

THE
ROTOTILLER
Registered Trade Mark

MANUAL

FOR TYPES

'50'

'51'

'30'



ISSUED BY

GEO. MONRO LTD.

Machinery Section

**L.N.E.R Station Approach,
WALTHAM CROSS, Herts.**

**Sales and Service Depots also at
Exeter, Stockport, Edinburgh.**

Machine No.....

30 c
40534

**THE
ROTOTILLER
MANUAL**

Important.

In preparing this Manual, our object has been to include only the instructions and advice of real importance to Rototiller users.

We, therefore, strongly recommend everyone who operates a Rototiller to make a point of carefully reading through the following pages at the outset, instead of using the Manual only for future reference.

A copy of this Manual is sent out with every Rototiller. Additional copies can be supplied at 1/6 per copy.

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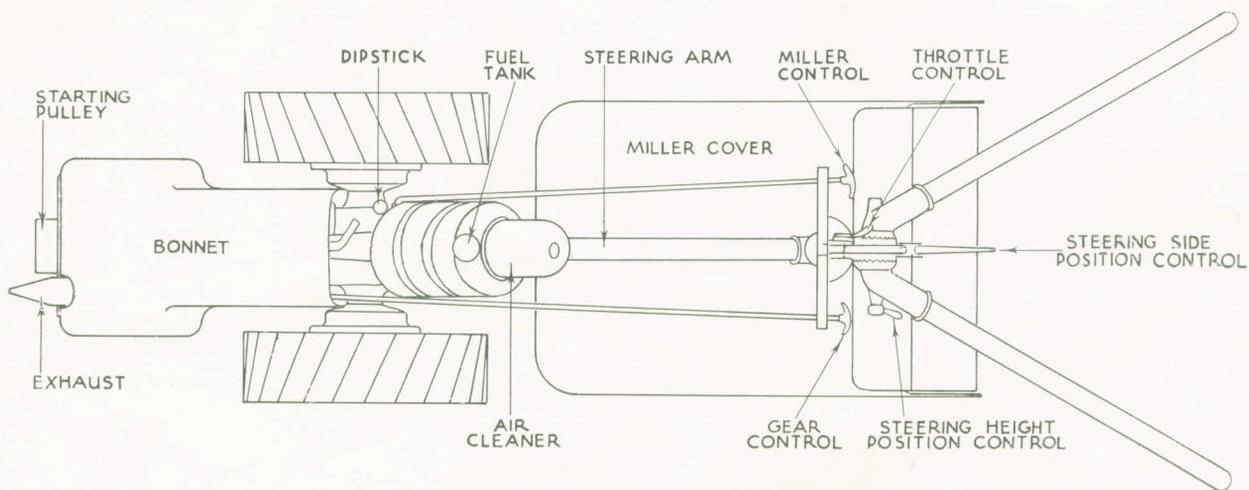
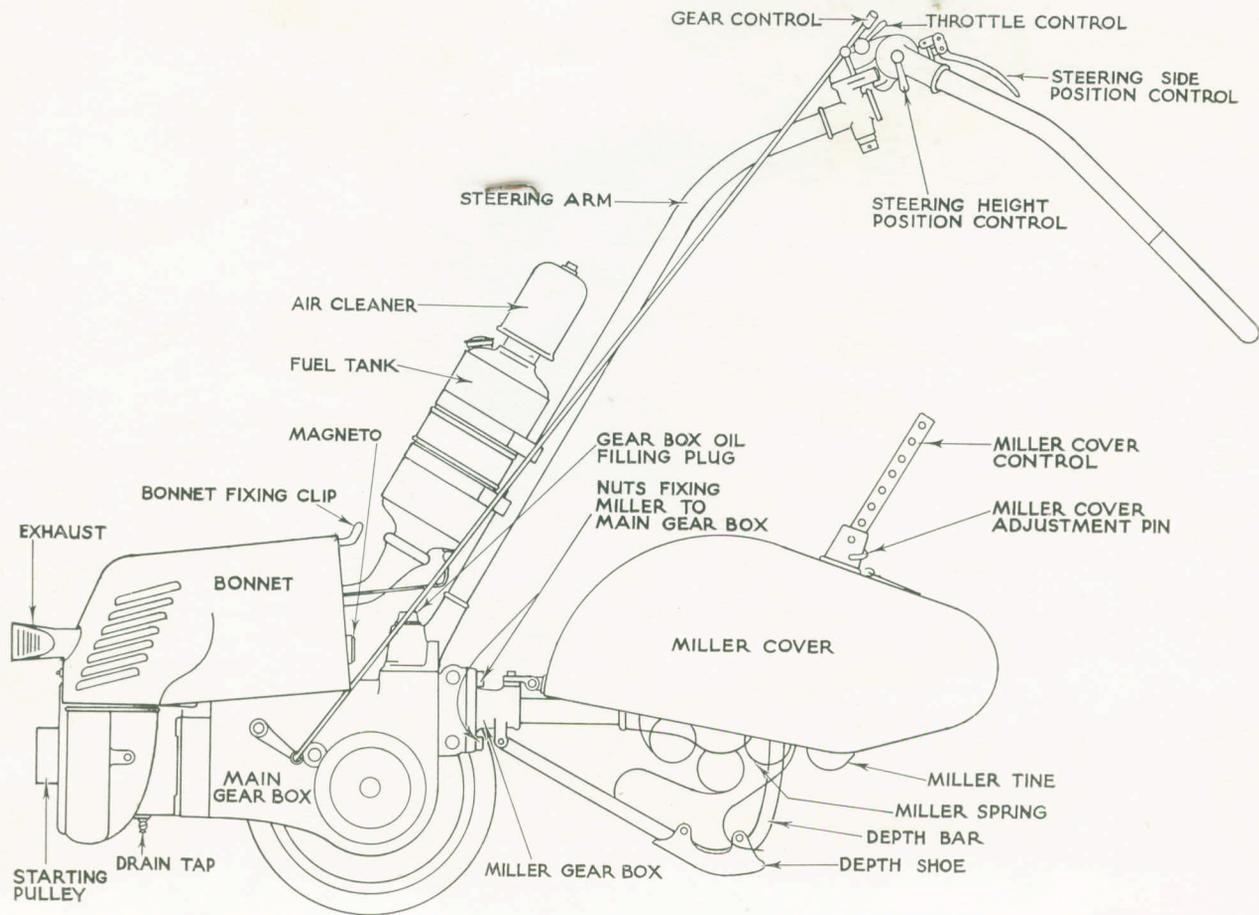


FIG. 1.—ROTOTILLER No. 30.

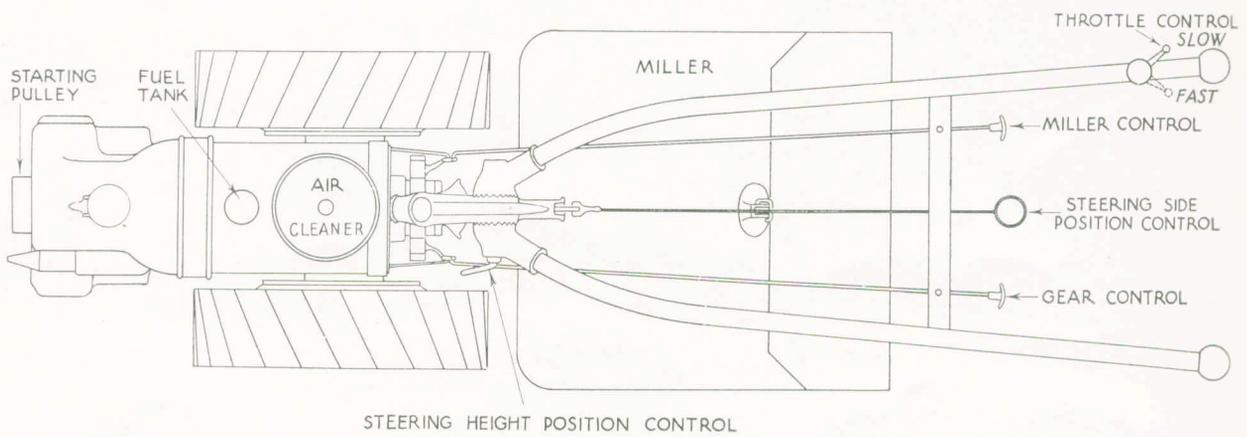
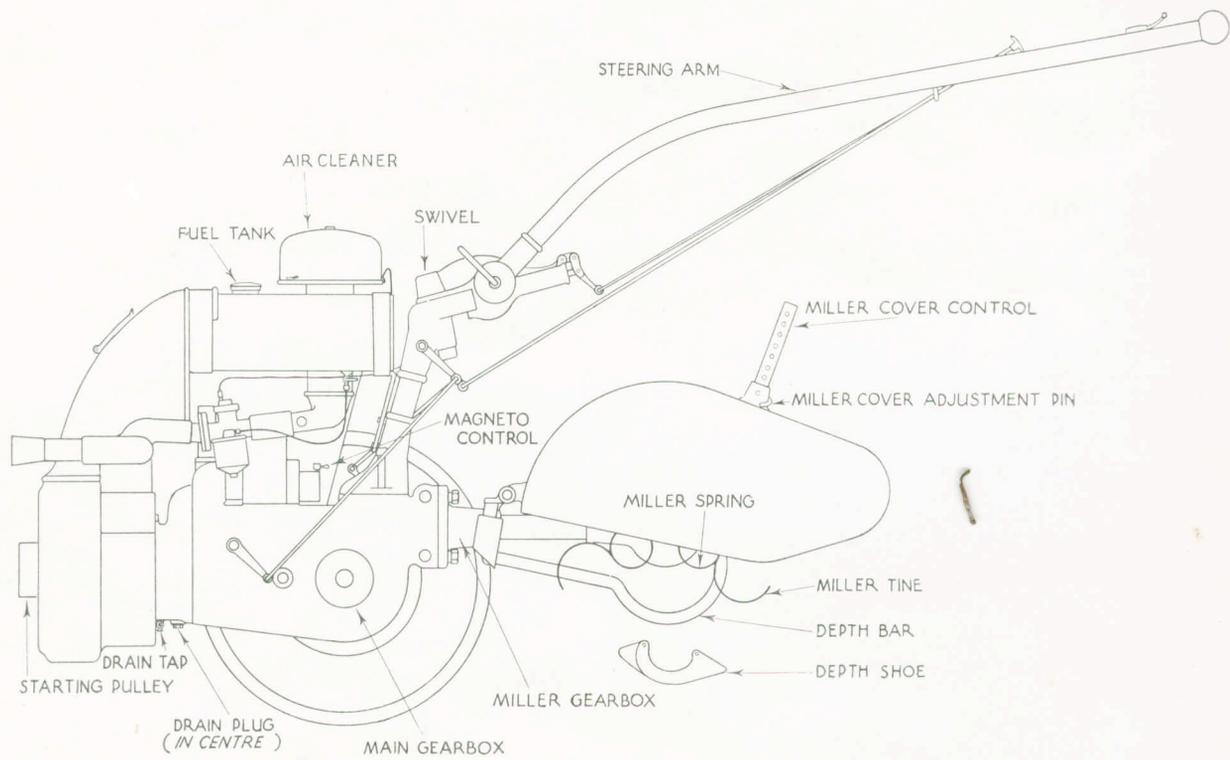


FIG. 2.—ROTOTILLER No. 50.

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ROTOTILLER

Registered Trade Mark.

I.—LUBRICATION.

THE ENGINE is lubricated exclusively by the oil which is to be mixed thoroughly with the fuel before introduction into the tank in the proportion of 6 per cent. (increased to 8 per cent. during the early life of the machine).



To prepare the mixture use the oil measure supplied with each machine. The oil measure is marked with a 6 per cent. groove and an 8 per cent. groove corresponding to the quantity of oil for one gallon of fuel.

Use **only** a good quality motor oil of SAE 40 to 60 viscosity such as:

FIG 3. "PATENT CASTROL XL"—"VEEDOL No. 5"—"TEXACO J"—"GOLDEN SHELL"—"GARGOYLE MOBILOIL B"—"KERVOLINE TT"—"USOL EXTRA HEAVY"—"LONG LIFE BP/SAE 50"—"MUTOL SAE 60"—"SIGOLINE M"—"DUROL GERM. No. 6"—"ESSOLUBE 50B"—"ELEKTRION 5045."

Avoid running the engine even for half a minute on fuel not mixed with the required proportion of oil or mixed with oil of low or unsuitable quality.

It is good practice to prepare in advance the bulk of the fuel mixture for the day's work and to supply this mixture exclusively to the driver of the machine.

The GEARS are provided with Wakefield's "SWANSHOT-CASTROL" when the machine is delivered (except machines despatched to the Southern Hemisphere or the Tropics). As an alternative "RETINAX SHELL" can be used for the gearbox.

On receipt of the machine and **after every 30 hours work, check the oil content of the gearbox.** To do this, place the machine level and pull out the dipstick located on the left-hand side of the gearbox on the No. 50 and No. 51 and the right-hand side of the gearbox on the No. 30. The level of oil in the gearbox should normally reach the upper mark on the rod and **must never be allowed to fall below the lower mark.** When replacing the oil level gauge make sure that it is properly "home."

To fill the gearbox on No. 50, remove the filling plug painted RED situated at the right-hand side of the magneto.

To fill the gearbox on No. 51, remove the oil cover, whose hand screw is painted RED, situated on the right-hand side of the reverse gearbox.

To fill the gearbox on No. 30, remove the filling plug painted RED situated at the base of the guiding arm.

Occasionally drain the gearbox by means of the hexagon-headed drain plug, situated underneath the gearbox casing. Do this just after the machine has been working, when the oil will drain more freely. Drain thoroughly, flush with paraffin and refill with fresh gear oil.

No further lubrication is required except occasionally a few drops of oil on the steering swivel joint, on the ratchets of the wheel hubs and on all the moving parts such as carburettor levers, etc. and some grease in the grease cups of wheel hubs whenever fitted.

II.—CARBURETTOR.

The AMAL carburettor (see Figs. 4 and 5) fitted to the Rototillers No. 50, 51 and No. 30, is provided with two jets.

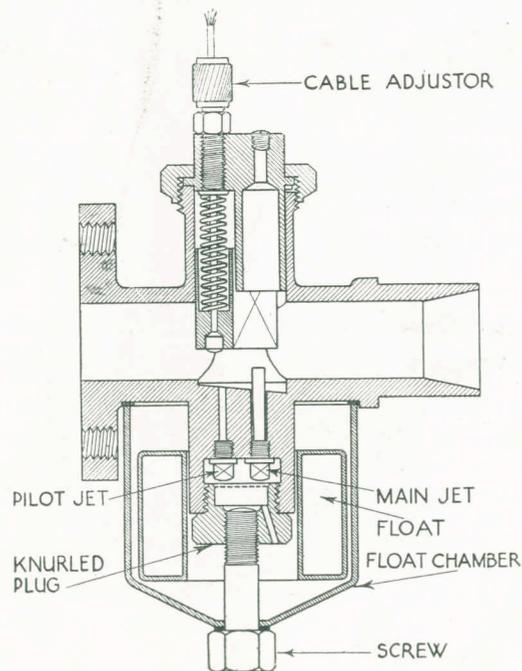


FIG. 4.

The pilot jet regulates the mixture from fully closed to $\frac{1}{4}$ -throttle.

The main jet differs from the pilot jet by its longer tube. This jet regulates the mixture from $\frac{3}{8}$ in. to full throttle.

To remove the jets first remove the screw situated below the float chamber and remove the float chamber and float. Then unscrew the knurled plug, thus uncovering the jets, which can then be carefully unscrewed with the special key supplied for this purpose.

If the engine "spits" or "fourstrokes," see instructions under Remedy Chart on pages 22—25.

A spare jet is supplied in the tool-kit. This can be used instead of the standard main jet when doing light work, thus securing smooth running and economy of fuel for light load. Care should however be taken not to fully load the engine with the spare jet fitted, as this will mean too poor a mixture for the power and consequently internal overheating of the engine with its undesirable consequences.

FUEL FILTER.—To prevent any impurity in the fuel from being admitted to the carburettor, a fuel filter is provided, situated immediately below the fuel tap. The sieve of this fuel filter should occasionally be cleaned, its choking having the same consequences of starving and overheating the engine as is the case when using too small a carburettor jet for the load applied.

To clean the fuel filter, unscrew the union on the pipe leading from the tap to the carburettor (see page 23).

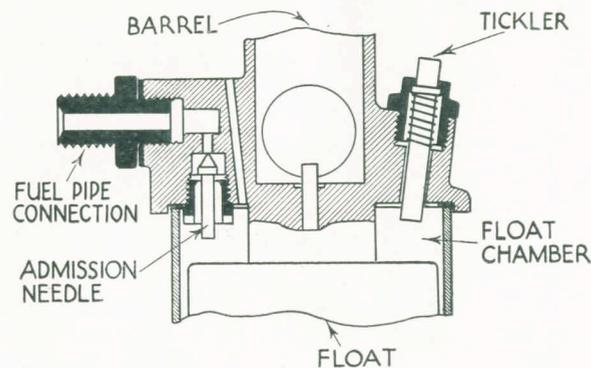


FIG. 5.

III.—AIR CLEANER.

The air suction to the engine is fitted on standard machines with a canvas bag separator and an oil-soaked wood shavings

filter. This filter is combined with the fuel tank. The canvas bag separates most of the dust and the oil-soaked wood shavings retain the finer dust which has been allowed to pass the canvas bag.

Thorough cleaning of the air is essential to the life of the engine, as any dust admitted to the engine will form a grinding compound which will wear the ball and roller bearings and also the gudgeon pin, cylinder and piston.

AIR CLEANER
No. 30.



FIG. 6.

AIR CLEANER
No. 50 & 51.



FIG. 7.

These troubles will be avoided by giving the Air Cleaner a reasonable amount of care. **Attention must, of course, be given more frequently when the machine is applied to work under dry soil conditions.**

The canvas bag must be kept in good condition, dry and clean. It can be easily removed and washed. If the canvas bag is allowed to get dirty or wet, the air will have difficulty in passing through, **resulting in loss of engine power and an abnormal consumption of fuel.** The canvas bag must not be used if torn or threadbare as all its efficiency is thus destroyed.

Particular care should be taken that the cage carrying the canvas bag rests properly on the felt ring, also that the felt ring is in good order so that no air can be admitted otherwise than through the canvas bag.

The wood shavings which fill the body of the Air Cleaner must be clean, fine, pliable and dust-free. They must be reasonably soaked in clean oil before introduction into the Air Cleaner.

An excess of oil in the wood shavings may lead to the superfluous oil, possibly mixed with dust, penetrating into the engine, thereby causing damage.

On the other hand, the use of insufficiently oiled shavings or shavings that have been allowed to dry during a period of idleness of the machine, reduces the efficiency of the dust retaining powers of the shavings, which may lead to trouble. It is, therefore, essential, especially in the case of machines which have travelled a long way (for instance overseas) to inspect and re-oil the shavings before starting to work the machine.

The body of the Air Cleaner must be kept $\frac{3}{4}$ full of wood shavings which should be distributed on the hook wire.

The gauze at the bottom of the Air Cleaner body must be kept in good condition; if faulty in any way it must be replaced by a new gauze immediately.

For cleaning purposes, the whole Air Cleaning device can be dismantled.

The Guarantee given with the machine is not applicable to damage resulting from the admission of foreign matter through the Air Cleaner.

We cannot insist enough on the vital importance of keeping the Air Cleaning device and its connection to the engine in perfect order.

IV.—CONTROLS.

THROTTLE CONTROL.—The throttle is operated by means of a Bowden Lever situated on the steering arm. To throttle down on the No. 50 and 51, push lever to right; on No. 30, pull lever back. To open throttle on No. 50 and 51, push lever to left; on No. 30, push lever forward.

GEAR CONTROL.—The gears for Forward Motion are controlled by a rod (painted red) fitted with "T" shaped grip situated on left (see Fig. 8). By pushing this red rod forward the clutch becomes engaged; pulling it backwards disengages the clutch.

CONTROLS (No. 50).

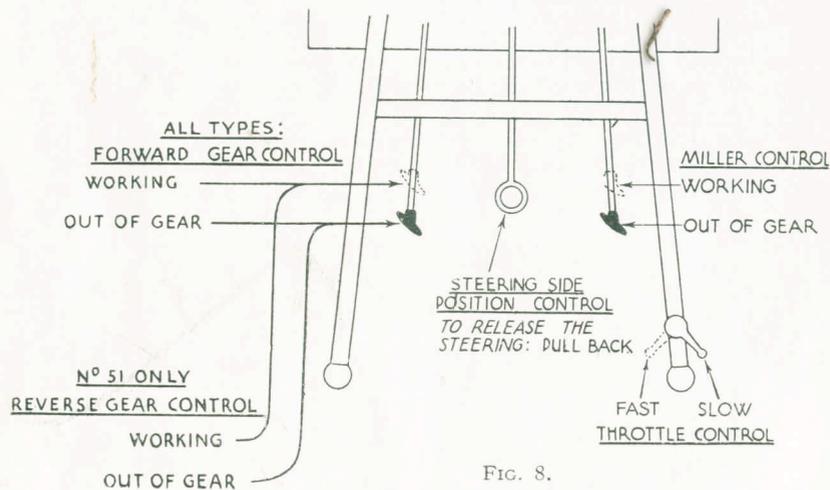


FIG. 8.

The above described Gear Control is the only one existing on No. 30 and No. 50 machines. On the No. 51 machine it is supplemented by a Reverse Motion Control Rod (painted blue), also fitted with "T" shaped grip and situated below the Forward Motion Control Rod described before. By pulling the blue rod backwards the Reverse Clutch becomes engaged and by pushing it forward, disengaged. The engagement of the blue rod can only take place if red rod is disengaged and the engagement of red rod if blue rod is disengaged.

It is important not to engage clutch with the engine running at high speed.

MILLER CONTROL.—The Miller is controlled by a rod (painted green) fitted with "T" shaped grip situated on the right (see Fig. 8). By pushing this rod forward the miller becomes engaged; pulling it backwards disengages the miller.

POSITION OF HANDLES.—The handles can be set at the required height by releasing the small handle situated at the right-hand side of the handle ratchets (see Figs. 1 and 2: Steering Height Position Control).

On the No. 50 and 51 the handles can be moved sideways by pulling back the rod fitted with "loop" shaped grip. This rod is situated in the centre, between the gear and miller controls (see Fig. 8).

On the No. 30, the handles can be moved sideways by releasing the lever situated underneath between the ratchets of the handles.

The distance between the two handles on the No. 30 can be altered by releasing the bolts holding them in their sockets and turning the handles round inside their sockets.

DEPTH CONTROL OF MILLER.—The bar hinged at bottom front end of the miller gearbox and which can be set to stand nearer to or further from the miller gearbox, is called the Depth Bar (see Fig. 9). This depth bar is held in place at the rear of the miller gearbox by means of a pin, termed the Depth Setting Pin.

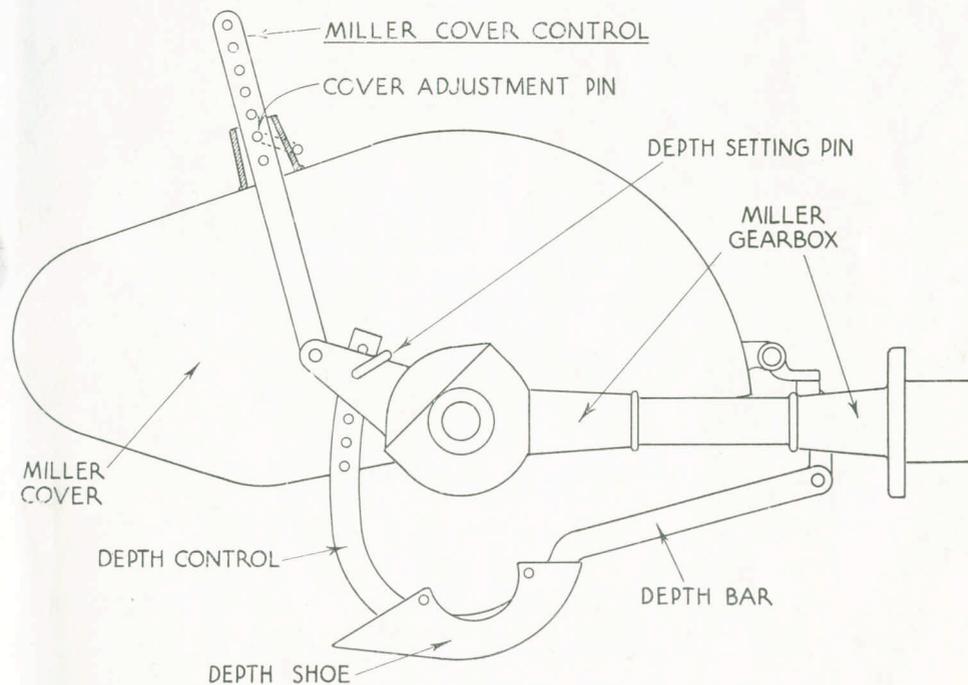


FIG. 9.

By lowering the Depth Bar away from the miller gearbox, shallower tillage is obtained.

The deepest tillage is obtained when the Depth Bar is immediately adjacent to the miller gearbox.

The Depth Setting Pin can be removed by hand. To do so, first twist it back so that its upper hook is released from the boss on the miller gearbox and then slip it out.

It is necessary to emphasise the importance of regulating the depth correctly. If, for example, the machine has a tendency to jump forward while at work, this proves that the depth bar is not sufficiently lowered, with the result that there is a danger that the engine is labouring on an excessive load. This is most likely to occur when the ground is very hard. Always bear in mind that, under these conditions, it is seldom wise to attempt to work to the full depth at the first passage. Instead set the depth shoe so that the miller will work 4-6 inches deep in the first passage and then go over the same ground again with the depth bar raised for deep tillage. If difficulty is experienced in working to the full depth on stiff soil, remove the depth shoe entirely from the depth bar.

When using the machine for surface cultivation on light soil, it sometimes happens that even with the depth bar lowered as far as possible, there is a tendency for the miller tines to work at too deep a level. This is due to the fact that the standard depth shoe is sinking into the light soil. The remedy is to fit instead a special depth shoe with a wider bearing surface.

MILLER COVER ADJUSTMENT.—Protruding above the miller cover is a perforated bar (see Fig. 9) on which the miller cover is held secure by means of a twisted pin. The miller cover can be so adjusted that its sides are level with the ground, thus preventing projection of soil side-ways (see Fig. 10).

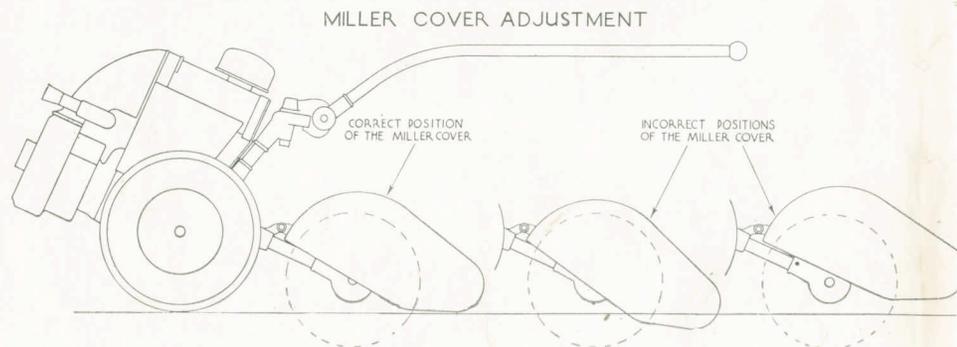


FIG. 10.

V.—WHEELDRIVE.

The wheels are mounted on hubs of special design enabling them to be connected with the wheelshaft in different ways (B) and also to connect the wheelshaft to bottom or top speed or to disconnect it entirely (A).

(A) The connections between wheelshaft and gearing are as follows: (see Fig. 11)

- (1) When fully inserting the long peg (fitted with a chain) in the hole provided in the left-hand hub, the bottom speed is engaged. This speed is to be used for heavy deep tillage.
- (2) When fully inserting this long peg in the right hand hub, the top speed is engaged. This speed is to be used for light surface cultivation.
- (3) When inserting this long peg only half-way in one or the other hubs, no speed is engaged and the machine can be wheeled about and can travel from place to place even with the engine stopped.

N.B.—Care should be taken when inserting the long peg (provided with a chain) in one of the hubs, to insert the short peg in the hole of the other hub, thus preventing dirt and obstructions from entering this hole.

If difficulty is encountered in inserting the long peg, insert it as far as it will go and keep pressing it, at the same time tilting the whole machine forward. In so doing the peg is bound to meet a hole and thus "go home" quite readily.

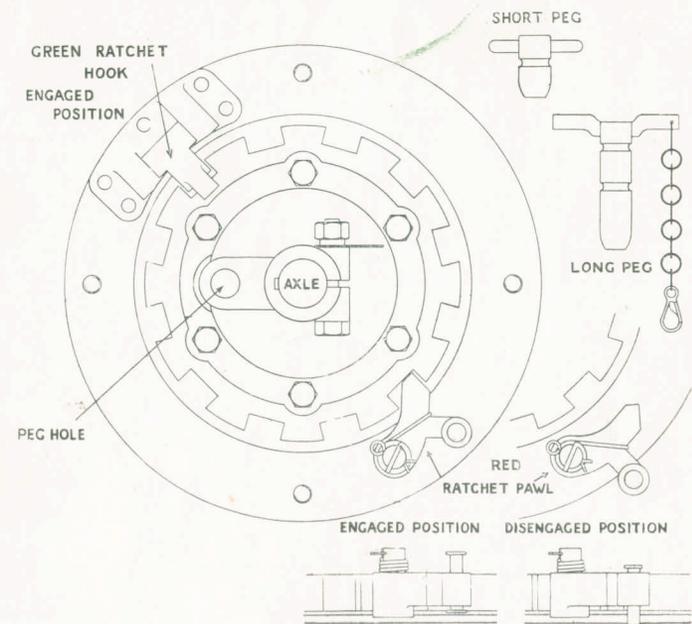


FIG. 11.

COMBINATIONS OF WHEEL DRIVES.

(B) The connection between wheelshaft and driving wheels can be effected by two distinct devices, viz., the Green Ratchet Hook securing rigid connection and the Red Ratchet Pawl enabling "free wheel" action (see Fig. 11), entire disconnection being obtained when both these two Ratchets are lifted. Out of the 16 obtainable combinations resulting, the more commonly used are indicated below:—

- (1) For Rototillage on light or medium soil, one wheel should have both Green Hook and Red Pawl down and the other wheel can have Green Hook lifted and Red Pawl down, thus facilitating turning at the end of the row.
- (2) For Rototillage on very stiff soil, both wheels should be rigidly connected, which is best obtained by both Green Hooks down, whereas Red Pawls remain lifted. If turning is found difficult, one of the Green Hooks can be lifted before operating the turning and dropped again after turning has been effected.
- (3) For mowing, the L.H. Wheel should have both Green Hook and Red Pawl lifted and the R.H. Wheel the Green Hook down.
- (4) For ploughing and other traction work on the field, both wheels should have Red Pawl down and Green Hook lifted except for No. 51, where one of the wheels should have the Green Hook down.
- (5) For road travel, one wheel should be rigidly connected, the other free wheeling, which is best obtained by one wheel with both Green Hook and Red Pawl down and the other wheel with Green Hook lifted and Red Pawl down.
- (6) For stationary work, special precautions should be taken to prevent any possibility of the wheels being set in motion, these precautions consisting in the first place by inserting the Long Peg only half way as described under A3 on page 13, and further by lifting both Green Hook and Red Pawl on both wheels.

VI.—STARTING AND WORKING.

STARTING ENGINE.—(a) Fill the tank with 6 per cent. (8 per cent. during the early life of the machine) petrol mixture as stated on page 5 of these instructions. The tank on the No. 50 contains $1\frac{1}{3}$ gallons, on the No. 51 2 gallons and on the No. 30 $\frac{4}{5}$ of a gallon. (b) Check that the gears and miller are disengaged. (c) Shake the machine so as to make sure that the oil is well mixed with the petrol. (d) Open the fuel tap. (e) Flood the carburettor. (f) Close the choke (this is a knurled knob situated on the carburettor intake pipe. This choke is not fitted on the No. 30). (g) Adjust throttle control about half way. (h) Insert end of strap in the starting pulley and wrap several coils clockwise. (i) Put left foot on driving wheel and pull strap in a straight line with pulley (see Fig. 12).

M.B.
as first viewed

When the engine has started, open the choke referred to under (f) above.

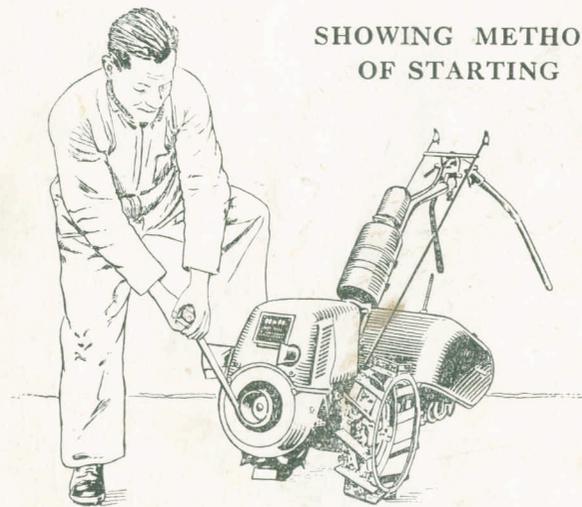


FIG. 12.

WORKING WITH MILLER.—Engage one or the other speed and engage the hubs as described under "A" and "B" on pages 13 & 14 above dealing with "Wheeldrive."

Adjust the height of the guiding arms, adjust the depth bar for the work at hand and also adjust the miller cover so that during the work it will just graze the surface of the soil.

Start engine as described on page 15. Lift the rear of the machine clear from the ground. Slow down engine and engage clutch by pushing home the red rod. Engage miller by pushing home the green rod. Accelerate the engine and **progressively** bring the miller in contact with the ground.

Move the steering handles sideways to avoid walking on the tilled soil.

TO TURN AT THE END OF A ROW.—Throttle down; lift rear of machine off ground **as high as possible** (see Fig. 13) disengage miller gear and walk round the machine briskly, pivoting on its own wheelbase.

In the case of the No. 51, turning will best be effected on reverse motion which will automatically operate the declutching of the R.H.S. Wheel round which the machine will pivot under its own power.

When effecting turning on reverse motion, that is when clutching in Reverse, care should be taken not to operate on tilled ground and to slow down engine, as otherwise a brutal jerk, tending to tip the machine on its nose, will be experienced.

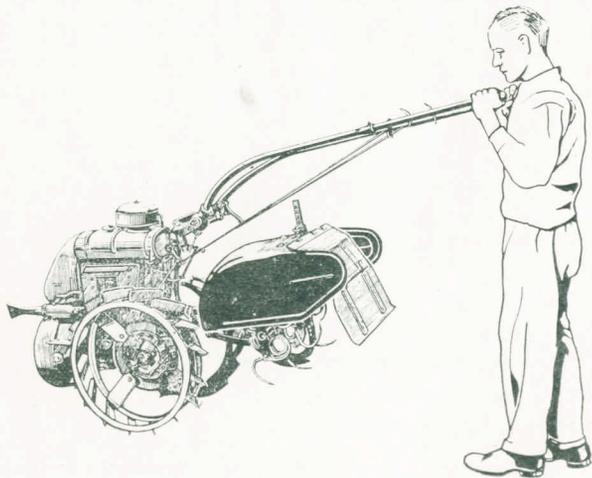


FIG. 13.

It is easier to turn the machine with the steering arm in the **central** position.

To **GUIDE THE MACHINE**, the driver should, when possible, look ahead at some fixed object in order to keep straight.

When **WORKING ACROSS A SLOPE** always begin at the top.

WORK ON UNEVEN GROUND.—It is difficult to obtain satisfactory results on ground which is very uneven. Where it is essential for the machine to be used on land recently ploughed, it is important to work **across** the furrow instead of following in the same direction as the plough. This makes the machine easier to control and also breaks up any "pan" created by the action of the plough.

For dealing with ground of an exceptionally rough and uneven nature, it is advisable to plough, cultivate and harrow first in order to level up the land and to use the Rototiller exclusively in subsequent seasons.

FARMYARD MANURE.—For dealing with farmyard manure which has been spread over the soil, it is advisable to work the ground first at top speed and with the depth shoe set shallow. Then go over the ground a second time in bottom speed with the depth shoe raised for deep tillage.

ROAD TRAVEL.—When running the machine on the roadway under its own power, it is advisable to engage the top speed. Avoid opening the throttle too freely, as this will only result in excessive vibration. If the machine has to travel under its own power for any appreciable distance on the roadway, it is important to fit the special road rims on to the driving wheels, which can be supplied as an accessory.

PUTTING AWAY.—Before storing away, turn off the petrol tap and run the engine to empty the carburettor. This will prevent the settling down of oil in the carburettor, which might give rise to subsequent starting difficulties.

"DON'TS."

DON'T overload during early life of engine, keep on very light work for the first 50 hours.

DON'T run the engine on fuel not mixed with the correct proportion of oil.

DON'T work under dusty conditions without first making sure that the Air Cleaner is in good order.

DON'T "race" the engine. It is particularly harmful to do this when the engine is cold.

DON'T put the machine to work immediately after starting engine; let it warm up first.

DON'T let your engine labour on an excessive load.

DON'T clutch in or declutch when engine is racing or when miller is in contact with the ground.

DON'T drive round in a small radius or attempt to make a sharp turn with miller engaged in soil.

DON'T on any account work the machine with the drain tap open. (This tap is shut when the slot is horizontal).

DON'T let anybody come near the machine when at work.

VII.—MILLER SPRINGS AND TINES.

There are various types of Miller Springs and Tines. The Hook Tine, Plain or Hinged, is fitted as standard to the machines when delivered. The primary use for these Hook Tines is for deep tillage, but they are equally useful for other shallower work. The other types of Miller Tines are the Knife Tine and the Scuffling Tine.

The Plain Miller Springs and Tines are to be assembled by following the procedure shown on Fig. 14 and 15, hammering the Tine in position at the same time holding a block of wood behind the loop of the spring.

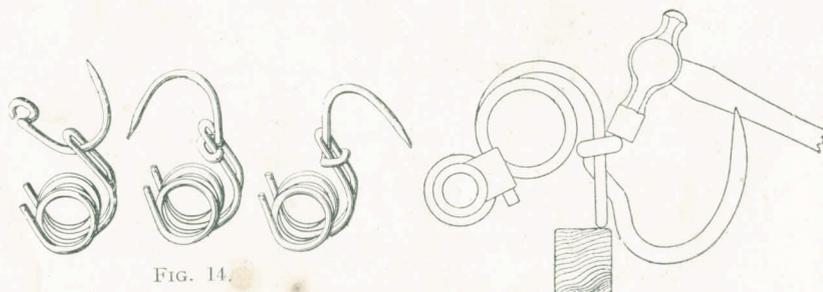


FIG. 14.

FIG. 15.

These illustrations show clearly how to carry out the simple operation of fitting a Tine on to the Miller Spring.

HINTS FOR INCREASING THE LIFE OF SPRINGS AND TINES

The actual working tools on the Rototiller are the springs and tines. It will, therefore, prove of assistance to give certain hints whereby the life of these working tools can in most cases be lengthened.

The most important recommendation is to avoid letting the miller into the ground too suddenly with the engine racing and the miller engaged. The correct way is to *progressively* bring the miller in contact with the ground, until it is working at the required depth, according to the setting of the depth shoe.

When breaking up the hard surface crust, it is important not to attempt to work too deeply at first. Once this crust has been broken, then the depth shoe may be set for deep tillage. Users who adopt this advice will add considerably to the life of the machine besides avoiding the possibility of spring breakages.

Do not attempt to work the machine too deeply in top gear; this gear is intended for surface hoeing. Always engage the bottom speed for deep tillage or hard soil conditions.

When working the machine close to trees, do not attempt to work too deeply or the tines may catch on to thick roots, with consequent risk of spring breakages. Good advice for this type of work is to fit worn tines to the outside springs.

When using the machine on land containing *large* stones, it is a good plan to gradually remove by hand the largest stones, as they may be a source of spring breakage.

When driving the machine, the operator should set the guiding handles so that his arms are fully extended downwards and not bent at the elbow. In this way he is able to react more readily to the shock of meeting any obstruction hidden in the soil.

The throttle should never be opened more than is necessary for the actual work in hand, as any excess power is delivered to the miller and is borne by the springs and tines.

VIII.—SPECIAL INSTRUCTIONS FOR CLEANING LAND FROM WEEDS.

The Rototiller is unrivalled as a cleaning tool for keeping land free from all weeds. It is, however, essential to tackle this problem in the right way due to the fact that Rototillage creates the best conditions for the rapid growth of plants and this applies also to the weeds.

The first step is to clear off the existing weeds by shallow cultivation, leaving the weeds to die on the surface. Then run over the ground again with the depth shoe set for deep tillage. As soon as a further crop of weeds—germinated from the weed seeds—appears, work the machine again shallow before these weeds have any chance to form new seeds.

If circumstances permit, it is advisable to repeat this operation again, that is after a third crop of weeds has made its appearance.

If these operations are carried out correctly, it will be found that whereas an appreciable amount of work is entailed during the first year, the land will be so thoroughly cleaned that very little trouble will be experienced in dealing with weeds in subsequent years.

In dealing with land infested with weeds with propagating roots such as **couch grass**, the correct procedure is as follows :

If the couch grass has grown to a height of more than 6 to 7 inches, the best plan is to first cut it down with scythe or mower and burn it.

The Rototiller fitted with normal tines and with the dust-board removed from the miller cover should then be run over the ground, working to a depth of 3 to 4 inches.

The next operation is to gather together the roots—which have been thrown on to the surface—by means of a light harrow and burn them.

The land should then be left for a period until such time as any roots which have been missed in the first operation again show signs of growth. A further passage with the Rototiller will extract this second growth of couch grass which should again be gathered together and burned. These subsequent operations should be progressively carried out at a greater depth in order to extract all roots which are located deeper in the ground.

If it is impossible to first cut down the tall couch grass, the best method is to fit a mixed outfit of hook tines and knife tines (instead of a complete set of hook tines) for the first passage of the machine. Use the machine in this instance more to chop off the grass than to till the ground to any depth. Here again the best method will be to collect the chopped grass after the passage of the machine and to burn it. If, during this operation, clogging takes place to any serious extent, it will be necessary to fit the miller *exclusively* with knife tines, and otherwise operate in exactly the same way.

The method described above will be found extremely effective for clearing land from couch grass, provided the instructions are carefully followed. **Avoid as far as possible carrying out this work when the land is in a wet condition.**

IX.—REMEDY CHART FOR DIFFICULT STARTING AND UNSATISFACTORY RUNNING.

DIFFICULTY IN STARTING.

Symptom.	Remedy.
Excess of oil in crankcase	Open the drain tap (situated underneath the crankcase). Turn the starting pulley two or three times by hand. Close drain tap.
Sparkling plug defective or dirty.	If defective, replace with new plug. If dirty, clean thoroughly with petrol and a coarse brush.
Gap of sparking plug points incorrect.	Adjust points to correct gap by using special gauge (obtainable from any garage).
Faulty high tension lead (joining sparking plug to magneto).	Insulate the faulty lead or renew lead.
Vent in fuel tank cap choked.	Clean vent.
Air lock in fuel pipe ...	Unscrew the union on the carburettor end of the fuel pipe. Let the fuel flow for one or two seconds and refit.
Fuel filter choked ...	Clean the gauze sieve of the fuel filter. To do this, unscrew the union which joins the fuel pipe to the tap. Then remove the filter from the bottom of the tap. Carefully wash the gauze sieve with petrol and refit.
Fuel pipe stopped up ...	Remove the fuel pipe from the machine and blow through it. Refit after cleaning all parts.
Carburettor jets choked...	Remove jets and clean by blowing or use a finely pointed match or a bristle. Never use a metal point.

Symptom.	Remedy.
Carburettor float seized ..	Remove the screw situated below the float chamber and remove the float chamber and float (see Fig. 4, page 6). Remove any foreign matter from the float chamber and re-assemble after cleaning all parts. Do not forget the fibre washers when re-assembling.
Magneto contact breaker tappet sticking.	Ease tappet with a little paraffin. Do not oil.
Dirty or defective contact points.	Clean the contact points carefully with very fine emery cloth. On no account use a file for this. If points are found defective, they must be replaced.
Displaced contact points	Adjust the gap of the contact points using the gauge fitted on the magneto spanner. This gauge gives the correct distance between the points when in the open position.
Broken carbon brush ...	Replace the defective brush. (This is situated underneath the H.T. pick-up terminal).

THE ENGINE SPITS AND POSSIBLY STOPS.

Symptom.	Remedy.
Mixture too weak ...	Make sure that the carburettor jets are clean, of the correct size and properly screwed down. To clean the jets blow through them or use a finely pointed match. Never use a metal point.
Engine seized ...	Allow the engine to cool, inject paraffin through the sparking plug hole and try to ease the piston. If unsuccessful send the engine unit to your nearest Rototiller service depot. Probable cause : Insufficient oil or oil of an inferior quality.

Symptom.	Remedy.
Excess of oil in crankcase	See instructions under heading, "Difficulty in Starting." (page 22).
Vent in fuel tank cap choked.	" "
Fuel pipe stopped up ...	" "
Fuel filter choked ...	" "

THE ENGINE "FOURSTROKES."

Symptom.	Remedy.
Mixture too rich... ..	Make sure that the carburettor jets are clean, properly screwed down and of the correct size. Do not forget the fibre washers when re-assembling. To clean the jets blow through them or use a finely pointed match or a bristle. Never use a metal point.
Excess of oil in fuel ...	Shake the machine to stir up contents of the fuel tank and flood the carburettor.
Air inlet obstructed in the air cleaner.	The air cleaner canvas bag is dirty or wet, or the wood shavings are packed too tightly or excessively soaked with oil (see pages 7, 8, 9).

THE ENGINE KNOCKS.

Symptom.	Remedy.
Pre-ignition or carbon deposit in cylinder.	Decarbonise the cylinder and piston and fit new sparking plug. Probable cause is bad quality oil.
Play in big end	Send the engine unit to your nearest Rototiller service depot for examination.
	Probable causes : Neglect of air cleaner, insufficient lubrication, or bad quality oil.

Symptom.	Remedy.
Faulty sparking plug ...	Renew plug.

LACK OF COMPRESSION.

Symptom.	Remedy.
Piston rings stuck ...	Inject paraffin through the sparking plug hole and revolve the starting pulley several times by hand. Then thoroughly drain the paraffin from the crankcase and after closing the drain tap, inject some engine oil into the cylinder.
Drain tap open	Close the drain tap by setting the slot in the horizontal position.
Leakage from cylinder or crankcase.	Tighten up the nuts fixing the cylinder head to the cylinder and also those fixing the cylinder to the crankcase. Make sure that the copper asbestos washer between cylinder and head is in sound condition. If faulty in any way fit a new washer.

X.—SERVICE.

If your machine is not doing its job to your entire satisfaction and you have been unable to locate the fault by reference to the remedy chart (see pages 22—25) the wisest course is to get in touch with the Distributors giving them as detailed a description as possible of the nature of your difficulty. It may be that the man in charge of the machine is not handling it correctly, or that some minor adjustment is necessary. If this is the case, you will, by reporting the matter, enable the Distributors to correct the fault either by means of advice given by post or by sending a representative to examine the machine. The charge involved for this service is very small, unless the trouble has been allowed to continue for too long a period, necessitating the return of the machine, or some part of it, for complete workshop overhaul.

Few things are more aggravating than to experience delays during a critical period, as, for example, when it is essential to get ground prepared quickly before the weather breaks. Delays of this nature can often be prevented by just a little forethought. **It is, for example, a good plan always to keep on hand a reserve supply of the working tools, such as the miller springs and tines for the Rototiller.**

The engine should be decarbonised at least two or three times a year. This is a 30 minutes' operation consisting of lifting the cylinder head and scraping the walls of the combustion chamber and the exhaust ports.

The machine should be thoroughly overhauled every winter in order to ensure maximum efficiency and immunity from delays throughout the working season.

This work would best be carried out by an engineer with special experience of overhaul work in connection with Rototillers.

A word of warning should be given advising Rototiller owners to avoid entrusting their machines in the hands of local mechanics, if not quite certain that they are reliable.

FURTHER HINTS.

The magneto should not be removed. For further information concerning the magneto, follow instructions given in magneto booklet. (See also page 23).

If you should experience magneto trouble which you are unable to rectify, the best course is to obtain a "service" magneto from the Distributors and return your magneto for overhaul.

Use only a similar sparking plug to the one originally fitted. Avoid plugs with longer reach which would foul the piston and damage the engine.

The threads used throughout the machine are S.I. metric. Do not attempt to fit other types of nuts, screws or studs.

If oil is coming out from the top of the steering arm and wheel bearings on the No. 30, it is a sign that there is an excess of oil in the gearbox. This has little importance and need cause no anxiety.

When work is completed and the machine is put away for a time, it should be thoroughly cleaned and examined, and any parts subject to rust should be coated with grease; also tighten any nuts, screws, bolts, etc., which may have become loose as a result of vibration.

This simple operation of cleaning the machine frequently draws attention to small defects which, if neglected, might result in accident or damage when using the machine later on.

