

WORKING & MAINTENANCE
INSTRUCTIONS

FOR

Ransomes

VIBRO-HOE

RANSOMES SIMS & JEFFERIES LIMITED

IPSWICH

NOTE

THE LATEST MODELS OF THE VIBRO-HOE ARE SUPPLIED WITH FIXED HANDLES AND THE INSTRUCTIONS IN THIS BOOK CONCERNING ADJUSTMENTS TO THE POSITION OF THE HANDLES WILL NOT APPLY.

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WORKING INSTRUCTIONS

GENERAL DESCRIPTION

Engine

The engine fitted to this machine is the well-known and reliable VILLIERS 2-stroke incorporating a centrifugal clutch.

Specification

Bore: 50 mm.

Stroke: 50 mm.

Capacity: 98 cc.

Cycle: 2-stroke.

Cooling: Air.

Lubrication: Petroil mixture.

Clutch: Automatic centrifugal.

Fuel: Mixture of oil and petrol.

Capacity of fuel tank: 2 pints.

Ignition: Flywheel magneto.

Transmission

The power is transmitted from the engine crankshaft through an automatic centrifugal clutch (which comes into operation at approximately 600 r.p.m.) to an intermediate shaft by means of a roller chain. From one side of this shaft, the drive is taken by means of machine cut gear wheels to the driving wheel axle, and from the other side by means of an eccentric and link motion to the vibrating toolbar. There is a dog clutch which isolates the drive from the intermediate shaft to the gear wheels.

Starting

Starting is by means of a rope on a pulley on the flywheel magneto.

Control

There are three controls, namely:—

1. The throttle which controls engine speed, and automatically, the engaging and disengaging of the clutch
2. The dog clutch which connects the drive from the engine.

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to the driving wheel and the tool frame. There are two positions for this clutch. When withdrawn to first notch the engine is disengaged. When withdrawn to second notch the land wheel is free and the machine can be wheeled about freely.

3. The trigger clutches which control the position of the handles.

Lubrication

As the useful life and the amount of good service which the engine will give depend almost entirely upon the way it is lubricated, especially during the early stages of its life, it is advisable always to use one brand of good oil and to ensure that the oil is thoroughly mixed with the petrol before putting it into the tank.

An oil measure is fitted to the petrol tank under the filler cap lid and holds 1/16 pint. This quantity of oil is sufficient for 1 pint of petrol.

Recommended Lubricants

	-	Engine and oil gun
Shell	-	Shell X.100 SAE 50.
Vacuum	-	Mobiloil "D".
Wakefield	-	Castrol XXL.
Prices	-	Energol SAE 60.
Anglo	-	Essolube 50.
Vigzol	-	Vigzol Y.50.

The engine runs upon a mixture of oil and petrol and the lubrication is automatic. This mixture consists of 16 parts of petrol to 1 part of oil, i.e. 2 gallons of petrol to 1 pint of oil.

Air cleaner.—A fine wire gauze air cleaner is fitted to the carburettor to protect the engine from dirt and dust. It should be removed every fifty hours, rinsed in petrol and then soaked in oil before being replaced. Failure to attend to this may cause the filter to become choked, when the engine will run very rich and cause excessive wear.

The machine is fitted throughout with "Oilite" self-lubricating bearings and only four oil nipples are provided:—

1. To the main drive chain case "A" (see Figure 1).

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2. To the intermediate shaft "E" in the centre of rear of the machine.
3. To eccentric shaft "B".
4. To the intermediate lever "C" ("B" and "C" are situated underneath the R.H. side cover which must be removed in order to gain access to the nipples).

BEFORE STARTING

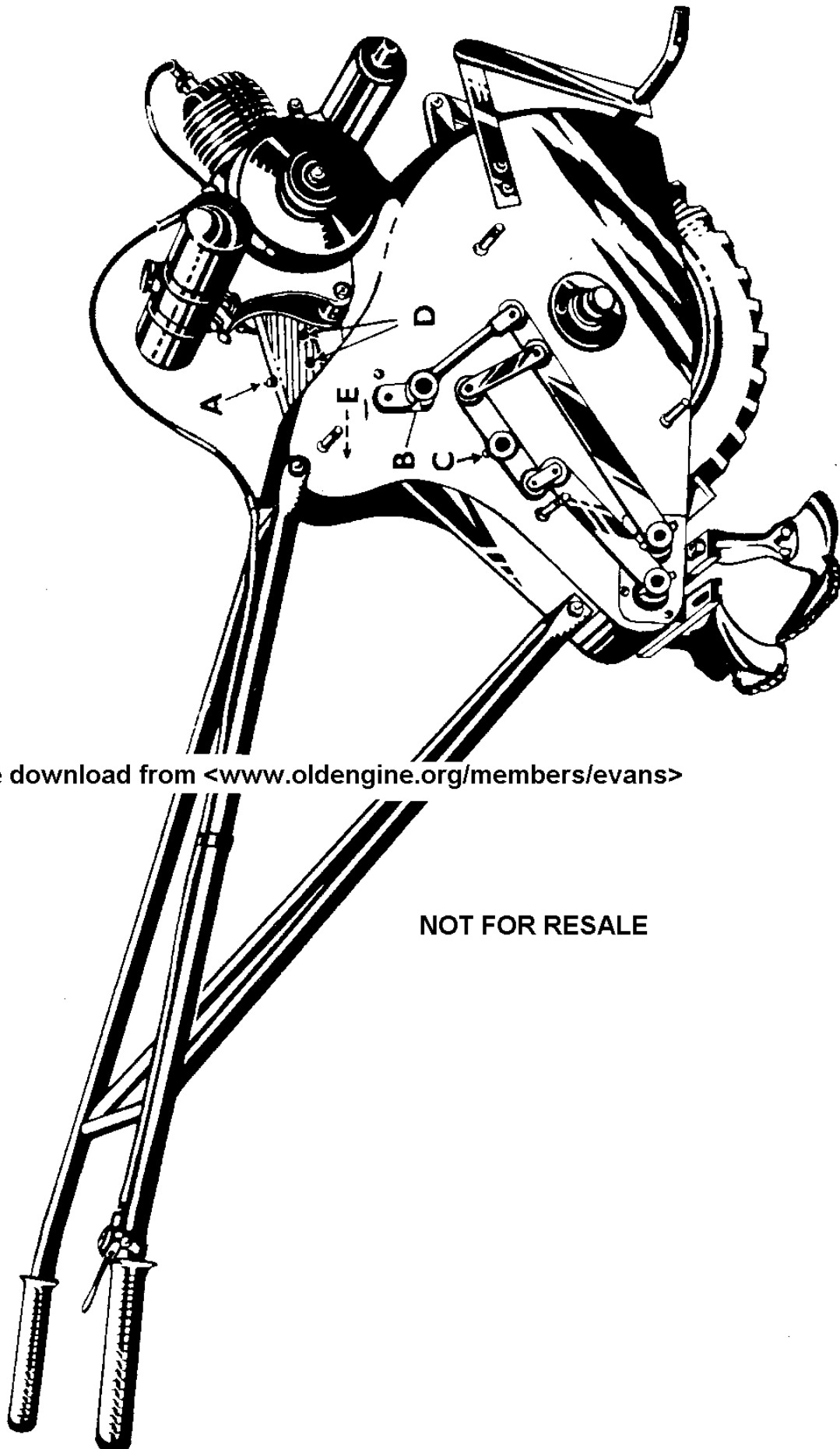
1. Fill the fuel tank with the correct mixture. See instructions on tank and as detailed under "Lubrication" on page 2.
2. Approximately adjust tools on vibrating toolbars as described on page 6.

TO START WHEN COLD

1. Pull the dog clutch out to first notch, to disengage engine.
2. Pull on tap beneath tank.
3. Close strangler on rim of air cleaner.
4. Press tickler at side of carburettor body until petrol is seen to drip.
5. Open carburettor control lever on right hand handle about one third of full opening.
6. Wind starting rope around the pulley on the flywheel magneto in a clockwise direction, one end in pulley notch, the other end being gripped in, but not around, the hand. Then give a brisk pull to rotate the engine, pulling the rope clear of the starting pulley.
7. After the engine has started, gradually open the strangler as the engine warms up.

TO START WHEN HOT

The same procedure should be adopted, except that it



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Fig. 1

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should not be necessary to close the strangler or to flood the carburettor.

FAILURE TO START

If the engine will not start after a reasonable number of trials, ascertain whether this is due to faulty fuel supply, faulty ignition, or to lack of compression.

Fuel Supply

Depress tickler at side of carburettor body. If fuel is reaching the float chamber it will spurt out of the vent at the top of the tickler. Should it not do this, disconnect the pipe from the carburettor and test whether the fuel flows through pipe. If it does not it is probable that the gauze filter on the push-pull tap is blocked and the tap will have to be removed to enable it to be cleaned.

Ignition System

Unscrew sparking plug from cylinder head and place it with ignition cable attached on a metal portion of the machine. When the engine is rotated a spark should be visible at the plug points. Should no spark occur try a new plug, or alternatively, check whether a spark occurs when the end of the ignition cable is held about $\frac{1}{8}$ " away from a clean metal part of the engine. If no spark still occurs it will be necessary to inspect the magneto. This can be done as described under Maintenance on pages 8 and 9, or it may be advisable to call in your local Service Engineer.

Compression

Compression should be felt when the engine is rotated at normal starting speeds with the throttle partly open. If this is weak or non-existent it is strongly advised that you call in your local Service Engineer.

If the above tests are satisfactory and the engine still will not start, tilt the machine back onto its handles so that the drain plug on the engine crankcase is at the bottom. Remove the drain plug and drain off any oil which may have accumulated in the crankcase.

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THE MACHINE AT WORK

The machine is driven by the engine through a centrifugal clutch and a dog clutch. This arrangement ensures that:—

1. The engine is automatically protected from any overload, and thus is prevented from stalling.
2. The vibrating toolbars are disengaged from the engine for starting by pulling out the dog clutch to the first notch.
3. A single throttle lever gives the operator full command of the machine.

After being started the engine should be allowed to run lightly for a few moments in order to warm it up. If the throttle is then fully closed the engine should “idle”, when the dog clutch on the left hand side of the machine can be engaged. As the throttle lever is opened up so the clutch will take up the drive and the machine will move off. Should the machine at any time fail to take up the drive due to the choking of the wheel or the tools, the dog clutch should first be disengaged before any attempt is made to unchoke them.

ADJUSTMENT OF TOOLS

When using L hoes care should be taken to ensure that they are so positioned that the blades do not foul one another as they reciprocate. It is recommended that one should be placed on each bar. It is important that the nuts securing the hoes to these bars should be fully tightened, otherwise the vibrating motion will work them loose and cause undue straining.

When grubbing tines are being used they should be equally spaced on both bars so that there is no side draught on the machine.

If used in wet or sticky conditions, the scraper which is fitted to the rear of the driving wheel should be kept up against the tyre, otherwise choking is likely to occur inside the main frame.

MAINTENANCE & REPAIRS

ENGINE

Petrol Filter

A filter gauze is fitted to the bolt connecting pipe to carburettor and also to the fuel tap in the tank. These filters should be examined occasionally and cleaned by dipping in petrol.

Carburettor

This is the Villiers "Junior" type having a single control lever to throttle and attached to the throttle is a taper needle which provides a correctly adjusted mixture at all throttle openings. The taper needle is set at the Works before delivery, but if it is desired to make any adjustments at any time, proceed as follows:—

First remove the throttle by unscrewing the top ring of the carburettor. At the top of the throttle there is a small screw: turning this in a clockwise direction—which lowers the needle—will give a weaker setting. For correct setting, screw down needle until the engine just begins to spit and run unevenly indicating too weak a mixture. Then raise the needle just enough to ensure that the engine will run smoothly and evenly, when warm, by unscrewing the adjusting screw by approximately half a turn at a time.

If the float chamber has to be removed at any time for cleaning, etc., care should be taken not to overtighten the bottom nut when reassembling.

Sparking Plug

Clean and reset the points to 0.025" gap after each 100 hours work. Adjustment of the gap should be done by moving the points attached to the outer body of the plug. Never bend the centre electrode. Keep the outside of the plug insulation free from water and dirt. When screwing the plug in the cylinder head, should any undue stiffness be experienced,

do not use force but examine thread for any particles of grit or carbon which may be present. These must be removed, otherwise the threads in the cylinder head may be damaged. It is a good plan to smear a little graphite grease on the plug threads before replacing. A long reach plug of the Lodge CB 3 type should be used when fitting a replacement.

Contact Breaker

The contact breaker points should be checked occasionally to see that they are clean, that the gap when fully opened is between 0.016" and 0.012" and that they open and close properly. To inspect and adjust the points proceeds as follows:

1. Remove starting pulley (unscrew the central bolt) and the flywheel cover plate which is held by three screws.
2. Turn flywheel until rocker pad is on top of cam profile of flywheel boss.
3. Release the screw "A" (Figure 2).
4. Position bracket "B" with 0.015" feeler gauge between

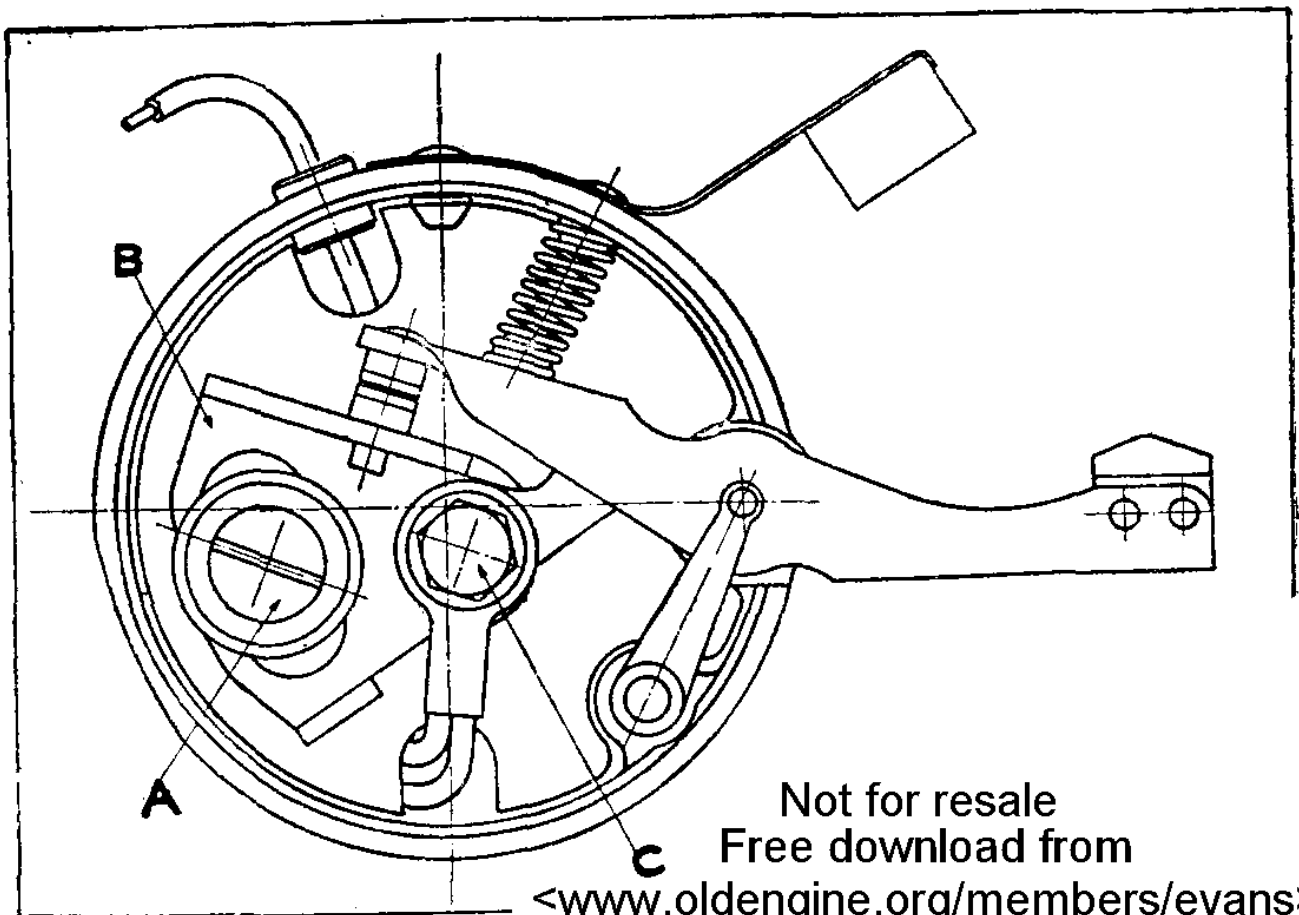


Fig. 2

the contact breaker points, tighten screw, taking care not to use too much force. It is not necessary to disturb screw "C" when adjusting the point gap.

To keep the felt pad moist, give it a drop of oil occasionally.

Magneto Timing

When the engine is built the magneto is timed so that the contact breaker points commence to open when the piston is $5/32''$ before top dead centre. A timing mark is stamped on the small boss on the rim of the armature plate, which coincides with a similar mark stamped on the flywheel rim when the piston is at the top of its stroke. To check the timing it is only necessary to remove the sparking plug, turn the flywheel until the two marks are opposite, when the piston should be at the top of its stroke.

Flywheel Removal

The cam operating the contact breaker is riveted to the flywheel which is driven by a taper on the crankshaft, and if alteration to the timing is necessary, the flywheel must be released, by unscrewing the centre nut with the box spanner supplied in the tool kit. This nut has a right hand thread and is imprisoned in the flywheel and it should be unscrewed until the flywheel is just free to revolve on the crankshaft. With the piston in its correct position, i.e. $5/32''$ before top dead centre, the flywheel should then be moved round until the points commence to open, then tighten up the nut firmly and recheck the timing. This nut must then be tightened up hard by hitting with a hammer on the end of the tommy bar.

The taper of the shaft and cam must be clean and dry; if any oil is present on the surface it will be impossible to secure an effective drive.

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Decarbonizing

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Decarbonizing the Villiers 2-stroke engine is quite straightforward, because of the simplicity of this type of unit; the following points, however, are worth special attention.

When removing and replacing the cylinder, care should be taken not to twist it round the piston—it should be pulled

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off or pushed on straight so that the rings cannot catch in any of the ports and break.

All carbon should be removed from inside the piston head as well as from the top of the piston and from the cylinder head. The ports in the cylinder, particularly the exhaust port, should receive careful attention, and should be kept clean, but on no account must the size or shape of these ports be altered by filing.

Piston ring grooves must be kept free from carbon in order to leave the rings quite free. Piston rings should be bright round their surface which makes contact with the cylinder bore. Should wear cause the ring gap to exceed 1/32" when in the cylinder, the piston ring should be replaced.

Carbon will form on the gudgeon pin at either side of the small end bush, and this should be carefully removed, otherwise difficulty will be experienced in removing the pin from the piston. The small end bush and the piston bosses should be kept quite free from carbon.

It is of the utmost importance that silencers and exhaust pipes are kept quite clean internally, and that a heavy deposit of carbon is not allowed to accumulate. This would cause back pressure and loss of power.

The connection between carburettor and induction pipe must be absolutely airtight, and after dismantling an engine, new washers should always be fitted at the induction pipe joint and cylinder base joint, if the original ones have been disturbed.

HINTS AND TIPS

1. Always thoroughly mix the oil and petrol before putting it in the tank.
2. It is wise to filter your petrol mixture through a fine wire gauze when putting it in the tank.
3. Do not flood carburettor before starting when engine is warm.
4. Stop engine by turning off fuel tap.
5. Do not experiment with cheap plugs — use the type recommended.

6. Always quote the engine number when ordering spares or asking for advice. The number with prefix letters and/or numbers is stamped on the crankcase at the back of the engine.
7. Crankshafts should only be taken apart by a skilled mechanic. Special tools are required for ensuring alignment when reassembling and as the makers have these facilities, repairs can be undertaken by them at the lowest cost.
8. It is important that air leaks should be avoided at the following points:—
 - (a) Between inlet pipe and carburettor.
 - (b) Between inlet pipe and cylinder.
 - (c) Between cylinder base and crankcase.
 - (d) Between the two halves of the crankcase.
9. When decarbonizing the engine it is very important that silencers and exhaust pipes are also cleaned out.
10. Avoid all sharp bends in the carburettor control cables.

MACHINE

Adjustment of Drive Chain

To gain access to the chain remove the two screws "D" in the centre of the top half of the chain cover (Figure 1), and lift off the cover. Slacken the nuts securing the engine feet to the crankcase and slide the engine forward until the chain is at its correct tension. There should be about $\frac{1}{4}$ " movement each side of the centre line of the chain.

To remove the chain completely it is first necessary to remove the left hand side cover and then take out the rear-most two screws attached to the main casing, when the lower half of the chain case can be dropped out.

Removal of Driving Wheel

The hexagonal driving wheel axle is held in position by two hardened steel setscrews which locate in drilled recesses on the axle. When these two screws are removed, by using the

special key supplied in the tool kit, the axle can be pushed through the bearings and the wheel withdrawn.

Centrifugal Clutch

To remove the clutch, proceed as follows:—

1. Remove large nut from outside of clutch.
2. Insert special extractor bolts into tapped holes provided in the clutch boss and tighten centre screw of extractor onto end of crankshaft. A sharp blow upon the head of the centre screw, after pressure has been applied to it, will facilitate the removal of the clutch. Alternatively, a blow may be given upon the back of the clutch ring with a block of wood.
3. The clutch ring may now be pulled off the flywheel boss and the clutch shoes and springs taken off the pins.

To reassemble proceed in the reverse order, taking care to ensure that the cones of the crankshaft and the clutch boss are clean and free from oil. Tighten nut securely.

Relining Clutch Shoes

It is essential to use the correct linings and copper rivets when relining. Care must be taken when replacing the shoes to see that the hinged ends of the shoes point in the direction of running. Be sure to fit the springs correctly, i.e. with the hooks facing away from the flywheel.

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