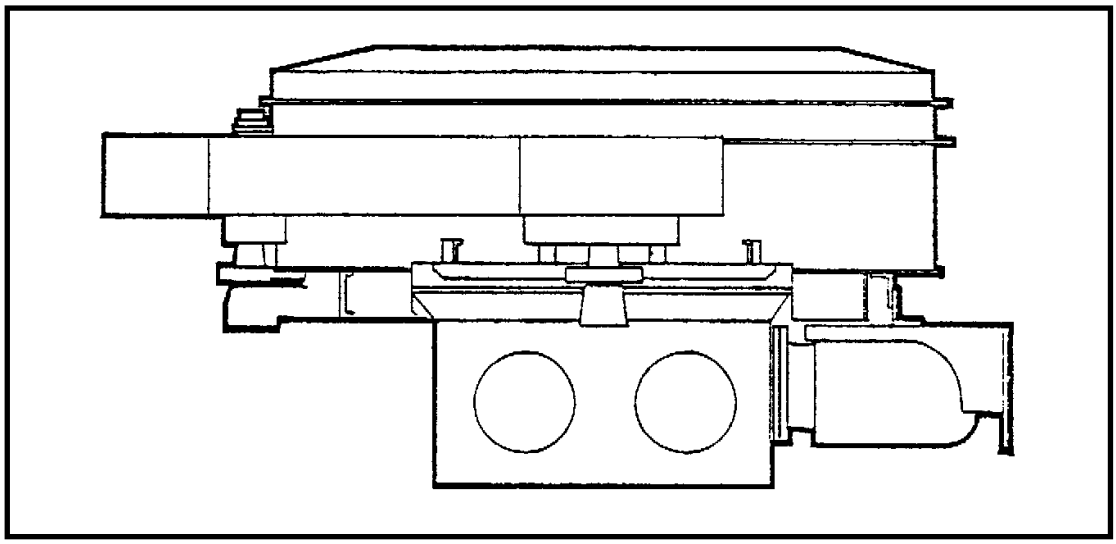
WINGET

OPERATION, MAINTENANCE & SPARE PARTS



333P TURBOMIXER

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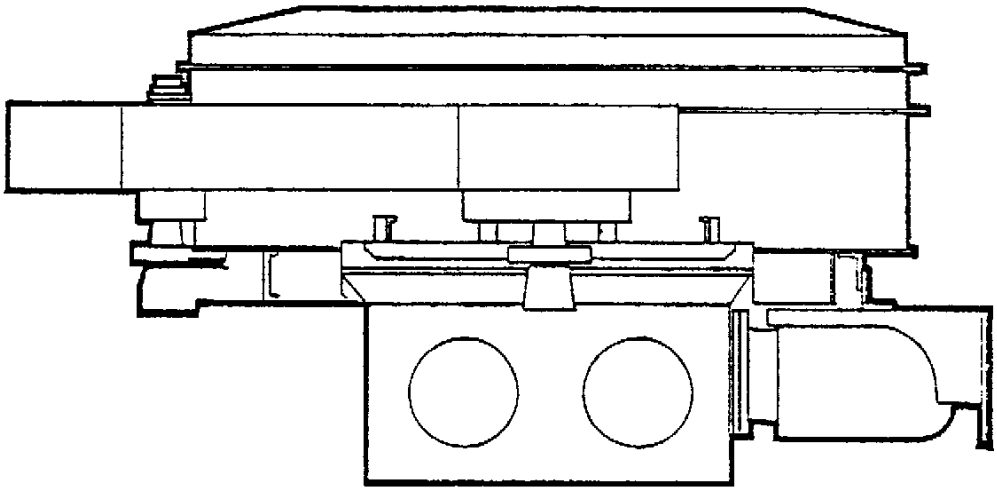

333P

This manual is a reprint of the Winget publication No S79 last printed during February 1973 and is a direct copy of one of the remaining original manuals.

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LIST OF CONTENTS.

DESCRIPTION & OPERATING INSTRUCTIONS.

OVERHAUL & MAINTENANCE INSTRUCTIONS.

IMPORTANT.

Your TURBOMIXER is a High Speed Mixer.

The Mix should never be allowed to remain in the pan for a period in excess of twice the mixing time required for any particular mix, otherwise, heavy overloading of the gear box will result.

Average mixing times are given on page 3 of this book.

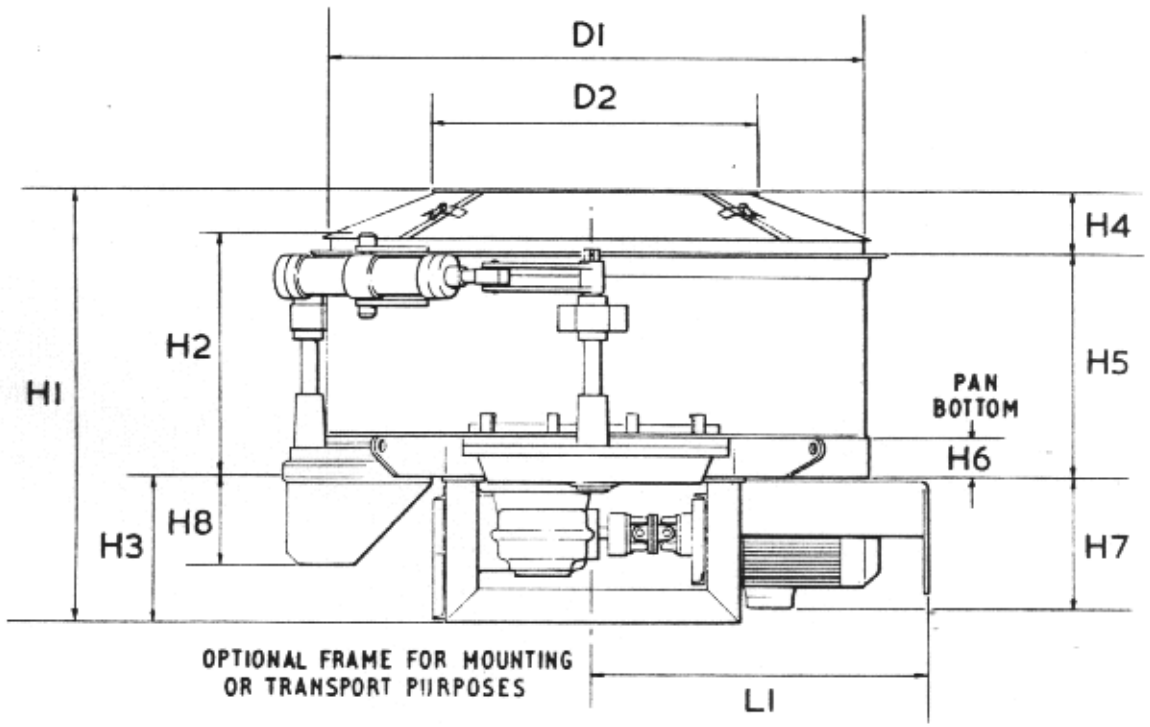
Recourse to a wet hopper should be arranged if the take-off from the plant is erratic.

Under no circumstances should the Mixer be stopped and re-started during the mixing cycle.

NOTE:- When fitted in batching plant further information concerning water systems and electrical equipment will be given in batching plant manual.

SPARE PARTS SECTION

ILLUSTRATIONS



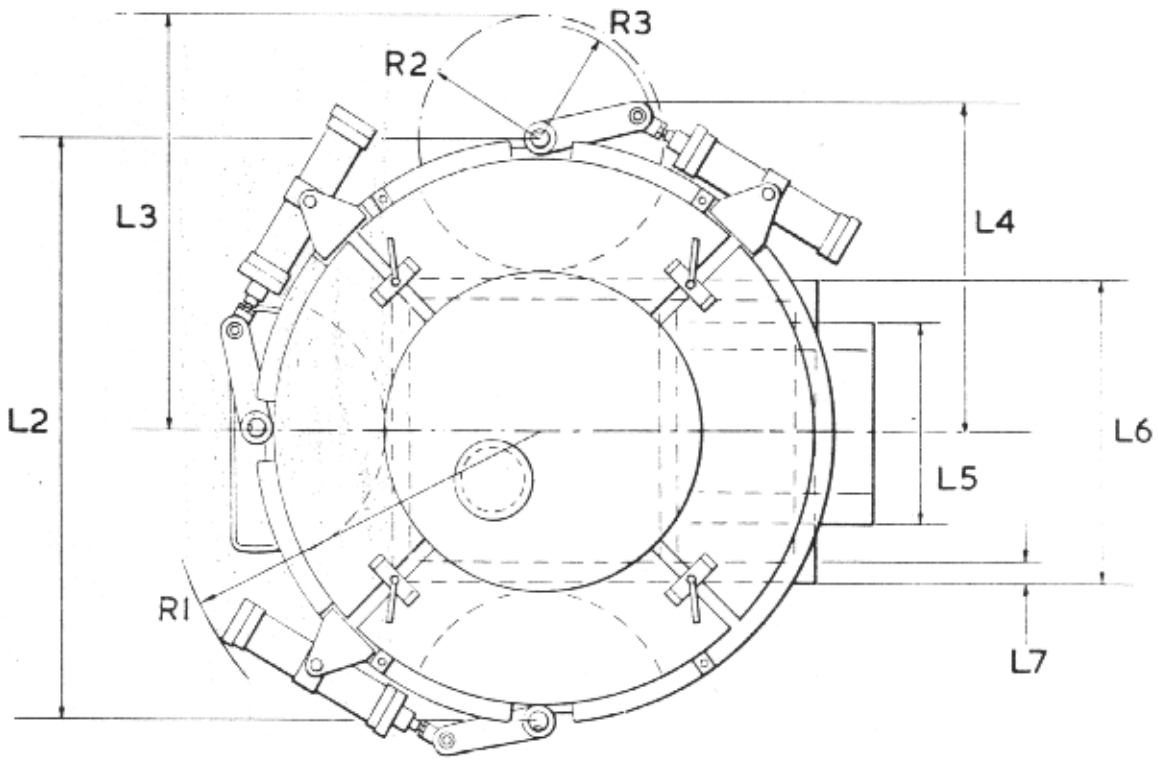


FIG 1. SPECIFICATION

SPECIFICATION

BATCH FEEDING BASED ON 50 BATCHES PER HOUR.

BATCH	INPUT OUTPUT	500 LITRES 18 CU. FT. 330 LITRES 12 CU. FT.
OUTPUT	CU. METRES/HOUR CU. YDS./HOUR	16 22
MOTOR	H.P. R.P.M.	20 1450
APPROXIMATE WEIGHT	KILOS LBS.	2200 4900
NUMBER OF MIXING BLADES		5

OVERALL DIMENSIONS

LENGTH	MM	INS.
D1	1711	67⅜
D2	1035	40¾
H1	1360	53.9/16
H2	787	31
H3	457	18
H4	197	7¾
H5	706	27.13/16
H6	127	5
H7	402	15.27/32
H8	270	10.5/8
L1	1057	41.5/8
L2	1840	72.7/16
L3	1320	51.31/32
L4	1029	40½
L5	635	25
L6	959	37¾
L7	64	2½
R1	1206	47½
R2	400	15¾
R3	356	14

WINGET LIMITED RETAIN THE RIGHT TO ALTER THIS SPECIFICATION WITHOUT NOTICE IN ACCORDANCE WITH THEIR POLICY OF IMPROVEMENT OF PRODUCTS.

DESCRIPTION AND OPERATING INSTRUCTIONS.

INSTALLATION

General:

The mixer must be installed in its working position ensuring that it is mounted horizontally, and that there is no distortion of the base frame. Provision should be made below the mixer to allow a free circulation of cooling air in and around the electric drive motor.

Access to the discharge door(s) from the underside of the mixer is recommended for inspection and maintenance of the mixing blades.

Air operated Discharge Door(s) - if fitted

The discharge door(s) on some mixers are operated by air cylinder. The working pressure required is in the range of 5.62 - 7.03 kilos per sq. cm. (80 - 100 p.s.i.) but should not exceed 10.55 kilos per sq. cm. (150 p.s.i.) The air supply is first passed through a filter to remove any dirt or moisture present, and then through an atomizing type airline lubricator.

Leaflets, supplied by the manufacturer, on the operation and servicing of these two units, are included at the back of this Manual. See page 10 for list of recommended lubricants.

PRE-RUNNING CHECKS.

1) Check the level of oil in spur gearbox and worm gearbox top up as necessary - see page 5. for access instructions.

2) Check 1.6 mm (1/16") clearance between blades and pan, adjust as necessary - see page 7.

   It is recommended after any blade adjustment that the rotor be given a couple of complete turns by hand, to ensure all round clearance of the blades due to any possible distortion of the pan or rotor housing.

3) If the mixer is being used for the first time after the electrical circuit has been connected or re-connected, ensure correct rotation of mixing blades.

4) If the water system has been drained, re-connect supply and pass a quantity of water through flowmeter to ensure accurate operation.

OPERATION:

Mixing:

It is important that the mixing blades are rotating at their full working speed before any material is fed into the pan.

It is recommended that to reduce the mixing time cycle to a minimum where possible, the cement, water and aggregate be added to the pan simultaneously.

The actual charging and mixing time will vary depending on the type of mix, but should NEVER be less than thirty seconds, the acerage time being thirty to forty five seconds.

THE MIX SHOULD NEVER BE ALLOWED TO REMAIN IN THE PAN AFTER MIXING TIME HAS EXPIRED.

The action of the mixing blades and aggregate generates a small amount of heat which will cause the water content to drop and consequently stiffen the mix.

This stiffening would eventually reach a point when it would cause the overload trip mechanism of the starter switch to operate and stall the mixer.

In the event of the mixer stalling, the discharge door(s) should be opened, water added to the mix and as much concrete as possible shovelled out before any attempt is made to restart the electric motor.

To prevent the accidental starting of the mixer while manhandling concrete out of the pan the supply fuses must first be removed or the isolating switch locked in the "OFF" position.

Discharging:

An air operated semi-circular shaped discharge door (or doors) in the bottom of the mixing pan, allows the concrete to be quickly discharged by the action of the rotating mixing blades.

It is recommended that on a mixer fitted with two or more discharge doors, that if only one is consistently used for any period, to prevent the unused door(s) from sticking, that it/they be opened after approximately every 10 batches, to remove any grout that will have accumulated in the crevice between the door and the pan.

Cleaning the Mixer.

At the end of each day's working, or if the mixer is idle for a period of more than two hours, the mixer should be thoroughly washed to prevent concrete setting in the pan or on the mixing blades.

Check the setting of each mixing and scraper blade daily and adjust if necessary, lubricate as described on page 7.

TURBOMIXER COVERS

TRAPPED KEY INTERLOCK SYSTEM

Grouping No. 1

The standard Mixer is supplied complete with covers and starter, protected by a trapped key interlock system. Mixers may also be supplied:-

(a) Less Starter
(b) With Starter but less trapped key interlock on Starter
(c) Less Covers
(d) With Covers but less trapped key interlocks
(e) Combination of items a - d.

Winget Limited will not accept responsibility for the safe working of a Mixer supplied as items a - e. Mixers are in fact supplied as items a - e but only on a written undertaking by the purchaser to take specified steps sufficient to ensure that the machine is safe and without risks to health when properly used.

Mixer sizes 333P2 to 750P2 - These are protected by interlocks as indicated on Flow Diagram 50-67405D. This comprises a bolt lock type K, with control key fitted to the starter, a key exchange box with four keys, three locks type MFT2 fitted to the three openings in the mixer covers, and a master key recognised by the 'T' shaped handle.

In the normal working condition, the control key is in the operated position in the starter, and the isolator turned to the 'ON' position. The mixer covers are in the closed position with the locks secured and four keys are in the exchange box. In this condition all keys are trapped and cannot be removed, thus making it impossible to gain entry to the mixer while it is working. When the starter isolator handle is turned to the 'OFF' position, the electrical supply to the starter is interrupted and the control key can be removed from the bolt lock 'K'. If the key is inserted in the key exchange box and turned, the four keys are freed, and may be removed, but the control key is trapped in the box, making it impossible to start the mixer while the four keys are not in position in the exchange box.

Three of the keys are used for operating the locks type MFT2 fitted to the Mixer openings. When operated to release the locks, the keys are trapped in the locks. A locating arrangement is fitted to the removable top cover to ensure that the lock cannot be operated with the cover detached.

The fourth key is not required for opening the mixer covers, but is supplied so that a further chain of interlocks may be initiated if so required.

Each set of keys is specific to the mixer for which it is supplied. Any queries or spares requirement should be accompanied by the Grouping Number indicated under the title of this section of the Manual.

The master key MUST be kept in the possession of a person in authority. It is provided to enable the mixer to be run with the covers open, to check adjustments IT IS TO BE ISSUED BY THE PERSON IN AUTHORITY, ONLY WITH A 'PERMIT TO WORK SYSTEM'. The requirements of a 'Permit to Work System' are indicated at the end of this section.

When the mixer is supplied with a plant, a different interlock system may be fitted and it is IMPERATIVE to be familiar with the arrangements fitted, which will be described in the Plant Manual.

Mixer sizes 1000P2 to 2000P2 - These are protected by an interlock system as indicated on the Flow Diagram 50-67406D. The system works in exactly the same way as that for the smaller mixers, with the exception that there are five openings in the mixer covers, instead of three, and the key exchange box is fitted with six trapped keys.

CLEANING THE MIXER

Remember, a clean mixer is more efficient, reducing considerably the wear on the pan and mixing elements.

At the end of each day's work, or if the mixer is idle for a period of more than two hours, the mixer should be thoroughly washed to prevent concrete setting in the pan or on the mixing elements.

Initial cleaning can be carried out by introducing a quantity of gravel and water and running the mixer for three to four minutes. This will not clean the mixer completely.

Utilizing the trapped key interlock system, backed up by a 'Permit to Work' arrangement, open the covers and hose down with high pressure hose. Close the covers and, using the trapped key system, restart the mixer, run for a few minutes and discharge. A gradual build up of set concrete may occur after extended use, and a man may have to enter the mixer pan to chip off the build up. Using the trapped key system as described, the man will be safe but, ENSURE THAT THE MASTER KEY IS WITH THE PERSON IN AUTHORITY. If the mixer is supplied as part of a plant, a different interlock system may be fitted - ENSURE THAT THIS IS UNDERSTOOD BEFORE ALLOWING A MAN TO ENTER THE MIXER.

These instructions apply only to safety arrangements supplied by Winget. Where customers have contracted to supply their own safety arrangements, THE PERSON IN AUTHORITY MUST CHECK THE SAFETY ARRANGEMENTS ACTUALLY FITTED, BEFORE ANY WORK IS CARRIED OUT ON THE MIXER. Coating the interior of the mixer with mould oil will reduce concrete build up.

ADJUSTING BLADES AND MAINTENANCE

This must be carried out using the trapped key system and together with a 'Permit to Work System'. In checking blade clearances it is necessary to rotate the rotor slowly. Due to the drive arrangements this can be achieved only by a momentary operation of the starter. Since the covers will be open, and the master key is required to override the trapped key system THIS IS A DANGEROUS OPERATION. IT IS THE CUSTOMER'S RESPONSIBILITY TO ENSURE THAT THE DANGERS ARE HIGHLIGHTED IN THE 'PERMIT TO WORK' DOCUMENT.

PERMIT TO WORK SYSTEMS - PARAGRAPH 53 BS/5304

53.1. Circumstances of Use

Interlocking guards (see Clause II) and safety devices provided at small units of machinery for the protection of the operator also protect the maintenance man when he requires access to the danger area. At larger machinery and process plant, however, this protection may not be available to maintenance personnel who, having entered a danger area, may be out of sight and therefore exposed to danger if the plant is switched on.

In these circumstances it is necessary for management to identify the hazards which are exposed and to develop a safe system of work whereby these

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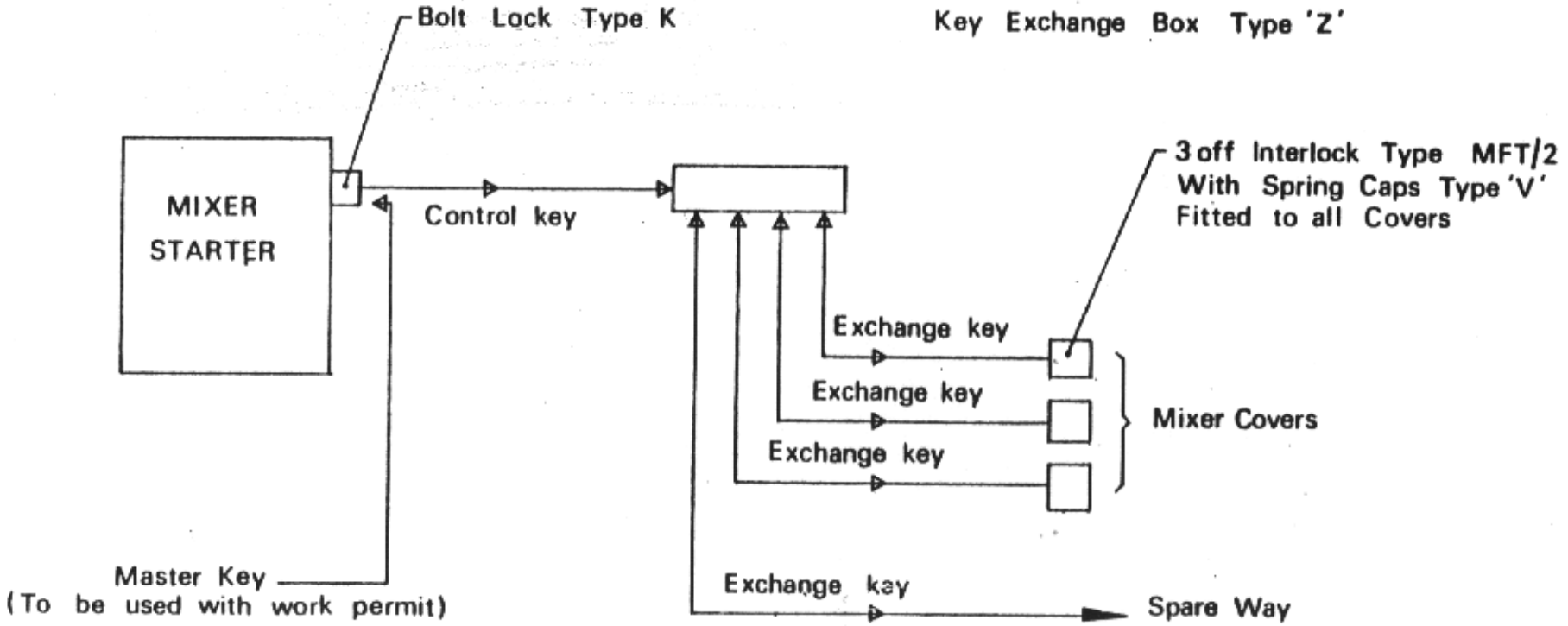


KEY EXCHANGE SAFETY INTERLOCK SYSTEM

OVERHAUL AND MAINTENANCE INSTRUCTIONS

WARNING - BEFORE ANY MAINTENANCE WORK IS CARRIED OUT ON THE MIXER, THE ISOLATING SWITCH MUST BE LOCKED IN THE "OFF" POSITION, OR THE SUPPLY FUSES REMOVED BY A QUALIFIED ELECTRICIAN.

LUBRICATION

Spur Gearbox Topping Up: Level of oil in the box should be checked weekly by means of a sight glass situated on the outer circumference of the turbomixer pan, an oil level indication plate is positioned behind the sight glass giving the Maximum and Minimum oil levels. If level of oil is found to be low remove the filler cap. Clean around neck of filler hole and top-up using oil or recommended grade only - SEE "OIL CHANGE".

Oil Change Spur Gearbox. The gearbox should be drained, flushed with diesel oil and refilled after the first 500 running hours. This procedure should be repeated after 3,000 running hours and subsequently every 5,000 running hours.

The recommended procedure for changing oil is as follows:-

1. Run mixer for a short period, lightly loaded to thin down the oil in the gearbox. Alternatively, carry out the oil change at the end of a working day whilst the oil remains warm.

2. Remove drain plug situated on the side of the upper half of the worm gearbox, collect the oil in a suitable container. Approx. 23 litres (5 imp. gallons). Remove and clean breather.

3. Replace the drain plug, refill box with diesel fuel and run for about 10 minutes and drain off oil. If possible the box should be left draining overnight.

4. Refill through gearbox access cover using approx 23 litres (5 imp. gallons) of oil of recommended grade as listed:

SHELL	-	MACOMA 72
ESSO	-	ESSTIC 78
REGENT	-	CALTEX MEROPA 3
REGENT	-	M.T. GEAR OIL EP 90
MOBIL	-	COMPOUND B.B.

Spur Gearbox Top Bearing Lubrication: A grease nipple is provided on top of the rotor drive shaft. This requires lubrication at monthly intervals. Access to this grease nipple is gained through a hole situated near the centre of the pan cover.

Worm Gearbox Topping Up: An oil sight glass is fitted to enable oil level to be checked at weekly intervals. If level of oil is low, remove the filler plug situated on the upper half of the gearbox case. Top up as necessary with SHELL VITREA 79.

Oil Change: Oil in worm gearbox should be changed after the first month's running, and subsequently every six months. This is best carried out at the end of a day's working with the machine stationery when the oil is warm, but allowing enough time for the oil to settle.

1. Remove drain plug adjacent to sight glass tube and collect oil in a suitable container, - Capacity 8½ pints 4.7 litres.

2. Refill with SHELL VITREA 79 or equivalent oil to level on sight glass tube.

Stauffer Lubrication: At weekly intervals the Stauffer protruding from the wormbox case should be given several turns, Refill with SHELL LIVONA (3) grease when empty.

REPLACEMENT OF WEARING PLATES: To assist in the replacement of wearing plates, they have been divided into easily removable sections. After any plates have been replaced, it is recommended as a final check that the rotor housing be turned by hand, to ensure correct adjustment of blades in relation to bottom of pan.

Bottom and Inner Plates:

1. Remove top cover to expose mixing blades.

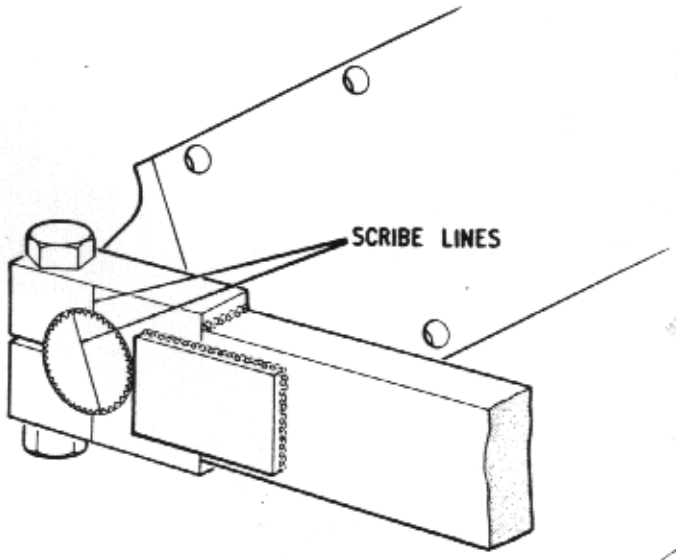
2. Remove one mixing arm assembly complete.

3. Turn the rotor housing by hand, until the mounting brackets of the removed blade is a little to one side of the wearing plate segment to be replaced.

4. Remove the countersunk screws and the wearing plate from the pan.

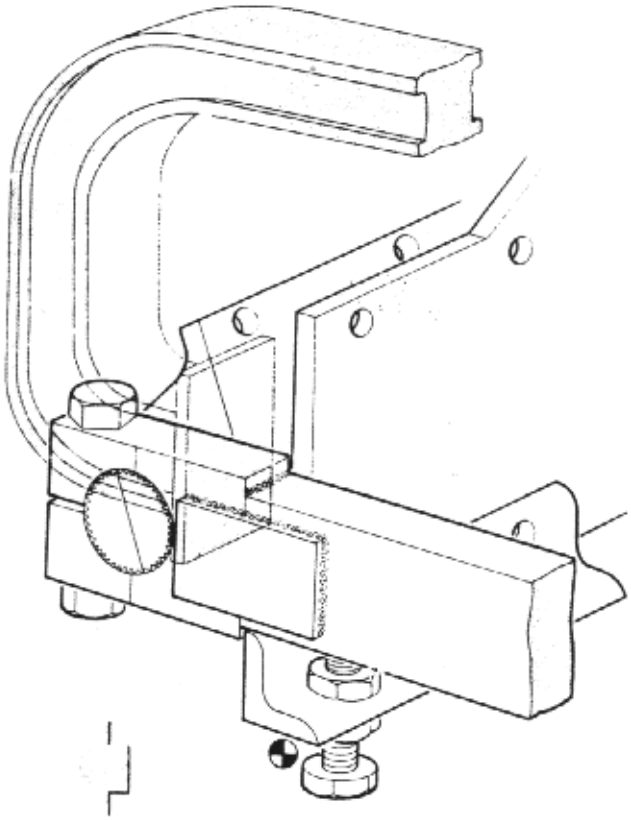
5. Fit new wearing plate, assemble mixing arm and top cover.

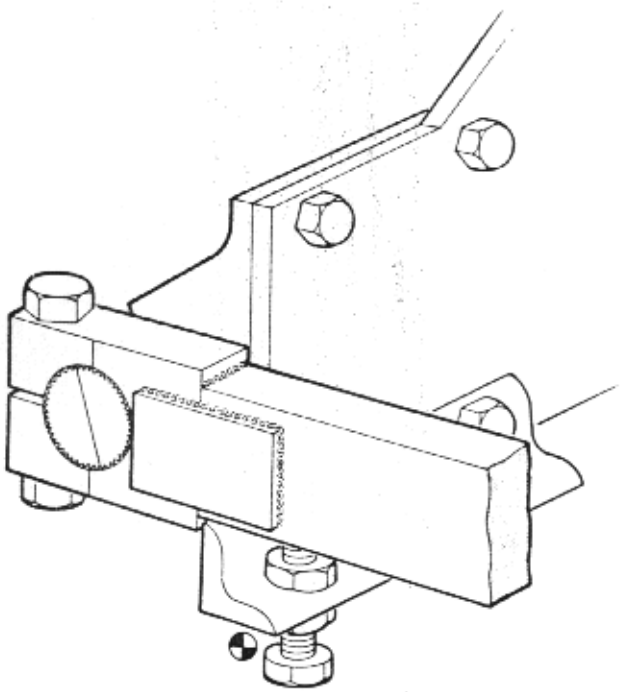
NOTE:- Some gearboxes are fitted with level plug in place of sight glass. The plug is positioned approx. ½" below joint in casing. When topping up fill to level of level plug.



STAGE 1
LINE UP BASE OF 'FLEXITOR' PARALLEL TO END EDGE OF MOUNTING BLOCK AND SCRIBE A STRAIGHT LINE ACROSS BLOCK AND SERRATED SHAFT.
TURN 'FLEXITOR' ANTI-CLOCKWISE UNTIL SHAFT SCRIBE LINE IS OFFSET 2-3 SERRATIONS FROM LINE ON MOUNTING BLOCK.
SECURE BLOCK TO SHAFT IN THAT POSITION.

STAGE 2
OFFER UP EDGE OF 'FLEXITOR' BASE TO ROTOR ARM.
POSITION CLAMP AROUND 'FLEXITOR' AND ROTOR ARM.





STAGE 3
SCREW UP ON CLAMP UNTIL 'FLEXITOR' IS POSITIONED FLUSH TO ROTOR ARM AND SECURE WITH SET SCREWS.
LIFT PADDLE BLADE 1/16 IN. FROM TOP OF BOTTOM WEARING PLATE, ADJUST 5/8 IN. SETSCREW UNTIL IT BEARS AGAINST UNDERSIDE OF ROTOR ARM AND SECURE WITH NUT.

NOTE
⊕ SCREWS MUST ONLY BE USED AS A STOP AND NOT A HEIGHT ADJUSTMENT.

FIG.2 PRE LOADING OF FLEXITORS

Outer Wearing Plate:

1. Remove top cover to expose mixing blades.

2. Turn rotor housing by hand, until the outer scraper blade is clear of the segment to be replaced.

3. Remove the countersunk fixing bolts and remove wearing plate from pan. Fit new wearing plate.

MIXING AND SCRAPER BLADES.

Adjustment: The blades should be inspected daily for wear and adjusted if necessary to give approximately 1.6 mm (1/16") clearance between the blades and the bottom or side of the pan.

After any adjustments have been made, it is recommended that as a final check before the motor is started that the rotor housing be rotated by hand a couple of times, to ensure that the blades do not foul the pan.

Pre-loading of Flexitors. Line up base of "Flexitor" parallel to end edge of mounting block and scribe a straight line across block and serrated shaft. Turn "Flexitor" anti-clockwise until shaft scribe line is offset 2 or 3 serrations from line on mounting block and secure block to shaft in that position Fig. 2. offer "Flexitor" base to side of rotor support and position clamp around "Flexitor" and rotor arm support, screw up clamp until "Flexitor" is positioned flush to rotor arm and secure with setscrews. Lift paddle blade 1/16" from top of bottom wearing plate and adjust $\frac{5}{8}$" setscrew until it bears against underside of rotor arm. Secure with nut.

NOTE: Screw must only be used as a stop and not for height adjustment.

FITTING NEW BLADES: Badly worn blades should be renewed as follows:-

1. Open the discharge door and turn the rotor by hand, until the worn blade is over the door opening.

2. Detach the blade by removing the two fixing bolts securing it to the mixing arm.

3. Fit new blade and tighten up bolts with them hard up to the top of the slotted holes in the mixing arm.

4. Reset blade until the correct clearance of 1.6 mm (1/16") is obtained as described.

ROTOR GEARBOX & MOTOR REPLACEMENT:

The notes given in this section are intended for general guidance only.

1. Disconnect the electrical supply from the mixer by removing the fuses, and the electrical connections from the motor at the starter switch. These should be clearly labelled to assist in easy reconnection.

2. Drain the oil from the spur gearbox into a clean container of suitable capacity, by removing the plug from the drain point at the top of the worm box body. When all oil is drained, detach the filling tube and remove nipple.

3. Remove top cover complete with spider frame if space available, or if not, dismantle by detaching individual cover plates, loosening centre bolts, withdrawing spider arms, after raising outer ends above pockets in pan body.

4. Unscrew a single bolt in top of rotor shaft and remove rotor complete with blades, if head room is available or detach blades if not.

5. Remove inspection cover in top of spur gearbox and fit a lifting eye bolt into the end of the wormbox output shaft.

6. Remove setscrews from wormbox flange and after disconnecting motor drive shaft, lower wormbox to ground complete with pinion and bearing, using suitable lifting tackle.

7. Remove false flange from underside of spur gearbox.

8. Screw lifting eye into rotor shaft and after removing bolts attaching spur gearbox to its mounting flange, lift gearbox complete, clear of pan and lower to ground.

   Alternatively, the gearbox can be dismantled without removing it from the pan, providing care is taken to ensure no dirt or grit enters the box.

9. Motor replacement is carried out, by first removing the wear plate immediately above the motor, revealing a hole in the pan bottom which gives access to a lifting eye on top of the motor support frame. The motor can then be lowered to the ground after removing bolts attaching the motor support frame to the pan frame.

NOTE: Motor can be replaced without removing spur or worm gearboxes.

To refit gearboxes and motor, carry out reverse procedure to above, finally refilling the spur gearbox with oil to the correct level, as indicated on the sight tube at the side of the pan. See page 5 for recommended oil and capacities.

Check that blade clearance of 1.6 mm (1/16") is maintained and rotate rotor by hand to ensure correct adjustment of blades relative to pan bottom.

Remake electrical connections to switch gear and replace covers before using the mixer, checking directions of rotation.

Recommended oils for use in the lubricator are as follows:-

TELLUS 21	SHELL MEX & B.P. LTD.
NORPOL 35	ESSO PETROLUEM CO. LTD.
GALTEX SPINDLE OIL A.	REGENT OIL CO. LTD.
MOBILE VELOCITE NO. 6.	MOBIL OIL CO. LIMITED.

DISCHARGE DOOR CYLINDER CUSHION ADJUSTMENT:

A needle valve located to the side of the main inlet port allows adjustment of the cushion.

Turning the valve clockwise will increase the cushioning effect, alternatively, an anti-clockwise rotation will reduce it.

The ideal cushion produces a uniform decleration of the moving parts without shock.

Cushion Setting:

Turn the adjusting screw clockwise to its fullest extent and then anti-clockwise, for one turn. Operate the cylinder. If bouncing takes place turn the screw anti-clockwise one half turn. If, however, there is metallic impact from within the cylinder, turn the screw clockwise a fraction. Repeat this until the desired cushioning is achieved.

Servicing: The only components subject to any appreciable deterioration are the flexible sealing members fitted to the piston head, and those contained within the front end cover.

Replacement of Seals:

NOTE: GENERALLY REPLACEMENTS MAY BE FITTED WITH THE CYLINDER IN SITU. ALL SEALS MUST BE HANDLED CAREFULLY TO PREVENT DAMAGE TO THEIR SEALING EDGES.

Piston Head: Remove the end cover through which the piston rod emerges by unscrewing the four socket head screws. Withdraw front end cover, piston rod and piston head assembly from cylinder barrel. Remove the whole piston head assembly from the shaft by unscrewing the three socket head screws.

Replace the seals on each of the two halves of the piston head, taking care to re-assemble the seals with their flared sealing lips pointing away from each other.
Replace the piston head assembly on the shaft, taking care to locate the split ring in both the shaft and the tapped half of the piston head.

Tighten the three socket head screws securely, Replace the piston head assembly and front end cover into the cylinder barrel, making sure that the piston head seal lips are not pinched between piston head and barrel.
Finally, tighten end cover fixing bolts evenly corner to corner.

Shaft Seal and Wiper Ring: Remove the wiper ring and shaft seal retaining circlip from the end cover through which the piston rod emerges. Apply air to the front of the cylinder. This will eject both the wiper ring, cage and shaft seal. Be sure and remove the air supply from both ends of the cylinder at this stage.

Wrap a strip of thin material over the piston rod flats and slip shaft seal onto rod, ensuring that the flared sealing lips face away from the screwed end of the piston rod.
Wrap a strip of thin material inside nose of the front end cover to protect the larger diameter sealing lip of the seal whilst sliding over the circlip groove.

Fit new wiper seal in cage and replace sub-assembly in end cover, making sure that leading edge of the seal projects through larger diameter of cage and towards screwed end of piston rod - replace circlip.

Cushion Seals - Blank End Cover:

Remove from cylinder by unscrewing the four socket head screws. Remove circlip spring washer and bonded cushion seal. Replace seal taking care that the metal insert faces towards the back of the end cover. Replace spring washer and circlip. Re-assemble and assembly, tightening each screw evenly corner to corner.

Cushion Seals - Front End Cover:

Remove from cylinder dismantle piston head assembly. Remove and replace cushion seal as already described. Re-assemble piston head and replace whole assembly as described previously.

NOTE: ON NO ACCOUNT MUST THE SHAFT BE REMOVED FROM THE END COVER. IF THIS HAPPENS THE NECK PACKING SEALS WILL BE DAMAGED - NECESSITATING REPLACEMENT.

LOCATION OF SUSPECTED LEAKS.

Piston Head:

Remove each port connection in turn and test for leak. Subject to bubble test if necessary by leading connections from end cover into still water.
Replace defective seals as described before re-assembly, ensure that the cylinder bore is perfectly free from all foreign materials. Should the cylinder continue to leak past the piston head after replacement seals are fitted, return it to the Works for inspection.

Front End Assembly

Test for leakage by connecting air to front end cover or cylinder and applying soapy water around the rod where it emerges from the end cover. Presence of bubbles indicates a leak. Replace defective seal as described. If leak persists, return cylinder to Works for inspection.

Worm Gear Unit for Electrically Operated Discharge Door:

Oil level should be checked at regular intervals. After initial 500 hours of operation gear unit should be drained and refilled with SHELL "VITREA" 79. Capacity 6.8 litres (12 pints) thereafter every six months or 5000 hours.

LUBRICATION & SERVICING SCHEDULE

DAILY or 24 hours

GENERAL	Thoroughly clean the inside and outside of the mixer paying particular attention to mixing and scraper blades. Give mixer a coating of equal parts of paraffin and engine oil. Apply a little engine oil to all moving parts, pin joints on discharge doors etc.
DISCHARGE DOOR	*Use grease gun - 2 nipples (each door)
AIR VALVE TOP & BOTTOM PLATE.	*Use grease gun - 2 nipples (each door)

WEEKLY or 200 hours

SPUR GEARBOX	Check oil level using sight glass, top up if neceesary. For access See Page 5. Top up with recommended oil only. See Page 5.
WORM GEARBOX	Check oil level using sight glass, top up if necessary. For access see Page 6. Top up with recommended oil only see Page 6. Turn Stauffer several times, Refill with Shell Livona 3.

MONTHLY or 800 hours

WORM GEARBOX	*Top bearing grease nipple using grease gun - one nipple. For access see Page 6.
HARDY SPICER	*Use grease gun - three nipples

SIX MONTHLY or 5000 hours

WORM GEARBOX	Change oil in gearbox. See page 6.
SPUR GEARBOX	Change oil in gearbox. See page 5
MOTOR	*Use grease gun - one nipple
WORM GEAR UNIT FOR ELECTRICALLY OPERATED DISCHARGE DOOR.	Change oil in Gear Unit See Page 11.

*SHELL "ALVANIA" Grease No. 2 or "UNEDO" Grease No. 2

Spares

Please note that a number of components are described as being c/w screws, nuts and washers, this is no longer the case and all fixings should be ordered separately if required. Imperial fixings may no longer be available and the nearest metric equivalent will be supplied.

TO FIND A SPARE PART

The assemblies on this machine have been divided into groups and given identification letters A B and C etc. To identify a component first find the relevant assembly in the list given on this page. This will give you a groups letter to turn to. On turning to this group, the illustrations will enable you to identify the part you require and give you a reference number. Against this number in the parts list will be found DESCRIPTION and PART NUMBER information which we require.

SPARE PARTS ILLUSTRATIONS.

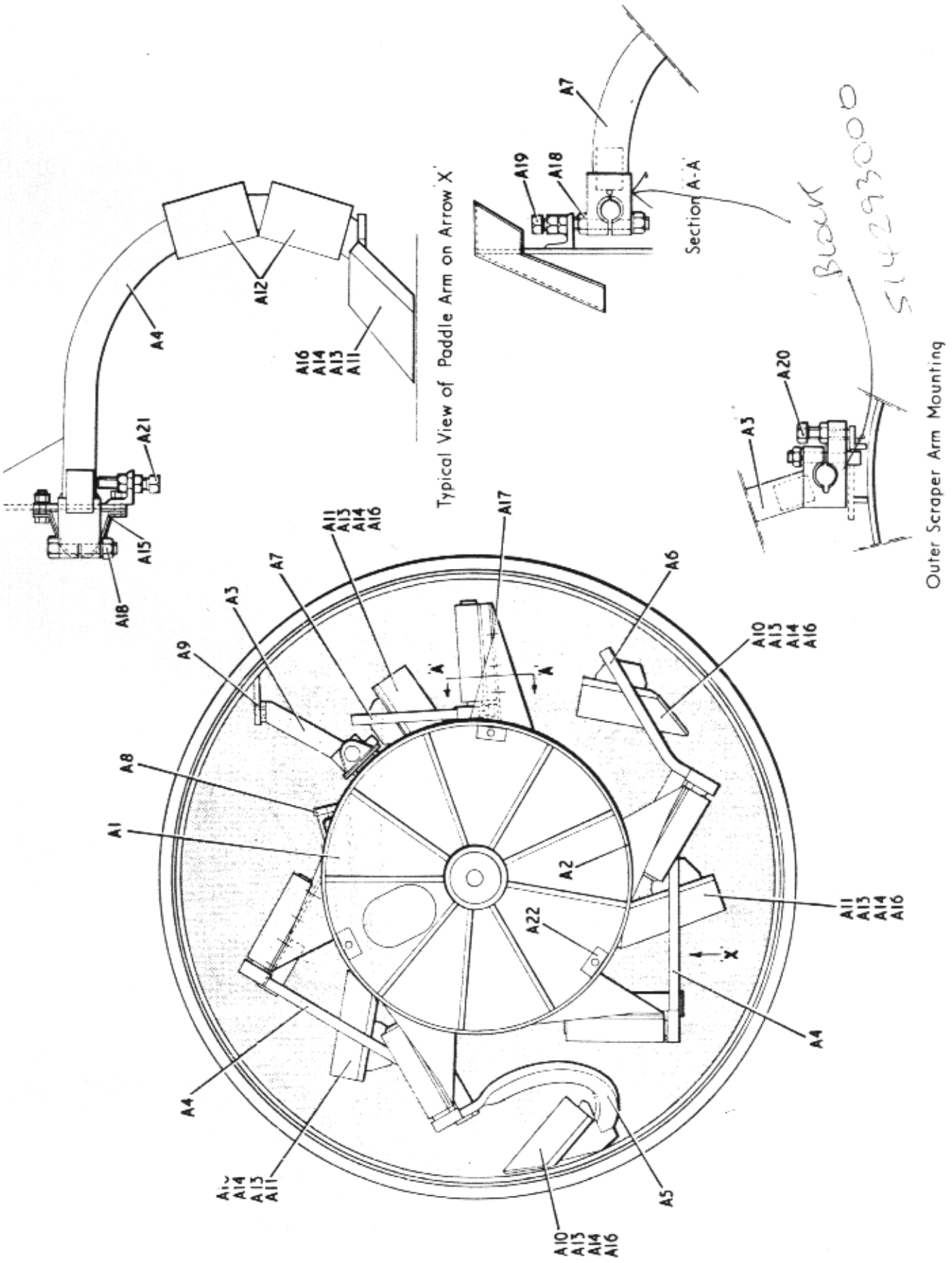
GROUP A	ROTOR PADDLE ARMS & BLADES (SOLID TYPE ROTOR) ROTOR PADDLE ARMS AND BLADES WITH SHEAR PINS
GROUP B	GEARBOX UP TO MACHINE NO.68 GEARBOX FROM MACHINE NO. 69 GEARBOX OIL LEVEL ASSEMBLY
GROUP C	DRIVE ASSEMBLY
GROUP D	
GROUP E	DISCHARGE DOOR OPERATING RAM
GROUP F	AIR OPERATED DISCHARGE DOOR ELECTRICALLY OPERATED DISCHARGE DOOR
GROUP G	PAN AND WEARING PLATES PAN BOTTOM WEARING PLATES
GROUP H	WORMBOX
GROUP J	ANCILLARY EQUIPMENT
Group K	WORM GEAR UNIT FOR ELECTRICALLY OPERATED DISCHARGE DOOR.

ROTOR PADDLE ARMS & BLADES — GROUP 'A'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
A1	1	Rotor (Solid Type)	514-3173
A2	1	Cover Plate for Rotor Centre	514-3172
A3	1	Outer Scraper Arm	514-2925
A4	2	Paddle Arm (No. 26)	514-2926
A5	1	Paddle Arm (No. 27/1)	514-2927
A6	1	Paddle Arm (No. 28)	514-2928
A7	1	Paddle Arm (No. 29)	514-2929
A8	1	Inner scraper blade - outer complete with hex. hd. bolts, nuts sp. and plain washers	514-3171
A9	1	Outer scraper blade - inner complete with hex. hd. bolts, nuts, sp. and plain washers	514-1578
A10	2	RH Paddle Blade - Outer	514-2957
A11	3	LH. Paddle Blade - Inner	514-2956
A12	10	Mixing Arm Wearing Plate	514-1331
A13	10	Bolt for Paddle Blade	514-1624
A14	10	Paddle Blade Washers	514-1625
A15	6	Flexitor Unit No. 10 less arm and studs complete with hex. hd. bolts, Binx nuts and plain washers	220-705000
A16	10	Hex. Binx Nut	330-110000 3357608
A17	8	Hex. Hd. Bolts with Binx Nuts and plain washers	460-550818
A18	6	Hex. Hd. Bolt (H.T.) Hex. Nut and spring washer	460-551026
A19	1	Hex. Hd. Setscrew with Hex. Nut	418-351016
A20	1	Hex. Hd. Setscrew with Hex. Nut	418-351020
A21	4	Hex. Hd. Setscrew with Hex. Nut	418-351024
A22	3	Hex. Hd. Setscrew with spring and plain washers	418-350605
A23	1	Rotor (shear pin type)	514-3174
A24	1	Rotor Hub	514-3175
A25	1	Rotor Retaining Plate	514-3176
A26	3	Shear Pin	514-3177
A27	1	Cover Plate for Rotor Centre	514-3172
A28	6	Headless Press Fit Bush up to M/c No.	514-3354/2
		" " " " from M/c No.	114-701000
A29	1	90° Grease Nipple	333-502000

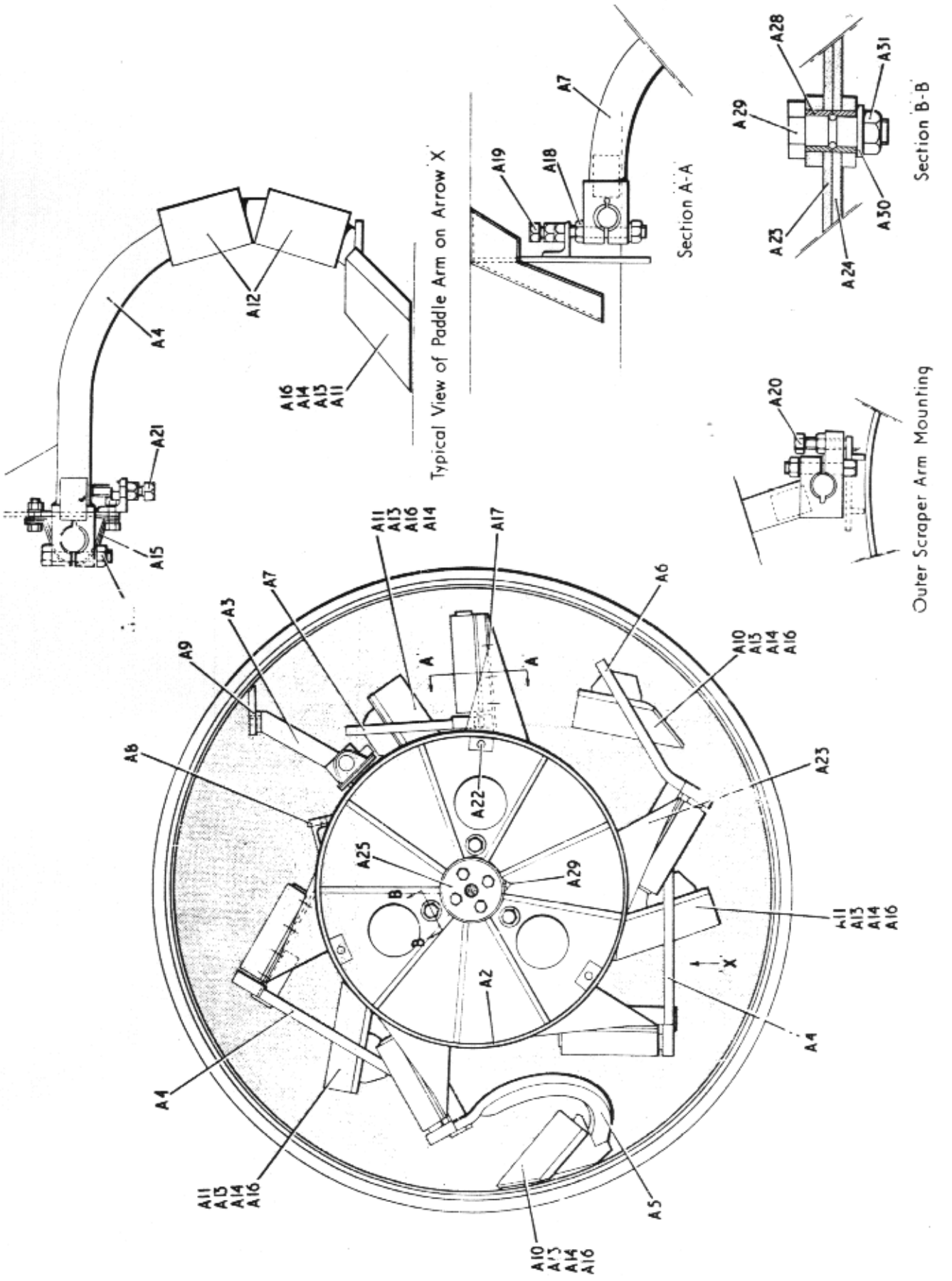
REF NO	NO. PER MACHINE	DESCRIPTION	PART NO.
A30	3	Bright M.S. Plain Washers	463-312000
A31	3	Hex Binx Nut	330-361200

GROUP A



ROTOR PADDLE ARMS & BLADES (SOLID TYPE)

GROUP A



ROTOR, PADDLE ARMS & BLADES WITH SHEAR PINS

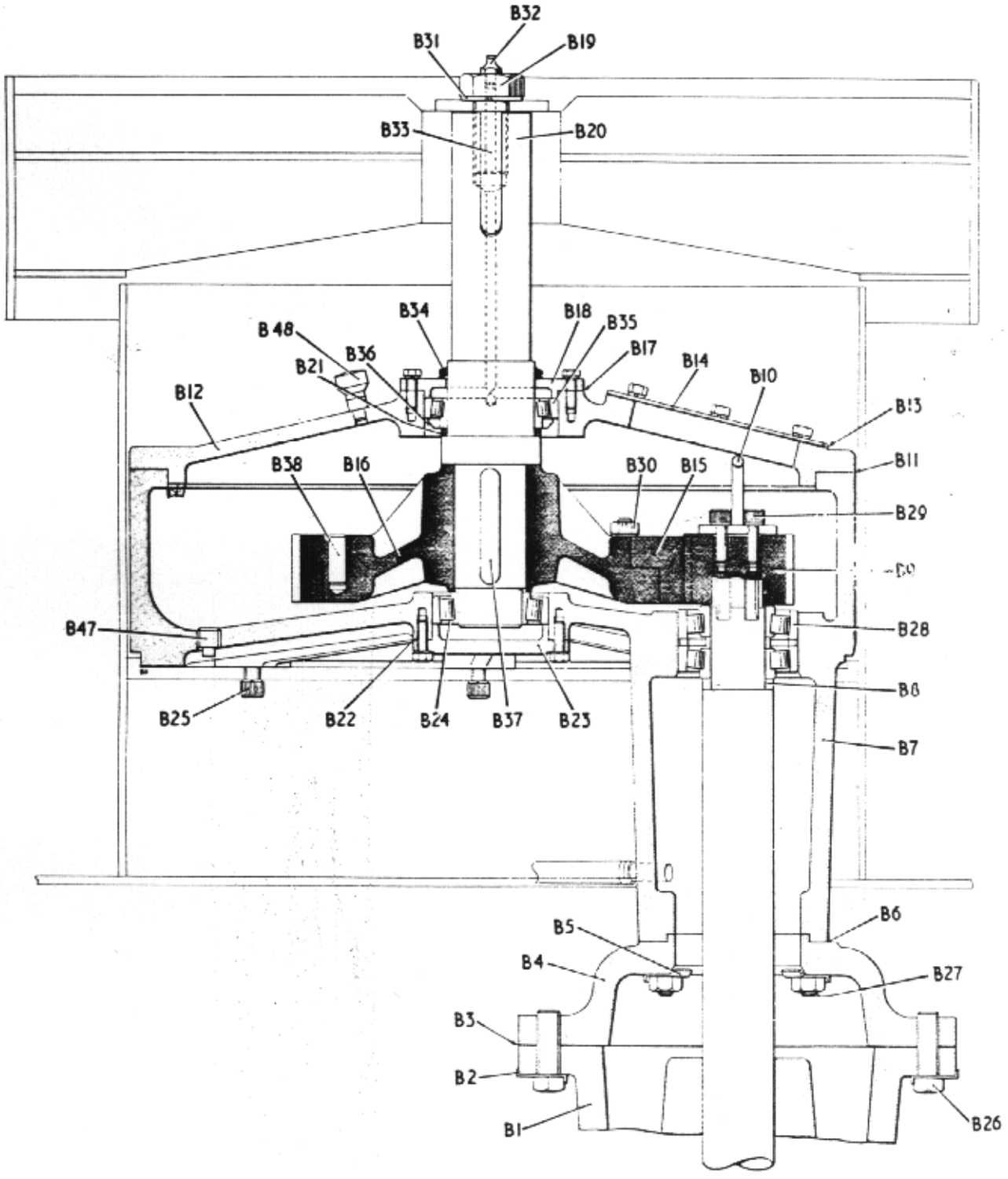
W5143352∞ Assy

GEARBOX GROUP 'B'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
B1	1	Moss Gear Unit	514-3229
B2	4	Tab Washer	514-2981
B3	1	Gasket - Moss Gear	514-3224
B4	1	Adaptor	514-3351
B5	6	Tab Washer for Adaptor	514-3223
B6	1	Gasket - Gearbox to Adaptor	514-3225
B7	1	Gearcase - Lower Half	514-3352
B8	1	Thrust Washer	514-3221
B9	1	Gearbox Pinion (21T)	514-3220
B10	1	Lifting Eye	514-3081
B11	1	Gearcase Gasket	514-3226
B12	1	Gearcase - Upper half complete with hex. hd. setscrews and spring washers	514-3213
B13	1	Access Cover Gasket	514-2983
B14	1	Access cover complete with setscrews and spring washers	514-2982
B15	1	Gear Ring (84T)	514-3218
B16	1	Gear Ring Hub	514-3214
B17	1	Bearing Retainer Gasket (Upper)	514-3227
B18	1	Bearing retainer (upper) complete with hex. hd. bolts and spring washer	514-3217
B19	1	Rotor Setscrew	514-2993
B20	1	Rotor drive shaft	514-3219
B21	1	Spacer	514-3222
B22	1 set	Bearing Retainer Shims (Lower)	514-3228
B23	1	Bearing Retainer (lower) complete with hex. hd. bolts and spring wasyers	514-3216
B24	1	Bearing (2·25 Bore	119-110000 Timken 462·453
B25	7	Socket Head capscrews with spring washers	404-750824
B26	4	Hex. Hd. H.T. Setscrew	460-551218
B27	6	Stud Type 'A' (H.T.) complete with Hex. Nuts.	411-910200
B28	1	Bearing	119-109000
B29	2	Socket Hd Capscrews	404-708220
B30	6	Stud Type 'B' complete with Binx Nuts and Plain Washers	411-908200

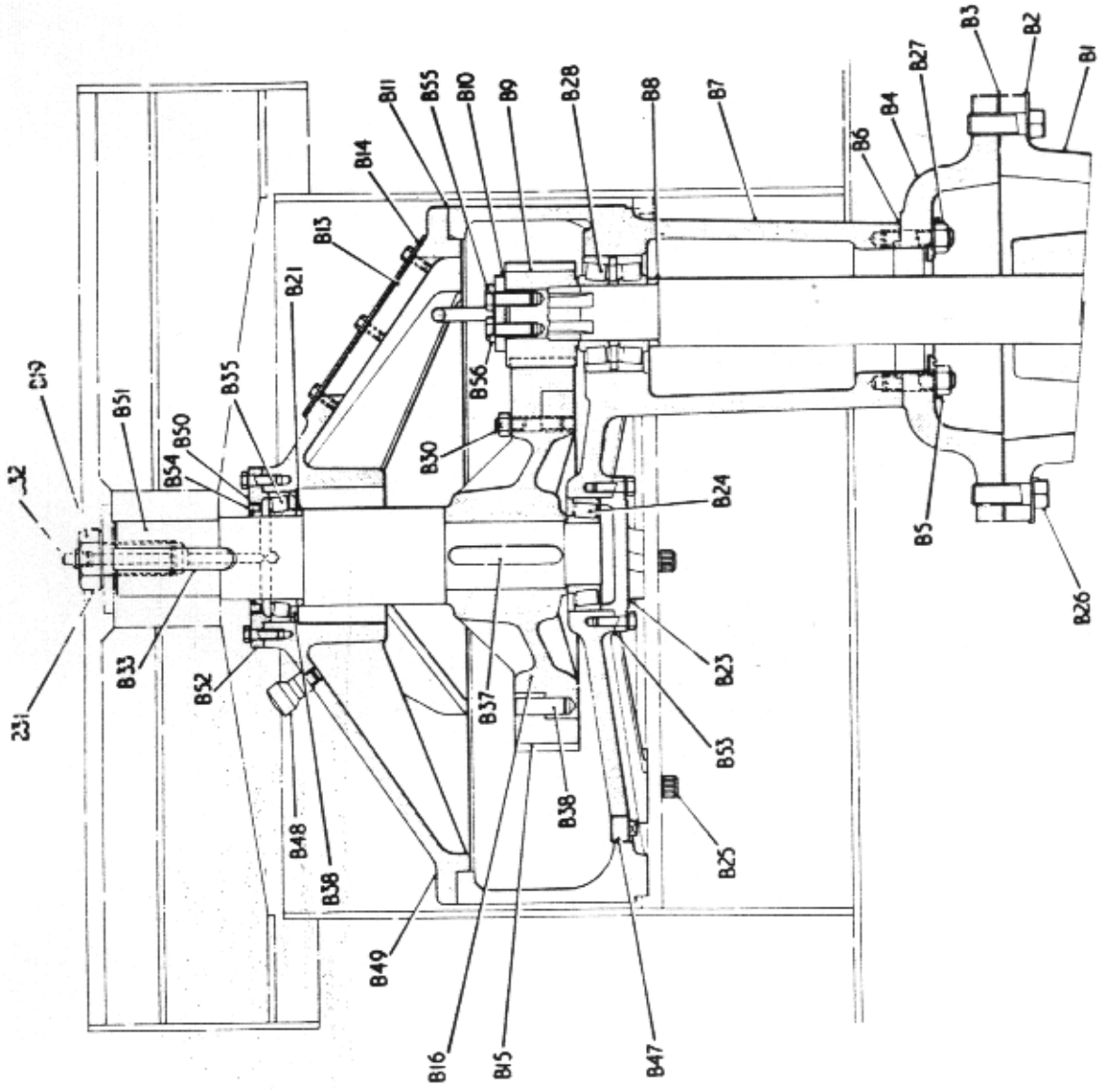
GROUP 'B'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
B31	1	Spring Washer	464-320000
B32	1	Straight Hydraulic Grease Nipple	333-1046
B33	2	Parallel Key 1 End Radius	304-123400
B34	1	Vee Ring Seal	417-772000
B35	1	Bearing (TAPER ROLLER) SINGLE ROW STRAIGHT 3" BORE (PER TIMKEN 34300 34478)	119-111000
B36	1	Ring	391-601000
B37	2	Parallel Key Radius Ends	330-511033
B38	2	Silver Steel Dowel	353-210150
B39	1	Reduction Box oil filler pipe complete with hex. hd. bolts, nuts and sp. washers	512-1307
B40	1	Plastic Cap	512-1309
B41	1	Oil Filler Pipe	514-3065
B42	1	Self Adhesive Oil Level Plate	514-3364
B43	1 length	Clear Acrylic Tube 7 ft. long	260-802000
B44	2	Hose clips	132-101000
B45	3	Single Ended Clip	148-266000
B46	3	Rd. hd. setscrews with nuts and sp. washers	402-431012
B47	1	Drain Plug	241-706003
B48	1	Breather	241-045200
B49	1	Gearcase upper half complete with hex. hd. setscrews and sp. washers	514-3438
B50	1	Bearing retainer upper complete with hex. hd. bolts and spring washers	514-3440
B51	1	Rotor Drive Shaft	514-3439
B52	1 set	Bearing retainer shims	514-3443
B53	1	Lower Bearing Retainer Gasket	514-3442
B54	1	Oil Seal	417-182000
B55	2	Hex Hd. Setscrews	418-250810
B56	1	Tab Washer	514-3390



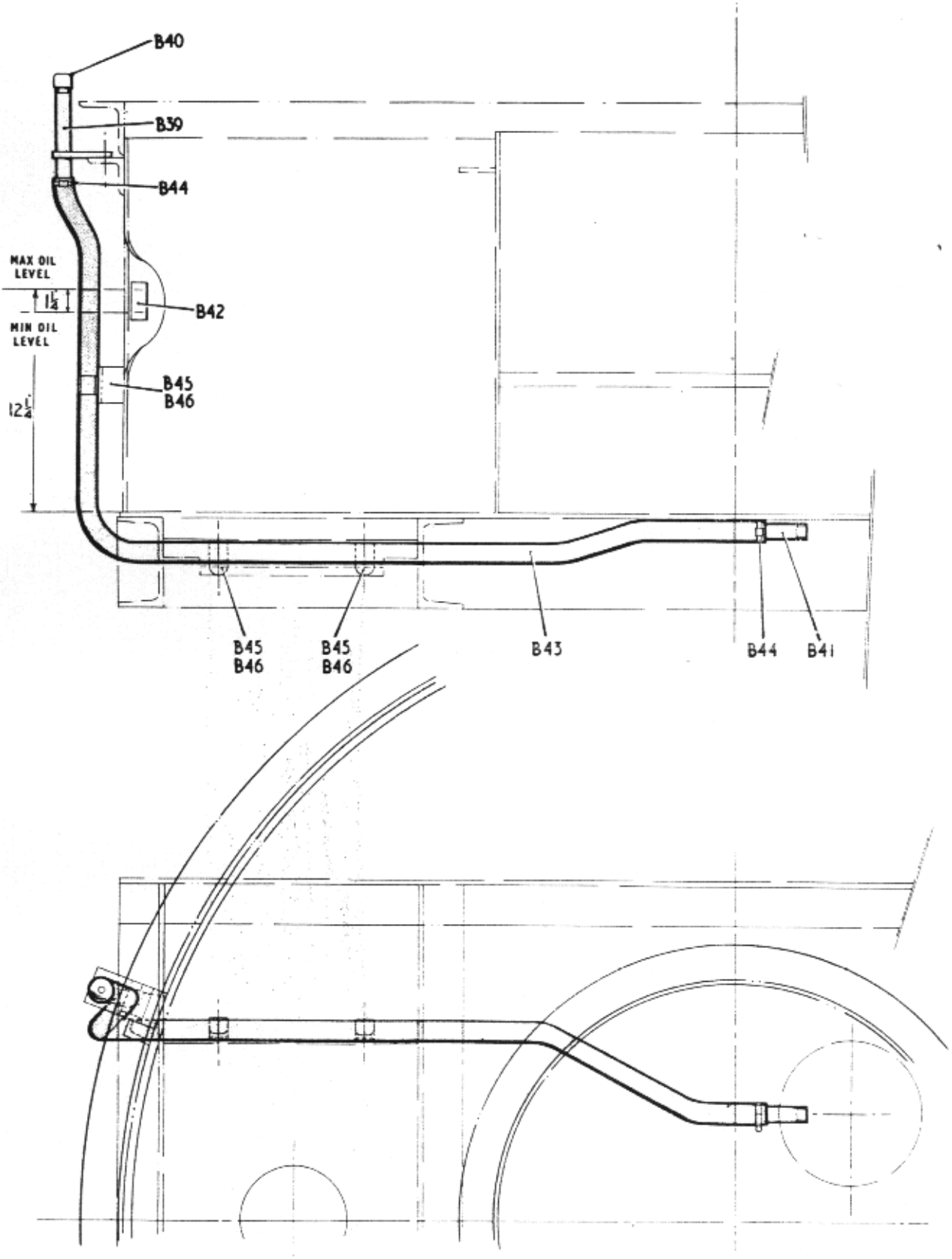
UP TO MACHINE N°68

GROUP B



FROM MACHINE N°69

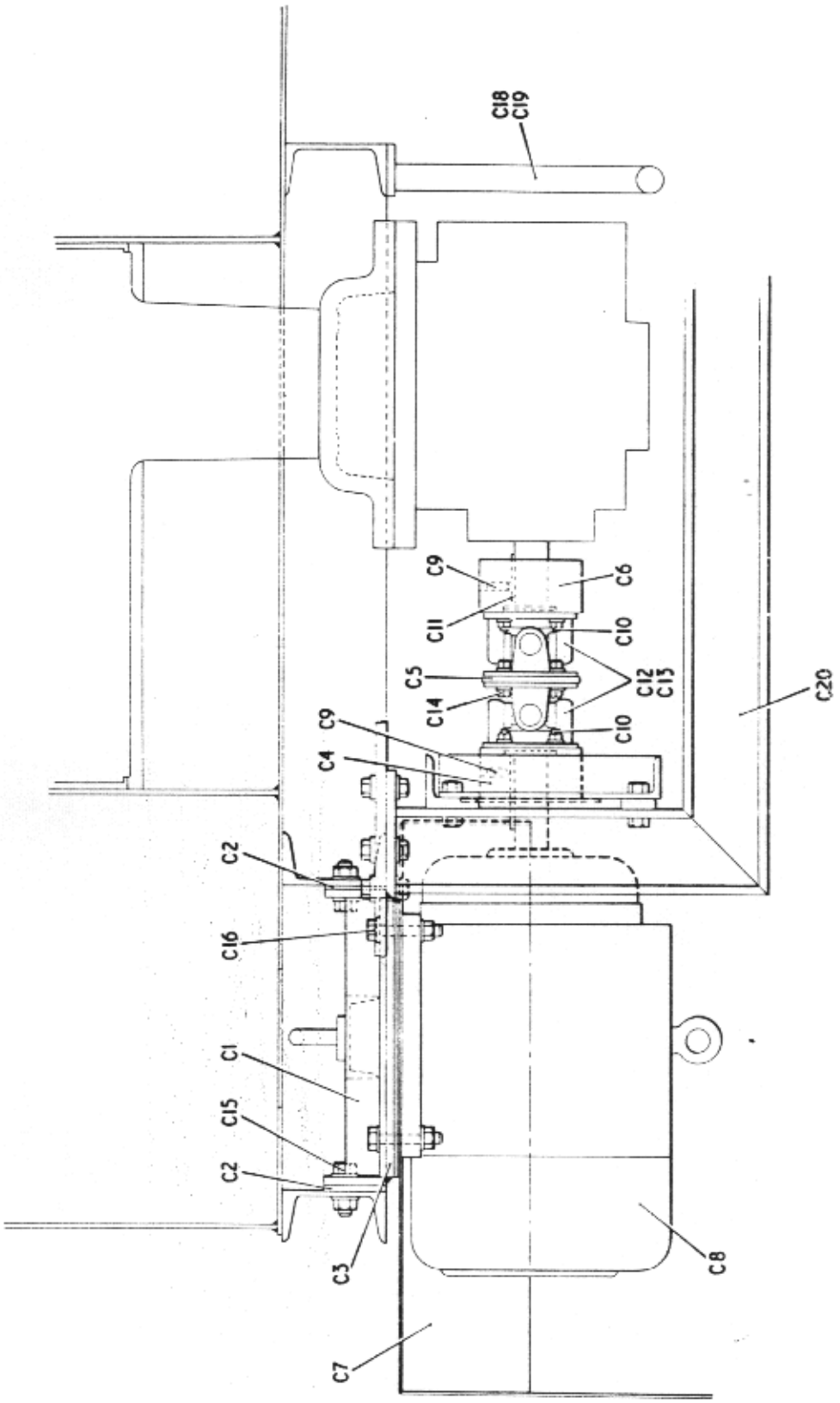
GROUP B



GEARBOX OIL LEVEL ASSEMBLY

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
C1	1	Motor Mounting	514-3204
C2	2	Motor Mounting Packers	514-3205
C3	1 set	Packers for Motor	514-3208
C4	1	Half coupling for motor	514-3206
C5	1	Spacer	514-3111
C6	1	Half Coupling for Worm Unit	514-3207
C7	1	Water Cover for Motor	514-3209
C8	1	Electric Motor B.S. Metric T.E.F.C.	
		either ASEA M1602 20 HP at 1450 r.p.m. NEWMAN D160L " " " " BROOKS D160L " " " "	
C9	2	Cone Point SKT Setscrews	403-360616
C10	8	Stud H.T. Thread Each End complete with Binx Nut and Plain Washers	411-350750
C11	1	Parallel Key - Square Ends	304-901000
C12	2	Hardy Spicer Joint } KR1350 To Drwg no SK772/B	130-956000
C13	2 per shaft	Hardy Spicer Unit Pack }	352-201000
C14	4	Hex. hd. bolts with Binx nuts and plain washers H.T.	460-350712
C15	6	Hex. hd. bolts with nuts sp. and plain washers H.T.	460-351016
C16	4	Hex. hd. bolts and Binx nuts and 2 plain washers H.T.	460-351024
C17	4	Hex. Hd. Bolt H.T.	460-350822
* C18	1	Gearbox Protector	514-3231
* C19	4	Hex. hd. bolts with Binx nuts and taper washers H.T.	460-551014
		*Not used on machines with door to left or right of drive.	
C20	1	Mixer Support	514-3425
C21	10	Hex. Hd. Bolts with Binx Nuts, plain and taper washers	460-551014
C22	5	Hex Hd. Bolts with Binx nuts and plain washers	460-551010

GROUP C


C18
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C14
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C2
C16
C1
C15
C2
C3
C8
C7

DISCHARGE DOOR OPERATING RAM — GROUP 'E'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
E1	1	Cage (009805)	
E2	1	Neck Packing (014982)	
E3	1	Bearing Bush (009806)	
E4	2	Circlip (009803)	
*E5	1	Tube - 18" stroke	
E6	2	Distributor Seal (SP.66)	
E7	1	Follower (009796)	
E8	4	Screws (SP.71)	
E9	1	Retaining Ring (SP.668)	
E10	1	Wiper Ring (SP.67)	
E11	2	'O' Ring (SP.62)	
E12	2	Ring (M009802)	
E13	1	Head Tapped (MO 15874/3)	
E14	4	'O' Ring (SP.63)	
E15	1	Ring Split (009795)	
E16	1	Head (C Bored) (MO 15875/3)	
E17	1	Rod (cyl. type 18" stroke)	
E18	1	End (L.009808)	
E19	2	Cushion Seal (009798)	
E20	2	Retaining Ring SP 669	
E21	2	Washer (009800)	
E22	2	Circlip (SP 422)	
*E23	2	Sleeve 18" stroke	
E24	2	Escutcheon (009810)	
E25	4	Rivet (SP35)	
E26	2	'O' Ring (SP 94)	
E27	2	Screw (009809)	
E28	1	End (L009804)	

*for items marked thus when ordering quote length of stroke.

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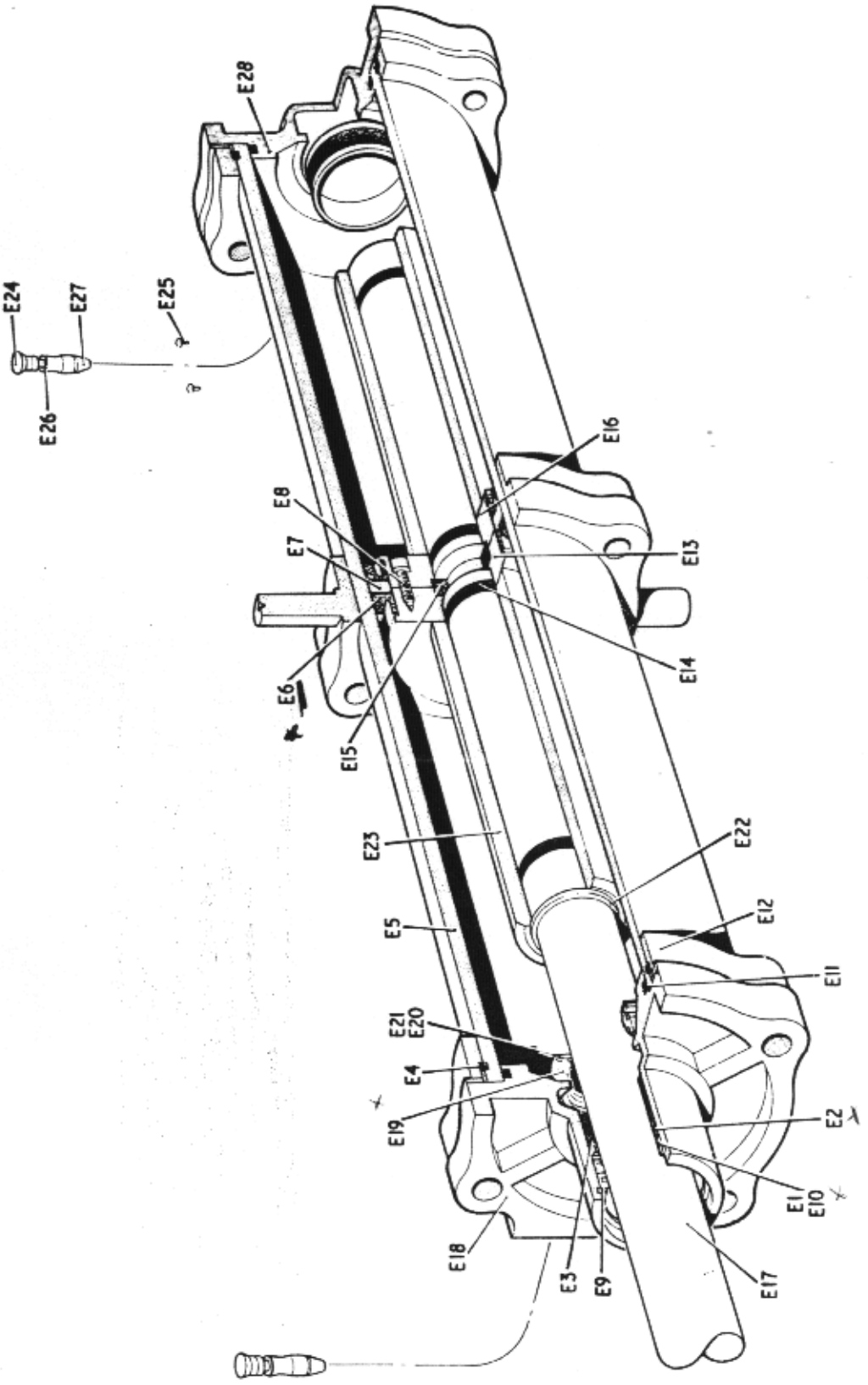


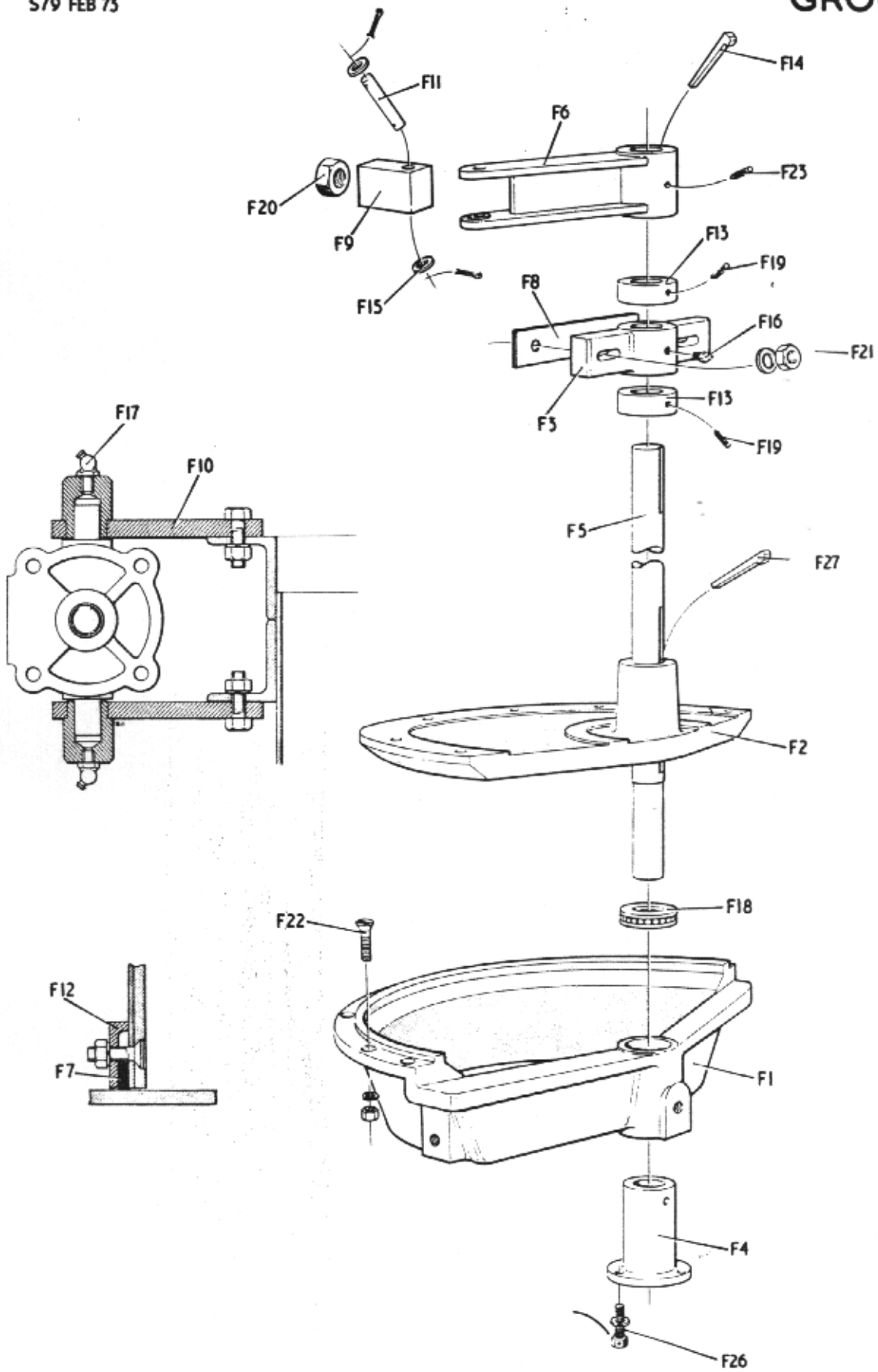
DISCHARGE DOOR OPERATING RAM

AIR & ELECTRICALLY OPERATED DISCHARGE DOOR — GROUP 'F'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
F1	1	Discharge Door Outlet	514-3180
F2	1	Discharge Door	~~514-3181~~ = use WS143488 + WS143489
F3	1	Door Shaft Bearing	514-3182
F4	1	Adjusting Sleeve complete with Hex. HD Setscrews with SP Washers	514-3183
F5	1	Door Shaft - Air Operated	514-3426
F6	1	Air Operated Door Lever	~~514-3185~~ 514349900
F7	1	Door Sealing Strip	514-3187
F8	1 set	Bearing Packer	514-3186
F9	1	Swivel Block	514-3145
F10	2	Air Cylinder. Pivot Plate complete with hex. hd. nuts and sp. washers	514-3148
F11	1	Swivel Block Pin	514-1539
F12	4	Sealing Strip Clamp	514-3036
F13	2	STD Collar No. 10T	-
F14	1	Gib HD Key	301-108360
F15	2	Plain Bright Washers complete with split pin	463-312000
F16	2	Straight Grease Nipple	331-042000
F17	2	35° angled Grease Nipple	337-520200
F18	1	Single Thrust Ball Bearint	111-210000
F19	2	Cone Pt. Skt. Hd. Setscrew	403-510812
F20	1	Locknut	331-218000
F21	2	Binx Nuts with Plain Washers	335-761000
F22	2	Csk Hd Screws complete with Nuts and Spring Washers	400-250812
F23	1	Cone Pt. Skt Hd Setscrew	403-560610
F24	1	Baldwin Air Cylinder	~~137-118041~~
F25	1	Discharge Chute complete with hex hd setscrew and spring washers (not illustrated)	137197000 514-3244
F26	4	Special Setscrews complete with locking wire and spring washers	514-3345/1
F27	1	Gib hd key	300-308401
F28	1	Discharge door shaft electrical operated	514-3448
F29	1	Mods. to Mixing Pan - For electrically operated door. (not illustrated)	514-3428
F30	1	Mounting	514-3449

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
F31	2	Hex hd HT Grade 5 Bolts with Binx Nuts and 2 plain washers	460-551018
F32	2	Hex. Hd. H.T. Grade 5 Bolts with Binx Nuts and 2 Plain Washers	460-551016
F33	1	Half Coupling	514-3369
F34	1	Half Coupling	514-3376
F35	1	Cover complete with hex. hd. bolts hex nuts and spring washers	514-3367
F36	2	Operating arm complete with hex hd bolts hex nuts and spring washers	514-3366
F37	1	Spacer	514-3447
F38	1	Geared Motor	267-106000
F39	4	Hex Hd HT Grade 5 Bolts complete with Binx Nuts and Plain Washers	460-551018
F40	1	Cone Pt Skt Setscrew	403-560812
F41	1	Rectangular Key	304-108320
F42	1	Cone Pt. Skt. Setscrew	403-560610
F43			
F44	2	Collars	145-501000
F45	1	Cone Pt. Skt. Setscrew	403-510811
F46	1	Gib Hd. Key	301-108401
F47	2	Limit Switches	208-532000
F48	4	Raised Cheese Hd Screw with Hex Nuts and spring washers	407-461016

GROUP F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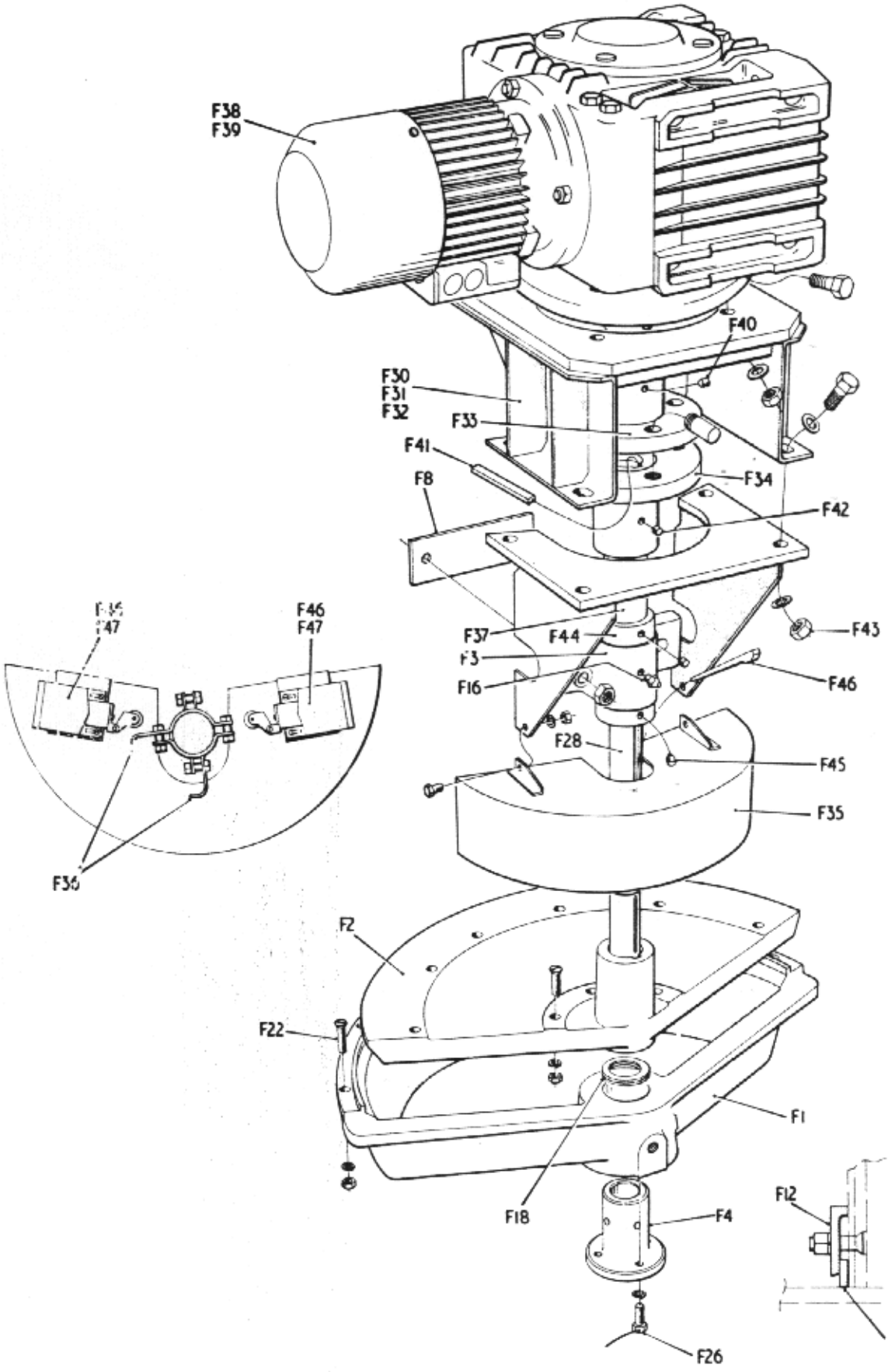
GROUP F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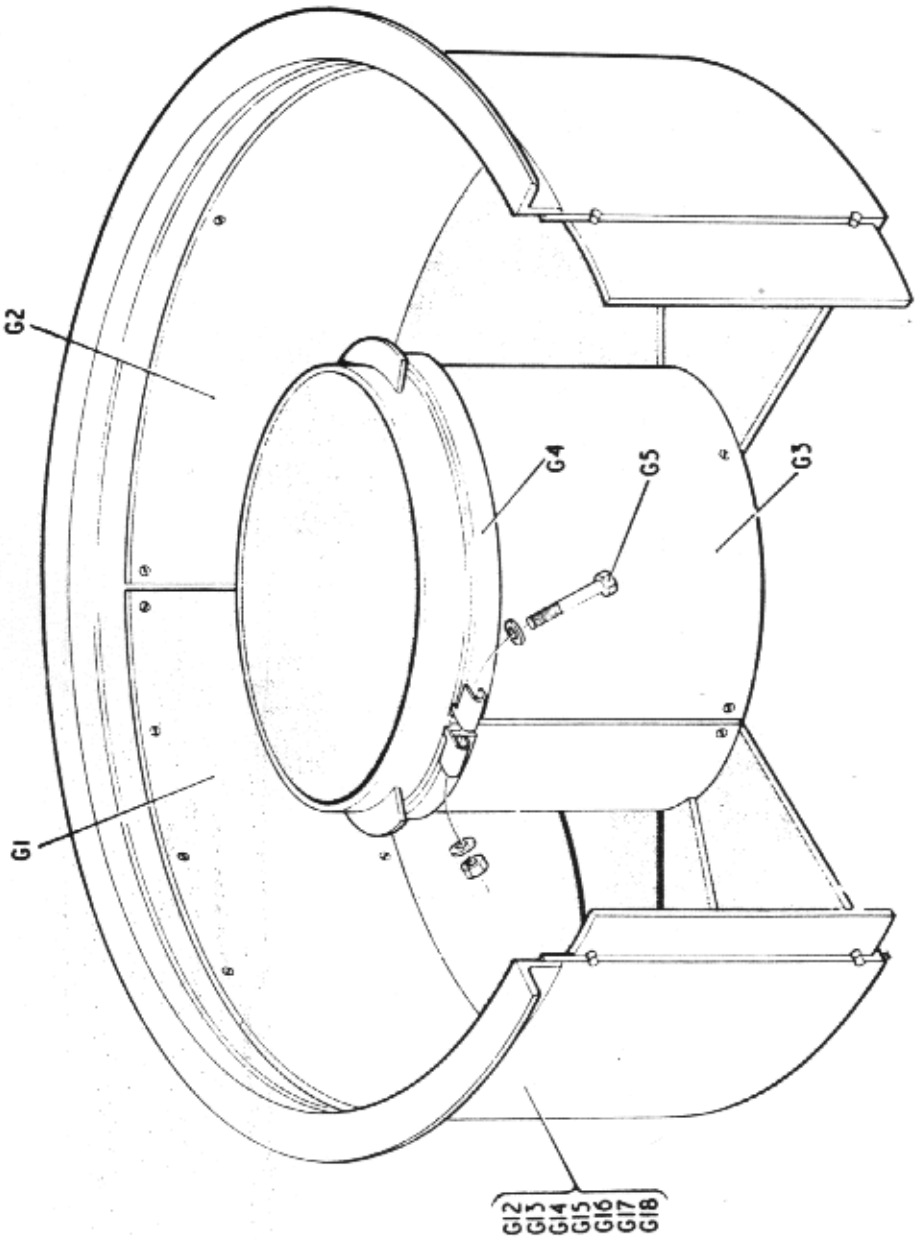
F26

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
G1	1	Outer Wearing Plate at door opening (single Door) complete with CSK HD Bolts, Nuts and Spring Washers	
	2	(2 door)	
	3	(3 Door)	514-3164
G2	3	Outer Wearing Plate (single door) complete with CSK HD Bolts Nuts and Spring Washers	
	2	(2 door)	
	1	(3 door)	514-3165
G3	2	Inner shroud wearing plate, complete with CSK HD Bolts nuts and spring washers	514-3156
G4	2	Strap for inner wearing plate	514-3154
G5	2	Hex HD Bolt, Binx Nut and 2 plain washers	460551046
G6		Door Wearing Plate	514-3166
	1	Diagram 1.	
	1	Diagram 2.	
	1	Diagram 3.	
	2	Diagram 4.	
	2	Diagram 5.	
	2	Diagram 6.	
	3.	Diagram 7.	
G7		Bottom Wearing Plate - Near Door Opening	514-3167
	1	Diagram 1.	
	1	Diagram 2.	
	1	Diagram 3.	
	2	Diagram 4.	
	2	Diagram 5.	
	2	Diagram 6.	
	3	Diagram 7.	
G8		Bottom Wearing Plate	514-3168
	3	Diagram 1.	
	3	Diagram 2.	
	3	Diagram 3.	
	2	Diagram 4.	
	2	Diagram 5	
	2	Diagram 6.	
	1	Diagram 7.	

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
G9		CSK Hd. Screws complete with nut and spring washers.	400-250810
	22	Diagram 1.	
	22	Diagram 2.	
	22	Diagram 3.	
	20	Diagram 4.	
	20	Diagram 5.	
	20	Diagram 6.	
	18	Diagram 7.	
G10		CSK Hd. Screw complete with nut and spring washer	400-250812
	9	Diagram 1.	
	9	Diagram 2.	
	9	Diagram 3.	
	18	Diagram 4.	
	18	Diagram 5.	
	18	Diagram 6.	
	27	Diagram 7.	
G11		CSK Hd. Screw complete with nut and spring washers	400-250816
	5	Diagram 1.	
	5	Diagram 2.	
	5	Diagram 3.	
	10	Diagram 4.	
	10	Diagram 5.	
	10	Diagram 6.	
	15	Diagram 7.	
G12	1	Mixing pan single door opposite drive	514-3396
G13	1	Mixing pan single door to left of drive	514-3395
G14	1	Mixing pan single door to right of drive	514-3397
G15	1	Mixing pan 2 doors, one to right and one to left of drive	514-3399
G16	1	Mixing pan 2 doors one opposite and one to left of drive	514-3398
G17	1	Mixing pan 2 doors one opposite and one to right of drive	514-3900
G18	1	Mixing pan 3 doors, one opposite one to left and one to right of drive	514-3401

GROUP G



○ G9 ● G10 ◔ G11

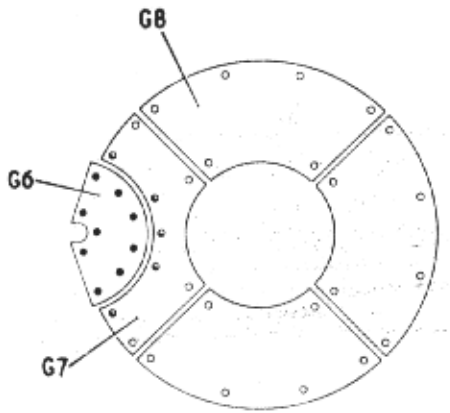
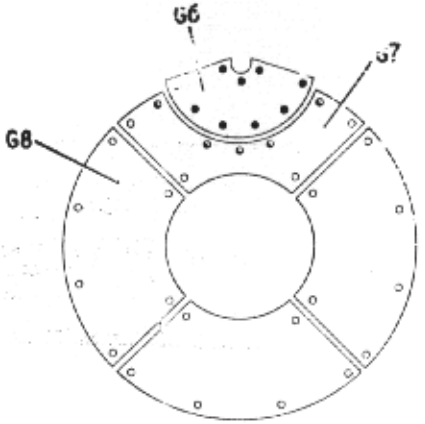
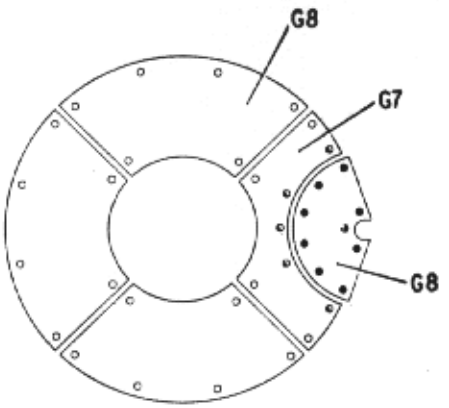


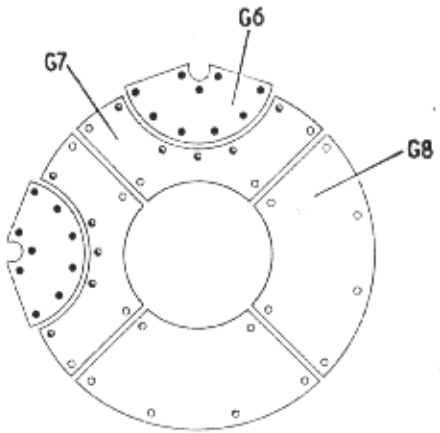
DIAGRAM (1) One Door Left of Drive



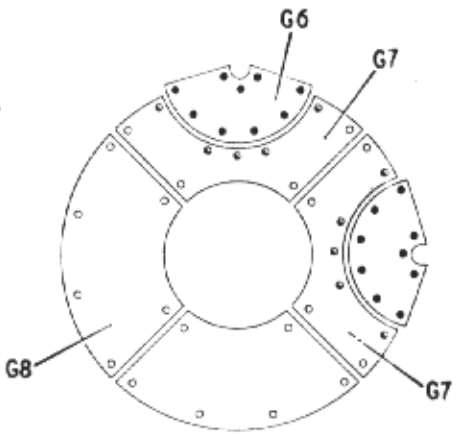
(2) One Door Opposite Drive



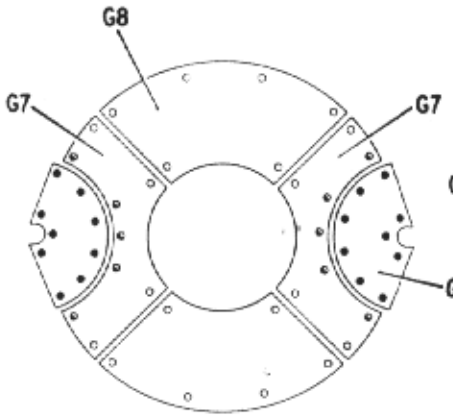
(3) One Door Right of Drive



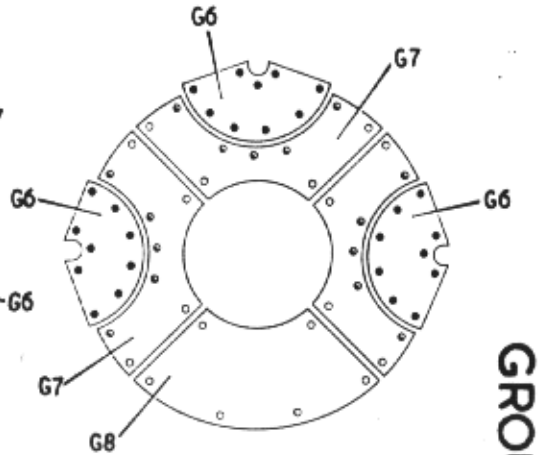
(4) Two Doors One Left & One Opposite Drive



(5) Two Doors One Right & One Opposite Drive



(6) Two Doors One Right & One Left of Drive



(7) Three Doors One Left, One Right & One Opposite Drive

PAN BOTTOM WEARING PLATES

GROUP G

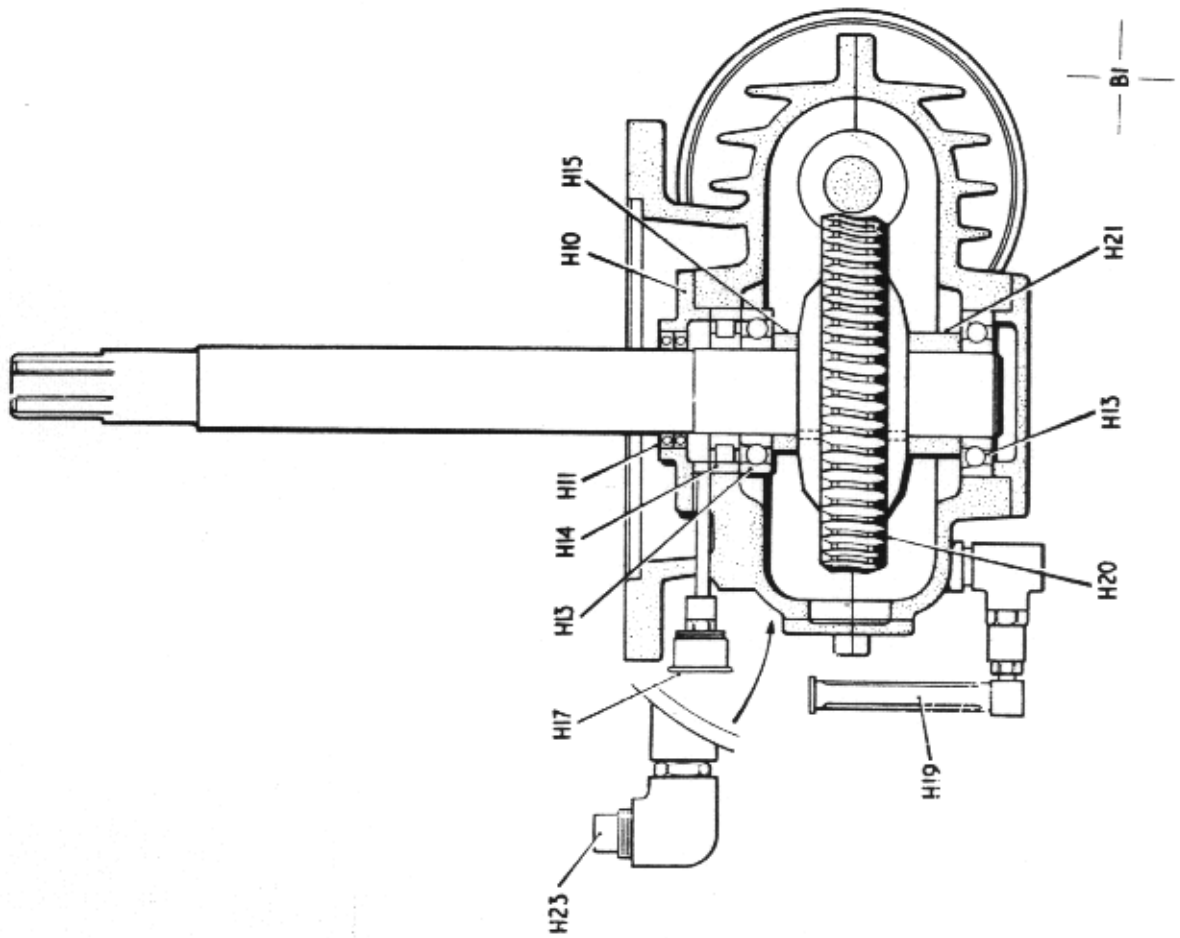
W2541294OO Box

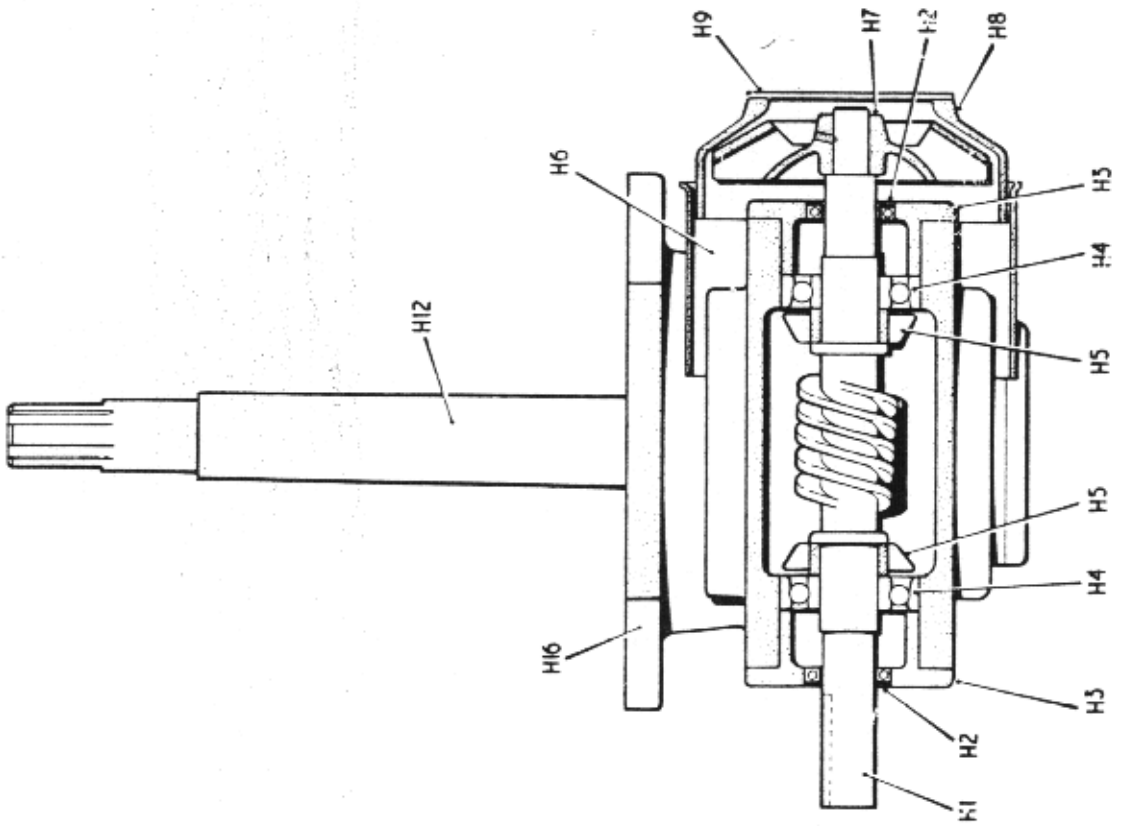
WORM BOX

GROUP 'H'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
H1	1	Wormshaft C 32860	-
H2	2	Wormshaft oil seal 250116	-
H3	2	Wormshaft open cover - B36560	-
H4	2	Wormshaft ball bearing MS 13½ AC	-
H5	2	Oil Flinger B4462	-
H6	1	Deflector - C 9765	-
H7	1	Fan - C7584	-
H8	1	Fan Cowl - C 9745	-
H9	1	Air Inlet Guard	-
H10	1	S.S.S. Open Cover B36949	-
H11	2	S.S.S. Oil Seal 337216N/12	-
H12	1	Slow Speed Shaft D.36943	-
H13	2	S.S.S. Ball Bearing 165AC	-
H14	1	S.S.S. Roller Bearing R165	-
H15	1	Spacing Washer Narrow B4460	-
H16	1	Gear Case - F36947	-
H17	1	Stauffer Lubricator	-
H18	1	Inspection Cover B2854	-
H19	1	Oil Sight Gauge	-
H20	1	Worm Wheel B32859	-
H21	1	S.S.S. Spacing Washer Wide B4459	-
H22	1	S.S.S. Blank Cover B.32557	-
H23	1	Filler and Breather.	

GROUP H


B1
H15
H10
H21
H13
H11
H4
H5
H20
H17
H19
H23


H9
H7
H2
H8
H6
H5
H4
H12
H5
H5
H4
H16
H3
H2
H1

ANCILLARY EQUIPMENT (NOT ILLUSTRATED) GROUP 'J'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
J1	1	Three Positioned Index Five Port-Air Valve	450-495
J2	2	Exhaust Hoods	450-4033
J3	1	Oil Fog Vitalizer Unit	451-502
J4	2	Reducing Bush	240-504202
J5	7	Hose Connector (Brass)	130-3044
J6	1	Rubber Hose 20'0" long	260-303
J7	7	Jubilee Clip	132-100

NOTE: Single discharge door only.

WORM GEAR UNIT FOR ELECTRICALLY OPERATED DISCHARGE DOOR. GROUP 'K'

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
K1	1	1st stage gear pinion	
K2	1	1st stage gear wheel	
K3	1	Worm Shaft	
K4	1	Worm Wheel	
K5	1	Wheel shaft 102 317 9	
K6	1	Feather Key (with second shaft) 010 0447	
K7	1	Oil seal (with second shaft) 010 664 X	
K8	1	Oil seal (with second shaft) 010 636 4	
K9	1	Mounting flange 102 309 8	
K10	1	Feather key 010 045 5	
K11	12	Hex Hd. Screw 010 160 5	
K12	2	Gasket 102 325 X	
K13	1	Bearing cover (not with second shaft) 102 313 6	
K14	10	Hex. Hd. Screw 010 165 6	
K15	1	Gear case 102 306 3	
K16	1	Cover 102 307 1	
K17	1	Gasket 102 327 6	
K18	6	Screw 010 222 9	
K19	8	Sealing Washer 010 226 1	
K20	1	Breather Screw 010 467 1	
K21	1	Gasket 102 324 1	
K22	1	Eye bolt 010 231 8	
K23	1	Circlip 010 277 6	
K24	1	Feather Key 010 054 4	
K25	1	Circlip 010 326 8	
K26	1	Spacer 010 358 6	
K27	2	Tapered Roller Bearing 010 602 X	
K28		Shim 010 380 2 Shim 010 404 3 Shim 010 421 3	
K29	1	Bearing Cover 102 315 2	
K30	1	Gasket 102 326 8	
K31	1	Drain plug (magnetic) 010 779 4	
K32	2	Tapered roller bearing 010 600 3	

REF NO	NO PER MACHINE	DESCRIPTION	PART NO.
K33	1	Distance Piece 102 323 3	
K34		Shim 010 383 7 Shim 010 407 8 Shim 010 423 X	
K35	2	Pin 010 757 3	
K36	4	Locking Washer 010 993 2	
K37	4	Hex. hd. screw 010 123 0	
K38	1	Oil flinger 010 771 9	
K39	1	Oil Seal 010 617 8	
K40	4	Hex. head screw 010 105 2	
K41	1	Bearing cap 100 529 4	
K42	1	Input shaft	
K43	1	Feather Key 010 023 4	
K44	2	Ball bearing 010 523 6	
K45	1	Input housing 100 555 3	
K46	1	Feather Key	
K47	2	Nilos Ring 010 723 9	