold a driver's licence, which can be obtained from the Chief Constable or Corporation of a County Borough, or from the County Council. The charge for this licence is 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.

Legal Matters—contd.

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 £3, if the cycle is to be used solo, or £4 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 cycle.

For registration purposes the following particulars will be requested:—

Type of model, "MATCHLESS" D/80.

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.

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.

Guarantee—contd.

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

NOTE.—We have designed and produced a special sidecar chassis for use with the Model D/80, which we have proved by prolonged tests extending over enormous mileages to give satisfaction, but we are not prepared to approve the fitting of any other type of sidecar chassis on the above "light" model.

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

CONDITIONS OF GUARANTEE.

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

Failing compliance with the above, such articles will lie here at the risk of the owner, and this guarantee and any implied guarantee, warranty or condition shall not be enforceable.

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

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

MACHINE NUMBERS.

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

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

MATCHLESS MOTOR CYCLES
(COLLIERS) LTD.



33/D80-6/33-1,000