

FINGERS

The Fingers should be replaced by new ones as soon as the edges over which the Knife Sections slide become rounded or the guards over the Knives broken.

Correct adjustment of the Knife Blade and the Knife Bar Pads will save excessive wear of the Fingers.

The part of the Fingers over which the Knives slide must all be in line so that the Knives press evenly on all the Fingers at once. Keep the points on the Fingers so that they may part the grass without dragging.

A set of Fingers for a standard three-foot Finger Bar consists of nine Single Fingers, Part No. 6, one right-hand double Finger, Part No. 6 R.H., and one left-hand double Finger, Part No. 6 L.H.

TYRES

The tyres fitted to the ALLEN MOTOR SCYTHER are specially designed to prevent clogging with the cut grass.

They will only work effectively if fitted to the machine the right way round, with the studs on the outside as shown in Fig. 14.

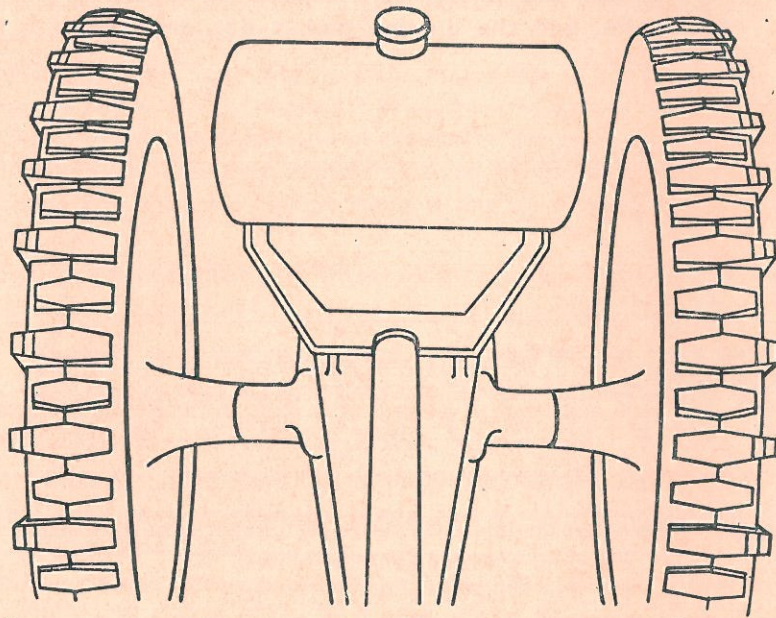


Fig. 14

Tyres must be kept fully inflated to the correct pressure of 40 lb.

In the event of a puncture, it is not usually necessary completely to remove the tyre or the road wheel from the machine. It will often facilitate the repair of punctures if the cutting unit is removed completely, thus enabling the machine to be turned over on its side with the damaged tyre uppermost.

In the event of a tyre being damaged beyond repair it is advisable to replace it by a similar special tread tyre which can be obtained either from our Main Agents or direct from ourselves.

THE ENGINE

The two-stroke engine fitted to the ALLEN MOTOR SCYTHER is of a most simple and robust design, there being only three main moving parts in the whole engine.

FAILURE TO START

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

Compression should be felt when the engine is rotated at normal starting speeds with throttle partly open.

Fuel Supply. Depress tickler at side of carburetter body. If fuel is reaching float chamber it will spurt out of vent at top of tickler.

Running In. Whilst the engine is new, it is advisable to add a little extra oil to the petrol and also to set the carburetter needle adjustment a little on the "rich" side rather than too weak.

Ignition System. Ignition troubles are rare; if, for instance, difficulty is experienced in starting the engine, investigation should first be made to ascertain that the engine is receiving a supply of petrol. Press the "tickler" on the carburetter, and if petrol flows, that may be taken as correct. Then suspect the sparking plug; unscrew it from the cylinder and lay it on the top fins with the high-tension cable connected to it in the usual way, but do not let the cable terminal touch the cylinder. Then rotate the engine, if no sparking is noticeable between the sparking plug points, it will show that the plug is the cause of your difficulty. It should be dismantled and carefully cleaned, all soot being removed from its insulation, because this is probably causing the current to short circuit instead of jumping the points and creating a

spark. Reassemble the sparking plug and carefully adjust the points so that a distance of not more than 0.025 in. separates them. Presuming that when tested there is a satisfactory spark at the plug points, and the engine still refuses to fire, examine the high-tension cable from the magneto to the sparking plug. This may have been touching the cylinder, with the result that the rubber covering has burned, and the inner wire was touching a metal part of the machine, thus causing a short circuit. The only satisfactory remedy then is to fit a new cable. Another point at which trouble may occur, but this is very unusual, is at the "pick-up" spring inside the magneto. At the magneto end of the high-tension cable is a vulcanite terminal. This terminal should be taken out, and it will be seen to contain a small spring which makes contact with the ignition coil. This spring should be quite straight, so that when the terminal is in position, its pad touches the small contact point on the coil, immediately underneath it. Should the spring show signs of having been bent sideways, it has probably not made proper contact, and the trouble lies there.

Another possible cause of difficult starting is the formation through oxidization of a film on the contact point of the ignition coil, and this can be scraped clean with a pen-knife.

A Final Word about Sparking Plugs. The engine manufacturers, who carry out extensive and prolonged tests, really do know the type of sparking plug best suited to each particular engine and, therefore, if occasion arises to fit a new sparking plug, it should always be of the same make and type as the original one. It is often a costly matter to experiment with different sparking plugs, because a very cheap one can quite easily do considerable damage, although this is not appreciated by many users.

ENGINE MAINTENANCE AND REPAIRS

Decarbonizing.

Decarbonizing the Villiers Two-Stroke Engine is quite straightforward, because of the simplicity of this type of unit. The following points, however, are worth special attention.

When removing and replacing the cylinder, care should be taken not to twist it round the piston—it should be pulled off or pushed on straight so that the rings cannot catch in any of the ports and break.

All carbon should be removed from inside the piston head, as well as from the top of the piston and from the cylinder head. The ports in the cylinder

—particularly the exhaust port, should receive careful attention, and should be kept clean, but on no account must the size or shape of these ports be altered by filing.

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

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

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

It is important that air leaks should be avoided.

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

Sparking Plug.

The type recommended for the Mk. 25 c. engine is the Lodge C 3, 18 mm. dia. thread.

Clean and reset the points 0.025 in. gap after each 100 hours' operation.

Adjustment of the gap should be done by moving the points attached to the outer body of the plug. *Never bend the centre pin.* Keep the outside of the plug insulation free from water and dirt. When screwing the plug in the cylinder head, should any undue stiffness be experienced, do not use force, but examine the thread for any particles of grit or carbon which may be present. These must be removed, otherwise the threads in the cylinder head may be damaged. It is a good plan to smear a little graphite grease on the plug threads before replacing.

Petrol Filter.

A filter gauze is fitted to the banjo bolt connecting fuel pipe to carburetter and another petrol gauze is part of the fuel tap. These filters should be examined occasionally and cleaned by dipping in petrol.

Air Filter.

This must be removed every 100 hours, or more frequently under very dusty conditions, and washed in petrol, then dip in **thin oil**, and allow surplus to drain off before refitting. Oil bath filters should be dismantled and the old oil drained away; the filter should then be washed and re-filled with oil to level indicated on container.

Contact Breaker.

The contact breaker points should be checked occasionally to see that they are clean, that the gap when fully opened is between 0.012 in. and 0.016 in., and that they open and close properly.

To obtain access to the points the starting pulley has to be removed, but before this can be done the cowling has to be taken off. The cowl is attached by three screws to armature plate and two screws to cylinder head.

Villiers Flywheel Magneto.

The condenser box is made in an aluminium alloy, the rocker arm being pivoted in a graphited bronze bearing, ensuring long life.

It is not necessary to use a spanner for contact point adjustment, a small screwdriver being the only tool necessary.

To adjust the point gap proceed as follows :—

Turn flywheel until rocker pad is on top of cam profile of flywheel boss.

Release the slotted screw with a screwdriver.

Position contact bracket with 0.015 in. feeler gauge between contact points, tighten screw, taking care not to use too much force. It is not necessary to disturb the centre hexagon screw when adjusting the point gap.

Magneto Timing.

The magneto is timed to give a spark when the piston is $\frac{5}{32}$ in. **before** top dead centre, with the points commencing to open. When building the engine the timing is set as above, flywheel tightened on shaft, then rotated until piston is at **top** of stroke. Two timing marks are then punched directly opposite one another, one on the boss provided on back of armature plate, the other on the flywheel rim, as close as possible to armature plate. Timing must be checked whilst cowling is removed.

Flywheel Removal.

The cam operating the contact breaker is rivetted to the flywheel which is driven by a taper on the crankshaft, and if alteration to magneto timing is necessary, the flywheel must be released, by unscrewing the centre nut with the box spanner provided in the Tool Kit. This nut has a right-hand thread and is imprisoned in the flywheel and it should be unscrewed until the flywheel is just free to revolve on the crankshaft. With the piston in its correct position, the flywheel should then be moved round until the points commence to open, then tighten up the nut firmly and re-check timing. This nut must be tightened up hard by hitting with a hammer on the end of the tommy bar.

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

It is important that the cowling and fan should be in position when the engine is running.

CARBURETTER

“ Junior ” Pattern with one lever control. Mark 25 C Engine.

To remove the centrepiece it is necessary to take out the locating screw situated at the bottom of throttle chamber close to the fuel pipe union.

Adjustment and Removal of Taper Needle.

In the centre at top of throttle is situated a slotted screw, which when turned clockwise, lowers needle and weakens mixture by reducing size of jet orifice. Turn anti-clockwise to give a richer mixture. To replace needle remove slotted screw after taking note of how far needle projects from end of throttle. To adjust give half a turn at a time until the correct setting is found.

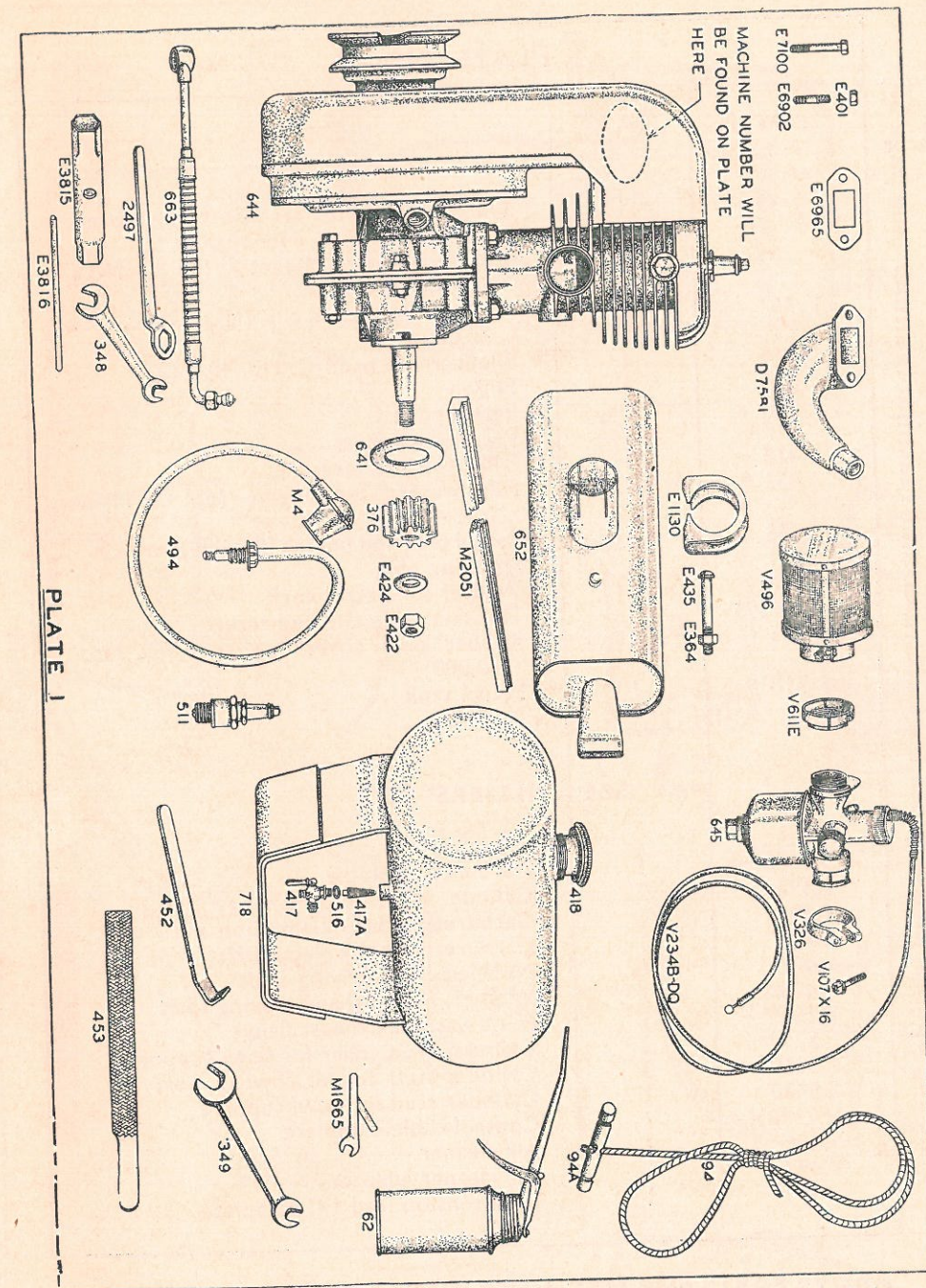
To assemble.

See that every part is clean. Place centrepiece in position with fibre washer under head, making sure that fuel needle and lever are in position. Fit screw to locate centrepiece correctly. Check petrol level and complete assembly.

PLATE NO. 1

PART No.	No. PER MACHINE	DESCRIPTION
376		Pinion
417		Petrol cock
417A		Petrol cock filter
418		Filler cap and measure (up to M/C. No. 51,680)
511		Sparking plug
516		Washer for petrol cock
562		Throttle cable clip
593	3	Self-tapping screws for machine number plate (2) and clip 562 (1)
594		Shield transfer
641		Felt washer for engine register (M/C. No. 40,000 and up)
644		25C Engine, complete with carburetter, silencer, pinion, felt washer and cable clip (M/C. No. 40,000 and up)
645		Carburetter "Junior" and air cleaner (M/C. No. 40,000 and up)
652		Silencer (M/C. No. 40,000 and up)
663		Petrol pipe and unions (flexible)
718		Petrol tank
732		Transfer (Clutch Instructions)
740		Filler cap and measure (M/C. No. 51,681 and up)
SEE VILLIERS' LIST		
D.7581		Inlet manifold (curved)
V.496		Air cleaner
V.611E		Air cleaner adapter
V.326		Body clip
V.107 x 16		Body clip screw
V.234B/DQ		Control cable complete
E.422		Nut for driving shaft
E.424		Spring washer for driving shaft
E.1130		Silencer clip
E.435		Silencer clip bolt
E.364		Silencer clip bolt nut
M.2051		Felt strip for fan cowl
494		High tension lead 17" complete
M.4		Waterproof plug cover
E.7100		Bolt inlet manifold
E.6902		Stud inlet manifold
E.6965		Joint washer inlet manifold
E.401		Nut 1/4"

ABOVE PARTS FOR MACHINE No. 40,000 AND UP



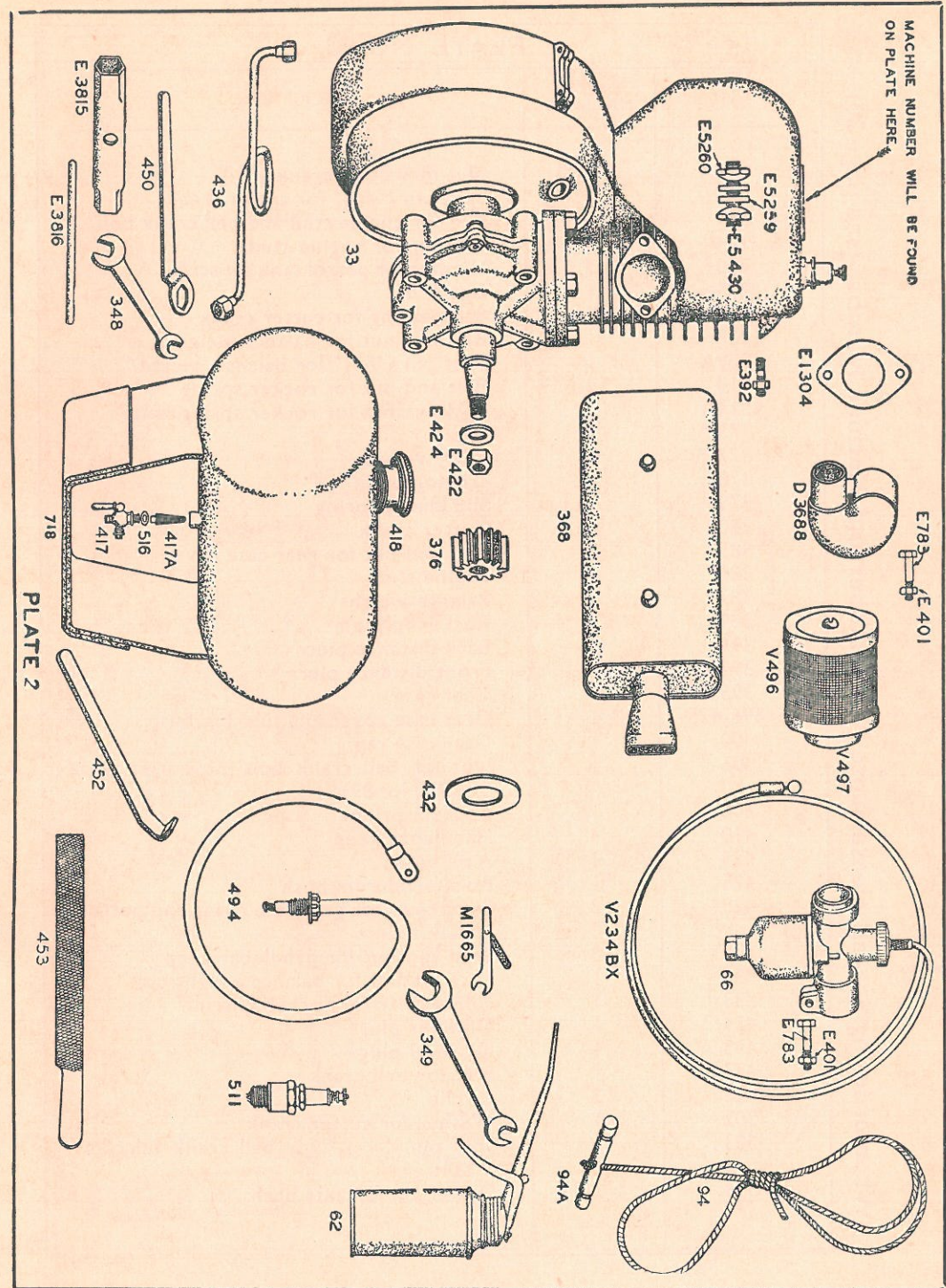
When ordering Spares, please quote Part Number and Machine Number (see page 30)

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PLATE NO. 2

PART No.	No. PER MACHINE	DESCRIPTION
33	1	IIC Engine with carburetter, silencer, etc. (up to M/C. No. 40,000)
66	1	Carburetter "Midget" (up to M/C. No. 40,000)
367	1	High tension cable clip (up to M/C. No. 40,000)
368	1	Silencer (up to M/C. No. 40,000)
376	1	Pinion
417	1	Petrol cock
417A	1	Petrol cock filter
418	1	Filler cap and measure
432	1	Felt washer for engine (up to M/C. No. 40,000)
436	1	Petrol pipe and unions (flexible)
511	1	Sparking plug
516	1	Washer for petrol cock
562/593	1	Throttle cable clip and screw
595	1	Rubber plug cover (up to M/C. No. 40,000)
718	1	Petrol tank
SEE VILLIERS' LIST		
D.3688	1	Carburetter elbow
E.392	2	Cylinder stud, exhaust flange
E.401	1	Carburetter body clamp bolt nut
E.783	1	Carburetter body clamp bolt
E.422	1	Nut, left-hand driving shaft
E.424	1	Washer, for left-hand driving shaft
E.1304	1	Joint washer, exhaust flange
E.5259	2	Cylinder stud collar for cowl support
E.5260	2	Cylinder stud nut for cowl support
E.5430	1	Cylinder stud for cowl support
V.234BX	1	Control cable complete
V.496	1	Air cleaner
V.497	1	Air cleaner adaptor
494	1	High tension lead 17" complete

ABOVE PARTS FOR MACHINES WITH SERIAL No. UP TO 40,000



When ordering Spares, please quote Part Number and Machine Number (see page 30)

PLATE NO. 3

PART No.	No. PER MACHINE	DESCRIPTION
83A	1	Nut for cutter crank $\frac{1}{2}$ "
85	1	Split pin $1" \times \frac{1}{8}"$ for cutter crank
89	6	Nut for engine stud and bell crank bolt
124	4	Washer for engine stud
220	2	Washer for petrol tank set screw
285	1	Crank die
288	2	Ball bearing for cutter crank
289	1	Bolt and nut for balance weight
289A	1	Split pin $1" \times \frac{1}{8}"$ for balance weight
314	2	Bolt and nut for rocker spring
314A	2	Lock washer for rocker spring bolts
373	1	Worm
377	1	Gear wheel
378	2	Friction plate
379	1	Slip clutch spring
380	1	Cutter crank
385	3	Bolt and nut for gear case cover
386	4	Engine stud
387	1	Balance weight
389	1	Rocker fulcrum
391	1	Back distance piece
392	1	Front distance piece
395	1	Gear case
396/425	1	Gear case cover and fulcrum bush
400	1	Gear case cap
406	1	Nut for bell crank bolt (now uses two part No. 89)
408	1	Rocker spring
410	4	Handlebar keep
424	2	Axle bush
425	1	Rocker fulcrum bush
428	8	Set screws for gear case cover and petrol tank fixing
429	8	Stud and nut for handlebar keep
430	1	Lock washer for balance weight bolt
433	1	Felt washer for rocker fulcrum
434	1	Oil filler plug
435	1	Oil level plug
437	1	Bolt for bell crank
455	2	Circlip
502	1	Washer for cutter crank
503	1	Split pin $1" \times \frac{3}{32}"$ for bell crank fulcrum bolt
504	2	Dowel pin for axle bush

PLATE 3

