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THE

HOWARD

ROTAVATOR

'Gem'

SERIES III MODEL

INSTRUCTION BOOK & SPARE PARTS LIST

ROTARY HOES LTD., HORNDON, ESSEX, ENGLAND
Tel: Herongate 361

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This instruction book has been written with the object of providing in the simplest possible manner a complete guide for the owner in the operation of the "Gem" machine.

Detailed instructions for the larger maintenance operations, especially those which may become necessary after long service, are not included in this publication, as such work should be entrusted to the "Gem" Distributor or Dealer.

ROTARY HOES LIMITED

HORNDON, ESSEX, ENGLAND

Telephone: Herongate 361 (6 lines). **Cables: Rotovate, Brentwood**

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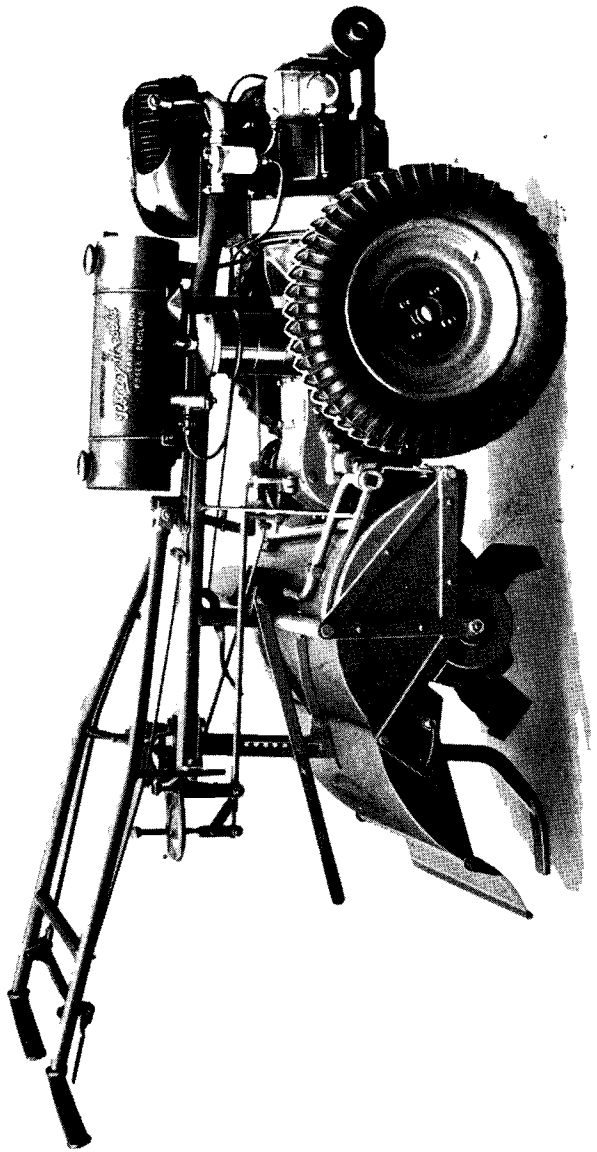


THE "GEM"

SPECIFICATION

ENGINE

Single cylinder side valve (600 cc.) J.A.P. Mk.III.

BORE AND STROKE

$3\frac{3}{8}$" diam. × 4" (85.7 mm. × 104 mm.)

ENGINE SPEED

1,800 r.p.m.

FUEL TANK

Fuel and oil tank built as one unit with separate compartments. Fuel capacity $1\frac{1}{2}$ gallons. Oil capacity 3 pints.

CLUTCH

Heavy duty single dry plate.

GEAR-BOX

Three speed and reverse transmission by hardened gears running in oil. All shafts mounted on ball bearings. Differential gear for easy turning automatically locked when rotor is engaged.

SPEEDS

1st gear— .78 m.p.h. 2nd gear—1.17 m.p.h.
3rd gear—1.65 m.p.h. Reverse gear—1.40 m.p.h.

ROTOR

Speed 155 r.p.m. 18" diam.

POWER TAKE-OFF PULLEY

10" diam. 4" face. 450 r.p.m. 1,178 ft. per min.

OVERALL DIMENSIONS OF MACHINE

Length 6' 6" Width 2' 1" *

WEIGHT

$5\frac{1}{4}$ cwt. approximately.*

* *Standard 20" Machine.*

CONTROLS

THROTTLE

The throttle control lever is fitted under the right handlebar grip. By raising it the engine speed is increased; by pressing it down the engine speed is reduced.

CLUTCH

Control lever is mounted on left handlebar. Normal operation for forward travel, pull up lever to disengage drive, release to re-engage. To reverse machine, operate as follows: pull up clutch lever, move gear lever to reverse (which operates safety interlock), release clutch lever. No movement takes place until clutch lever is pushed down. Removal of pressure automatically stops machine. To disengage reverse gear, pull up clutch lever, move gear lever to neutral.

HANDLEBAR POSITIONING LEVER

This is mounted on the main frame and is situated between the gear levers. To swing the handlebars to either side, press the handlebar positioning lever down to its full extent and swing the handlebar to whichever side it is desired.

HEIGHT OF HANDLEBARS

To adjust the height to suit the operator, remove the bolt at each end of the handlebar slide and select another hole in the lugs attached to the handlebars.

ROTOR GEAR CONTROL LEVER

The lever on the quadrant engages with either of two notches. Pushing the lever forward disengages the rotor whilst pulling it back engages the rotor.

TRAVEL GEAR CONTROL LEVER

Operates in a 4-star quadrant, marked 1, 2, 3, R to indicate forward travel and reverse positions. Neutral position is central. Move lever to required position. Note safety feature, clutch interlock with reverse gear, see instructions under "Clutch".

ROTOR DEPTH CONTROL LEVER

This is linked with the depth control skid, or wheel, and situated above the rotor shield. To lower the rotor for deeper work, the lever is raised, to decrease the depth the lever is pushed down.

EXHAUST VALVE LIFTING LEVER

This is placed under the main frame over the centre of the rotor shield and lifting up decompresses the engine for easy starting.

ENGINE STARTING HANDLE

When this is not in use it is folded back on the rotor shield. When starting the engine, lift it out of the bracket and swing it forward until the recessed square on the handle will engage with the protruding square end of the starting dog on the gear-box. *Both travel gear and rotor must be out of gear when starting.*

PREPARING FOR WORK

Before starting the engine, be sure that the petrol and oil taps under the tank are both turned on, and make certain that all the oiling points listed on the chart have received attention. See that no nuts or bolts are loose, particular attention being paid to the rotor blade bolts.

Standing on the right-hand side of the machine looking forward, flood the carburettor, and see that *both the rotor and the travel gears are in neutral.* Ensure that the throttle control lever is only just open. With the left hand lift the exhaust valve lifter. Place the starting handle into position. Briskly crank the engine and release the exhaust valve lifter after the first turn or two. When the engine starts replace the starting handle.

When the engine is running adjust throttle control to a brisk idling speed, remove the oil filler cap (the front one on the petrol and oil tank), and ascertain that the engine oil is circulating through the engine. The oil will be seen returning to the tank in spurts if working satisfactorily. See that the depth control handle is set so that the rotor is clear of the ground. Next, lift the clutch hand lever and engage the desired gear, release the clutch at the same time gently accelerating the engine.

COMMENCING CULTIVATION

Adjust the depth control lever to give the required depth of work, select the appropriate travel gear to give the required fineness of tilth, put the rotor gear in mesh and commence work keeping the engine running at a constant speed whatever type of work is being done. Do not race the engine if the work is light nor labour the engine if the work is heavy. After a little practice, no difficulty will be found in maintaining the best engine speed.

Rear shield

To avoid an accumulation of soil choking the rotor and causing the use of unnecessary power, always keep the rear shield well raised so that the blades will throw the soil clear.

To stop the engine

Put both gears in neutral and then lift the exhaust valve lifter.

NOTES ON CULTIVATION

Since the scope of operation is so extensive, and as soil tillage methods differ so greatly with various crops, climates and soil conditions, it is only possible to deal briefly with this aspect. However, the following hints should enable the user to obtain the best results from the machine.

Virgin soil or land tightly bound together with grass or roots is best cultivated by first working shallow to break up the surface. The required depth may then be reached on successive runs over the ground.

The low gear must be used when cultivating ground that is very hard or covered with heavy growths. Second gear is used for all ordinary cultivation, and top gear for light cultivation. Always work on the highest gear that will produce the quality of tilth required. Always use top gear for running the machine between work. A depth control skid, or wheel, is fitted and by moving this up and down the depth of work is controlled in $\frac{3}{4}$″ stages from $\frac{3}{4}$″ to about 8″ in depth.

When cultivating a ploughed field, the " Gem " should be run across the furrows—not along them. This will ensure complete cultivation.

On hilly ground always run the machine around the contour, working from top to the bottom of the hill. After the first cut, one road wheel can be run in the soil just cut up and any tendency to slip will be obviated by the wheel coming against a wall of uncut soil.

If the land is exceptionally light special extension rims may be supplied to prevent the machine sinking in.

Do not overtax the power of the machine—far better results will be obtained from working in easy stages rather than by forcing the machine to do work in excess of its horsepower.

NOTES FOR OPERATOR

1. The importance of regular and correct lubrication cannot be over-emphasized and particular attention must be paid to the Lubrication Chart on page 11.

Before starting up ensure that the oil tap fitted under the oil compartment of the petrol and oil tank is turned on. *This tap should only be turned off if the machine is laid up for a lengthy period to prevent the crankcase from being flooded with oil.*

2. *Air cleaner and oil filter maintenance is of paramount importance.* (*See page* 13.)

3. The throttle must always be shut to idling position when lifting the clutch lever for engaging or disengaging gears.

4. The engine must not be allowed to idle at slow speeds for long periods.

5. Do not hold the handles firmly down if the machine jumps on striking a stump or similar obstacle, but just lightly resist the movement and let the machine right itself. This particularly applies when working on hillsides in badly cleared land.

6. When taking sharp corners, put the rotor out of gear, if necessary lifting the machine at the handles to help in turning.

7. Never run the " Gem " with the engine labouring. By selecting the right gear and the correct depth of work a reserve of engine power is always in hand.

8. When operating the " Gem," use the clutch in the same way as in a car; that is, for changing gear only. Do not " slip the clutch " to obtain extra engine speed.

9. For the first 12 hours after delivery, only light work should be done in order that the working parts are allowed to bed down properly.

LUBRICATION

ENGINE The oil compartment (front) [point "A" on chart] of the fuel tank has a capacity of approximately 3 pints but care should be taken to fill it only to within $\frac{1}{2}$" of the oil return pipe located inside the tank under the filler cap. Oil is fed to the oil feed pump and forced under pressure into the big end bearing, being returned to the tank via the filter by the scavenge end of oil pump. Oil must be renewed completely after every 24 hours work. The oil may require topping up from time to time and the oil level should never be allowed to fall below one-third full.

Recommended oil:—**Engine oil** (see chart, page 11).

ROTOR DRIVE DOG GEAR-BOX Remove the square-headed plug [point "B" on chart], and give half a dozen spurts of oil from the oil-can. This should be done every 24 hours and particularly before starting up after any prolonged period of rest.

Recommended oil:—**Engine oil.**

ROTOR DRIVE CHAIN BOX Remove the square-headed plug [point "C" on chart] on top of the chain cover and using the dipstick from the gear-box, fill the case up to the lower mark. A quarter of a pint is sufficient. Do not overfill as this may result in oil being forced on to the rotor friction clutch causing it to slip unnecessarily. This should be checked after every 24 hours of work.

Recommended oil:—**Gear oil.**

ROTOR STUB AXLE [Point "D" on chart.] Remove the round-headed screw and with an oil-can, fill the oil space inside the rotor tube, after every 24 hours work.

Recommended oil:—**Engine oil.**

DEPTH CONTROL WHEEL Remove round-headed screw and with oil-can fill space inside the axle, every 24 hours.

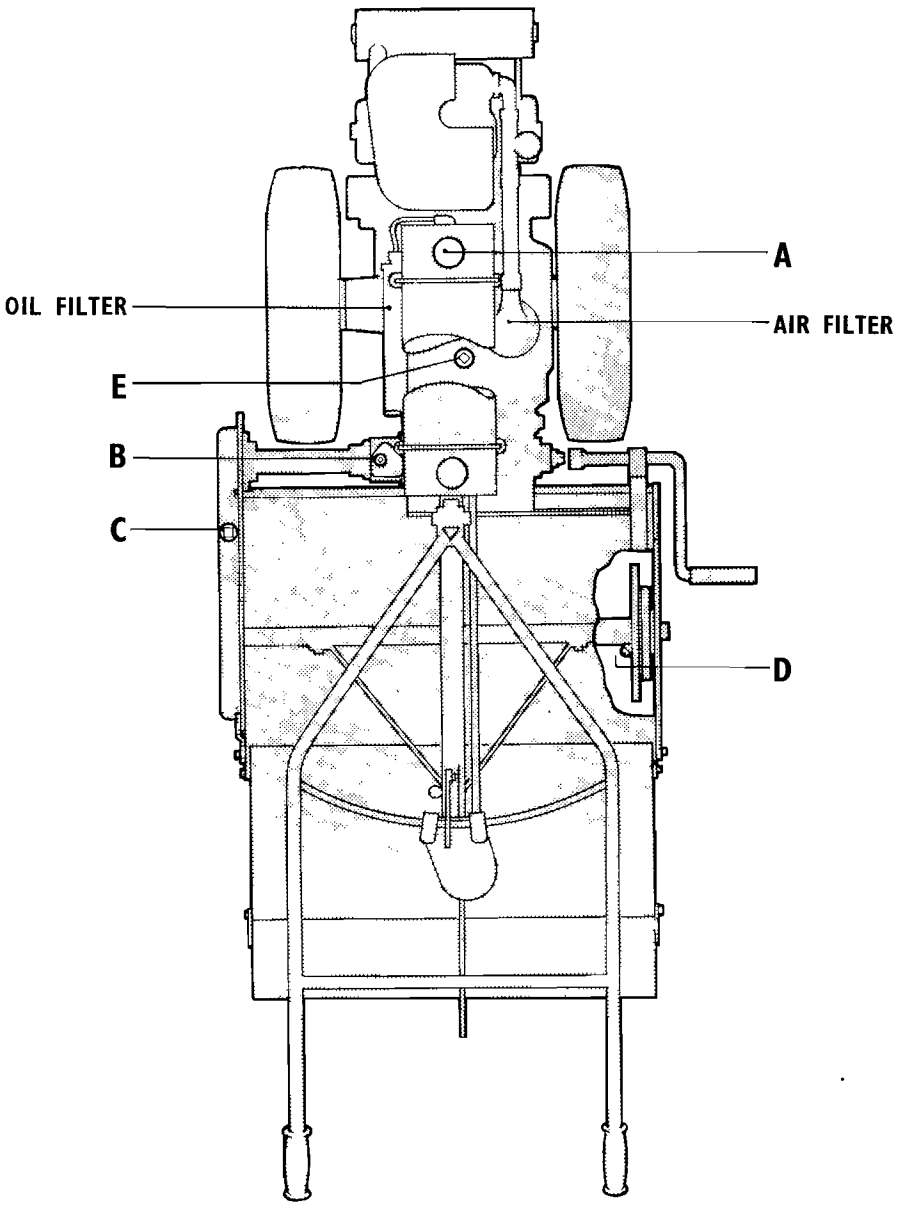
Recommended oil:—**Engine oil.**

GEAR-BOX Every 24 hours check the level as indicated on the uppermost mark of the dipstick, which is attached to the square-headed plug [point "E" on chart], screwed into the top of the gear-box. Normally, it should only be necessary to drain and renew the oil in the gear-box after every four hundred hours of work. Drainage is best carried out when the oil is warm and it is a good practice to remove the drain plug at the end of a day's work leaving the plug out all night. Capacity of the gear-box is approximately $\frac{3}{4}$ gallon.

Recommended oil:—**Gear oil** (see chart).

In addition to these lubrication directions, points such as the slide bar of the swinging handlebars, and the fulcrum levers of the throttle and the clutch controls should be oiled to ensure free movement, using engine oil.

LUBRICATION CHART



ENGINE TROUBLE

Engine fails to start

Fuel System:

Fuel supply turned off.
Fuel pipe choked or air lock.
Water or dirt in fuel.
Throttle too wide open.

Ignition System:

Magneto contact breaker point gaps need adjustment.
Spark plug dirty or faulty.
Spark plug point gaps need adjustment. Should be .020″—.025″ gap.
Water or moisture in magneto.
Magneto contact breaker points stuck or dirty
High-tension lead cracked or perished.

Engine lacks power or runs irregularly

Fuel System:

Fuel pipe partially blocked.
Jets partially blocked, or not correctly adjusted.

Ignition System:

Spark plug dirty.
Spark plug point gaps need adjustment.
Magneto contact points dirty or need adjustment.

Mechanical Faults:

Valve springs weak or broken.
Cylinder head gaskets leaking.
Valve stuck open. Valves badly burnt.
Valve clearance incorrect. Broken piston rings.
Badly worn piston rings and or cylinder bore.
Badly worn valve guides.

Engine stops suddenly

Fuel System:

Fuel tank empty. Water in fuel.
Overheating owing to lack of oil.
Jet blocked by foreign matter.

Ignition System:

Magneto contact breaker points stuck.

Engine overheats

Ignition retarded too far.
Spark plug dirty.
Spark plug point gaps need adjustment.
Insufficient or poor grade of oil.
Engine requires decarbonising.
Valves not seating properly.
Engine cowling blocked with grass or weeds
Flywheel fan blocked with grass or weeds.

GENERAL MAINTENANCE

ENGINE CLUTCH The clutch is of a single fibre disc type, simple in operation and efficient in work. It should be adjusted with a little play on the lever (about ¼″ at the end) so that the thrust bearing is free except when the Hand lever is lifted. Adjustment can be made by means of the wing nut.

ROTOR FRICTION DRIVE The rotor to which the blades are bolted is driven direct from the main gear-box through a friction clutch. This clutch is not intended to operate except when the rotor blades strike an obstacle, and, when leaving the factory, is adjusted so that no slip takes place under ordinary working conditions. If it is suspected that the clutch slips too freely, it should be adjusted by means of the four nuts; tighten up, then slack back half a turn.

ROAD WHEELS The road wheels are mounted on hubs, driven by friction clutches. These are adjusted so that the wheels have sufficient grip to pull the machine but will slip if they become jammed with an obstruction between the wheels and the frame. Adjustment as for rotor clutch.

AIR CLEANER *Regular attention to this is most important.* The oil level must be checked after every 8 hours running and after every 24 hours it must be dismantled and thoroughly cleaned out. To remove the cleaner, loosen the clamping screw and, leaving the cover still connected to the hose connection, take the air cleaner from its platform. Separate the top from the bottom half of the cleaner, and pour the dirty oil from the reservoir. Thoroughly wash out all sediment in the bottom with petrol. Remove the serrated spring clip in the filter container, take out the wire gauze filters and wash them in petrol. Refill the oil reservoir to the correct level with *clean* engine oil. Put the wire gauze filter back into the container then replace the perforated plates and the serrated spring clip. Now put the two halves together with the felt washer between and replace. Fit the cover, taking care that the cover felt washer is intact and clamp back into position.

If working under exceptionally dusty conditions the air cleaner requires cleaning every 6 hours.

OIL FILTER When changing the engine oil, *make it a routine job to clean the filter at the same time.* To extract the filter element from the tube remove the large brass cap at the rear end of filter body and withdraw the filter and centre tube. Wash thoroughly in petrol and if the bag is damaged it should be renewed.

When replacing the filter element, make sure that the brass caps are securely tightened up.

MAINTENANCE OF HOE BLADES *It is essential that only the cutting edge should rub in the soil and that the back should have clearance.*

The Blades are designed so that use in average soil tends to sharpen them, but if the machine is used on stony ground it is suggested that two sets of hoe blades should be used alternately in order that one set may be kept sharpened.

The efficiency of the machine depends largely on the condition of the hoe blades. If bent through striking solid obstacles in the ground and not straightened, they will require twice the power to drive, the quality of work will be poor and the blades will wear out quickly. Trouble will also be experienced with clogging under the shield. Blades should therefore be straightened up as soon as noticed with the blade setting bar which is provided for the purpose, the hooked end of which is intended to fit over the blade.

ROTOR FLANGE WEEDCUTTERS Two weedcutter blades are provided to prevent long grass or weeds from binding round the end rotor flanges. To adjust, slack the two setscrews securing the weedcutter blade and tap the blade untii it is within 1/32″ of the rotor flange, revolve the rotor by hand to make sure the blade does not foul and retighten the setscrews.

OIL PUMP The engine is of the dry sump type with a gear driven plunger pump. The right-hand end of the plunger forces the oil into the big end bearing while the left-hand end scavenges the used oil from the engine sump and returns it through the filter back to the tank. The pump is simple and positive in action and normally requires no attention and any failure of oil to return to the tank need not necessarily be caused by a faulty pump. If the oil is not being returned first check all oil pipe connections for airleaks. Not only union nuts but joints of nipples and pipes should be closely inspected. *More failures in oil circulation are attributable to air leaks than to any other cause.* Bent or flattened pipes which may impose restrictions in oil flow also are common causes of faulty circulation. Particular attention should be paid to the crankcase oil suction pipe, where it is connected to the crankcase. When satisfied that no air leaks exist, inspect breather to see that spring holds valve ball firmly on its seat. Next inspect the oil pump fulcrum screw (Part No. 12073) located on the pump body. This screw has a plain unthreaded end which locates in a helically cut groove in the pump plunger and its function is to give the necessary reciprocating action to the pump while the latter is rotating. If this screw becomes loose or lost the pump ceases to function. See that it is always kept tightly screwed home. If these adjustments fail to correct the faults in the oil system, the Service Agent should be consulted.

ENGINE CARBURETTOR Before the engine leaves the works, the carburettor is tested and the variable jet adjusted to give the best all-round performance. If, at any time, the setting is disturbed it will be found that one and a half turns open is a satisfactory position.

To clean the carburettor jet it is necessary to take out the main jet body (Part No. B.J.9106) through which the main jet adjusting screw operates; the idling jet is a very small hole drilled in the groove halfway up the jet bolt.

If black smoke (not blue) is emitted from the silencer when the engine is running under normal load the jet should be slowly screwed in until this stops.

If black smoke is seen when the engine is idling, the idling jet adjusting screw (Part No. B.J.9104) requires to be unscrewed slowly until this ceases.

DECARBONISING THE ENGINE This will only be necessary after at least 400 hours running, and should preferably be left to the service dealer who has the facilities to do the work and check the extent of cylinder, piston and valve wear.

If, however, it is essential for this work to be done on the site the following method should be followed.

Remove the cylinder cowling, disconnect the petrol pipe at the carburettor and air cleaner hose. Remove all the cylinder head bolts and studs and the sparking plug (it is advisable that they should be replaced in their respective holes when reassembling).* The cylinder head and valve chamber will now lift off. Turn the engine until the piston is at the top of its stroke and remove the carbon deposit with a blunt knife, do not scratch the piston but thoroughly clean off any carbon. Leave a ring of carbon about $\frac{1}{8}$″ wide around the edge of the piston as this assists in maintaining an oil seal.

Next remove the valves. Carefully mark the valve heads to ensure that they are replaced in the correct positions. Place the valve chamber upside down on a bench and with two screwdrivers, compress the spring so that the split taper cotters can be removed.* The valves will then withdraw through the top. The valve heads should be cleaned with sandpaper and any carbon deposit removed from the valve pockets. Smear a small amount of *fine* grinding paste on the bevelled face of the valve and placing a broad-headed screwdriver in the slot in the head, rub the valve on its seating with an oscillating rotary action. Do not rotate the valve continually in one direction. The valve should show a continuous bright ring all round. If any breaks or thin places show, repeat the operation. Only the minimum grinding must be given to produce this condition: a deep recessed groove in the face will impair the seating of

* B.J. Engine only.

the valve. Any burnt or deeply pitted valves should be replaced by new ones. The valve seating should show a similar continuous bright ring of uniform width. If the seat width is much over 1/16" it is necessary to have it refaced, and this should be attended to by the service dealer at the first opportunity.

Remove all trace of grinding paste from the valve and seating by washing in petrol. Reassemble the valves, smearing a little clean oil on the valve stems.

Clean the face of the cylinder head, valve chamber and cylinder and replace the gaskets which, if at all damaged, should be renewed. When tightening up the cylinder head bolts, tighten each an equal amount until they are all dead tight, and check the tappet clearance as previously described. Replace the carburettor, petrol pipe and air cleaner hose; run the engine for two or three minutes on closed throttle and re-tighten the cylinder head studs before replacing the cylinder cowling. Take care that the engine does not overheat.

ATTACHMENTS AND EQUIPMENT

Various attachments may be used with the "GEM" Machine :—

For Mobile Work

Furrowing Attachment.	Depth Control Wheel.
Furrow Covering Attachment.	Roller Attachment.
Picktine Rotor.	Extension Rims.

Leaf Guards.

For Stationary Work

Power Take-off Pulley.	Soil Shredder.

Waterproof Cover.

FITTING THE ATTACHMENTS

THE FURROWING ATTACHMENT is fitted on to the depth control skid. First remove the depth control skid by pivoting the depth control lever clip; pull the depth control lever sideways until the pin engaging in the skid is withdrawn and the skid may then be pulled out of the depth control socket from under the rotor shield.

Assemble the furrowing attachment on to the depth control skid leaving the bottom of the attachment approximately $\frac{1}{2}$" above the foot of the skid, or as required for the crop to be planted, and tighten locking nut. Fit the assembly in the depth control socket and connect to depth control lever. For machines where a depth control wheel has been fitted in place of a skid, the skid must also be ordered in addition to the furrowing attachment. When using the furrower, the rotor is put in gear so that the combined operations of cultivating and furrowing are carried out simultaneously.

THE FURROW COVERING ATTACHMENT is fitted into the depth control socket in the same way as the furrower, except that it is supplied with its own pedestal. When in use, the rotor should be out of gear and allowed to roll over the ground like a wheel.

THE ROLLER ATTACHMENT is used in place of the depth control wheel or skid, and is intended to consolidate the land. The roller may be loaded with sand to increase its weight and will leave a smooth surface ready for drilling or planting. This attachment is used in conjunction with the rotor.

Depth for the above operations is controlled in the same way as for ordinary cultivation.

ROAD WHEEL EXTENSION RIMS can be supplied when the machine has a tendency to sink in very light lands, and to prevent side slip when working on steep contours. They are bolted by five bolts to holes provided in the existing road wheels (cleated type only). The road wheel extension flange can be supplied with or without serrations (the illustration in the Parts List shows the serrated type). Alternatively, the flange may be removed to leave a plain extension rim only. An extended starting handle is required with these rims and is supplied with all orders for rims.

THE PICKTINE ROTOR which is used for special work such as dealing with very hard soil conditions or for pasture renovation is fitted as follows:—

Slack off all nuts and bolts holding the support bracket carrying the stub axle, staytube and rotor shield. Remove the four rotor friction drive adjusting nuts and springs. Spring the bracket off the stub axle with bar and slide the rotor sideways and withdraw. The picktine rotor is fitted by reversing the operations above. Unless otherwise stated, the picktine rotor is supplied complete with picktines, bolts and nuts and stub axle assembly.

To fit the **POWER TAKE-OFF**:—Remove the hinge bolt for the starting handle, remove the four set screws holding the starting dog bearing cover in place on the gear-box side-plate and remove the cover and loose dog. Assemble power take-off casting in place of the bearing cover, and ensure that the dogs in the bearing and power take-off mesh before replacing the four set screws. Next insert a long bolt in the hole provided in the power take-off casting and tighten. After oiling the power take-off bearing behind the pulley it is ready for use.

To fit the **SOIL SHREDDER**:—Remove depth control skid or wheel and one end rotor blade on the right-hand flange and replace by feeder blade. Lift the back of the machine sufficiently high to pass the shredder into position under the rotor, lower the machine ensuring that the lugs on the shredder locate the staytube and chain case and tighten the clamping bolts.

A **WATERPROOF CANVAS COVER** can be supplied for covering the " Gem " when not in use.

SPARE PARTS LIST

AND

DIAGRAMS

ORDERING SPARE PARTS

IMPORTANT. For spares and service consult your Rotovator dealer. When ordering spare parts always give part number and name and quote the serial number of your machine which is stamped on the main frame member at the rear of the fuel tank. In the case of engine parts the number of the engine should be also quoted. This information will ensure correct parts being sent.

All references to left and right hand are to be read as from rear of machine looking forward.

When ordering a new part it should be located from the Parts Diagrams on following pages and the part number noted. Refer to the Parts Lists, and obtain the correct name of the part.

The following parts are supplied assembled:—

25021 Bull wheel supplied complete with differential pinion studs 25024.

25028 Differential plate supplied complete with differential pinion studs 25024.

9509 Flywheel supplied complete with driving pins 8002.

Crank cases only in pairs.

It is also recommended that:—

Crown wheel and pinion be paired.

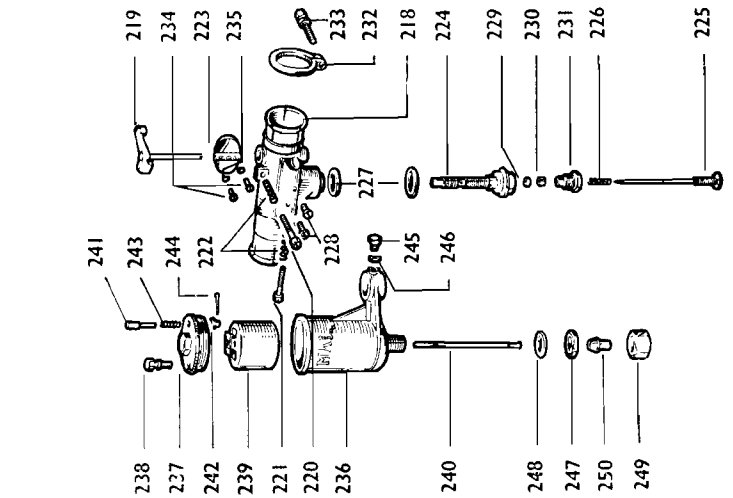
Road wheel shaft be supplied assembled with fixed hub gear.

AIR CLEANER & CARBURETTOR

Plate No. 1

Illust. No.	*Part No.*	*Description*	*No. off*
		AIR CLEANER ASSEMBLY	
201	G.178	Inlet pipe cap	1
202	G.180	Gauze container	1
203	G.181	Tank cover	1
204	G.182	Gauze container clip	1
205	G.185	Tank	1
206	G.268	Extension tube hose connection	1
207	G.269	Extension tube	1
208	G.270	Tank gasket	1
209	G.271	Cover gasket	1
210	G.272	Perforated plate	2
211	G.273	Perforated base cone	1
212	G.274A	Gauze filter	2
213	9530	Hose connection to carburettor	1
214	G.276	Hose clips	2
		CARBURETTOR	
—	BJ.8098	Carburettor, complete assembly (Amal. 225) ...	1
218	BJ.9100	Carburettor body	1
219	BJ.9101	Throttle lever, spindle and stop	1
220	BJ.9102	Throttle stop screw	1
221	BJ.9104	Air adjusting screw	1
222	BJ.9103	Screw setting springs	2
— *OR*	BJ.9135	Locknuts (alternative to above springs) ...	2
223	BJ.9105	Throttle valve	1
224	BJ.9106	Adjustable main jet body	1
225	BJ.9107	Needle for main jet	1
226	BJ.9109	Needle setting spring	1
— *OR*	BJ.9134	Locknut (alternative to above spring)	1
227	BJ.9108	Washer for float chamber union	2
228	BJ.9110	Plug screws for mixing chamber	2
229	BJ.9111	Gland washer	1
230	BJ.9112	Cork gland	1
231	BJ.9113	Gland adjusting screw	1
232	BJ.9114	Outlet pipe clip	1
233	BJ.9115	Outlet pipe clip pin	1
234	BJ.9116	Throttle valve screw	2
235	BJ.9117	Locking washers	2
—	BJ.9118	Float chamber complete assembly	1
236	BJ.9119	Float chamber only	1
237	BJ.9120	Float chamber cover	1
238	BJ.9121	Cover lock screw	1
239	BJ.9122	Float	1
240	BJ.9123	Needle	1
241	BJ.9124	Tickler	1
242	BJ.9136	Tickler stop	1
243	BJ.9125	Tickler spring	1
244	BJ.9127	Tickler cotter pin	1
245	BJ.9128	Plug screw	1
246	BJ.9129	Plug screw washer	1
247	BJ.9130	Needle seat lock nut	1
248	BJ.9131	Needle seat lock nut	1
249	G.229	*Petrol pipe union nut	1
250	G.227	*Petrol pipe union nipple	1

*Part of petrol pipe assembly, see Plate 2.



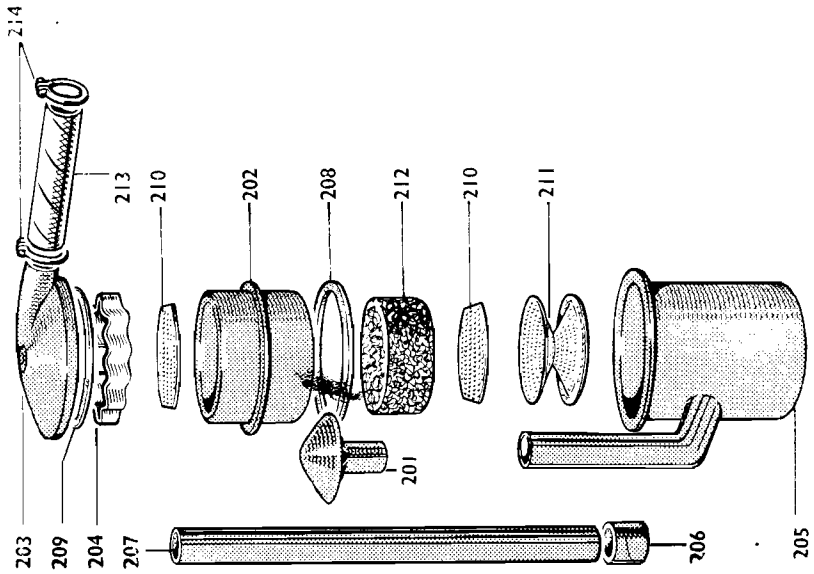


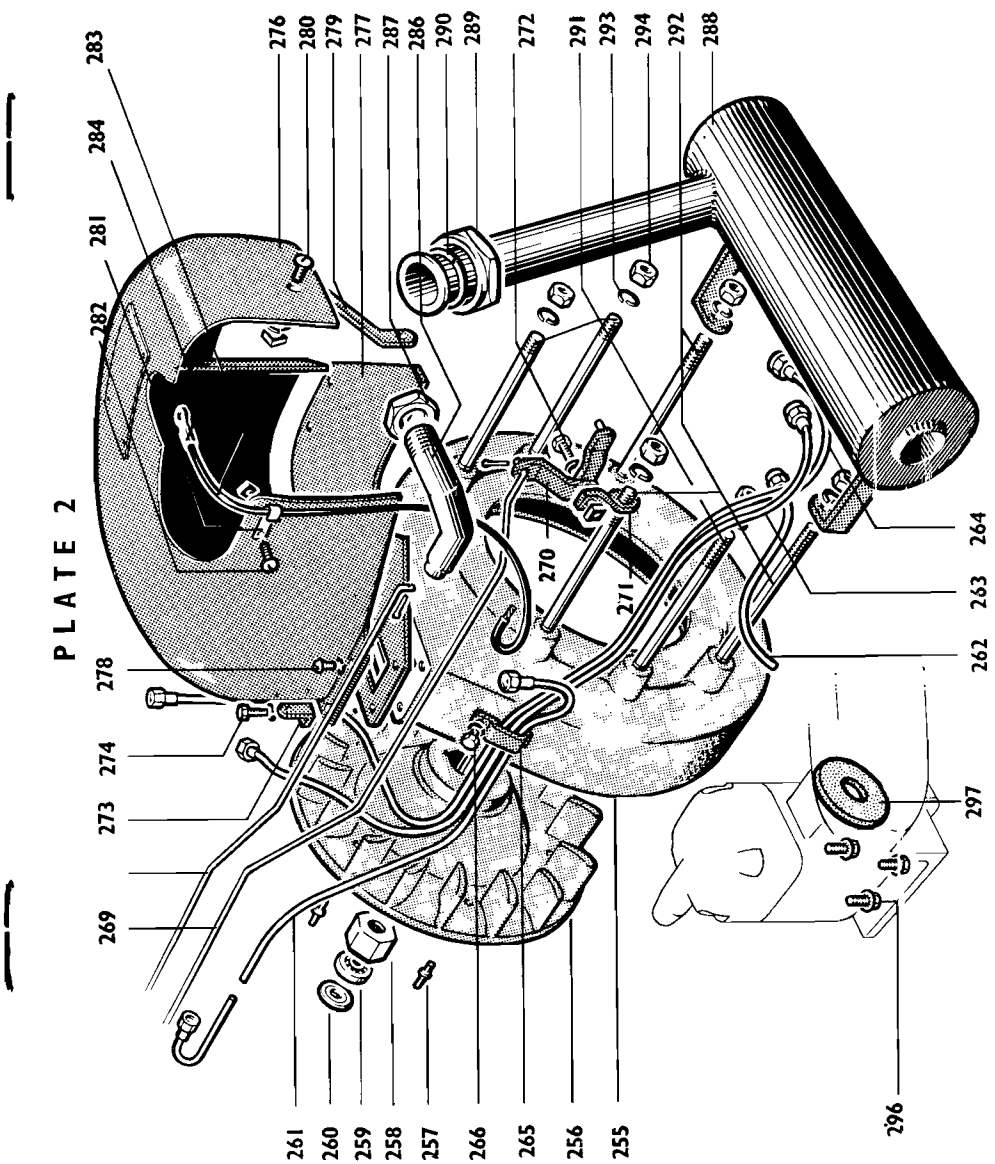
PLATE 1

AIR CLEANER and CARBURETTOR

J.A.P. ENGINE FITTINGS

Plate No. 2

Illust. No.	*Part No.*	*Description*	*No. off*
255	9512	Flywheel housing	1
256	9509	Flywheel	1
257	8002	Flywheel driving pins	6
258	9511	Flywheel nut	1
259	B.R.L.½	Spigot bearing 1 $\frac{9}{16}$″ O.D. × ½″ I.D. × ⅜″ W. ...	1
260	8007	Spigot bearing retaining washer	1
261	25376	Petrol pipe, tank to carburettor	1
262	25373	Oil breather pipe	1
263	25375	Oil pipe, tank to engine	1
264	25377	Oil pipe, engine to filter	1
265	9522	Pipe retaining clip	1
266		Pipe retaining clip setscrew, ¼″ BSW Hx Hd × ½″L	1
—		Spring washer, ¼″ dia.	1
268	9533	Throttle control rod, frame arm to carburettor	1
—		Split pin, $\frac{1}{16}$″ dia. × ½″ L.	1
269	9531	Exhaust valve lifting control rod	1
—		Split pin, $\frac{1}{16}$″ dia × ½″ L.	1
270	9518	Exhaust valve lifting crank	1
271	9517	Exhaust valve lifting crank bracket	1
272	S/2/7	Exhaust valve lifting crank fulcrum bolt ...	1
—		Thackeray washer, ¼″ dia....	1
—		Flat washer, ¼″ dia....	1
—		Nut, ¼″ B.S.W.	1
273	9532	Guide bracket	1
274		Guide bracket setscrew, ¼″ B.S.W. Hx. Hd. × ½″ L.	1
—		Spring washer, ¼″ dia.	1
276	9520	Cooling blast shroud	1
277	9519	Cooling blast shroud base plate	1
278		Attachment screw, ¼″ B.S.W. Rd. Hd. × ½″ L....	5
—		Spring washers, ¼″ dia.	5
—		Nuts, ¼″ B.S.W.	2
279	9526	Clip between shroud and tappet cover	1
280		Attachment screw, ¼″ B.S.W. Rd. Hd. × ½″ L....	1
—		Spring washer, ¼″ dia.	1
—		Nut, ¼″ B.S.W.	1
281	25384	Magneto lead clip	1
282	25385	Magneto lead clip screw	1
—	25386	Nut	1
283	8983	Magneto lead	1
284	8984	Magneto lead terminal	1
286	9527	Fuel induction pipe	1
287	25387	Fuel induction pipe lock nut	1
288	25367	Exhaust muffler	1
289	25382	Exhaust pipe attachment nut	1
290	25383	Exhaust pipe spring ring	1
291	9513	Flywheel housing stud, short	3
292	9514	Flywheel housing stud, long	3
293		Spring washers, ⅜″ dia.	6
294		Nuts ⅜″ B.S.W.	6
296		Setscrews, ⅜″ B.S.W. Hx. Hd. × ¾″ L.	3
—		Flat washers, ⅜″ dia.	3
297	9534	Felt sealing washer	1



GEAR-BOX, JACKSHAFT & LAYSHAFT

Plate No. 3

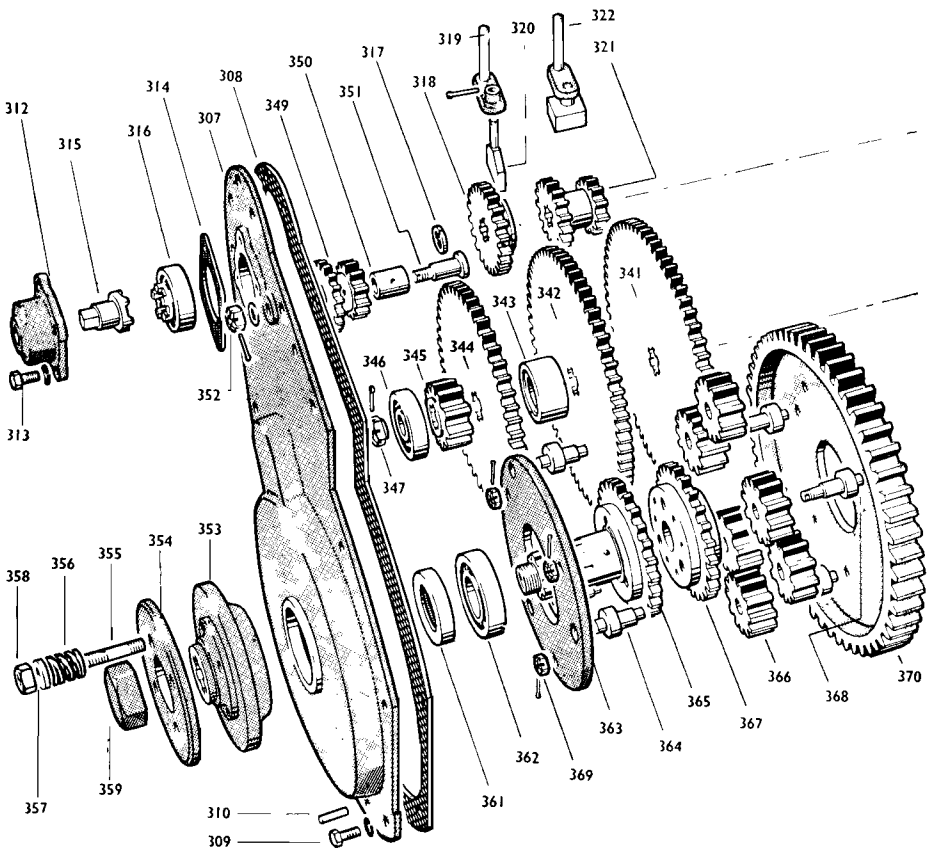
Illust. No.	*Part No.*	*Description*	*No. off*
300	25048	Casing	1
301	G.476	Dipstick	1
302	25121	Inspection cover	1
303	25185	Inspection cover gasket	1
304		Setscrew $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{3}{8}$″ L.	1
—		Spring washer $\frac{1}{4}$″ dia.	4
305		Flywheel housing bolt $\frac{1}{4}$″ B.S.W. $\frac{3}{4}$″ L.	8
—		Spring washer $\frac{1}{4}$″ dia.	8
306	G.479	Drain plug	1
307	25049	Gear-box cover	1
308	25050	Cover gasket	1
309		Cover setscrews $\frac{5}{16}$″ B.S.W. × $\frac{3}{4}$″ L.	15
—		Spring washers $\frac{5}{16}$″ dia.	15
310	25059	Mills pin	2
312	G.374	Starting dog bearing housing	1
313		Setscrew $\frac{3}{8}$″ B.S.W. × $\frac{3}{4}$″ L.	4
—		Spring washer $\frac{3}{8}$″ dia.	4
314	G.402	Starting dog bearing housing gasket	1
315	G.373	Starting dog	1
316	G.437	Starting dog bearing	1
		JACKSHAFT	
317	G.436	Circlip	1
318	25006	Single pinion	1
319	25074	Reverse selector	1
320	25072	Reverse selector block	1
—		Split pin $\frac{1}{16}$″ dia. × $\frac{3}{4}$″ L.	1
321	25005	Double pinion	1
322	25115	Speed change selector assembly	1
323	G.481	Selector bush	2
325	25029	Jackshaft	1
326	25008	Crownwheel	1
327		Rivets $\frac{5}{16}$″ dia. × $\frac{3}{4}$″ L. Rd. Hd.	6
328	G.451	Ball bearing	1
329	G.461	Jackshaft shim	As req.
330	25065	Spring lubricating belt	1
331	25063	Lubricating belt wheel	1
332	25064	Pin	1
333		Simmonds nut $\frac{3}{8}$″ B.S.F.	1
		LAYSHAFT	
335	G.354	Bearing stop	1
336	G.355	Gasket	1
337		Setscrew $\frac{5}{16}$″ B.S.W. × $\frac{5}{8}$″ L.	3
—		Spring washer $\frac{5}{16}$″ dia.	3
338	25054	Shim	As req.
339	G.353	Ball bearing	1
340	25037	Layshaft	1
341	25011	Large gear	1
342	25012	Medium gear	1
343	25015	Spacer	1
344	25013	Small gear	1
345	25025	Bull pinion	1
346	BLR1	Ball bearing $2\frac{1}{4}$″ 1″ × $\frac{3}{8}$″ w.	1
347	25038	Special nut	1
348			

GEAR-BOX (contd.)

Plate No. 3

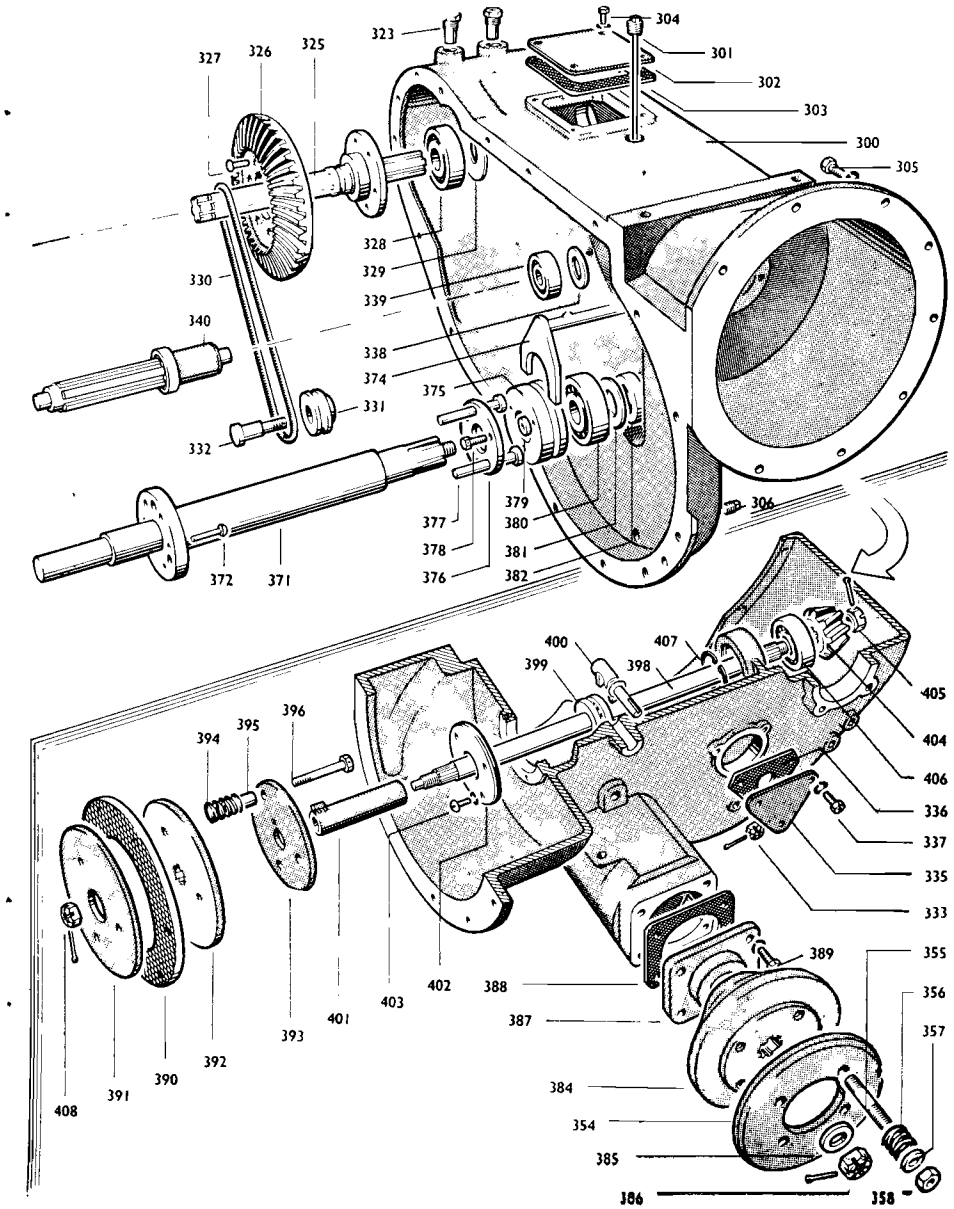
Illust. No.	*Part No.*	*Description*	*No. off*
—		Split pin $\frac{3}{32}$″ dia. × 2″ L.	1
349	25027	Reverse idler gears	1
350	25034	Reverse idler gears	1
351	25026	Reverse idler gears bush	1
—		Washer $\frac{1}{2}$″ dia.	1
352		Simmonds nut $\frac{1}{2}$″ B.S.W.	1
		ROADWHEEL SHAFT	
353	25051	Wheelhub, right	1
354	G.162	Wheelhub disc (both wheels)	2
355	G.141	Studs (both wheels)	8
356	G.142	Springs (both wheels)	8
357		Washers (both wheels) $\frac{1}{2}$″ dia.	8
358		Nuts (both wheels) $\frac{1}{2}$″ B.S.W.	8
359	25351	Hub nut, right	1
360			
361	G.305	Oil seal	1
362	BRE.$1\frac{3}{4}$	Ball bearing 3″ × $1\frac{3}{4}$″ × $\frac{9}{16}$″ W.	1
363	25028	Differential plate	1
364	25023	Differential pinion pins	3
365	25020	Loose hub gear	1
366	25022	Differential pinions	6
367	25019	Fixed hub gear	1
368	25024	Pinion studs	3
369	25042	Special nut	3
—		Split pin $\frac{3}{32}$″ dia. × $1\frac{3}{4}$″ L.	3
370	25021	Bull wheel	1
371	25046	Road wheel axle	1
372		Rivet $\frac{1}{4}$″ dia. × $1\frac{3}{4}$″ L. Rd. Hd.	6
373			
374	25359	Differential lock selector	1
375	G.313	Differential lock	1
376	G.314	Differential lock ring	1
377	25056	Differential lock pin	3
378	G.317	Differential lock setscrew	3
379	G.316	Differential lock spacer	3
380	BRL.$1\frac{1}{4}$	Ball bearing $2\frac{3}{4}$″ × $1\frac{1}{4}$″ × $\frac{11}{16}$″ w.	1
381	25058	Oil seal disc	1
382		Oil seal 2″ × $1\frac{1}{4}$″ × $\frac{1}{2}$″	1
383			
384	25052	Wheel hub, left	1
385		Hub washer, $\frac{3}{4}$″ dia.	1
386	25047	Hub nut	1
—		Split pin $\frac{5}{32}$″ dia. × 2″ L.	1
387	25053	Axle bearing stop	1
388	25057	Axle bearing stop gasket	1
389		Setscrew $\frac{3}{8}$″ B.S.W. × $\frac{7}{8}$″ L.	4
—		Spring washer $\frac{3}{8}$″ dia.	4

PLATE 3



GEAR BOX

PLATE 3



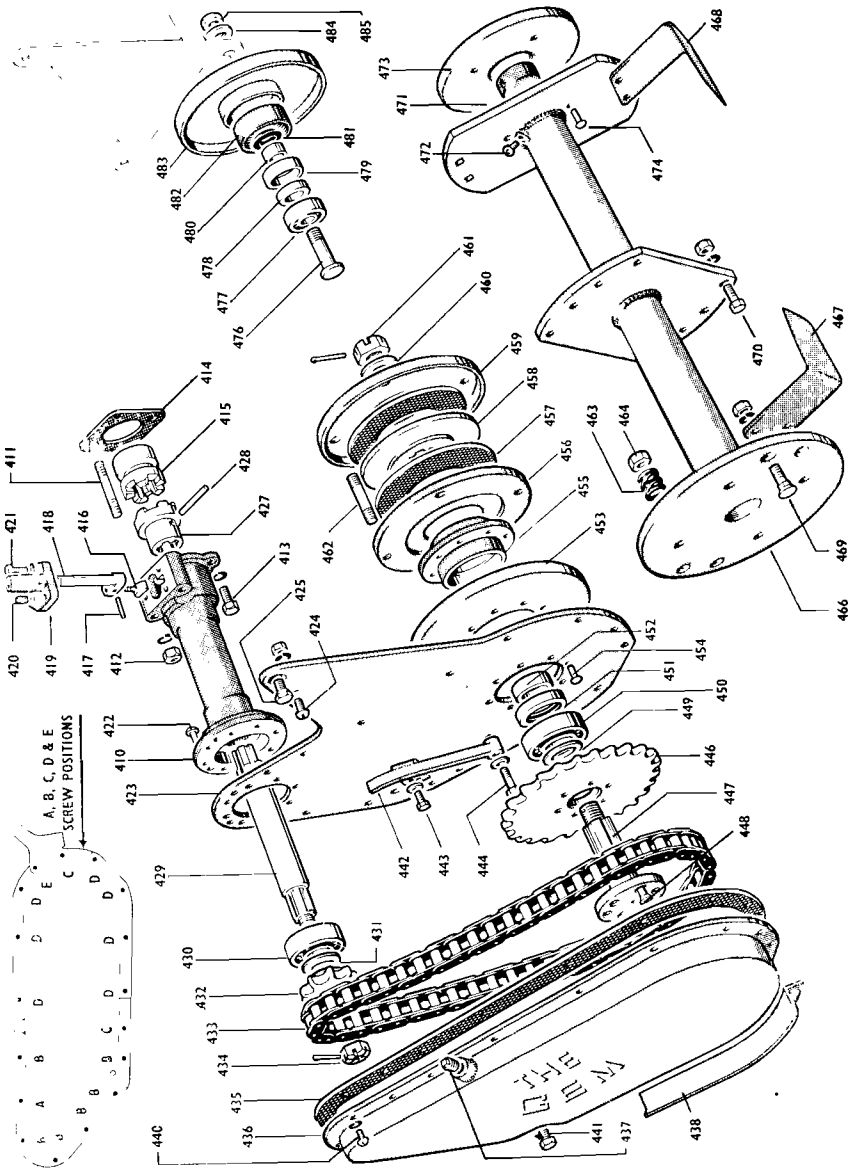
GEAR BOX

ENGINE CLUTCH, JACKSHAFT EXTENSION, CHAINCASE

Plate No. 4

Illust. No.	*Part No.*	*Description*	*No. off*
390	G.220	Friction disc	1
391	G.230	Loose plate	1
392	25071	Fixed plate	1
393	G.290	Thrust plate with driving pin	1
—	G.234	Thrust plate driving pin only	1
394	G.260	Spring	3
395	G.255	Distance piece	3
396	G.250	Bolt	3
397			
398	25009	Shaft	1
399	SFL. $\frac{3}{4}$	Thrust race $\frac{3}{4}$″ bore	1
400	G.291	Operating pawl	1
401	G.288	Thrust sleeve	1
402	25069	Shaft oil seal	1
403		Setscrew $\frac{1}{4}$″ B.S.W. × $\frac{3}{4}$″ L. Rd. Hd.	3
—		Spring washer $\frac{3}{4}$″ dia.	3
404	25007	Spiral bevel pinion	1
405	25061	Special nut	1
—		Split pin $\frac{3}{32}$″ dia. × $1\frac{1}{4}$″ L.	1
406	BRM. $\frac{3}{4}$	Ball race 2″ × $\frac{3}{4}$″ × $\frac{11}{16}$″ W.	1
407		Circlip	1
408	25062	Special nut	1
—		Split pin	1
		JACKSHAFT EXTENSION	
410	25469	Housing (18″ machine)	1
410	G.453	Housing (20″ machine)	1
410	25470	Housing (24″ machine)	1
411	G.454	Housing studs	2
—		Spring washers $\frac{3}{8}$″ dia.	2
412		Nuts $\frac{3}{8}$″ B.S.W.	2
413		Setscrews $\frac{3}{8}$″ B.S.W. × 1″ L.	2
—		Spring washers $\frac{3}{8}$″ dia.	2
414	G.402	Gasket	1
415	G.439	Sliding dog	1
416	G.156	Selector block	1
417	G.157	Selector cotter pin	1
418	G.153	Selector	1
419	G.456	Dog clutch housing cover	1
420	G.458	Oil plug	1
421		Setscrews $\frac{5}{16}$″ B.S.W. × $\frac{3}{4}$″ L.	2
—		Spring washers $\frac{5}{16}$″ dia.	2
422		Rivets $\frac{1}{4}$″ dia. × $\frac{5}{8}$″ L. Rd. Hd.	8
		CHAINCASE	
423	G.530	Chaincase back plate	1
424		Setscrew, back plate to shield $\frac{1}{4}$″ B.S.W. × $\frac{1}{2}$″ L. Rd. Hd.	1
—		Spring washer $\frac{1}{4}$″ dia.	1
—		Nut $\frac{1}{4}$″ B.S.W.	1
425	G.591	Frame setscrew, countersunk head	1
426			
427	G.452 2	Fixed dog	1
428	G.452 3	Fixed dog rivet	1
429	25467	Shaft (18″ machine)	1
429	G.452 1	Shaft (20″ machine)	1
429	25468	Shaft (24″ machine)	1
430	BRM.1	Ball bearing $2\frac{1}{2}$″ × 1″ × $1\frac{3}{4}$″ W. RHS.8	1
431	G.462	Shim	As req.
432	G.460	Sprocket	1

PLATE 4



JACKSHAFT EXTENSION, CHAIN CASE and ROTOR

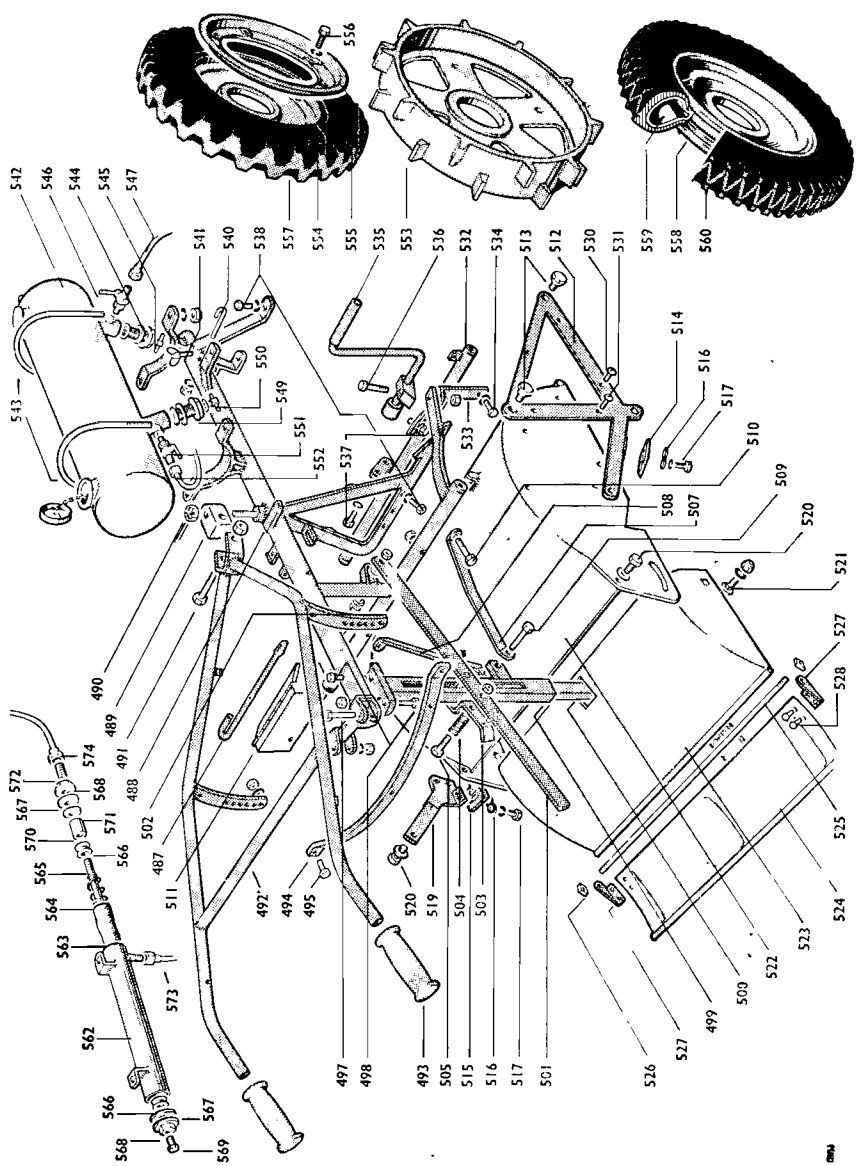
Illust. No.	Part No.	Description	No. off
		CHAINCASE	
433	25101	Drive chain complete	1
—	25101/2	Chain connecting link (quote make of chain)	
434	G.455	Sprocket nut	1
—		Split pin $\frac{1}{8}$" dia. × $1\frac{1}{2}$" L.	1
435	G.523	Chaincase gasket	1
436	G.520	Chaincase	1
437	G.522	Oil filler plug	1
438	G.519	Wearing shoe	1
439			
440A		Setscrew $\frac{1}{4}$" B.S.W. × $\frac{3}{8}$" L. Rd. Hd.	1
440B		Setscrew $\frac{1}{4}$" B.S.W. × $\frac{1}{2}$" L. Rd. Hd.	6
440C		Setscrew $\frac{1}{4}$" B.S.W. × $\frac{5}{8}$" L. Rd. Hd.	2
440D		Setscrew $\frac{1}{4}$" B.S.W. × $\frac{3}{4}$" L. Rd. Hd.	7
440E		Setscrew $\frac{1}{4}$" B.S.W. × $\frac{3}{4}$" L. Hx. Hd.	1
—		Spring washers $\frac{1}{4}$" dia.	17
—		Nuts, on 440C, D & E $\frac{1}{4}$" B.S.W.	10
441	G.590	Setscrew, chain box to stay tube	1
442*	G.585	Chain skid	1
443*		Chain skid locking screw $\frac{5}{16}$" B.S.W. × $\frac{3}{4}$" L.	1
—		Washer $\frac{5}{16}$" dia.	1
—		Nut $\frac{5}{16}$" B.S.W.	1
444		Chain skid hinge bolt $\frac{5}{16}$" B.S.W. × $1\frac{1}{4}$" L.	1
—		Washer $\frac{5}{16}$" dia.	1
—		Nut $\frac{5}{16}$" B.S.W.	1
		ROTOR DRIVE	
445			
446	G.560	Drive sprocket	1
447	G.550	Drive shaft	1
448		Sprocket rivets $\frac{1}{4}$" dia. c'sk × $\frac{5}{8}$" L.	6
449	G.554	Sprocket shim	As req.
450	BRM.030	Ball bearing 72 mm. × 30 mm. × 19 mm. W.	1
451		Oil seal $2\frac{1}{2}$" × $1\frac{1}{2}$" × $\frac{1}{2}$" W.	1
452	G.552	Spacing sleeve	1
453	G.545	Dust cover	1
454		Bearing housing rivets $\frac{1}{4}$" dia. Rd. Hd. × $\frac{3}{4}$" L.	8
455	G.540	Drive shaft bearing housing	1
		ROTOR SAFETY CLUTCH	
456	G.605	Drive plate	1
457	G.607	Friction discs	2
458	G.606	Drive disc	1
459	G.544	Wearing plate	1
460	G.1369	Drive shaft washer	1
461		Drive shaft nut $\frac{3}{4}$" B.S.F. slotted	1
—		Split pin $\frac{1}{8}$" dia. × $1\frac{1}{2}$" L.	1
462	G.603	Studs	4
463	G.602	Springs	4
464		Nuts	4
		ROTOR (Plate 4)	
466	25461	Rotor (18" machine—3 flange)	1
466	G.600A	Rotor (20" machine—3 flange)	1
466	25462	Rotor (24" machine—4 flange)	1
467	G.900R	Hoe blade, right	4 or 6
468	G.900L	Hoe blade, left	4 or 6
469	G.919	Blade bolts (end flanges)	8
470	G.918	Blade bolt (intermediate flanges)	8 or 16
—	G.920	Blade spring washers	16 or 24
—		Blade nuts $\frac{7}{16}$" B.S.F.	16 or 24

Illust. No.	Part No.	Description	No. off
		ROTOR STUB AXLE	
471	G.635	Back plug	1
472		Oiling screw $\frac{1}{4}$" B.S.W. × $\frac{3}{8}$" L. Rd. Hd.	1
473	G.639	Inner dust cover	1
474		Inner dust cover rivets $\frac{3}{16}$" dia. × $\frac{1}{2}$" L. Rd. Hd.	3
475			
476	G.630	Stub axle	1
477	BRM. $\frac{5}{8}$	Ball bearing $1\frac{13}{16}$" × $\frac{5}{8}$" × $\frac{5}{8}$" W.	1
478		Oil seal $1\frac{1}{2}$" × $\frac{7}{8}$" × $\frac{13}{32}$" W.	1
479	G.637	Oil seal holder	1
480	G.634	Spacing sleeve	1
481	G.629	Felt dust seal	1
482	G.632	Bearing cap	1
483	G.640	Outer dust cover	1
484	G.648	Washer	1
485		Nut $\frac{5}{8}$" B.S.F. locknut	1
486	Stub axle	Stub axle	1
		FRAMES	
487	18G.993 20G.993 24G.993	Rotor blade setting bar { 18" machine / 20" machine / 24" machine }	1
488	25330 25105 25329	Main frames { 18" machine / 20" machine / 24" machine }	1
		HANDLEBARS	
489	G.104	Pivot	1
490		Slotted nut $\frac{5}{8}$" B.S.F.	1
—		Split pin $\frac{1}{8}$" dia. × $1\frac{1}{4}$" L.	1
491		Pivot bolt $\frac{1}{2}$" B.S.W. × $2\frac{1}{4}$" L.	1
—		Locknut $\frac{1}{2}$" B.S.W.	1
492	G.122	Handlebars	1
493	G.121	Grips	2
494	G.123	Slide	1
495		Bolts $\frac{3}{8}$" B.S.W. × $1\frac{1}{4}$" L.	2
—		Spring washers $\frac{3}{8}$" dia.	2
—		Nuts $\frac{3}{8}$" B.S.W.	2
—			
496			
497	25392	Slide clamp bolts	2
—		Spring washers $\frac{3}{8}$" dia.	2
—		Nuts $\frac{3}{8}$" B.S.W.	2
		DEPTH CONTROL	
498		Socket bolts $\frac{3}{8}$" B.S.W. × $2\frac{1}{2}$" L.	2
—		Nuts $\frac{3}{8}$" B.S.W.	2
499	25219	Socket	1
400	G.950	Skid	1
501	G.671	Arm	1

*The parts shown in these illustrations have been replaced in later machines by the following :

Illust. No.	Part No.	Description	No. off
—	25917	Chain skid	1
—	25919	Connecting link	2
—	25914	Connecting pins	2
—		Split pins $\frac{1}{16}$" dia. × 1" L.	2
—	25920	Sliding block	1
—	25913	Adjusting screw	1
—		Hexagon nut $\frac{5}{16}$" B.S.F.	1

PLATE 5



FRAME, FITTINGS, SHIELDS and WHEELS

FRAME FITTINGS and SHIELDS

Plate No. 5

Illust. No.	*Part No.*	*Description*	*No. off*
502		Pivot bolts $\frac{3}{8}$″ B.S.W. × $1\frac{3}{4}$″ L.	1
—		Thackeray washer $\frac{3}{8}$″ dia.	1
—		Washer $\frac{3}{8}$″ dia.	1
—		Nut $\frac{3}{8}$″ dia.	1
503	G.674	Arm clip	1
504	G.675	Arm clip spring	1
505		Arm clip bolt $\frac{1}{4}$″ B.S.W. × $1\frac{1}{2}$″ L.	1
—		Nut $\frac{1}{4}$″ B.S.W.	1
506		**FRAME**	
507	G.667	Support stay, right	1
508	G.668	Support stay, left	1
509		Bolt, support stay to socket $\frac{1}{4}$″ B.S.W. × 1″ L.	1
—		Spring washers $\frac{1}{4}$″ dia.	1
—		Nut $\frac{1}{4}$″ B.S.W.	1
510		Crossmember bolts $\frac{1}{4}$″ B.S.W. × $1\frac{3}{4}$″ L....	3
—		Spring washers $\frac{1}{4}$″ dia.	3
—		Nuts $\frac{1}{4}$″ B.S.W.	3
511	G.790	Tool box	1
512	G.650	Side frame	1
513	G.591	Setscrew, countersunk head	2
514	G.821	Weed cutter blade, right	1
515	G.820	Weed cutter blade, left	1
516	G.830	Keeper plate	2
517		Setscrew $\frac{1}{4}$″ B.S.W. × $\frac{1}{2}$″ L.	4
—		Spring washers $\frac{1}{4}$″ dia.	4
518			
519	G.825	Weed cutter bracket	1
		SHIELD	
520		Rear shield hinge bolts $\frac{3}{8}$″ B.S.W. × 1″ L. ...	2
—		Spring washers $\frac{3}{8}$″ dia.	2
521	G.644	Rear shield champing bolts	2
—		Washers $\frac{3}{8}$″ dia.	2
—		Simmonds nut $\frac{3}{8}$″ B.S.W., thick	2
522	25435	Front shield (18″ machine)	1
522	G.641	Front shield (20″ machine)	1
522	25436	Front shield (24″ machine)	1
523	25439	Rear shield (18″ machine)	1
523	G.642	Rear shield (20″ machine)	1
523	25443	Rear shield (24″ machine)	1
524	25451	Trailing Board (18″ machine)	1
524	G.645	Trailing Board (20″ machine)	1
524	25454	Trailing Board (24″ machine)	1
525	25453	Trailing board, hinge bar (18″ machine ...	1
525	G.646	Trailing board, hinge bar (20″ machine)... ...	1
525	25479	Trailing board, hinge bar (24″ machine)... ...	1
526		Hinge lock nuts $\frac{5}{16}$″ B.S.W.	2
527	G.647	Hinge bracket	2
528		Bracket rivets $\frac{3}{16}$″ dia. Rd. Hd. × $\frac{1}{2}$″ L. ...	4
530		Setscrews, side frame $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{5}{8}$″ L.	3
531		Setscrews, side frame $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{3}{4}$″ L.	2
—		Spring washers $\frac{1}{4}$″ dia.	5
—		Nuts $\frac{1}{4}$″ dia.	5
		FRAME	
532	25424	Staytube (18″ machine)	1
532	G.589	Staytube (20″ machine)	1
532	25428	Staytube (24″ machine)	1
533	G.381	Starting handle support lug	1
534		Setscrew lug to staytube $\frac{3}{8}$″ B.S.W. × $\frac{3}{4}$″ L. ...	1

FRAME, FITTINGS, SHIELDS, WHEELS, etc.

Plate No. 5

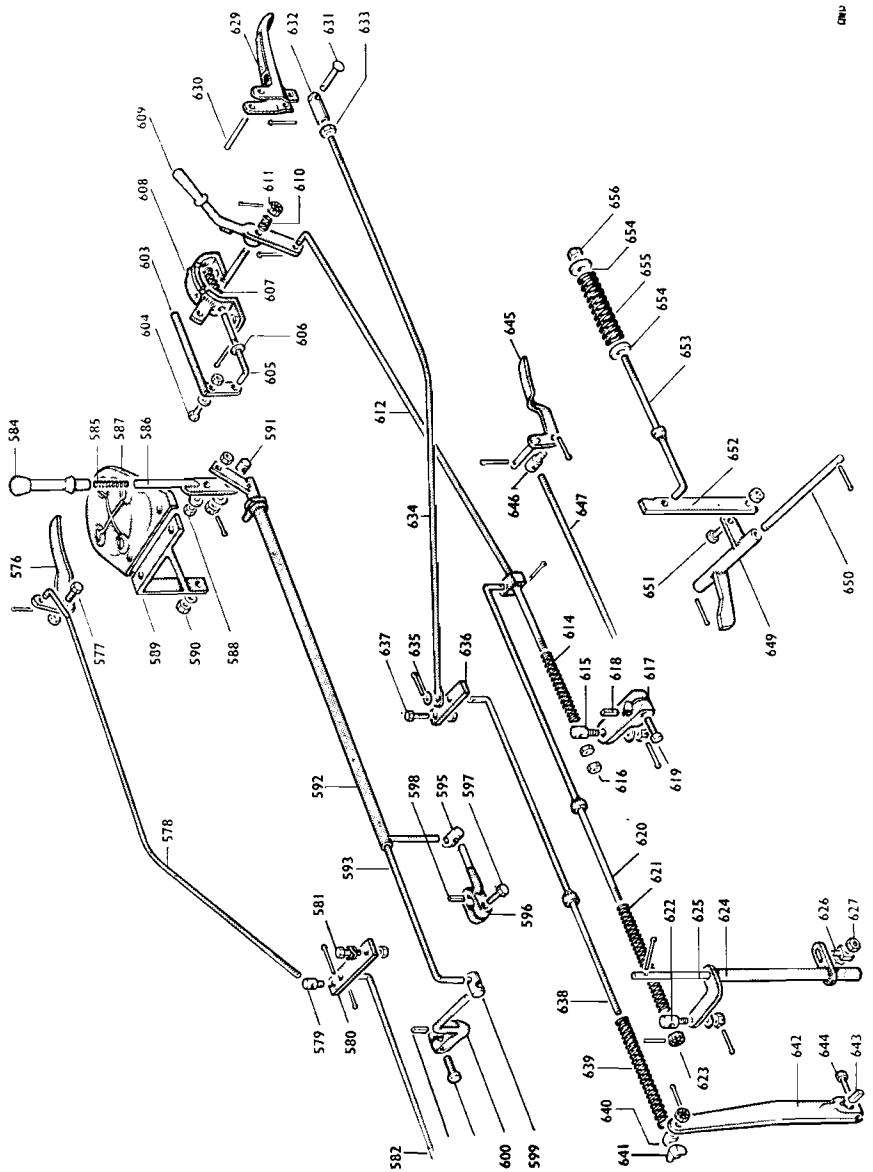
Illust. No.	*Part No.*	*Description*	*No. off*
—		Spring washer $\frac{3}{8}$″ dia.	1
535	25465	Starting handle and block (18″ machine) ...	1
535	G.380	Starting handle and block (20″ machine) ...	1
535	25466	Starting handle and block (24″ machine) ...	1
536	G.382	Bolt starting handle block to frame	1
—		Nut $\frac{7}{16}$″ B.S.W.	1
537		Setscrews, staytube to gear-box $\frac{3}{8}$″ B.S.W. × 1″ L.	4
—		Spring washers $\frac{3}{8}$″ dia.	4
538		Setscrews, main frame to gear-box $\frac{3}{8}$″ B.S.W. × $\frac{3}{4}$″ L.	5
—		Spring washers $\frac{3}{8}$″ dia.	5
539			
540	G.708	Throttle rod hook bolt	1
—		Spring washer $\frac{1}{4}$″ dia.	1
—		Nut $\frac{1}{4}$″ B.S.W.	1
541	G.183	Air cleaner clamp screw	1
		FUEL TANK	
542	G.165	Tank assembly complete with caps	1
543	G.175	Tank straps	2
—		Spring washers, $\frac{1}{4}$″ dia.	4
—		Nuts, $\frac{1}{4}$″ B.S.W.	4
544	G.168	Tank oil filter core	1
545	G.458	Tank oil filter drain plug	1
—		Tank oil filter cock (alternative)	1
540	G.167	Oil supply cock	1
547	—	Oil pipe (see Engine fittings illustration, *p. 25*) ...	1
549	G.171	Petrol filter core	1
550	25413	Petrol filter drain plug	1
—		Petrol filter drain fibre washer	1
551	G.166	Petrol supply cock	1
552	—	Petrol pipe (see Engine fittings illustration *p. 25*)	1
		WHEELS	
553	G.130	Land wheel	2
558	G.132	Pneumatic tyred wheel hub, left	1
558	G.131	Pneumatic tyred wheel hub, right	1
559	G.133	Pneumatic tyred wheel inner tube	2
560	G.134	Pneumatic tyred wheel outer cover	2
		OIL FILTER	
562	G.880	Outer tube	1
563	G.890	Bag	1
564	G.891	Bag support spring	1
565	G.882	Centre tube	1
566	G.889	Bag securing discs	2
567	G.883	Fibre discs	2
568	G.881	Tube end caps	2
569		End cap sealing screw $\frac{3}{8}$″ B.S.W. Hx. Hd. × $\frac{3}{4}$″ L.	1
570	G.886	Connecting union	1
571	G.887	End washer	1
572	G.885	Tube nipple	1
573	—	Oil pipe (see Engine fittings illustration, *p. 25*) ...	1
574	25378	Oil pipe filter to tank	1

CONTROLS

Plate No. 6

Illust. No.	*Part No.*	*Description*	*No. off*
		THROTTLE	
576	797	Throttle control hand lever	1
577		Lever fulcrum bolt, $\frac{1}{4}$″ B.S.W. Hx. Hd. × $\frac{3}{4}$″ L.	1
—		Locknut $\frac{1}{4}$″ B.S.W.	1
578	G.795	Throttle control rod hand lever to frame arm ...	1
—		Split pin, $\frac{1}{16}$″ dia. × $\frac{1}{2}$″ L.	1
579	G.789	Trunnion	1
—		Split pin, $\frac{3}{16}$″ dia. × $\frac{1}{2}$″ L.	1
580	G.759	Throttle control frame arm	1
581		Arm pivot bolt, $\frac{1}{4}$″ B.S.W. Hx. Hd. × $\frac{7}{8}$″ L. ...	1
—		Thackeray washer, $\frac{1}{4}$″ dia.	1
—		Locknut, $\frac{1}{4}$″ B.S.W.	1
582	—	Throttle control rod (see eng. fitt. illust., *p. 25*)	1
—		Split pin, $\frac{1}{16}$″ dia. × $\frac{1}{2}$″ L.	1
		TRAVEL	
584	25154	Gear lever handle	1
585	25161	Gear lever spring	1
586	25158	Gear lever	1
587	25173	Gear lever gate	1
588		Fulcrum bolt $\frac{1}{4}$″ B.S.W. Hx. Hd. × $\frac{3}{4}$″ L. ...	1
—		Washer, $\frac{1}{4}$″ dia.	1
—		Locknut, $\frac{1}{4}$″ B.S.W.	1
589	25136	Rear support bracket	1
590		Nut $\frac{5}{16}$″ B.S.W.	1
—		Washer $\frac{5}{16}$″ dia.	1
591	25415	Trunnion	1
—		Washer, $\frac{5}{16}$″ dia.	1
—		Slotted nut, $\frac{5}{16}$″ B.S.W.	1
—		Split pin, $\frac{3}{32}$″ dia. × $\frac{3}{4}$″ L.	1
592	25139	Control tube (to 2nd & 3rd gears)	1
593	25165	Control rod (to 1st & rev. gears)	1
595	25172	Universal joint (2nd & 3rd gears)	1
596	25332	Control arm (2nd & 3rd gears)	1
597		Control arm clamping bolt, $\frac{5}{16}$″ B.S.W. × 1″ L.	2
598	G.155	Control arm key	2
599	25166	Universal joint (1st & rev. gears)	1
600	25331	Control arm (1st & rev. gears)	1
		HANDLEBARS	
603	25320	Positioning arm	1
604		Fulcrum bolt, $\frac{1}{4}$″ B.S.W. × $\frac{3}{8}$″ L.	1
—		Washer, $\frac{1}{4}$″ dia.	1
—		Locknut, $\frac{1}{4}$″ B.S.W....	1
605	G.465	Handleba rpositioning pin	1
606		Washer, $\frac{5}{16}$″ dia.	1
—		Split pin, $\frac{3}{32}$″ dia. × $\frac{3}{4}$″ L.	1
607	G.466	Spring	1
		ROTOR & DIFFERENTIAL	
608	25222	Control quadrant	1
609	G.781	Control hand lever	1
610	G.792	Handlever spring	1
611		Nut, $\frac{5}{16}$″ B.S.W. slotted	1
—		Split pin, $\frac{3}{32}$″ dia. × $\frac{3}{4}$″ L.	1
612	G.793	Rotor control rod	1
—		Split pin, $\frac{3}{32}$″ dia. × $\frac{3}{4}$″ L.	1
614	G.794	Rotor control rod spring	1
615	G.773	Trunnion	1
—		Washer, $\frac{5}{16}$″ dia.	1
—		Slotted nut, $\frac{5}{16}$″ B.S.W.	1
—		Split pin, $\frac{3}{32}$″ dia. × $\frac{3}{4}$″ L.	1

PLATE 6



CONTROLS

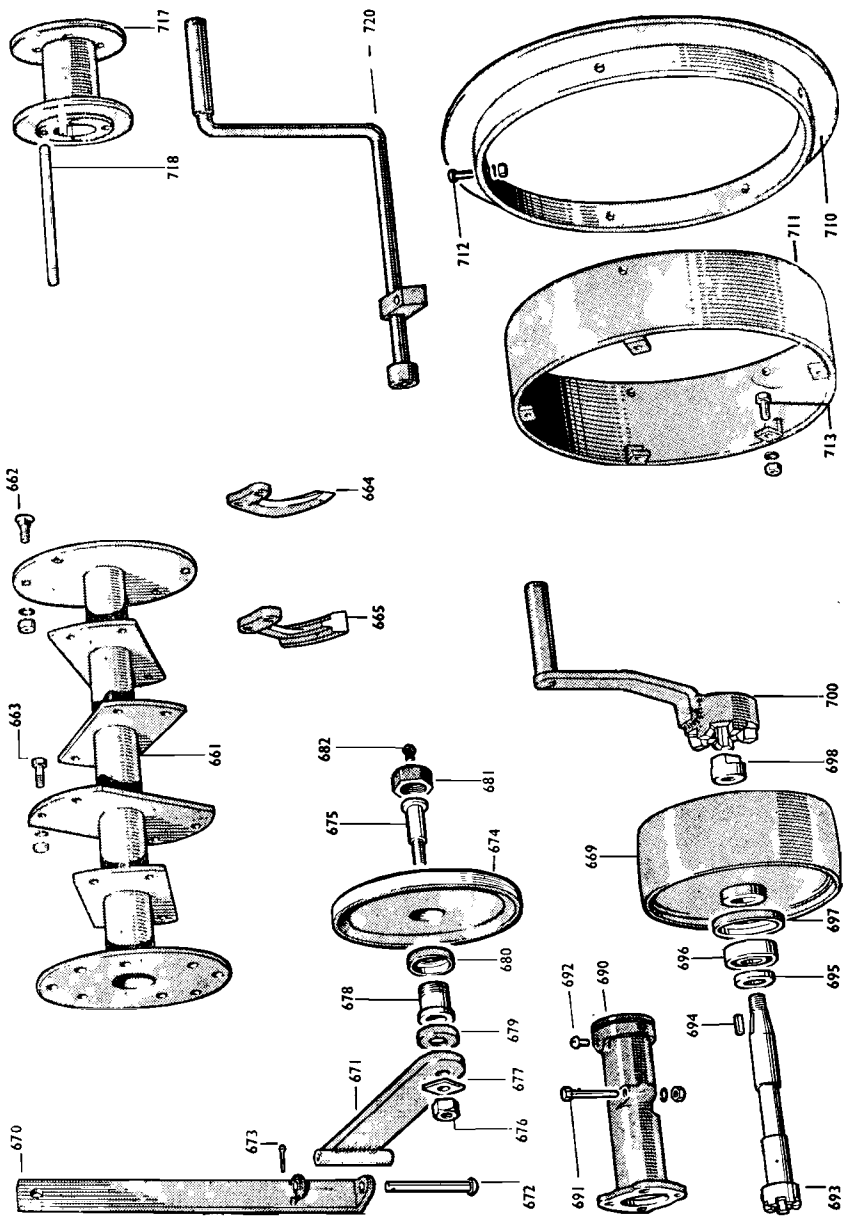
CONTROLS (contd.)

Illust. No.	Part No.	Description	No. off
616		Locknuts, $\frac{5}{16}$" B.S.W.	2
617	G.152	Rotor control arm	
618	G.155	Rotor control arm key	
619	S/3/8	Clamping bolt, $\frac{5}{16}$" B.S.W. × 1" L.	
620	G.321	Diff. lock control rod	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
621	G.324	Diff. lock control rod spring	
622	G.773	Trunnion	
—		Washer $\frac{5}{16}$" dia.	
—		Slotted nut $\frac{5}{16}$" B.S.W.	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
623		Slotted nut $\frac{5}{16}$" B.S.W.	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
624	25356	Diff. lock selector quadrant	
625	25352	Diff. lock selector quadrant pin	
—		Split pin $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	
626	G.319	Trunnion	
627		Locknuts $\frac{1}{2}$" B.S.W.	2
		CLUTCH	
629	25145	Hand lever	
630	G.699	Hand lever fulcrum rivet	
631	25149	Hand lever pivot pin	
—		Split pin $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	
632	25150	Rod adjusting link	
633		Locknut $\frac{5}{16}$" B.S.W.	
634	25170	Rod, hand lever to frame arm	
635		Washer, $\frac{1}{4}$" dia.	
636	25144	Frame arm	
637		Frame arm pivot bolt $\frac{1}{4}$" B.S.W. × 1" L. ...	
—		Locknut $\frac{1}{4}$" B.S.W.	
638	25446	Rod, frame arm to control arm	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
639	25412	Rod spring	
640	25410	Trunnion	
—		Slotted nut $\frac{5}{16}$" B.S.W.	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
641	25411	Wing nut	
642	G.170	Arm	
643	G.711	Arm key	
644		Arm clamping bolt $\frac{5}{16}$" B.S.W. × 1" L.	
45	G.188	Exhaust valve lifting control hand lever ...	
		DECOMPRESSOR	
—		Split pin $\frac{3}{32}$" dia. × $\frac{3}{4}$" L.	
646	G.789	Trunnion	
—		Split pin $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	
647	—	Exhaust valve lifting control rod ... ... (see Engine fittings illustration, p. 25)	
649	25132	Reverse interlock rocker	
650	25153	Reverse interlock rocker pin	
—		Split pins $\frac{1}{16}$" dia. × 1" L.	2
651		Linking setscrew $\frac{1}{4}$" B.S.W. × $\frac{3}{4}$" L.	
—		Locknut $\frac{1}{4}$" B.S.W.	
652	25152	Reverse interlock, vertical link	
653	25181	Reverse interlock rod	
654	25178	Special washers	2
655	25131	Reverse interlock spring	
656		Tensioning nut $\frac{5}{16}$" B.S.W.	

PICKTINE ROTOR, DEPTH CONTROL WHEEL, POWER TAKE-OFF

Plate No. 7

Illust. No.	*Part No.*	*Description*	*No. off*
		PICKTINE ROTOR ASSEMBLY	
		Note—Picktine Rotor will be supplied complete with Stub Axle Assembly to facilitate fitting.	
661	25472	Picktine rotor (6 flanges, 18″ machine) ...	1
,,	25473	Picktine rotor (6 flanges, 20″ machine) ...	1
,,	25471	Picktine rotor (7 flanges, 24″ machine) ...	1
662	G.922	End flange bolts	8
663	G.921	Intermediate flange bolts	16 or 20
—		Spring washers $\frac{7}{16}$″ dia.	24 or 28
—		Nut $\frac{7}{16}$″ B.S.F.	24 or 28
664	G.991	Picktine, Lucerne	12 or 14
665	G.992	Picktine chisel	12 or 14
		ROTOR DEPTH CONTROL WHEEL ASSEMBLY	
670	G.664	Pedestal	1
671	G.663	Arm	1
672	G.666	Arm swivel pin	1
673		Split pin $\frac{1}{8}$″ dia. × 1″ L.	1
674	G.660	Wheel	1
675	G.661	Axle	1
676		Axle nut $\frac{5}{8}$″ B.S.W....	1
677	G.665	Locking washer	1
678	G.659	Wheel bush	1
679	G.657	Inner dust cover	1
680	G.658	Outer dust cover	1
681	G.662	Wheel cap	1
682		Oiling screw $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{3}{8}$″ L. ...	1
		POWER TAKE-OFF ASSEMBLY	
690	25404	Housing (18″ machine)	1
,,	25402	Housing (20″ machine)	1
,,	25475	Housing (24″ machine)	1
691		Housing bolt $\frac{3}{8}$″ B.S.W. 2$\frac{1}{2}$″ L.	1
—		Spring washer $\frac{3}{8}$″ dia.	1
—		Nut $\frac{3}{8}$″ B.S.W.	1
692		Oiling screw $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{1}{2}$″ L. ...	1
693	25406	Shaft (18″ machine)	1
,,	25400	Shaft (20″ machine)	1
,,	25477	Shaft (24″ machine)	1
694	G.939	Shaft key	1
695	G.932	Thrust collar	1
696	G.936	Ball bearing	1
697	G.935	Bearing dust cover	1
698	G.938	Shaft nut	1
699	G.940	Pulley wheel	1
700	G.941	Starting handle	1



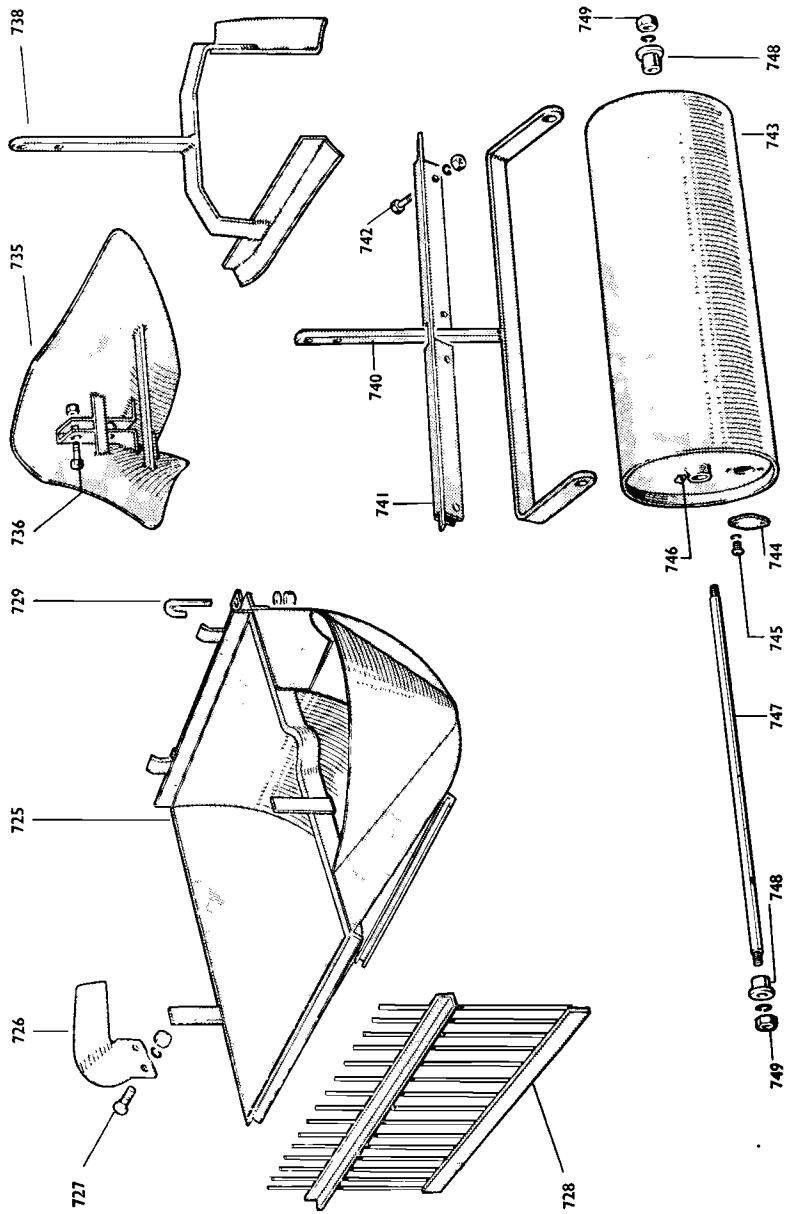
ROAD WHEEL EXTENSION HUBS and RIMS — *Plate No. 7*

Illust. No.	*Part No.*	*Description*	*No. off*
		EXTENSION RIMS FOR CLEATED LAND WHEELS	
710	G.135/1	Land wheel extension flange	2
711	20G.135/3	Land wheel extension rim (18″ & 20″ machine)	2
,,	24G.135/3	Land wheel extension rim (24″ machine) ...	2
712		Flange bolt $\frac{3}{8}$″ B.S.W. × $1\frac{1}{4}$″ L.	10
713		Rim attachment bolt $\frac{3}{8}$″ B.S.W. × $1\frac{1}{4}$″ L. ...	10
—		Spring washer $\frac{3}{8}$″ dia.	20
—		Nut $\frac{3}{8}$″ B.S.W.	20
		EXTENSION HUBS FOR PNEUMATIC TYRED WHEELS	
715			
716			
717	205396	Extension hub for twin wheels, wide setting, RH.	1
,,	205397	Extension hub for twin wheels, wide setting, LH.	1
718	205393	Studs for use with 25396	4
,,	205394	Studs for use with 25397	4
		Pneumatic tyres and their wheels will be supplied as required, see Plate 5.	
		N.B.—The pneumatic wheels required are both left hand—Pt. No. G.132.	
		STARTING HANDLES FOR USE WITH EXTENSION RIMS & HUBS	
720	25466	For 18″ and 20″ machine fitted with extension rims or narrow setting twin tyres	1
,,	25561	For 24″ machine fitted with extension rims or narrow setting twin tyres	1
,,	25395	For 18″, 20″ and 24″ machine fitted with wide setting twin tyres	1
		N.B.—The appropriate handle will be supplied for whatever wheel extensions are ordered.	

Plate No. 8

Illust. No.	*Part No.*	*Description*	*No. off*
725	18G.1000	Trough (18″ machine)	1
,,	20G.1000	Trough (20″ machine)	1
,,	24G.1000	Trough (24″ machine)	1
726	G.1001	Feeder blade	2
727	G.919	Feeder blade bolt	4
—		Spring washer $\frac{7}{16}$″ dia.	4
—		Nut $\frac{7}{16}$″ B.S.F.	4
728	18G.1002	Soil screen, coarse (18″ machine)	1
,,	20G.1002	Soil screen, coarse (20″ machine)	1
,,	24G.1002	Soil screen, coarse (24″ machine)	1
,,	18G.1004	Soil screen, fine (18″ machine)	1
,,	20G.1004	Soil screen, fine (20″ machine)	1
,,	24G.1004	Soil screen, fine (24″ machine)	1
729	G.1003	Hook bolt	2
—		Spring washer $\frac{3}{8}$″ dia.	2
—		Nut $\frac{3}{8}$″ B.S.W.	2

PLATE 8



SOIL SHREDDER, FURROWING ATTACHMENT
FURROW COVERING ATTACHMENT, ROLLER

FURROWING ATTACHMENT
FURROW COVERING ATTACHMENT
ROLLER ASSEMBLY

Plate No. 8

Illust. No.	*Part No.*	*Description*	*No. off*
		FURROWING ATTACHMENT	
735	G.952	Mould board	1
736		Skid bracket clamping bolt $\frac{1}{4}$″ B.S.W. × 1″ L. ...	1
—		Nut $\frac{1}{4}$″ B.S.W.	1
		FURROW COVERING ATTACHMENT	
738	G.951	Furrow covering attachment complete	1
		ROLLER ASSEMBLY	
740	18G.1007	Roller fork (18″ machine)	1
,,	20G.1007	Roller fork (20″ machine)	1
,,	24G.1007	Roller fork (24″ machine)	1
741	18G.1017	Roller scraper (18″ machine)	1
,,	20G.1017	Roller scraper (20″ machine)	1
,,	24G.1017	Roller scraper (24″ machine)	1
742		Scraper clamping bolt $\frac{1}{4}$″ B.S.W. × 1″ L. ...	2
—		Flat washer $\frac{1}{4}$″ dia.	2
—		Spring washer $\frac{1}{4}$″ dia.	2
—		Nut $\frac{1}{4}$″ B.S.W.	2
743	18G.1005	Roller drum (18″ machine)	1
,,	20G.1005	Roller drum (20″ machine)	1
,,	24G.1005	Roller drum (24″ machine)	1
744	G.1011	Roller filler plate	1
745		Setscrew $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{3}{8}$″ L.	2
—		Spring washer $\frac{1}{4}$″ dia.	2
746	G.1012	Grease nipple	2
747	18G.1006	Axle (18″ machine)	1
,,	20G.1006	Axle (20″ machine)	1
,,	24G.1006	Axle (24″ machine)	1
748	G.1008	Axle bush	2
749		Axle locknut $\frac{5}{8}$″ B.S.W.	2
—		Axle spring washer $\frac{5}{8}$″ dia.	2

A True Benefit to Mankind

"And he gave it for his opinion that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country."

"Gullivers Travels" - Jonathan Swift, 1667-1745.

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