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RON GREENGRASS 01274-810631
Chester Hudson
01435-812902

THE

HOWARD

ROTAVATOR

'Gem'

Series IV Model

INSTRUCTION BOOK

AND

SPARE PARTS LIST

Publication No. RG4/B/1151

THE
HOWARD

ROTAVATOR

'Gem' Series IV model

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" Series IV Model.

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 local "Gem" Service Distributor.

ROTARY HOES LIMITED
HORNDON, ESSEX, ENGLAND
Telephone: Herongate 361. **Cables: Rotovate, Brentwood**

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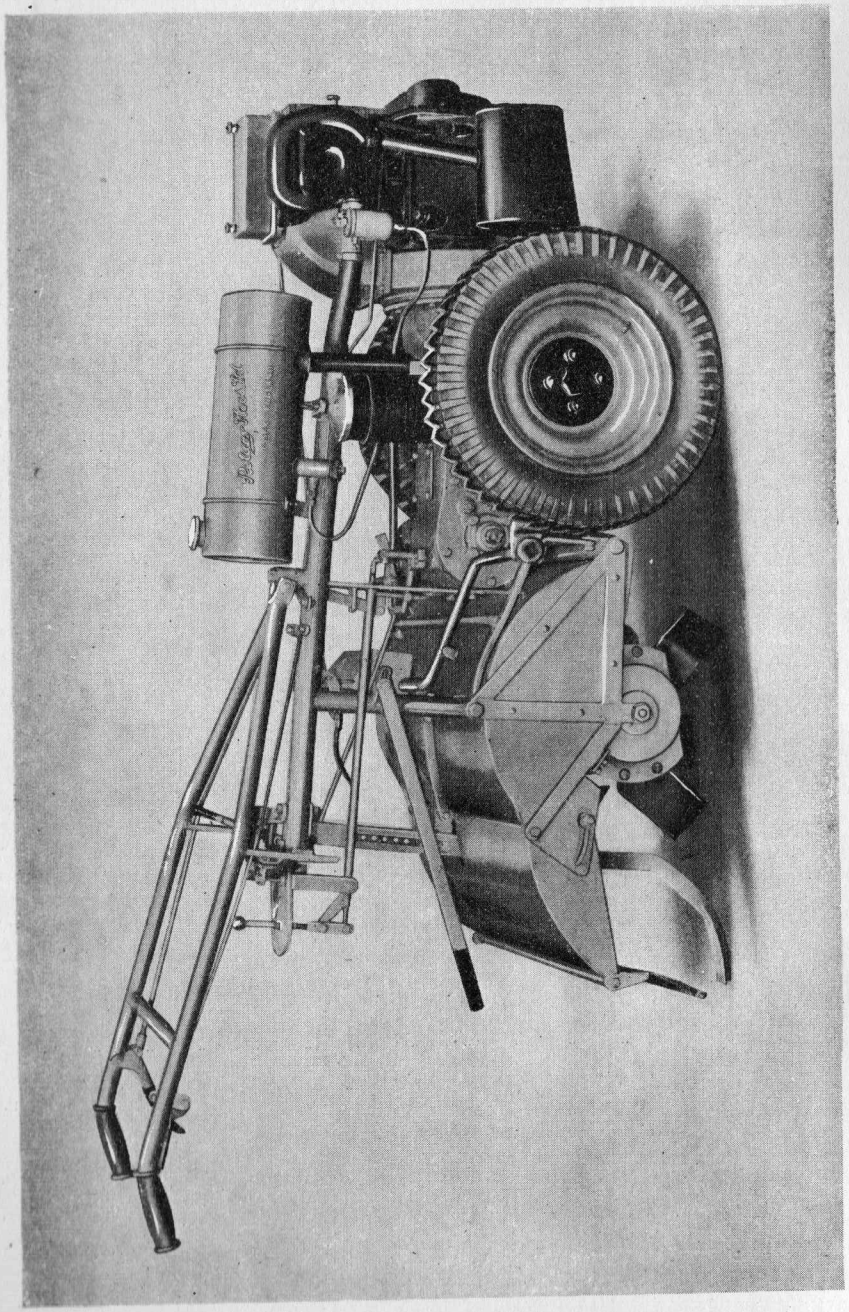


THE "GEM" Series IV Model.

SPECIFICATION

ENGINE

Air-cooled (Fan) Twin cylinder (in line vertical) 4-stroke (810 cc.).

BORE AND STROKE

3″ diam. × 3½″ stroke.

ENGINE SPEED

2,000 r.p.m.

FUEL TANK

Capacity 2 gallons

CLUTCH

High 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—.87 m.p.h. 2nd gear—1.3 m.p.h.
3rd gear—1.83 m.p.h. Reverse gear—1.55 m.p.h.

ROTOR

Speed 172 r.p.m. 18″ diam.

POWER TAKE-OFF PULLEY

10″ diam. 4″ face. 500 r.p.m. 1,309 ft. per min.

OVERALL DIMENSIONS OF MACHINE

Length 6′ 8″. Width (24″ rotor) 2′ 5″.
(30″ rotor) 2′ 11″.

WEIGHT

5½ cwt. approximately.

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. The twin engine is governed, the hand throttle being used for starting and idling. At all other times the governor has control.

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 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. To engage gear, 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.

THE 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 check the oil and petrol supply. Check the oil level in the crankcase by means of the dipstick which is located on the exhaust side of the engine immediately below the governor radius arm.

Unscrew the dipstick, wipe clean, and check oil level without screwing in the threaded portion of the dipstick. The indicating marks on the dipstick indicate High and Low levels (when the thread of the dipstick is not engaged).

The engine should not be run with the oil level below the Low level as shown by the dipstick. Always top up the oil level before starting the day's work. The oil filler cap is situated on the exhaust side of the crankcase, just below the carburettor. The " Gem " Series IV being a wet sump model, the oil is carried in the engine sump.

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 in the bracket provided on the shield.

Adjust throttle control to a brisk idling speed. 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.

2. *Air cleaner 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

(*See Lubrication Chart, page* 11)

ENGINE 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 the Low level on the dipstick.

ROTOR DOG CLUTCH HOUSING 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.

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.

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, every 24 hours work.

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

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.

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 with engine oil to ensure free movement.

ENGINE TROUBLE CHART

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 (.012″).
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.

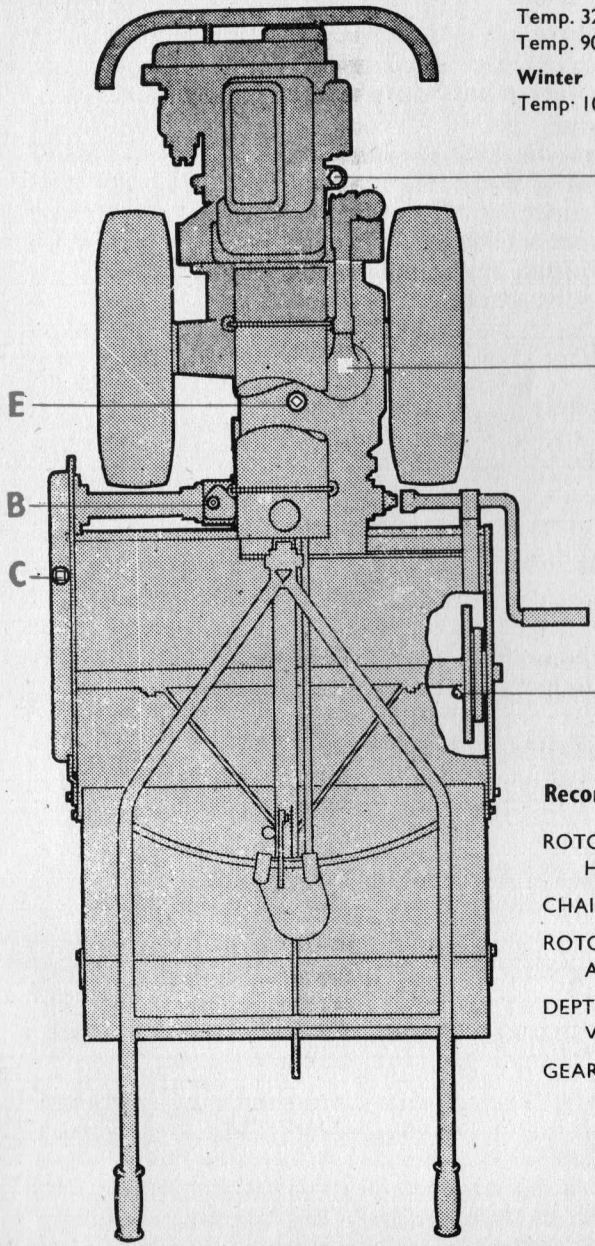
(continued on page 12)

LUBRICATION CHART

ENGINE Oils Recommended :

Summer
Temp. 32° – 90°:— S.A.E. 40
Temp. 90° and over:—S.A.E. 50

Winter
Temp· 10° – 32°:—S.A.E. 30



Recommended Oils :—

ROTOR DOG CLUTCH HOUSING :—S.A.E. 90
CHAIN BOX :— S.A.E. 90
ROTOR STUB AXLE :— S.A.E. 50
DEPTH CONTROL WHEEL :— S.A.E. 50
GEAR-BOX :— S.A.E. 90

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 $\frac{1}{4}''$ 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.

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 until 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.

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 stops.

DECARBONISING THE ENGINE This will only be necessary after at least 400 hours running, and should preferably be left to the service agent 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.

Disconnect the exhaust valve lifter, throttle control, air cleaner hose, petrol pipe and exhaust. Remove the induction and exhaust manifold, sparking plugs, cowl, and valve gear cover. Slacken and remove the six cylinder holding nuts, lift the rocker assembly. The cylinder head will now lift off the block. 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. Remove the carbon adhering to the bore *above* the piston's travel.

Next remove the valves. Carefully mark the valve heads to ensure that they are replaced in the correct positions. Place cylinder head on a bench and with two screwdrivers, compress the spring so that the split taper cotters can be removed. The valves will then withdraw. 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 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 Agent 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 and cylinder and replace the gasket 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. Set tappet clearance to .008 on all tappets. Reassemble all parts in the reverse of the dismantling order. Run the engine for two or three minutes on closed throttle and re-tighten the cylinder head nuts. 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.
Furrow Covering Attachment.
Picktyne Rotor.
Depth Control Wheel
Roller Attachment.
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 ½" 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 PICKTYNE 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 Picktyne rotor is fitted by reversing the operations above. Unless otherwise stated, the Picktyne rotor is supplied complete with Picktynes, 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. 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 reference 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.

25286 Fly wheel supplied complete with driving pins B.J.8002.

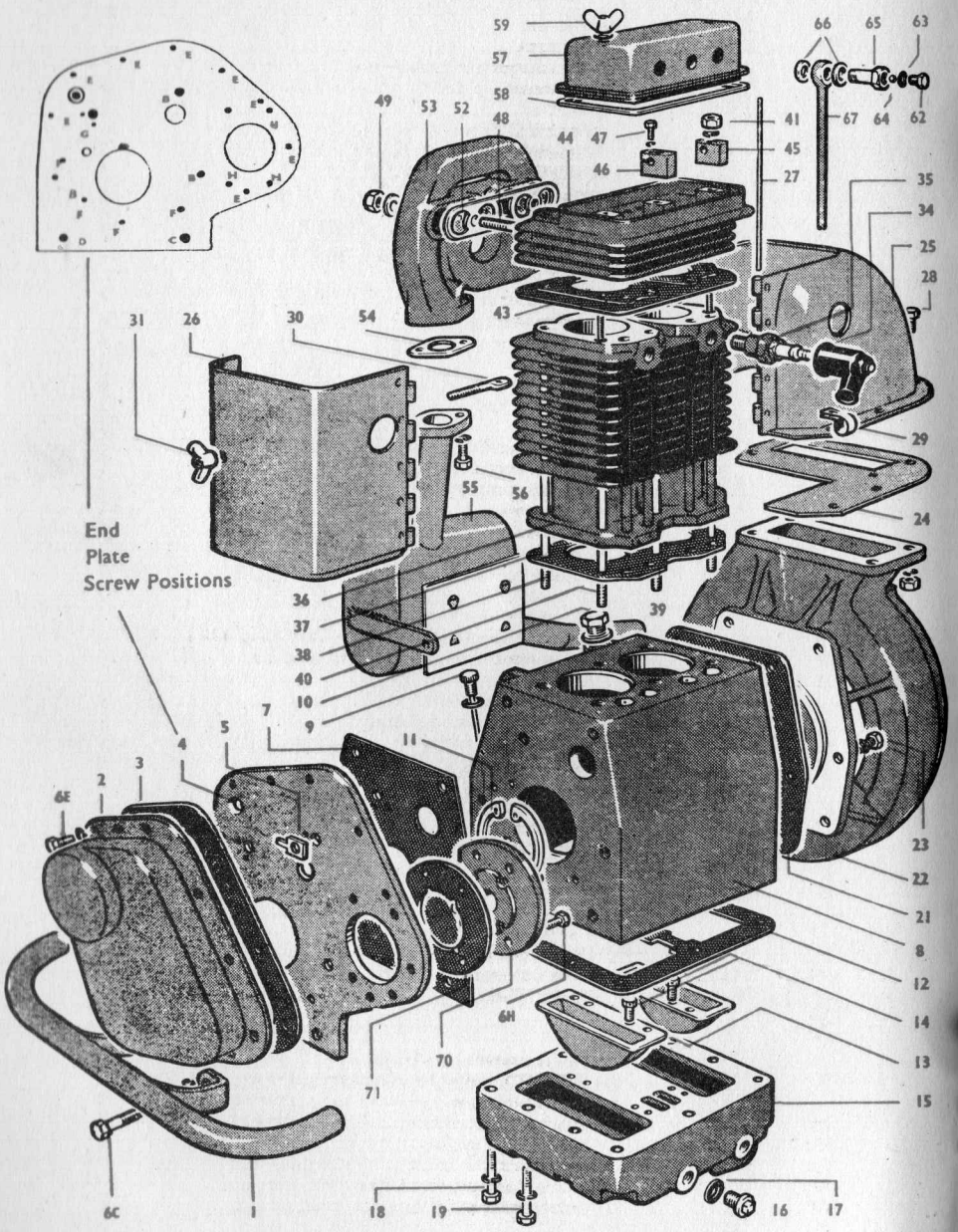
It is also recommended that:—

Crown wheel and pinion be paired.

Road wheel shaft be supplied assembled with fixed hub gear.

Illust. No.	Part No.	Description	No. off
		CRANKCASE AND CYLINDER (Plate 1)	
1	25604	Bumper bar	1
2	25691	Timing case	1
3	25192	Timing case cover gasket	1
4	25195	Crankcase end plate	1
5	25714	Tab washer	1
6A		Countersunk screw $\frac{3}{8}$" B.S.F. × $\frac{5}{8}$" L.	1
6B		Setscrews Hex. Hd. $\frac{3}{8}$" B.S.F. × $\frac{5}{8}$" L.	3
6C		Setscrews Hex. Hd. $\frac{3}{8}$" B.S.F. × $1\frac{1}{4}$" L.	1
6D		Setscrews Hex. Hd. $\frac{3}{8}$" B.S.F. × $1\frac{1}{4}$" L.	1
—		Spring washers $\frac{3}{8}$" dia.	4
6E		Setscrews Hex. Hd. $\frac{1}{4}$" B.S.F. × $\frac{1}{2}$" L.	8
6F		Setscrews Hex. Hd. $\frac{1}{4}$" B.S.F. × $\frac{7}{8}$" L.	4
—			
6H		Setscrews securing magneto $\frac{1}{4}$" B.S.F. × $\frac{7}{16}$" L.	4
—		Spring washers $\frac{1}{4}$" dia.	4
7	25196	Crankcase end plate gasket	1
8	25126	Crankcase	1
9	25257	Dipstick	1
—	25414	Dipstick washer	1
10	25243	Filler plug	1
—	25244	Filler plug washer	1
11		Circlip—Internal 3" dia.	1
12	25186	Crankcase sump gasket	1
13	25189	Scoop trough	2
14	25334	Setscrews securing troughs	8
—	25335	Locking wire	2
15	25127	Crankcase sump	1
16	25258	Sump drain plug	2
17	25259	Sump drain plug washer	2
18		Bolt, Sump, Corners Hx. Hd. $\frac{1}{4}$" B.S.F. × $1\frac{3}{4}$" L.	4
19		Bolt, Sump intermediate Hx. Hd. $\frac{1}{4}$" B.S.F. × $2\frac{1}{4}$" L.	6
20			
—		Spring washers $\frac{1}{4}$" dia.	10
21	25256	Flywheel fan housing gasket	1
22	25129	Flywheel fan housing	1
23		Setscrew Hex. Hd. $\frac{3}{8}$" B.S.F. × $\frac{7}{8}$" L.	6
—		Spring washer $\frac{3}{8}$" dia.	6
24	25592	Cowling, base plate	1
25	25591/1	Cowling, rear half	1
26	25591/2	Cowling, front half	1
27	25591/4	Cowling hinge pin	1
28		Setscrew securing rear cowling $\frac{1}{4}$" B.S.W. × $\frac{1}{2}$" L.	6
—		Spring washer $\frac{1}{4}$" dia.	6
—		Nut $\frac{1}{4}$" B.S.W.	3
29	25593	Magneto lead clip	1
30	25695	Captive bolt securing front cowling	1
31	25694	Wing nut $\frac{1}{4}$" B.S.F.	1
32			
33			
34	25408	Spark plug cover and terminal	2
35	25343	Spark plug (14 mm. long reach)	2
—	25344	Spark plug washer	2
36	25270	Cylinder block assembly	1
37	25180	Cylinder block gasket	1
38	25272	Cylinder block stud, short	3
39	25338	Cylinder block stud, medium	1
40	25271	Cylinder block stud, long	2
41		Nut $\frac{3}{8}$" B.S.F.	6
—		Spring washer $\frac{3}{8}$" dia.	6
42			
43	25183	Cylinder head gasket	1

PLATE I



CRANKCASE AND CYLINDER ASSEMBLY

Illust. No.	Part No.	Description	No. off
44	25188	Cylinder head	1
45	25300	Rocker shaft end bearing	2
46	25301	Rocker shaft centre bearing	1
47		Centre bearing set screw ¼" B.S.F. × ¾" L.	1
—		Spring washer ¼" dia.	1
48	25238	Manifold stud	2
—		Spring washer ¼" dia.	2
49		Nut ¼" B.S.F.	2
50–51 spare			
52	25276	Manifold gasket	1
53	25228	Combined inlet and exhaust manifold	1
54	25649	Exhaust muffler gasket	1
55	25311	Exhaust muffler assembly	1
56		Setscrew ¼" B.S.W. × ¼" L.	2
—		Spring washer ¼" dia.	2
57	25339	Cylinder head cover	1
58	25280	Cylinder head cover gasket	1
59	25694	Wing nut ¼" B.S.F.	2
—	25578	Fibre washer	2
62	8390	Breather valve body plug	1
63	1394	Fibre washer	1
64	8411	Breather valve ball	1
65	8380	Breather valve body	1
—	8420	Spring	1
66	1396	Fibre washers	2
67	8400	Breather pipe assembly	1
68–69 spare			
70	25197	Magneto flange	1
71	25255	Magneto flange gasket	1
—	A-1137 BZ	Magneto (complete) (For Magneto Spare Parts see Illustration Nos. 801-870 below)	1

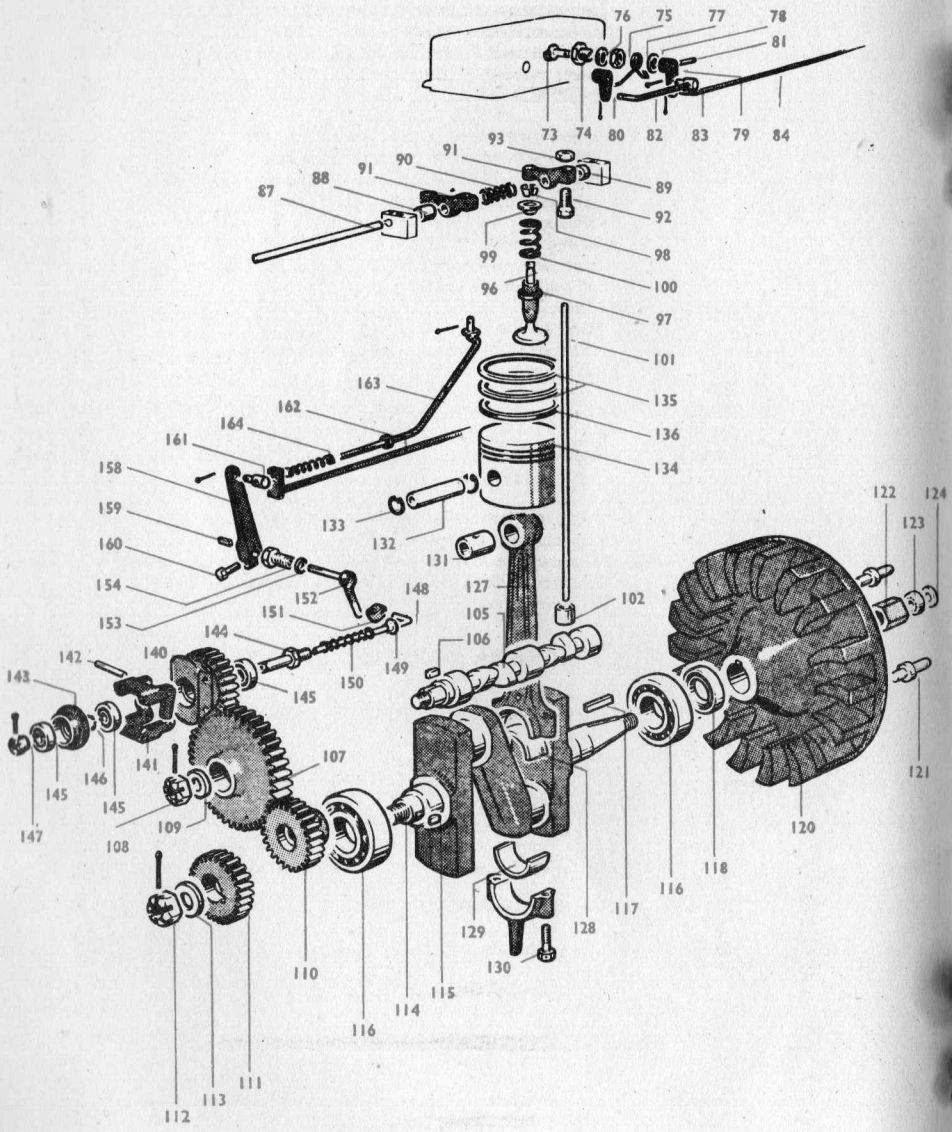
DECOMPRESSOR CONTROL (Plate 2)

72			
73	25583	Exhaust valve lifting cam	2
74	25594	Sleeve	2
75	25585	Nut	2
76	25586	Fibre washer	2
77	25590	Return spring	1
78	25716	Washer	2
79	25580	Long lever	1
80	25581	Short lever	1
81	25587	Mills pin	2
82	25582	Connecting link	1
83	25715	Trunnion	1
84	25646	Control rod	1
85			
—		Split pin $\frac{1}{16}$" dia. × ½" l.	2

VALVE AND CAMSHAFT (Plate 2)

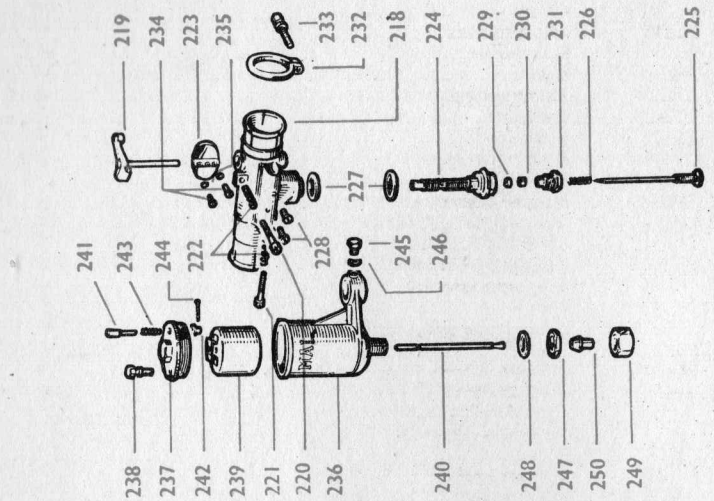
86			
87	25299	Rocker shaft	1
88	25303	Spacer tube, long	2
89	25304	Spacer tube, short	2
90	25302	Rocker shaft spring	2
91	25297	Rocker lever, inlet and exhaust	4
92	25298	Rocker lever adjusting screw	4
93		Locknut ¼" B.S.F.	4
94–95 spare			

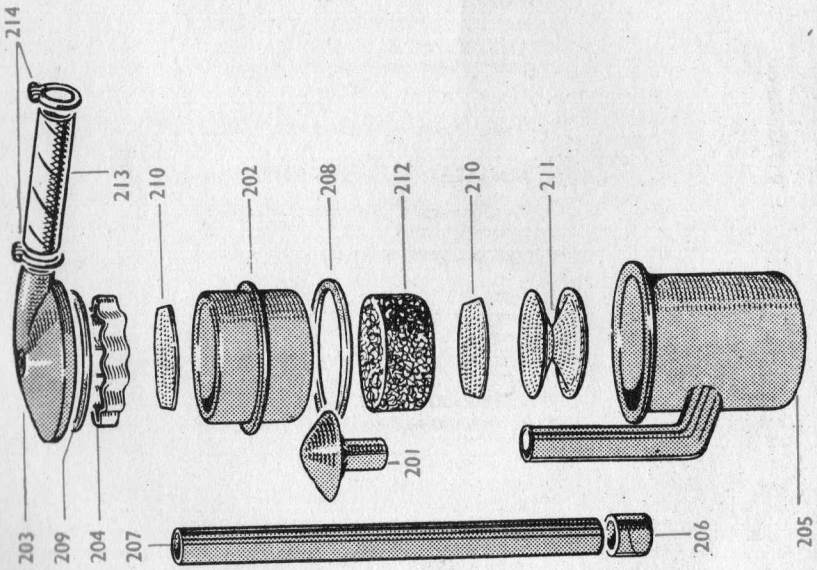
PLATE 2



CRANKSHAFT ASSEMBLY

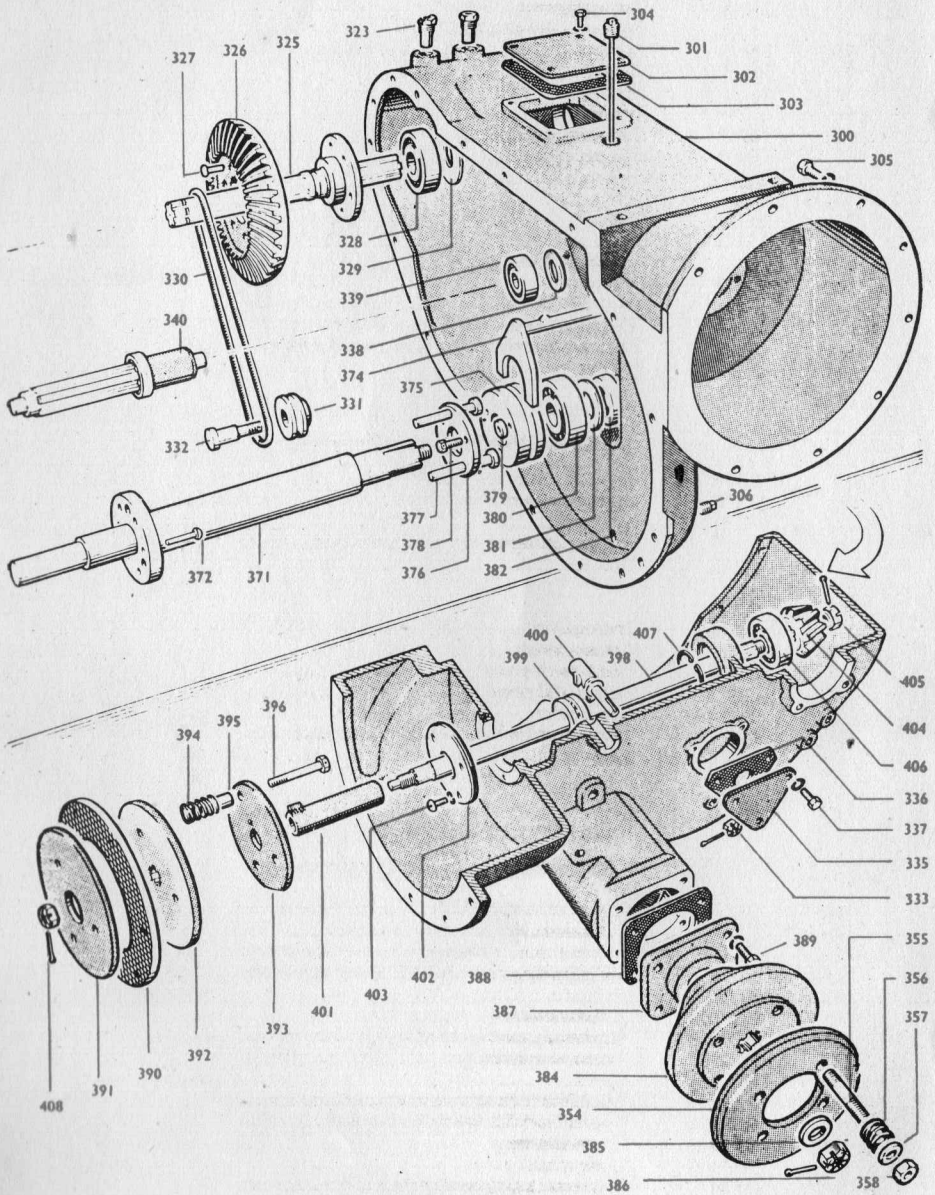
Illust. No.	Part No.	Description	No. off
96	25203	Valve	4
97	25209	Valve guide	4
98	25239	Split collet	4
99	25249	Collar	4
100	25275	Valve spring	4
101	25202	Push rod	4
102	25237	Tappet	4
105	25190	Cam shaft	1
106	25307	Key	1
107	25204	Timing pinion, camshaft	1
108		Slotted nut $\frac{9}{16}$" B.S.F.	1
109		Washer $\frac{9}{16}$" dia. plain	1
—		Split pin $\frac{1}{8}$" dia. × $1\frac{1}{2}$" L.	1
110	25199	Magneto pinion	1
		CRANKSHAFT (Plate 2)	
111	25194	Timing pinion, crankshaft	1
112		Slotted nut $\frac{5}{8}$" B.S.F.	1
113		Washer $\frac{5}{8}$" dia. plain	1
—		Split pin $\frac{1}{8}$" dia. × $1\frac{1}{2}$" L.	1
114	25125	Crankshaft	1
115	25288	Woodruff key	1
116	BRL. $1\frac{3}{8}$	Ball bearing 3" × $1\frac{3}{8}$" × $\frac{11}{16}$" W.	2
117	25285	Key	1
118		Oil seal $2\frac{1}{16}$" × $1\frac{3}{8}$" × $\frac{3}{8}$" W.	1
119			
120	25286	Flywheel assembly (with clutch pins)	1
121	25246	Flywheel clutch pin	6
122	25187	Flywheel nut (see below for assembly)	1
123	BRL. $\frac{1}{2}$"	Ball bearing $1\frac{5}{16}$" × $\frac{1}{2}$" × $\frac{3}{8}$" W.	1
124	BJ.8007	Bearing retainer washer	1
125			
126			
—	25287	Flywheel nut complete assembly	1
		CONNECTING ROD AND PISTON (Plate 2)	
127	25124	Connecting rod (top and bottom parts)	1
128	25216	Half bearing, top	2
129	25217	Half bearing, bottom	2
130	25251	Bolt	4
—	25333	Locking wire	2
131	25242	Gudgeon pin bearing	2
132	25291	Gudgeon pin	2
133	25292	Gudgeon pin circlip	4
134	25122	Piston	2
135	25293	Piston ring, plain	4
136	25294	Piston ring, scraper	2
137			
138			
139			
		GOVERNOR (Plate 2)	
140	25220	Governor pinion (see below for assembly)	1
141	25253	Governor weight	2
142	25254	Governor weight pin	2
—	25308	Governor pinion and weight riveted assembly	1
143	25225	Thrust plate	1
144	25229	Governor sleeve	1
—		Grub screw a B.A. × $\frac{5}{16}$" L.	1
145	25354	Ball bearing $1\frac{1}{8}$" × $\frac{1}{2}$" × $\frac{1}{4}$" W.	3





Illust. No.	*Part No.*	*Description*	*No. off*
146		Circlip external $\frac{1}{2}$" dia.	1
147	25240	Adjusting nut	1
—		Split pin $\frac{1}{16}$" dia. × 1" L.	1
148	25230	Spindle	1
149	25579	Collar	1
150	25245	Spring	1
151	25247	Trunnion	1
152	25248	Cranked spindle	1
153	25409	Sealing ring	1
154	25317	Sleeve	1
155–157 spare			
158	25594	Lever	1
159	25713	Key	1
160		Setscrew $\frac{1}{4}$" B.S.F. × $\frac{1}{2}$" L.	1
161	G.789	Trunnion	1
—		Split pin $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	1
162	25601	Throttle control rod from frame arm	1
163	25600	Throttle control rod from governor to carb. ...	1
164	25603	Spring	1
		AIR CLEANER (Plate 3)	
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			
207	G.269		
208	G.270	Tank gasket	1
209	G.271	Cover gasket	1
210	G.272	Perforated plate	2
211	G.273	Perforated cone	1
212	G.274A	Gauze filter	2
213	J.9530	Hose connection to carburettor	1
214	G.276	Hose clips	2
		CARBURETTOR (Plate 3)	
—	BJ.8098	Carburettor, complete assembly	1
215–217 spare			
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.9135	Locknuts	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.9134	Locknut	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

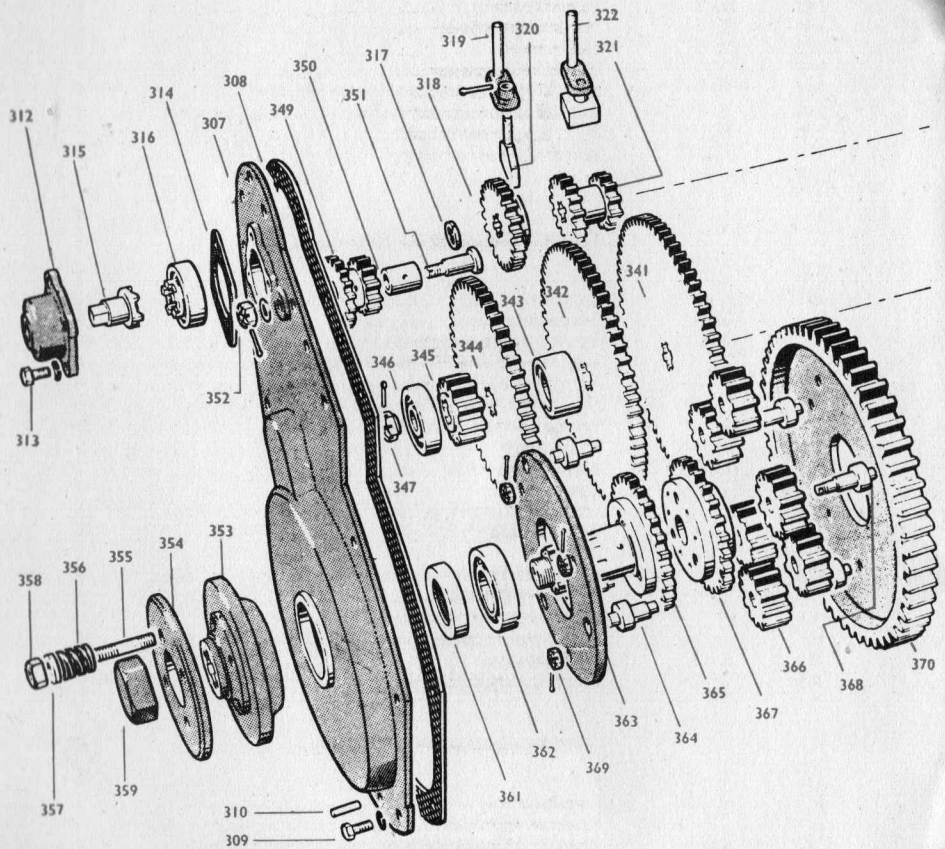
PLATE 4



GEAR-BOX

Illust. No.	Part No.	Description	No. off
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.9126	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
251–299 spare			
		GEAR-BOX CASING (Plates 4 & 5)	
300	25048	Casing	1
301	G.476	Dipstick	1
302	25121	Inspection cover	1
303	25185	Inspection cover gasket	1
304		Setscrew ¼″ B.S.W. Rd. Hd. × ⅜″ L.	1
—		Spring washer ¼″ dia.	4
305		Flywheel housing bolt ¼″ B.S.W. × ¾″ L	8
—		Spring washer ¼″ dia.	8
306	G.479	Drain plug	1
307	25049	Gear-box cover	1
308	25050	Cover gasket	1
309		Cover setscrews ⅝″ B.S.W. × ¾″ L.	15
—		Spring washers ⅝″ dia.	15
310	25059	Mills pin	2
312	G.374	Starting dog bearing housing	1
313		Setscrew ⅜″ B.S.W. × ¾″ L.	4
—		Spring washer ⅜″ 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 (Plates 4 & 5)	
317	G.436	Circlip	1
318	25006	Single pinion	1
319	25074	Reverse selector	1
320	25072	Reverse selector block	1
—		Split pin ⅛″ dia. × ¾″ 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 ⅝″ dia. × ¾″ 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		Slotted nut ⅜″ B.S.F.	1
—		Split pin ⅛″ dia. × 1″ L.	1
334			

PLATE 5

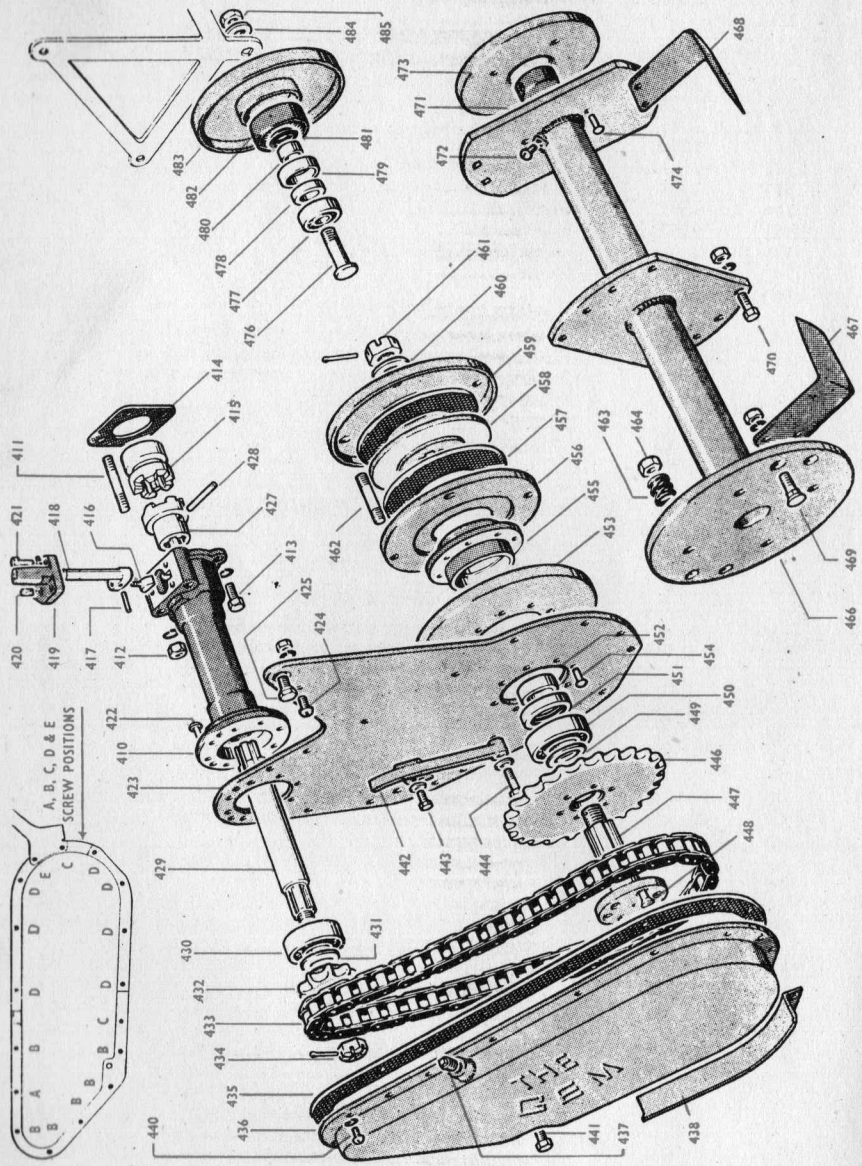


GEAR-BOX

Illust. No.	Part No.	Description	No. off
		LAYSHAFT (Plates 4 & 5)	
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" × $\frac{5}{8}$" w.	1
347	25038	Special nut	1
348			
—		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		Slotted nut $\frac{1}{2}$" B.S.W.	1
—		Split pin $\frac{3}{32}$" dia. × 1$\frac{1}{4}$" L.	1
		ROADWHEEL SHAFT (Plates 4 & 5)	
353	25051	Wheelhub, right	1
354	G.162	Wheelhub disc (both wheels)	2
—	25393	Studs, long } 30" machine	4
—	25394	Studs, short }	
355	G.141	Studs (both wheels) 24" machine	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$\frac{3}{4}$" × $\frac{5}{16}$" 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	25021	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

PLATE 6

JACKSHAFT EXTENSION, CHAINCASE and ROTOR

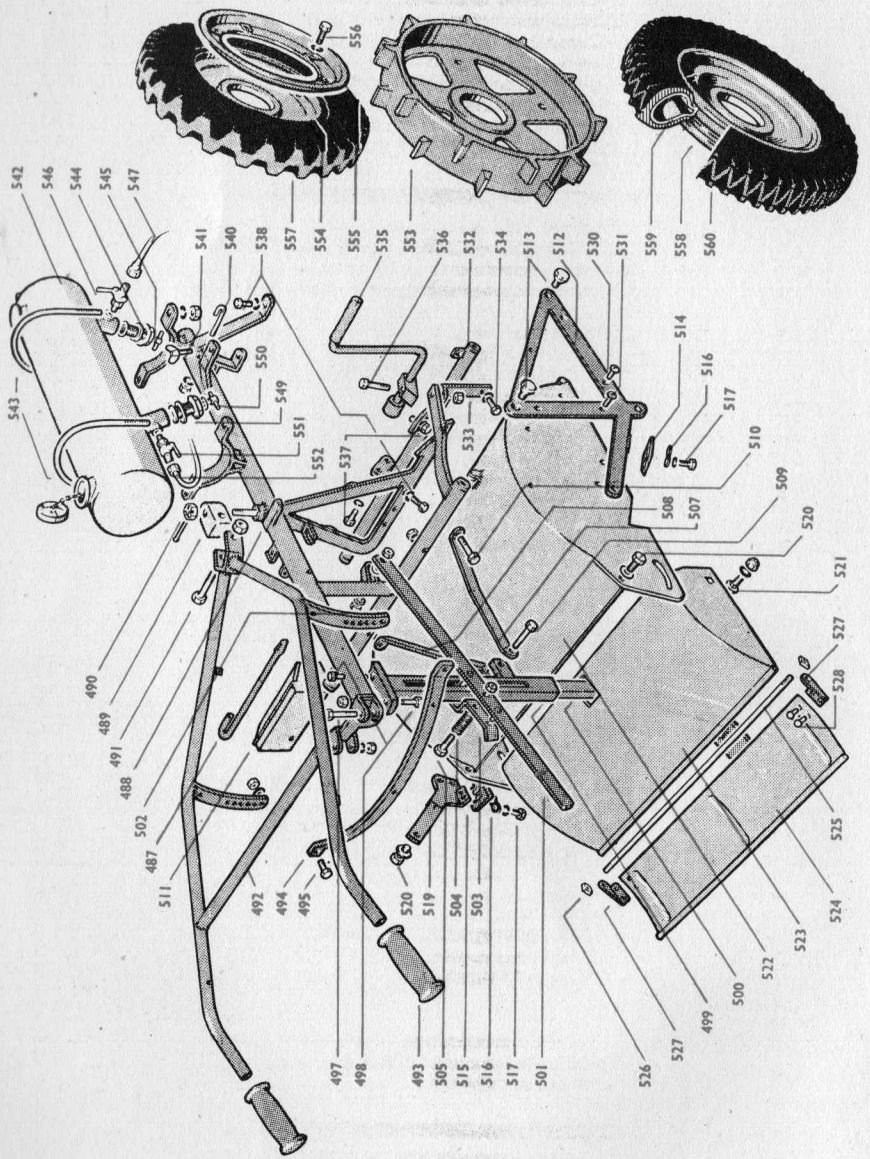


Illust. No.	Part No.	Description	No. off
385		Hub washer, $\frac{3}{4}$″ dia.	1
386	25047	Hub nut	1
—		Split pin $\frac{5}{32}$″ dia. × 2″ L.	1
387	25053	Axle bearing stop	1
388	25057	Axle bearing stop gasket	1
389		Setscrew $\frac{3}{8}$″ B.S.W. × $\frac{7}{8}$″ L.	4
—		Spring washer $\frac{3}{8}$″ dia.	4
		ENGINE CLUTCH (Plate 4)	
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. 25.07.2007	1
407		Circlip	1
408	25062	Special nut	1
—		Split pin	1
		JACKSHAFT EXTENSION (Plate 6)	
410	25735	Housing (30″ 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 (Plate 6)	
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	591	Frame setscrew, countersunk head	1
426			

Illust. No.	Part No.	Description	No. off
		JACKSHAFT EXTENSION (Plate 6)	
427	G.452/2	Fixed dog	1
428	G.452/3	Fixed dog rivet	1
429	25738	Shaft (30″ machine)	1
429	25468	Shaft (24″ machine)	1
430	BRM.1	Ball bearing 2½″ × 1″ × 1¾″ W.	1
431	G.462	Shim	As req.
432	G.460	Sprocket	1
		CHAINCASE (Plate 6)	
433	25101	Drive chain complete	1
—	25101/2	Chain connecting link (quote make of chain)	
434	G.455	Sprocket nut	1
—		Split pin ⅛″ dia. × 1½″ 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 ¼″ B.S.W. × ⅜″ L. Rd. Hd.	1
440B		Setscrew ¼″ B.S.W. × ½″ L. Rd. Hd.	6
440C		Setscrew ¼″ B.S.W. × ⅝″ L. Rd. Hd.	2
440D		Setscrew ¼″ B.S.W. × ¾″ L. Rd. Hd.	7
440E		Setscrew ¼″ B.S.W. × ¾″ L. Hx. Hd.	1
—		Spring washers ¼″ dia.	17
—		Nuts, on 440C, D & E ¼″ 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 ⅝″ B.S.W. × ¾″ L.	1
—		Washer ⅝″ dia.	1
—		Nut ⅝″ B.S.W.	1
444		Chain skid hinge bolt ⅝″ B.S.W. × 1¼″ L.	1
—		Washer ⅝″ dia.	1
—		Nut ⅝″ B.S.W.	1
		ROTOR DRIVE (Plate 6)	
445			
446	G.560	Drive sprocket	1
447	G.550	Drive shaft	1
448		Sprocket rivets ¼″ dia. c'sk × ⅝″ 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 2½″ × 1½″ × ½″ W.	1
452	G.552	Spacing sleeve	1
453	G.545	Dust cover	1
454		Bearing housing rivets ¼″ dia. Rd. Hd. × ¾″ L.	8
455	G.540	Drive shaft bearing housing	1
		ROTOR SAFETY CLUTCH (Plate 6)	
456	G.605	Drive plate	1
457	G.607	Ferodo fibre rings	2
458	G.606	Drive disc	1
459	G.544	Wearing plate	1
460	G.1369	Drive shaft washer	1
461		Drive shaft nut ¾″ B.S.F. slotted	1
—		Split pin ⅛″ dia. × 1½″ L.	1
462	G.603	Studs	4
463	G.602	Springs	4
464		Nuts	4

Illust. No.	Part No.	Description	No. off
		ROTOR (Plate 6)	
466	25734	Rotor (30″ machine)	1
466	25462	Rotor (24″ machine)	1
467	G.900R	Hoe blade, right	6
468	G.900L	Hoe blade, left	6
469	G.919	Blade bolts (end flanges)	8
470	G.918	Blade bolt (intermediate flanges)	16
—	G.920	Blade spring washers	24
—		Blade nuts 7/16″ B.S.F.	24
		ROTOR STUB AXLE (Plate 6)	
471	G.635	Back plug	1
472		Oiling screw ¼″ B.S.W. × ⅜″ L. Rd. Hd.	1
473	G.639	Inner dust cover	1
474		Inner dust cover rivets ⅜″ dia. × ½″ L. Rd. Hd.	3
475			
476	G.630	Stub axle	1
477	BRM. ⅝	Ball bearing 1 13/16″ × ⅝″ × ⅝″ W.	1
478		Oil seal 1½″ × ⅞″ × 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 ⅝″ B.S.F. locknut	1
486	G.630	Stub axle	1
		FRAME (Plate 7)	
487	24G.993	Rotor blade setting bar (24″ machine)	1
	30G.993	Rotor blade setting bar (30″ machine)	1
488	25322	Main frames (24″ machine)	1
	25730	Main frames (30″ machine)	1
		HANDLEBARS (Plate 7)	
489	G.104	Pivot block	1
490		Slotted nut ⅝″ B.S.F.	1
—		Split pin ⅛″ dia. × 1¼″ L.	1
491		Pivot bolt ½″ B.S.W. × 2¼″ L.	1
—		Locknut ½″ B.S.W.	1
492	G.122	Handlebars	1
493	G.121	Grips	2
494	G.123	Slide	1
495		Bolts ⅜″ B.S.W. × 1¼″ L.	2
—		Spring washers ⅜″ dia.	2
—		Nuts ⅜″ B.S.W.	2
—			
496			
497	25392	Slide clamp bolts	2
—		Spring washers ⅜″ dia.	2
—		Nuts ⅜″ B.S.W.	2
		DEPTH CONTROL (Plate 7)	
498		Socket bolts ⅜″ B.S.W. × 2½″ L.	2
—		Nuts ⅜″ B.S.W.	2
499	25219	Socket	1
500	G.950	Skid 24″ model only	1
		(Depth control wheel for 30″ model see Plate 9)	
501	G.671	Arm	1

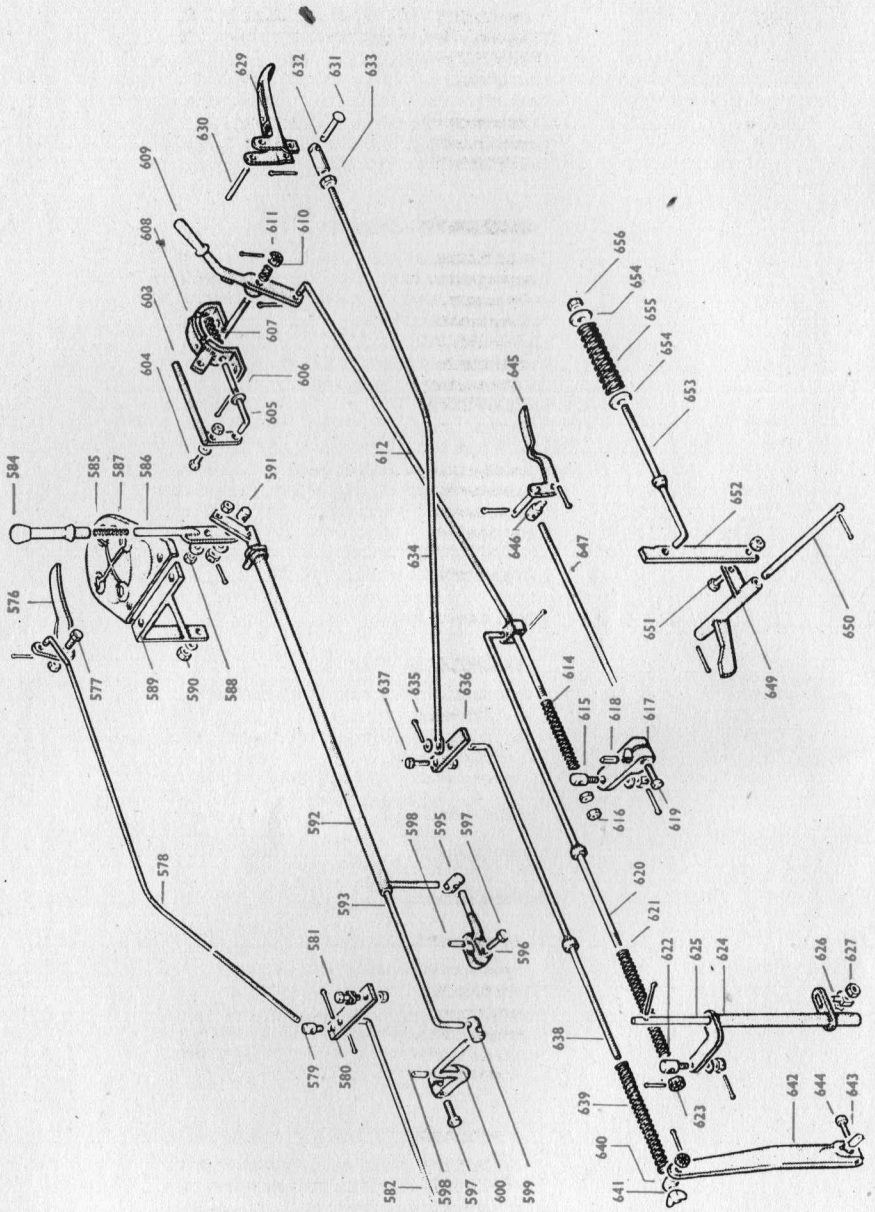
PLATE 7



Illust. No.	Part No.	Description	No. off
502		Pivot bolts ⅜″ B.S.W. × 1¾″ L.	1
—		Thackeray washer ⅜″ dia.	1
—		Washer ⅜″ dia.	1
—		Nut ⅜″ dia.	1
503	G.674	Arm clip	1
504	G.675	Arm clip spring	1
505		Arm clip bolt ¼″ B.S.W. × 1½″ L.	1
—		Nut ¼″ B.S.W.	1
506			
		FRAME (Plate 7)	
507	G.667	Support stay, right	1
508	G.668	Support stay, left	1
509		Bolt, support stay to socket ¼″ B.S.W. × 1″ L. ...	1
—		Spring washers ¼″ dia.	1
—		Nut ¼″ B.S.W.	1
510		Crossmember bolts ½″ B.S.W. × 1¾″ L. ...	3
—		Spring washers ½″ dia.	3
—		Nuts ½″ 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 ¼″ B.S.W. × ½″ L.	4
—		Spring washers ¼″ dia.	4
518			
519	G.825	Weed cutter bracket	1
		SHIELD (Plate 7)	
520		Rear shield hinge bolts ⅜″ B.S.W. × 1″ L. ...	2
—		Spring washers ⅜″ dia.	2
521	G.644	Rear shield champing bolts	2
—		Washers ⅜″ dia.	2
—		Simmonds nut ⅜″ B.S.W., thick	2
522	25436	Front shield { 24″ machine	1
	25743	30″ machine }	
523	25443	Rear shield { 24″ machine	1
	25744	30″ machine }	
524	25454	Trailing board { 24″ machine	1
	25746	30″ machine }	
525	25479	Trailing board, hinge bar { 24″ machine	1
	25751	30″ machine } ...	
526		Hinge lock nuts ⅝″ B.S.W.	2
527	G.647	Hinge bracket	2
528		Bracket rivets ⅜″ dia. Rd. Hd. × ½″ L.	4
530		Setscrews, side frame ¼″ B.S.W. Rd. Hd. × ⅝″ L.	3
531		Setscrews, side frame ¼″ B.S.W. Rd. Hd. × ¾″ L.	2
—		Spring washers ¼″ dia.	5
—		Nuts ¼″ dia.	5
		FRAME (Plate 7)	
532	25428	Staytube { 24″ machine	1
	25747	30″ machine }	
533	G.381	Starting handle support lug	1
534		Setscrew lug to staytube ⅜″ B.S.W. × ¾″ L. ...	1
—		Spring washer ⅜″ dia.	1
535	25466	Starting handle and block { 24″ machine	1
	25561	30″ machine } ...	
		(See also Road wheel ext. Plate 9)	

PLATE 8

CONTROLS

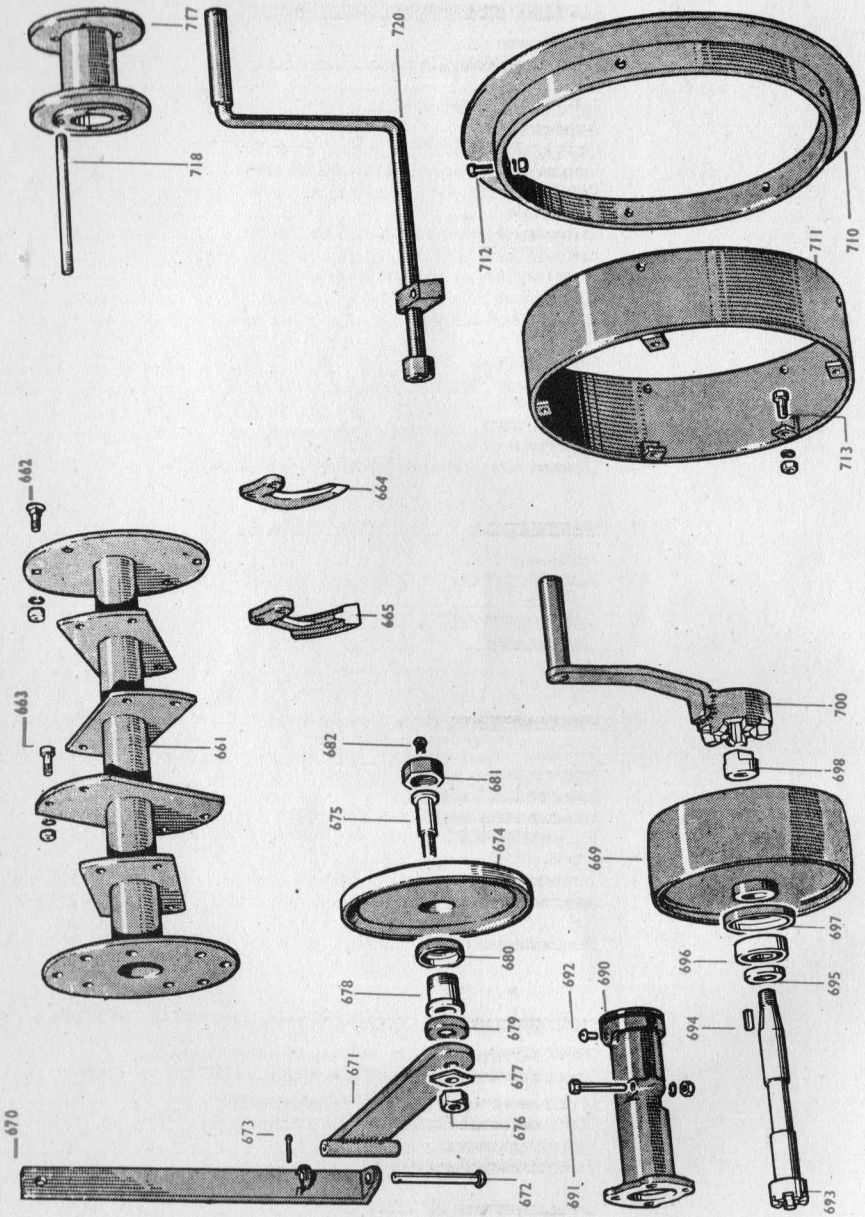


Illust. No.	Part No.	Description	No. off
536	G.382	Bolt starting handle block to frame	1
—		Nut $\frac{7}{16}$" B.S.W.	1
537		Setscrews, staytube to gear-box $\frac{3}{8}$" B.S.W. × 1" L.	4
—		Spring washers $\frac{3}{8}$" dia.	4
538		Setscrews, main frame to gear-box $\frac{3}{8}$" B.S.W. × $\frac{3}{4}$" 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 (Plate 7)	
542	25376	Tank assembly complete with cap	1
543	G.175	Tank straps	2
—		Spring washers $\frac{1}{4}$" dia.	4
—		Nuts $\frac{1}{4}$" B.S.W.	4
544–548 spare			
549	G.171	Petrol filter core	1
550	25413	Petrol filter drain plug	1
—		Petrol filter drain fibre washer $\frac{3}{8}$" dia.	1
551	G.166	Petrol supply cock	1
552	25376	Petrol pipe	1
		WHEELS (Plate 7)	
553	G.130	Land wheel	2
554–557 spare			
558	G.131	Pneumatic wheel, left	1
558	G.132	Pneumatic wheel, right	1
559	G.133	Inner tube	2
560	G.134	*Outer cover	2
		(*2 each additional for double wheels, see "extension hubs")	
		THROTTLE CONTROL (Plate 8)	
561–575 spare			
576	797	Hand lever	1
577		Lever fulcrum bolt $\frac{1}{4}$" B.S.W. × $\frac{3}{4}$" L.	1
—		Locknut $\frac{1}{4}$" B.S.W.	1
578	G.795	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 $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	1
580	G.799	Frame arm	1
581		Arm pivot bolt $\frac{1}{4}$" B.S.W. × $\frac{1}{8}$" L.	1
—		Thackeray washer $\frac{1}{4}$" dia.	1
—		Locknut $\frac{1}{4}$" B.S.W.	1
582	25601	Throttle control rod	1
—		Split pin $\frac{1}{16}$" dia. × $\frac{1}{2}$" L.	1
583			
		TRAVEL GEAR CONTROL (Plate 8)	
584	25154	Gear lever handle	1
585	25161	Spring	1
586	25158	Gear lever	1
587	25173	Gate	1
588		Fulcrum bolt $\frac{1}{4}$" B.S.W. × $\frac{3}{4}$" L.	1
—		Washer $\frac{1}{4}$" dia.	1

Illust. No.	Part No.	Description	No. off
—		Locknut ¼″ B.S.W.	1
589	25136	Rear support bracket	1
590		Nut ⅝″ B.S.W.	1
—		Washer ⅝″ dia.	1
591	25415	Trunnion	1
—		Washer ⅝″ dia.	1
—		Slotted nut ⅝″ B.S.W.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
592	25139	Control tube (to 2nd and 3rd gears)	1
593	25165	Control rod (to 1st and rev. gears)	1
594			
595	25172	Universal joint (2nd and 3rd gears)	1
596	25332	Control arm (2nd and 3rd gears)	1
597		Control arm clamping bolt ⅝″ B.S.W. × 1″ L. ...	2
598	G.155	Control arm key	2
599	25166	Universal joint (1st and rev. gears)	1
600	25331	Control arm (1st and rev. gears)	1
601			
602			
		HANDLEBAR CONTROL (Plate 8)	
603	25320	Positioning arm	1
604		Fulcrum bolt ¼″ B.S.W. × ¾″ L.	1
605	G.465	Positioning pin	1
606		Washer ⅝″ dia.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
607	G.466	Spring	1
		ROTOR AND DIFFERENTIAL CONTROL (Plate 8)	
608	25222	Control quadrant	1
609	G.781	Control hand lever	1
610	G.792	Hand lever spring	1
611		Nut ⅝″ B.S.W. slotted	1
—		Split pin 3/32″ dia. × 0″ L.	1
612	G.793	Rotor control rod	1
—		Split pin 3/32″ dia. × ¾″ L.	1
613			
614	G.794	Control rod spring	1
615	G.773	Trunnion	1
—		Washer ⅝″ dia.	1
—		Slotted nut ⅝″ B.S.W.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
616		Locknuts ⅝″ B.S.W.	2
617	G.152	Rotor control arm	1
618	G.155	Control arm key	1
619		Control arm clamping bolt ⅝″ B.S.W. × 1″ L....	1
620	G.321	Differential lock control rod	1
—		Split pin 3/32″ dia. × ¾″ L.	1
621	G.324	Control rod spring	1
622	G.773	Trunnion	1
—		Washer ⅝″ dia.	1
—		Slotted nut ⅝″ B.S.W.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
623		Slotted nut ⅝″ B.S.W.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
624	25356	Differential lock selector quadrant	1
625	25352	Quadrant pin	1
—		Split pin 1/16″ dia. × ½″ L.	1
626	G.319	Trunnion	1
627		Locknuts ½″ B.S.W.	2
628			

Illust. No.	Part No.	Description	No. off
		CLUTCH CONTROL (Plate 8)	
629	25145	Hand lever	1
630	G.699	Hand lever fulcrum rivet	1
631	25149	Pivot pin	1
—		Split pin 1/16″ dia. × ½″ L.	1
632	25150	Adjusting link	1
633		Locknut ⅝″ B.S.W.	1
634	25170	Control rod, hand lever to frame arm	1
635		Washer ¼″ dia.	1
636	25144	Frame arm	1
637		Frame arm pivot bolt ¼″ B.S.W. × 1″ L. ...	1
—		Locknut ¼″ B.S.W.	1
638	25446	Rod, frame arm to control arm	1
—		Split pin 3/32″ dia. × ¾″ L.	1
639	25412	Control rod spring	1
640	25410	Trunnion	1
—		Slotted nut ⅝″ B.S.W.	1
—		Split pin 3/32″ dia. × ¾″ L.	1
641	25411	Wing nut	1
642	G.710	Control arm	1
643	G.711	Control arm key	1
644		Control arm clamping bolt ⅝″ B.S.W. × 1″ L.	1
		DECOMPRESSOR CONTROL (Plate 8)	
645	G.188	Hand lever	1
—		Split pin 3/32″ dia. × ¾″ L.	1
646	G.789	Trunnion	1
—		Split pin 1/16″ dia. × ½″ L.	1
647	25646	Control rod...	1
648			
		REVERSE INTERLOCK (Plate 8)	
649	25132	Rocker	1
650	25153	Rocker pin	1
—		Split pins 1/16″ dia. × 1″ L.	2
651		Linking setscrew ¼″ B.S.W. × ¾″ L.	1
—		Locknut ¼″ B.S.W.	1
652	25152	Vertical link	1
653	25181	Tension rod	1
654	25178	Special washers	2
655		Spring	1
656	25130	Tensioning nut ⅝″ B.S.W.	1
657–660 spare			
		PICKTYNE ROTOR ASSEMBLY (Plate 9)	
		Note.—Picktyne rotor will be supplied complete with stub axle to facilitate fitting.	
661	25473	{ Picktyne rotor (7 flanges, 24″ machine) / Picktyne rotor (9 flanges, 30″ machine) } ...	1
662	G.922	End flange bolts	8
663	G.921	Intermediate flange bolts	4 per flange
—		Spring washers 7/16″ dia.	4 per flange
—		Nut 7/16″ B.S.F.	4 per flange
664	991	Picktyne, Lucerne } Alternatives	2 per flange
665	992	Picktyne chisel }	

PLATE 9



PICKTYNE ROTOR, DEPTH CONTROL WHEEL, POWER TAKE-OFF, ROAD WHEEL EXTENSION, HUBS and RIMS

Illust. No.	Part No.	Description	No. off

DEPTH CONTROL WHEEL ASSEMBLY (Plate 9)

Standard fitting for 30″ model, alternative to skid for 24″ machine.

666–669 spare			
670	G.664	Pedestal	1
671	G.663	Arm	1
672	G.666	Swivel pin	1
673		Split pin ⅛″ dia. × 1″ L.	1
674	G.660	Wheel	1
675	G.661	Axle	1
676		Axle locknut ⅝″ 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 ¼″ B.S.W. Rd. Hd. × ⅜″ L. ...	1

POWER TAKE-OFF ASSEMBLY (24″ machine only) (Plate 9)

683–689 spare			
690	25475	Housing	1
691		Housing bolt ⅜″ B.S.W. × 2½″ L.	1
—		Spring washer ⅜″ dia.	1
—		Nut ⅜″ B.S.W.	1
692		Oiling screw ¼″ B.S.W. Rd. Hd. × ½″ L. ...	1
693	25477	Shaft	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

EXTENSION RIMS FOR CLEATED LAND WHEELS (Plate 9)

701–709 spare			
710	G.135/1	Land wheel extension flange	2
711	24G.135/3	Land wheel extension rim (24″ machine) ...	2
712		Flange bolt ⅜″ B.S.W. × 1″ L.	10
713		Rim attachment bolt ⅜″ B.S.W. × 1¼″ L. ...	10
—		Spring washer ⅜″ dia.	20
—		Nut ⅜″ B.S.W.	20
714–716 spare			

EXTENSION HUBS FOR DOUBLE PNEUMATIC TYRED WHEELS (Plate 9)

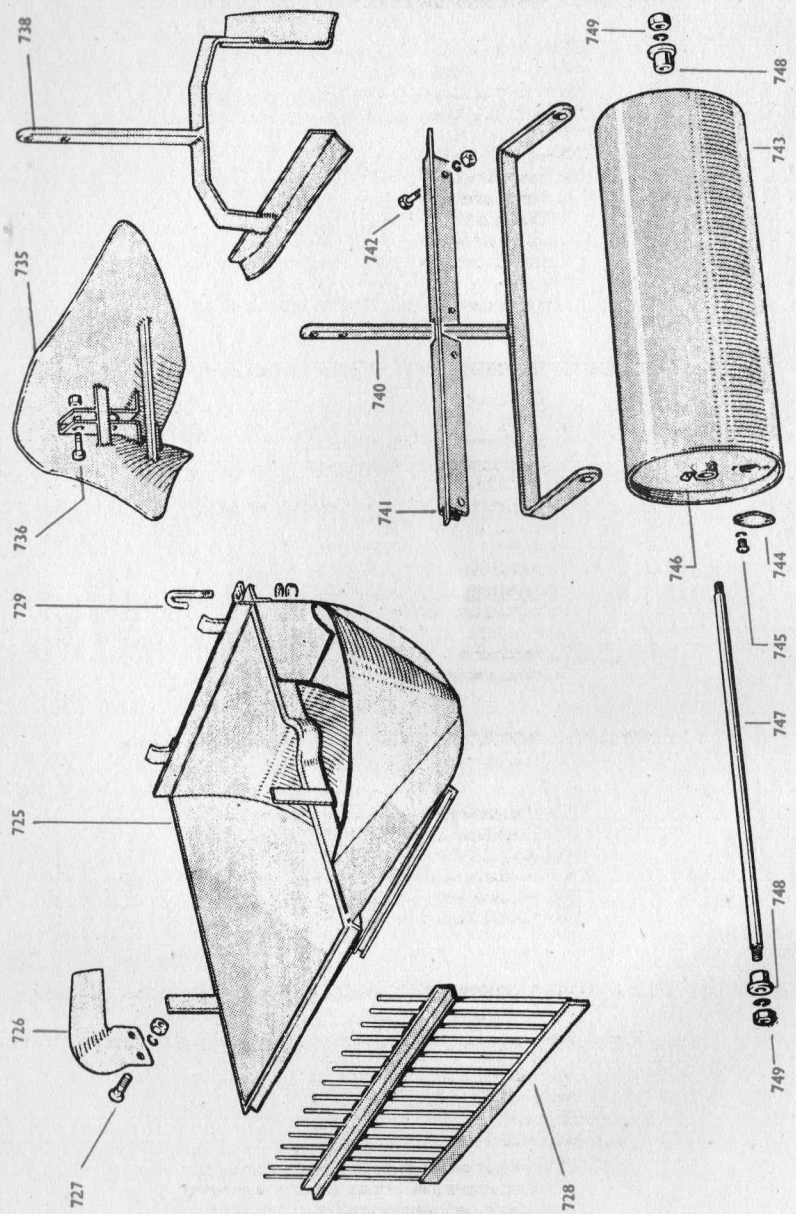
Standard for 30″ machine, optional fitting for 24″ machine.

717	25396	Hub, R.H.	1
717	25397	Hub, L.H.	1
718	25393	Studs, R.H.	4
718	25394	Studs, L.H.	4

(Tyres cannot be supplied as spares by us. Pneumatic tyres and their wheels will be supplied as required; see Plate 7.

N.B.—The double pneumatic wheels required are THREE right hand, Pt. No. B.132 and one left hand, Pt. No. G.131).

PLATE 10



SOIL SHREDDER, FURROWING ATTACHMENT
FURROW COVERING ATTACHMENT, ROLLER

Illust. No.	Part No.	Description	No. off

STARTING HANDLES FOR USE WITH EXTENSION RIMS AND HUBS

(Plate 9)

719			
720	25561	For 24″ machine fitted with extension rims ...	1
720	25395	For 24″ machine fitted with twin tyres ...	1
		(N.B.—The appropriate handle will be supplied whichever wheel extensions are ordered.)	

SOIL SHREDDER (24″ model only) (Plate 10)

721–724 spare			
725	24G.1000	Trough	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	24G.1002	Soil screen, coarse	1
728	24G.1004	Soil screen, fine	1
729	G.1003	Hook bolt	2
—		Spring washer $\frac{3}{8}$″ dia.	2
—		Nut $\frac{3}{8}$″ B.S.W.	2
730–734 spare			

FURROWING ATTACHMENT (Plate 10)

735	G.952	Mould board	1
736		Clamping bolt $\frac{1}{4}$″ B.S.W. × 1″ L.	1
—		Nut $\frac{1}{4}$″ B.S.W.	1

FURROW COVERING ATTACHMENT (Plate 10)

737			
738	G.951	Attachment complete	1
739			

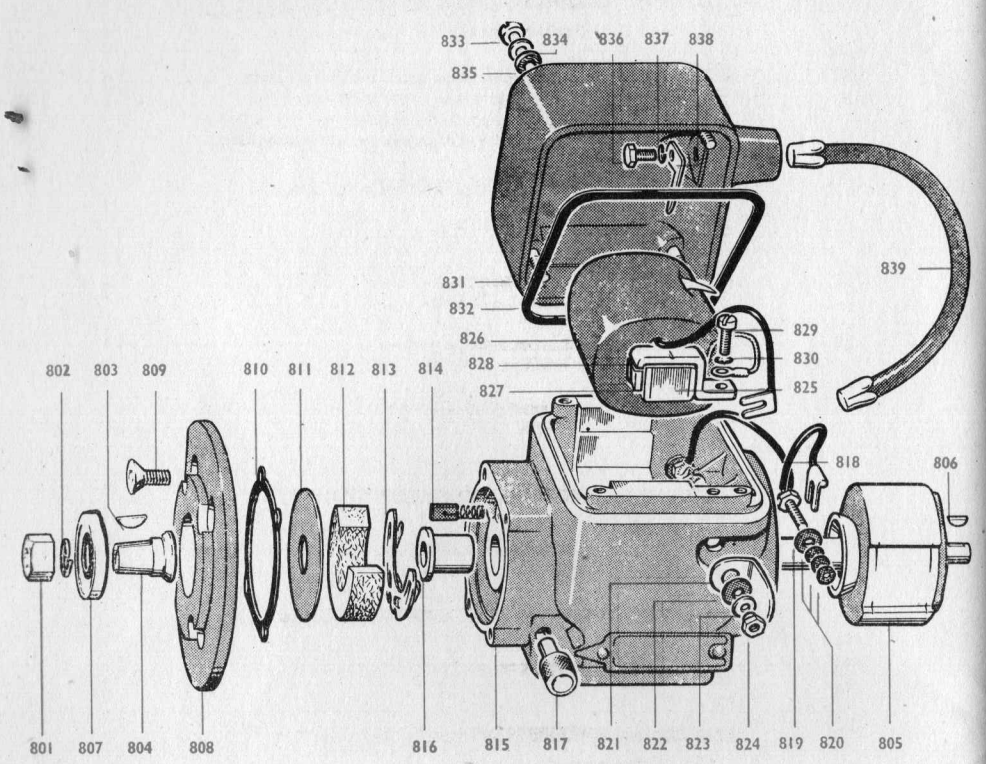
ROLLER ASSEMBLY (24″ model only) (Plate 10)

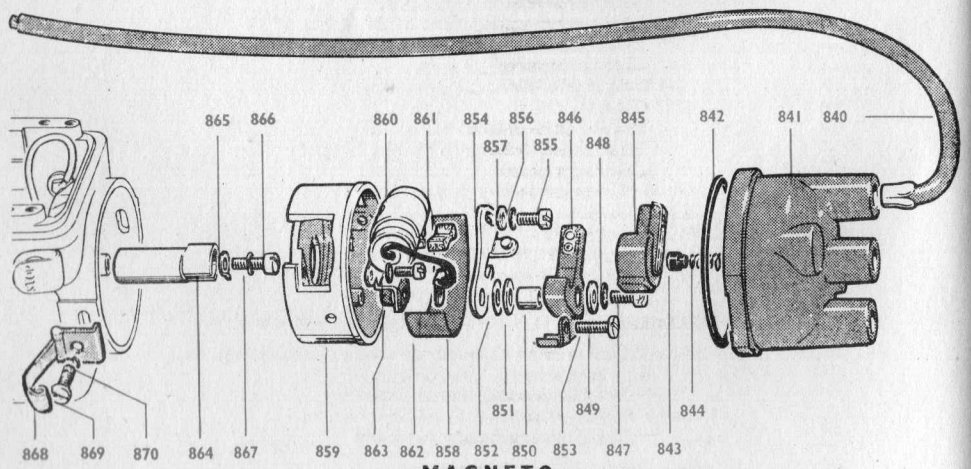
740	24G.1007	Roller fork	1
741	24G.1017	Roller scraper	1
742		Scraper clamping bolt $\frac{1}{4}$″ B.S.W. × 1″ L. ...	2
—		Flat washer $\frac{1}{4}$″ dia.	2
—		Spring washer $\frac{1}{4}$″ dia.	2
—		Nut $\frac{1}{4}$″ B.S.W.	2
743	24G.1005	Roller drum	1
744	G.1011	Roller filler plate	1
745		Setscrew $\frac{1}{4}$″ B.S.W. Rd. Hd. × $\frac{3}{8}$″ L.	2
—		Spring washer	2
746	G.1012	Grease nipple $\frac{1}{8}$″ B.S.P.	2
747	24G.1006	Axle	1
748	G.1008	Axle bush	2
749		Axle nut $\frac{3}{8}$″ B.S.W. locknut	2
—		Axle spring washer $\frac{3}{8}$″ dia.	2

WICO MAGNETO TYPE. A-1137 BZ. (Plate 11)

—	ZX.207	Drive shaft adaptor assembly (comprising the following)—	
801	1365A	Drive shaft adaptor nut	1
802	M.121XB	Drive shaft adaptor nut lock washer	1
803	1146D	Drive shaft adaptor nut key	1
804	E.113XA	Drive shaft adaptor	1
805	X.1399M	Rotor assembly	1
806	1146	Breaker cam key	1

PLATE II





MAGNETO

Illust. No.	Part No.	Description	No. off
—	FX.193	End plate group (comprising the following)—	
807	B.33X	Oil seal	1
808	F.153	End plate	1
809	A.72XC	End plate screw	4
810	I.VA–715	End plate gasket	1
—	X.1669C	Oiling disc unit (comprising the following)—	
811	I.VA–487	Oiling disc	1
812	1379	Main oil pad	1
813	X.2505B	Main oil pad spring	1
814	X.1487	Oil scraper assembly	1
—	GX.1414EPM	Main housing group (comprising the following)—	
815	X.1414EPM	Main housing unit (includes items 816 & 817) ...	1
816	2495	Main housing bushing	2
817	1423	Oiler	2
818	X.1596	Earth stud group (2 screws, connecting wire and breaker lead)	1
819	I.XA.862	Earth stud fibre washer	2
820	M.34X	Earth stud fibre insulating bushing	6
—	B.140X	Stop button unit (comprising the following)—	
821	B.138X	Stop button contact	2
822	I.XA.862	Earth stud fibre washer	2
823	I.XA.256	Earth stud washer	2
824	A.142X	Earth stud nut (right side)	1
OR	M.72	Earth stud nut (left side)	1
—	X.1411	Coil and core group (comprising the following)—	
825	X.1409	Coil core group	1
826	X.1410	Coil group	1
827	2264B	Coil wedge	2
828	1384	Coil core clamp	2
829	M.126XB	Coil core clamp screw	2
830	M.55XA	Coil core clamp screw lock washer	2
—	X.1412	Cover group (comprising the following)—	
831	X.2009	Cover unit (includes items Nos. 836, 837 & 838)	1
832	1385	Cover gasket	1
833	1117	Cover screw	4
834	I.XA–256	Cover screw washer	4
835	1118	Cover screw leather washer	4
836	1328	Coil contact screw	1
837	M.55XA	Coil contact screw lock washer	1
838	1397	Coil contact	1
839	X.1615Z	Secondary interlead group	1
840	IKFP.121	H.T. lead group (16")	2
841	X.1622B	Distributor cap cover (includes item No. 842) ...	1
842	16–159	Distributor cap gasket	1
—	X.NC–74	Rotor arm contact bush group (comprising the following)—	
843	1216	Rotor arm contact bush	1
844	1217	Rotor arm contact bush spring	1
845	16–X.477B	Rotor arm	1
—	X.1878B	Breaker assembly (comprising the following)—	
846	X.1408B	Breaker arm group	1
847	M.31X	Breaker arm clamp screw	1
848	M.55XA	Breaker arm clamp screw lock washer	1
849	1207	Breaker arm clamp washer	1

Illust. No.	Part No.	Description	No. off
850	1418	Breaker arm bearing bush	1
851	1197	Breaker arm spring washer	1
852	1197B	Breaker arm spring shim	2
853	6017	Breaker arm spring screw	1
854	1196	Fixed contact	1
855	M.31X	Fixed contact screw	1
856	M.54X	Fixed contact screw lock washer	1
857	1.XA.256	Fixed contact screw washer	1
858	16–818B	Breaker box insulation strip	1
859	X.2175B	Breaker assembly housing	1
860	X.1413	Condenser group (includes items 862 & 863) ...	1
861	5446M	Breaker cam oil pad	1
862	1100	Condenser screw	2
863	M.900	Condenser screw lock washer	2
—	X.1561	Breaker cam unit (comprising the following)—	
864	1107	Breaker cam	1
865	1381	Cam screw lock plate	1
866	M.31X	Cam screw	1
867	M.55XA	Cam screw lock washer	1
868	X.1700	Distributor cap clip assembly	2
869	2073	Breaker box screw	2
870	M.55XA	Breaker box screw lock washer	2

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