Proper installation and maintenance of your Wysong and Miles Sander can mean added years to its productive life. This manual is designed to give you practical information in installing and maintaining your unit, so we strongly recommend following the instructions as closely as possible. The first few pages of this manual give instructions on installing and checking the operation of your sander, while the following pages are devoted to adjustments and periodic inspections and recommendations. If problems arise that are not covered in this manual please contact our Service Department as we want your sander to give complete satisfaction. In writing for information please refer to your serial number which is located above the oil reservoir on the left-hand end of the machine.

November, 1967

INSTALLATION OF MACHINE

The machine should be transported to the operating location if possible on the skids to make the handling easier. After the machine is directly over the operating position remove skids and lower machine to the mounting bolts, level the machine both longitudinally and horizontally and bolt securely to the foundation. After the machine has been leveled and properly located, assemble the table carriage rails and clean all bearing slides and exposed steel parts of rust preventative, lubricate machine thoroughly before putting it into operation.

This machine has two sumps - one located in the operating head and the other in the pump reservoir with an oil level line connecting the two sumps to maintain proper hydraulic oil level. The oil in the head doubles as the lubricant as well as an oil reservoir. All operating parts such as the drive chain, cylinder rods, bearings, shafts and control mechanism operate in a bath of oil.

The total capacity of the two sumps is approximately 90 gallons. Access is gained for filling the control head through the center inspection panel on the top of the machine. Fill control head until the oil begins to flow out the level flow line to the lower reservoir. After head is full, remove filler caps and fill lower sump till the oil level reaches center line of the oil lever indicator. Be sure to use a good grade of clean hydraulic oil which offers high resistence to oxidation and chemical deterioration. Use the oil having a viscosity of 225 at 150 SSU at 100° F. This is considered for operating temperatures between 50° and 90° F. Make certain that the oil is clean and free from chips, filings, paint, lint, sludge, water and other impurities. When changing oil be sure to strain oil through a microme filter or a screen of 200 mesh or finer. The hydraulic oil should be changed after the first two weeks of use to remove any scale or other impurities which may have been trapped in system, and twice or three times a year thereafter.

Connect machine to power supply and start belt motor. After belt motor is in operation start feed motor and note rotation of shaft. The direction of rotation can be determined by the arrow on the hydraulic pump body on the right-hand column of the machine. Do not permit pump to run in the wrong direction for any period of time as this will cause possible damage to the hydraulic pump. Once proper rotation is established the stroke motor and the table lift motor will operate properly in their indicated direction. (Reverse the power supply leads to change direction of rotation.)

OPERATING INSTRUCTIONS

After checking all the motors and controls proceed to install the sanding belt or belts being careful to observe the direction of rotation indicated by the arrows on the inside of the belt. After the belts are in position alignment can be obtained by adjusting the alignment pulley opposite the belt drive motor. A large handwheel is used for adjusting the belt tension and the alignment control is operated first by loosening the small handwheel in the vertical position and adjusting the handwheels which are in a horizontal position. This is, of course, done while moving the belt by hand to prevent damage of the belt. When proper alignment is noted start belt motor and re-check for proper alignment of the belt. Line the center of the stock to be sanded to the center of the table by use of the control handle which is a good indicator point for determining the proper location of the stock to be sanded. Push table motor control to bring the stock

to be sanded into position. The flow control should be set on 0. Then push to feed control and open slowly the flow control which will start the cycling of the sanding pad. The push button control located on the operating handle adjusts the stroke for proper operating length. Increase the flow control to the approximate speed required for sanding. Bring pad down and contact with the stock to be sanded and make correction of you stroke while the sanding pad is oscillating. After proper stroke and speed is determine test by sanding a few pieces of stock to acquaint operator with controls and sanding procedure.

After proper operation is noted proceed to hook to your dust collection system before attempting production sanding on your machine.

The machine has been thoroughly adjusted and tested before leaving our plant and we strongly urge that no attempt be made to adjust the operating pressure of the control valve. Should adjustments be necessary on these units be sure that it is made by competent mechanics after referring first to the maintenance and adjustments information on the following pages of this manual.

SANDING PAD ADJUSTMENTS

The sanding pad and carriage travels on ball bearing rollers and are eccentric mounted for adjustment to the carriage rail. The carriage rail is high carbon high chrome steel and the wear factor will vary very slight. However, from time to time it may be necessary to make an adjustment to offset lost motion that accumulates between the bearings and rail. To adjust carriage to rail, it is necessary to disengage the sanding pad from the driving band removing the cap screw clamping device so that the carriage can be moved by hand. The top roller should be adjusted first to prevent any whipping action upon changing the direction of the sanding pad. By loosening the clamping mount and turning the eccentric shaft the roller can be brought into contact to establish clearance between the roller and the rail. It should be adjusted so that there is a slight drag on the roller although even when the carriage is in motion you should be able to hold roller, which would indicate proper running clearance.

The front rollers are adjusted in the same manner, after which all rollers should be checked for proper tension before putting the carriage back into operation. It is advisable that the carriage rail be kept clean to prevent an overload and dragging condition on the carriage. This can be done by the use of a light oil on a cleaning cloth or felt. The felt wipers that come in contact with the rail should be removed, cleaned and oiled from time to time to assure a more efficient job from the wipers.

TABLE ADJUSTMENTS

The sanding table is equipped with a truss rod which is located between the roller brackets on each end with a turnbuckle in the center for leveling. It is recommended that the maintenance man use a straight edge in checking the table for level operating conditions. The table was aligned at the factory and should not need attention until after considerable amount of sanding has been done. Usually the first indication of a sag is irregular sanding of panels and the drag on the sanding table as it is being pushed along the rails. This adjustment should be made as often as necessary to assure uniform and quality work and ease of operation from your sander.

CARRIAGE DRIVE ADJUSTMENT

The metal band that drives the carriage back and forth should be kept tight at all times. The adjustment studs are located in the large pulleys on each end of the band for this adjustment. Should at any time whipping action be noticed in the driving band at the end of the stroke this adjustment should be made.

The drive chain located in the control head should also be kept tight, should it be permitted to loosen whipping action will be noted which might cause a possible fracture to the drive chain or connecting linkage. Access to the drive chain is gained by removing the cover plate over the control head. Indications for adjustment can be noted by an abnormal noise and a whipping action of the sanding pad. In removing and replacing the plate control head clean the area thoroughly and prevent any foreign matter from dropping into the oil sumpas this is part of your hydraulic system and will be forced back through the system causing possible trouble in your valves and controls.

4-WAY VALVE ADJUSTMENT

The valve illustrated on page 15 controls the cycling of the hydraulic oil from one end of the cylinder to the other. There are four needle valves for controlling the plunger. These valves are designated A and B. The "A" valves control the stroke of the plunger within the valve. By shortening the stroke a quicker reversal is obtained, which will shorten the stroke of the sanding pad. Both "A" valves should be adjusted as to have the same length of stroke from center on each side. Valves "B" control the amount of fluid for shifting the control plunger and will cause a slight change in the reversal speed. The adjustments are made as follows:

(1) Open or back out on "A" valves.
(2) Screw in on valve "B" fromopen position until the knock in the valve is barely audible.
(3) Screw in on "A" valves to reduce the over ride thus shortening the stroke being careful to adjust to the same length of stroke from center on each end. This adjustment should be made with flow control set on three or four. With proper adjustment at this point control should be the same over the entire range.

It is possible for lint or scale to effect the control by restricting the oil flow through the "B" valves. Should this be noted open the "B" valve on the side which is effected and permit restriction to be flushed away. Being careful to set "B" valve back in its previous position.

The above condition will be noted by an over ride of the carriage on the effected end.

FLOW CONTROL VALVE

The flow control valve controls the volume of oil to the cylinder which varies the cycling or speed of the sanding pad, and should be adjusted with the stroke changed to give the smoothest operation. You will note a market increase in speed when shortening the stroke since less fluid is used for short strokes. The flow control valve should be adjusted when changing the stroke to maintain uniform quality in sanding. By varying the cycling of the pad the feed rate and pad control will be minimized, thus reducing operating fatigue.

PRESSURE ADJUSTMENT

The pressure regulator is located on the right side of the flow control valve and is properly adjusted before leaving the factory for most operating conditions and should not be adjusted unless absolutely necessary. And then only after checking the other controls for any possible restriction in their jets or vanes. It is possible for any one of the control valves to be effected by foreign matter getting into the jets. This is why the filter should be cleaned and changed regularly. And extreme care should be exercised when going into the control head or hydraulic system to prevent foreign matter from getting into system. Should adjustment be necessary after checking the system, pressure is increased by screwing in at set screw. And decreased by backing screw out. Be careful when backing out on adjustment screw as the springloaded needle can fall from seat causing a complete loss of pressure.

Starting the Pump

(1) Start the pump by "jogging" the drive motor; that is, switching it on and off a few times in rapid succession so that full drive speed is not reached immediately. This allows the pump to develop its prime while speed is being built up. (Full drive speed must not be below the recommended minimum, however, because adequate centrifugal force is necessary to initially eject the vane and establish immeidate vane-to-ring contact.) For parts identification see page 14.

(2) If the pump is new or re-built, It should be started under load conditions on the first run so that a back pressure is present to assure adequate internal lubrication. Once the pump is broken in, it may be started under "no load" conditions.

INSTALLATION AFTER OVERHAUL

(1) PRECAUTIONS - Since an improper installation can cause severe damage to the pump or result in faulty pump performance, check the following conditions carefully before putting the pump into service:

(a) DIRECTION OF SHAFT ROTATION- Make certain that the prime mover will drive the shaft in the correct direction of rotation before starting the pump. A pump driven in the wrong direction of rotation for which it is assembled could result in broken or scored parts.

(2) OIL SUPPLY - Use a good grade of clean hydraulic oil which offers high resistance to oxidation and chemical deterioration. Make certain that the oil is clean and free from scale, chips, filings, paint, lint, sludge, water, and other impurities. Protect circuit by keeping air filter reservoir breather vent, an intake oil strainer or strainers clean.

Make certain that the oil in the reservoir is maintained at a level more than adequate to supply the combined demand of the pump and system, that the strainer capacity is sufficient so that pump operation is not hampered by inadequate intake supply, and that the pump inlet port is less than four feet above the reservoir oil level. Check the oil level after the system is in operation for a few minutes.

(3) HEAD SCREW ADJUSTMENT - Turn the drive shaft by hand to test for the cartridge or shaft binding. If the shaft will not rotate freely, determine the cause of the binding before starting the pump. This condition is commonly caused by over-tightened head screws and can be eliminated by loosening these screws slightly.

SERVICE INSTRUCTIONS

Maintenance

Protecting Opened Equipment - When a pump is dismantled or removed from the system for repairs, cap or cover all exposed ports and openings into the system. Keep the system oil as free of air as possible since operation of the oil will cause noisy and erratic pump operation. Air will find its way into the system whenever it is opened for service. Therefore, after starting the system in service again, take all necessary steps to follow this trapped air to escape. NEVER USE AN AIR HOSE ONOR NEAR OPENED HYDRAULIC EQUIPMENT SINCE THE AIR STREAM CARRIES HARMFUL DIRT OR WATER.

Lubrication

Shaft End Bearing - The large bearing at the shaft end of pumps in these groups is the only part that requires special lubrication. On all of these pumps a grease fitting is provided on top of the pump body, and on some of the larger pumps a grease relief fitting is also provided on the bottom of the body. It is recommended that the shaft end bearing be lubricated sparingly (approximately one tablespoonful every six months) with a low pressur gun using a good quality, high temperature, bearing grease. CAUTION--Over-lubrication of this bearing can damage the adjacent shaft seal or force grease through this seal and contaminate the system oil.

Other Parts - All other moving parts of these pumps, including the small head end bearing, are internally lubricated by system oil and require no special attention.

Shaft Seal - The shaft seal of pumps in this group should be greased whenever the seal is removed from the pump if the seal is not to be replaced with a new one. Use a high quality high temperature, bearing grease and apply it to the entire inner diameter of the sealing element that bears against the drive shaft.

Other Parts - All of the other moving parts, including both bearings, are internally lubricated by system oil and require no special attention.

Periodic Inspection - Make certain that all hydraulic connections are tight. A loose connection will allow oil to escape or air to enter the system. Inspect the hydraulic oil in the reservoir for evidence of foreign particles. If the oil is contaminated , the following steps are recommended:

(1) Drain the entire system
(2) Clean the reservoir thoroughly removing all sediment.
(3) Change the filter or filter element
(4) Flush the entire system at lease once with clean hydraulic oil and drain the system.

Refill the reservoir with a new oil after filtering this oil through a micron filter or a screen of 200 mesh or finer.

Periodic Inspection - Check the operation of the system periodically against the trouble shooting date. If the performance is unsatisfactory, take the necessary corrective measures.

OVERHAUL

Preparation for Overhaul - Prepare a clean, lint-free surface on which tolay the internal parts of the pump. Thoroughly clean areas adjacent to the components being removed so as to minimize the danger of dirt entering the system. WARNING--Make certain hydraulic system pressure is reduced to zero before disconnecting any component of a system.

Single Pump Disassembly (See Page next page)

Group A Standard Series

(1) Head End Disassembly - Remove head (1) and packing (2). Remove bearing (3) fromhead (1) only if this bearing is worn and requires replacement. This can be determined by washing it in a compatible solvent and testing it by slowly rotating its inner race by hand. The bearing should be removed if it feels rough or "catchy."
(2) Slide bushing (4) out of the body and not the relative positions of pin (5), the cam controlof ring (7), and the slant of the slots in rotor (8). Remove pin (5), vanes (6), ring (7), rotor (8), and bushing (9) from the pump.
(3) Shaft End Disassembly - Uncouple the pump and free it of piping. Remove key (10), from shaft (12). Remove mounting flange or bracket (11) (if used) and slide shaft (12) out of the small end of the pump. If bearing (13) is worn or damaged, press it off shaft (12) with an arbor press. Remove gland (14) and packing (15).

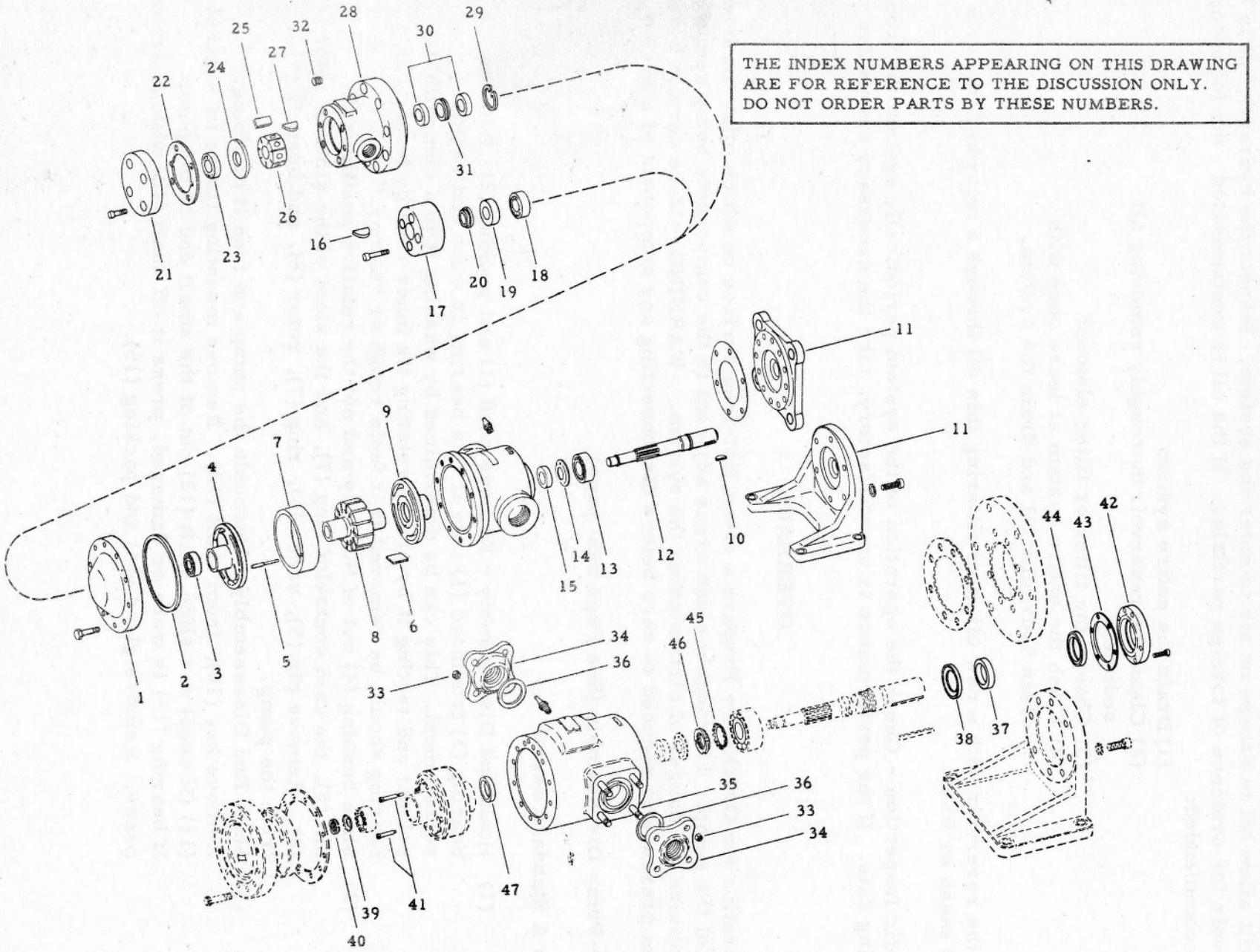
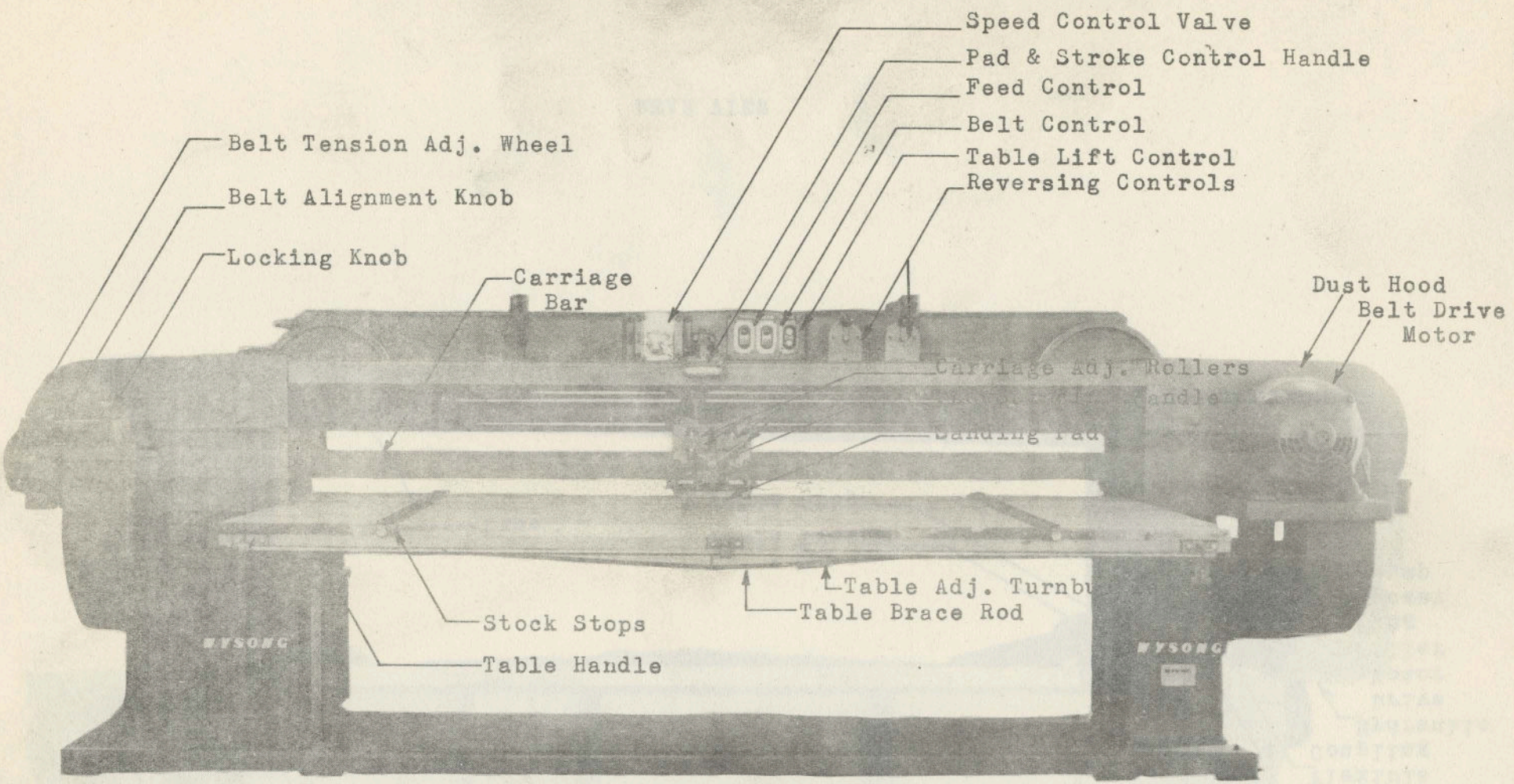


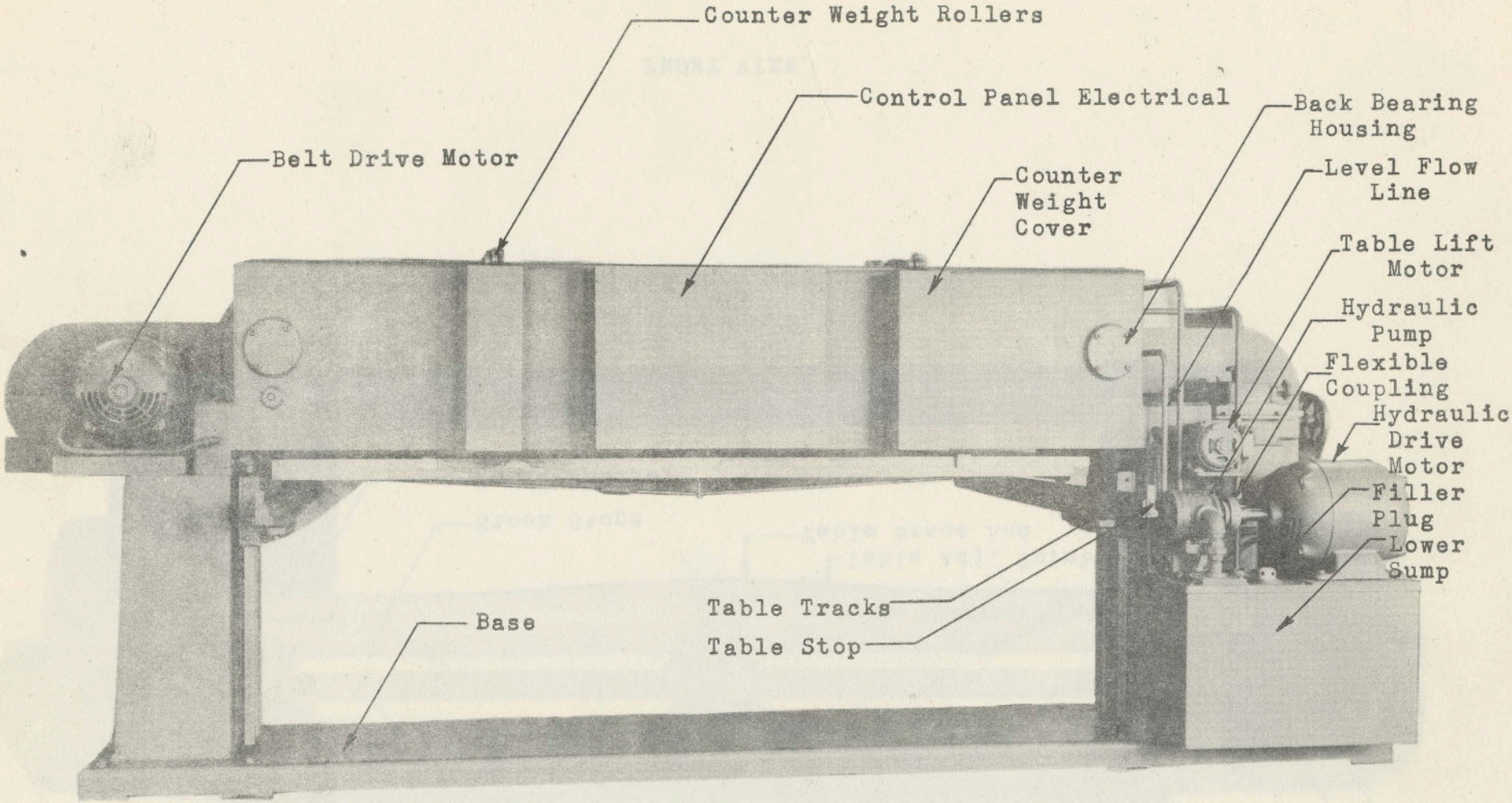
FIGURE 3 - COMPOSITE EXPLODED VIEW OF SINGLE PUMPS (GROUPS A THROUGH J)

TROUBLE	PROBABLE CAUSE	REMEDY
Pumps Not Delivering Oil	Pump Driven in W rong Direction of Rotation	Must be reversed immediately to prevent seizure. Check direction of drive rotation against proper pump rotation as indicated by arrow on body.
	Pump Drive Shaft Coupling Sheared (Direct Drive)	Remove pump from accessory mounting pad and determine damage to pump cartridge. Replace needed parts. Check input speed to determine whether it is higher than recommended.
	Fluid Intake Pipe in Reservoir Blocked or Oil Viscosity too Heavy to Pick Up Prime	Drain complete system. Add new fluid of proper viscosity. Filter the new oil as recommended. Check all filters for dirt and sludge.
	Air Leaks at Intake, Pump Not Priming	Circuit must be tested at input connections. Determine where air is being drawn into line connections and tighten. Check intake pipe. The oil level must be above intake opening in reservoir. Check minimum drive speed which may be too slow to prime the pump.
	Vane or Vanes Stuck in R otor Slots	Inspect rotor slots for wedged chips or foreign particles and replace all damaged parts. Flush complete system thoroughly by recommended processes and fill system with new clean hydraulic oil.
Pumps Making Noise	Partially Clogged Intake Line or Intake Strainer or Restricted Intake	Pump must receive intake oil freely or cavitation will result. Drain system, and clean intake line, intake pipe, and replace filter. Add new oil and strain by recommened procedures.

TROUBLE	PROBABLE CAUSE	REMEDY
Pumps Making Noise	Air Leak at Pump Intake Piping Joints or Pump Shaft Packing	Test by pouring oil on joints and around drive shaft. Listen for change in operation. Tighten joints affected and replace pump drive shaft packing according to service instructions outlined in the manual.
	Coupling Misalignment	Re-align and replace oil seal if it has been damaged by shaft and misalignment.

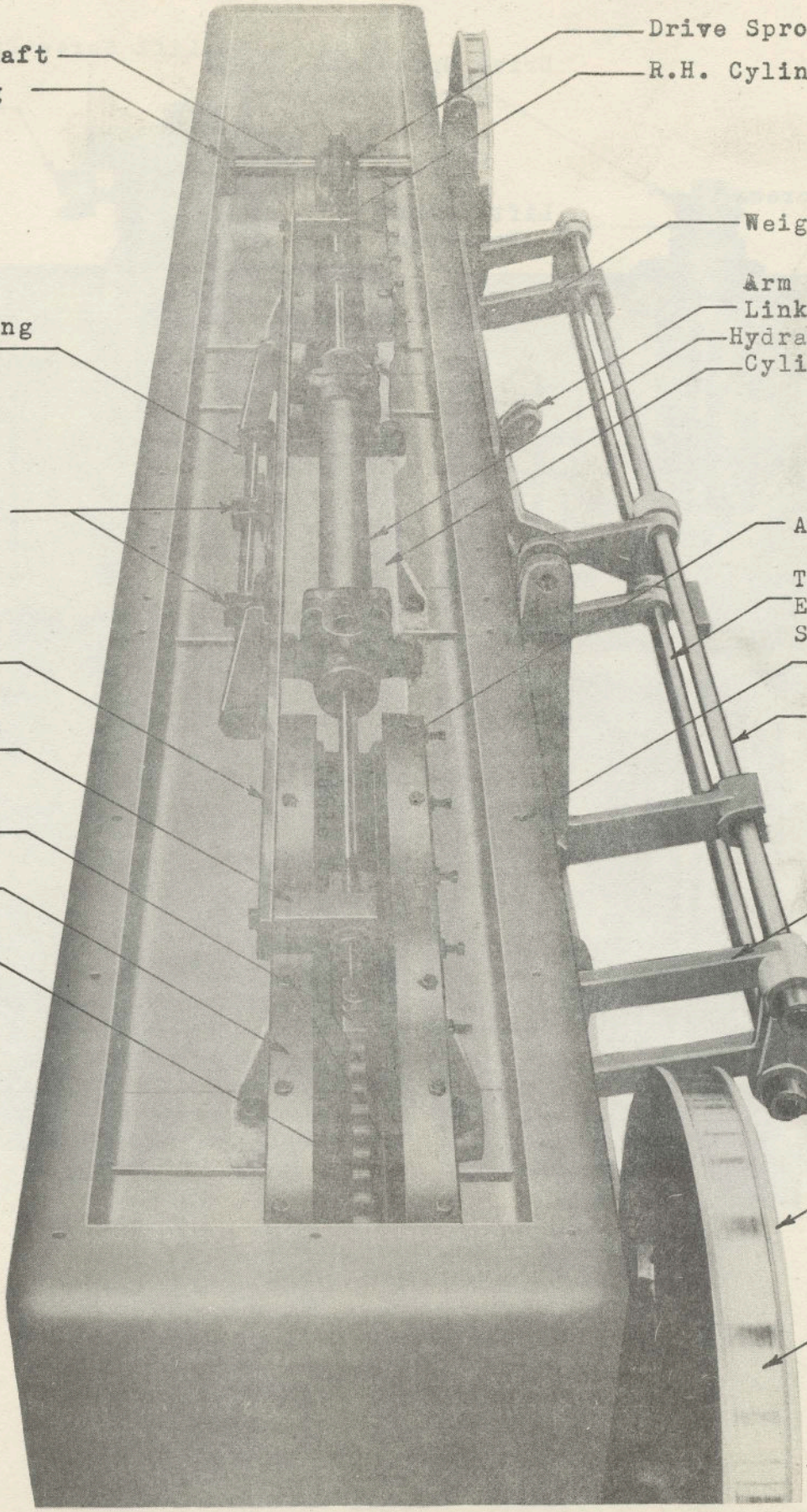

Speed Control Valve
Pad & Stroke Control Handle
Feed Control
Belt Control
Table Lift Control
Reversing Controls
Belt Tension Adj. Wheel
Belt Alignment Knob
Locking Knob
Carriage Bar
Dust Hood
Belt Drive Motor
Carriage Adj. Rollers
Stock Stops
Table Handle
Table Brace Rod
WYSONG

FRONT VIEW

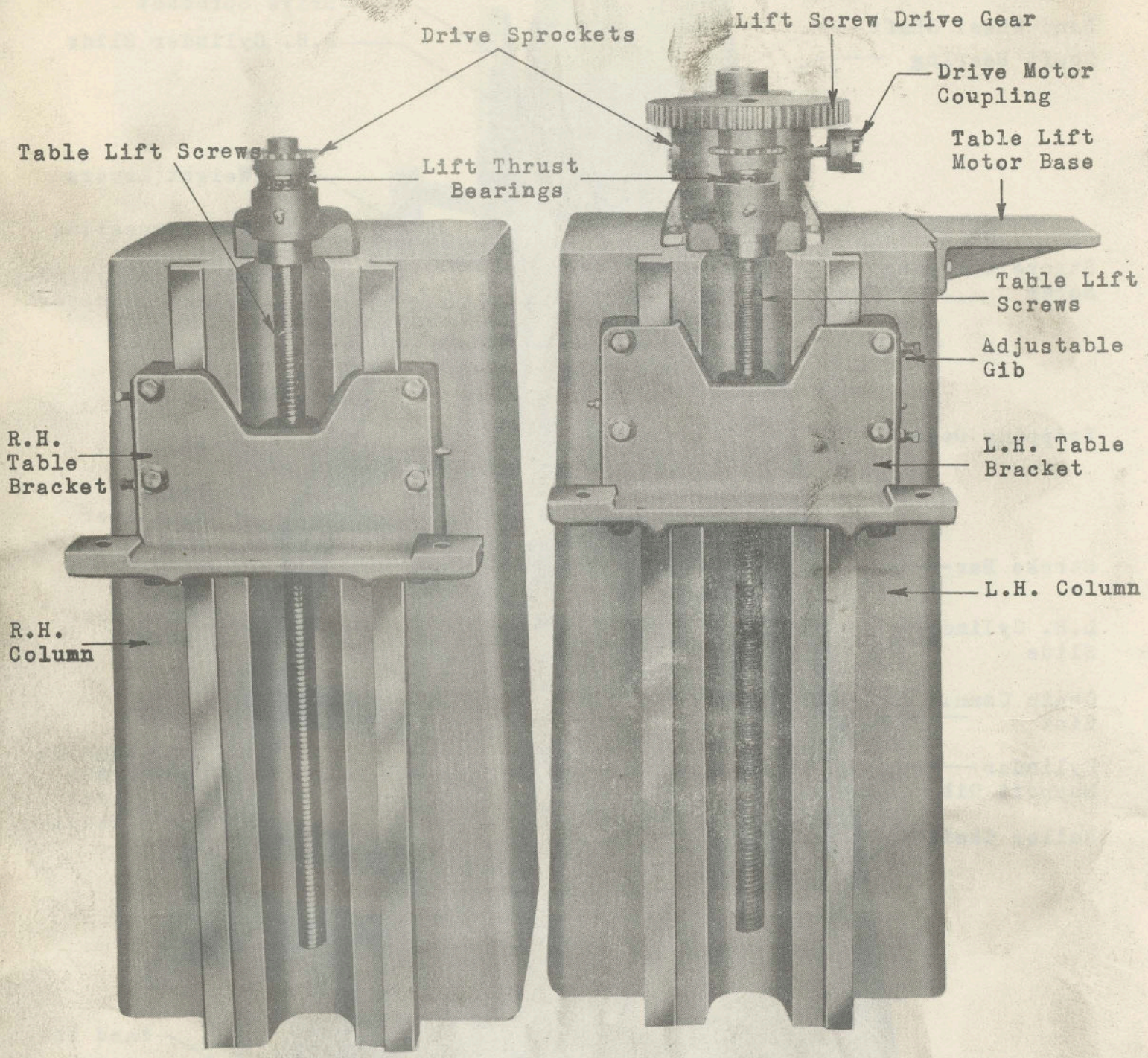

Counter Weight Rollers
Control Panel Electrical
Back Bearing Housing
Belt Drive Motor
Counter Weight Cover
Level Flow Line
Table Lift Motor
Hydraulic Pump
Flexible Coupling
Hydraulic Drive Motor
Filler Plug
Lower Sump
Table Tracks
Table Stop
Base

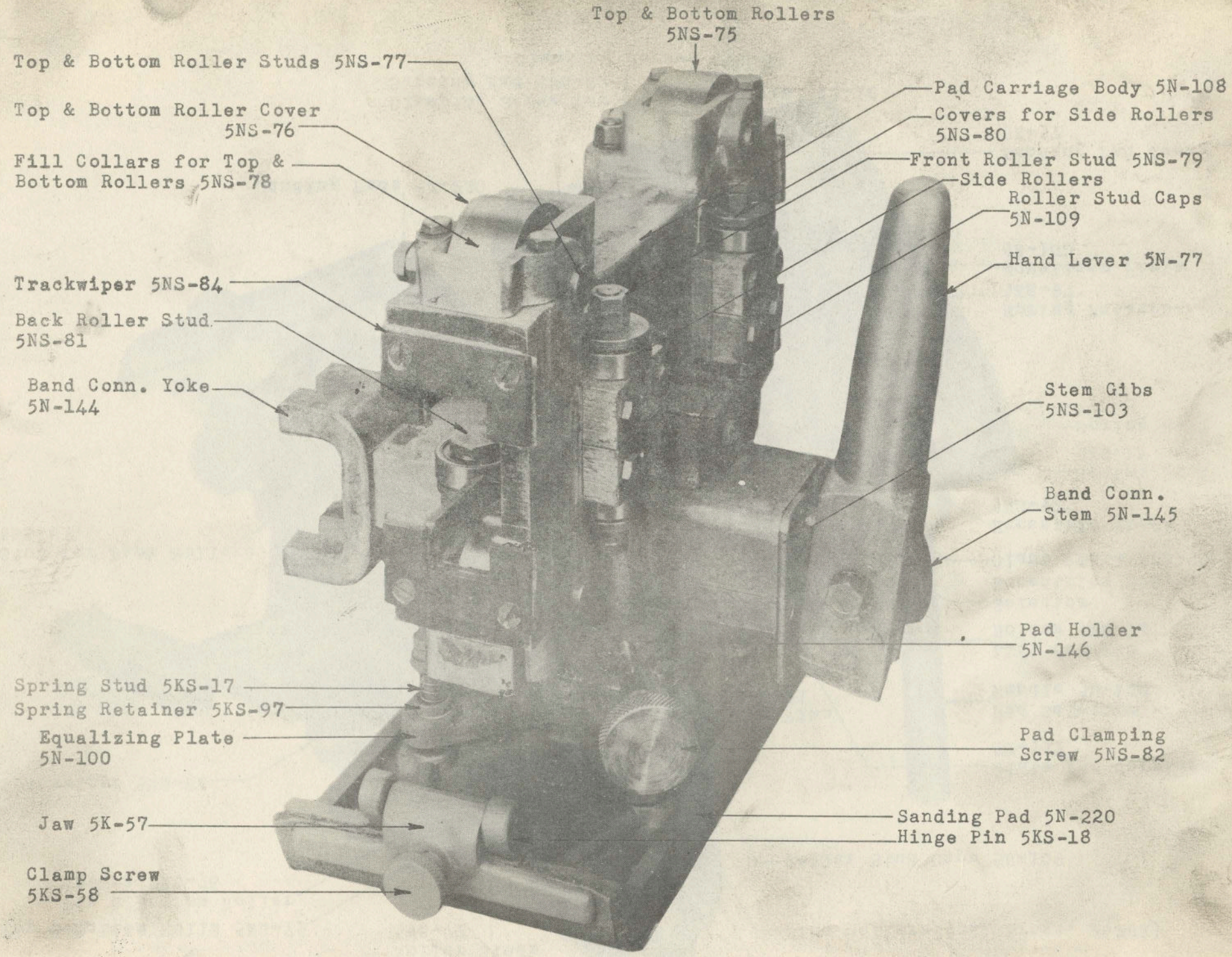
REAR VIEW

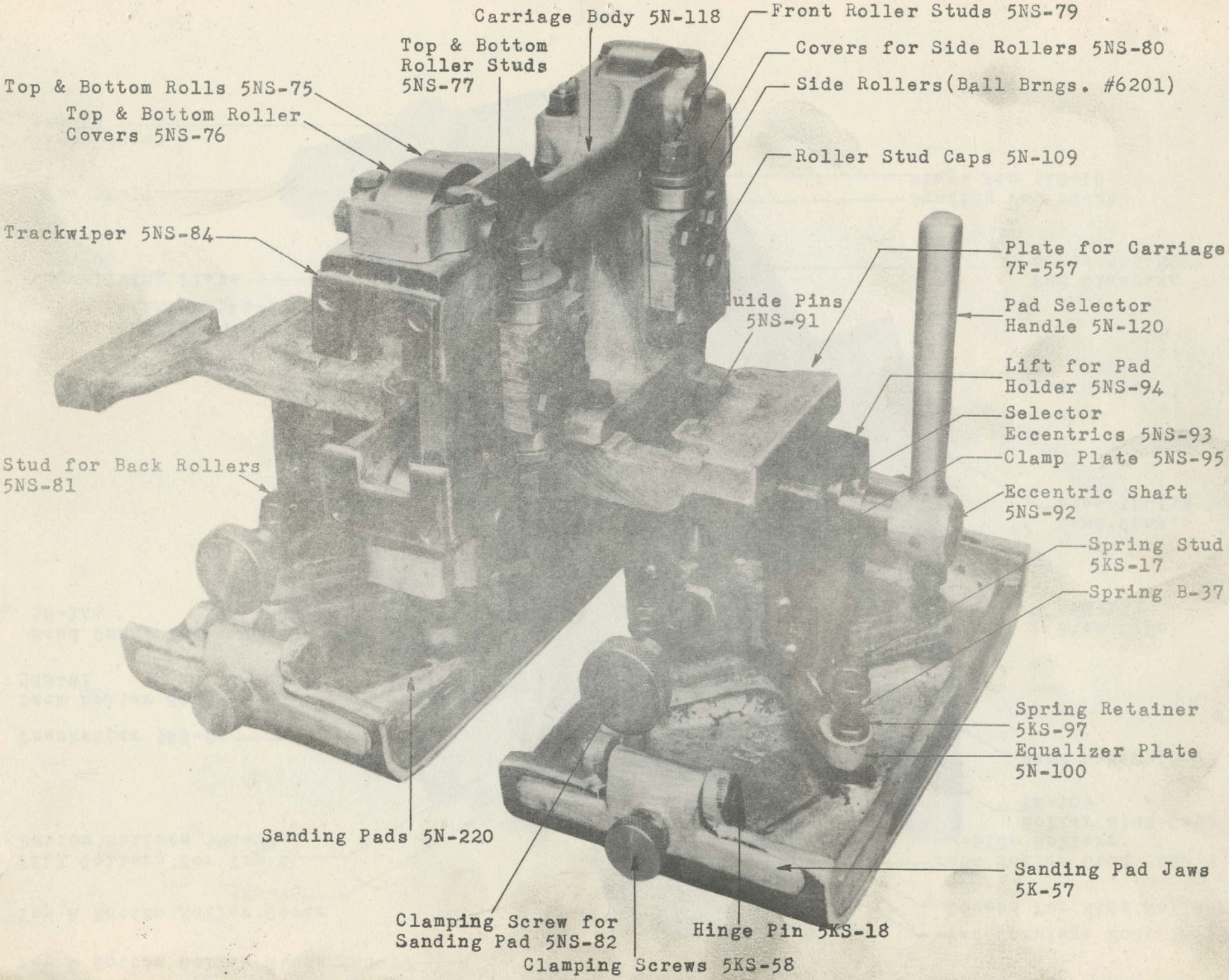
CONTROL HEAD ASSEMBLY



COLUMN ASSEMBLY

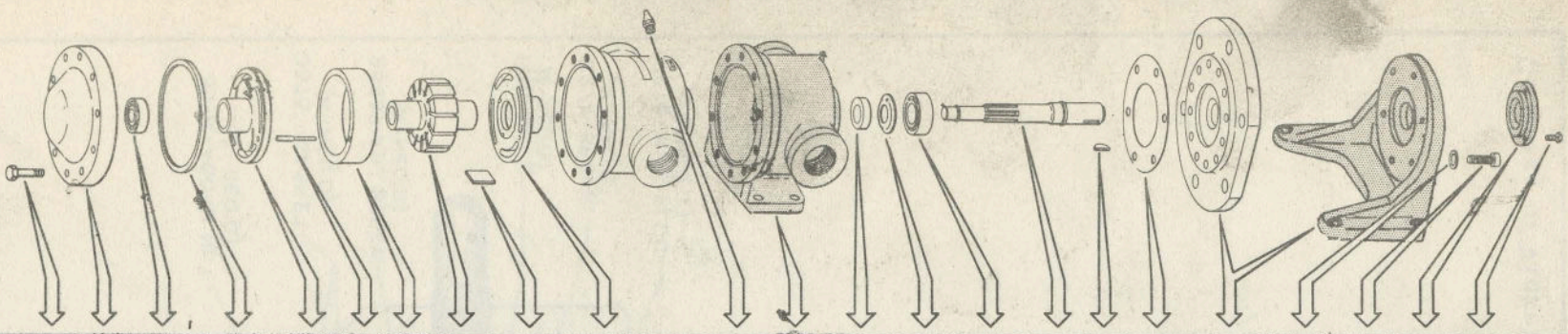



Top & Bottom Rollers 5NS-75
Top & Bottom Roller Studs 5NS-77
Top & Bottom Roller Cover 5NS-76
Fill Collars for Top & Bottom Rollers 5NS-78
Trackwiper 5NS-84
Back Roller Stud 5NS-81
Band Conn. Yoke 5N-144
Spring Stud 5KS-17
Spring Retainer 5KS-97
Equalizing Plate 5N-100
Jaw 5K-57
Clamp Screw 5KS-58
Pad Carriage Body 5N-108
Covers for Side Rollers 5NS-80
Front Roller Stud 5NS-79
Side Rollers
Roller Stud Caps 5N-109
Hand Lever 5N-77
Stem Gibs 5NS-103
Band Conn. Stem 5N-145
Pad Holder 5N-146
Pad Clamping Screw 5NS-82
Sanding Pad 5N-220
Hinge Pin 5KS-18


Carriage Body 5N-118
Front Roller Studs 5NS-79
Top & Bottom Roller Studs 5NS-77
Covers for Side Rollers 5NS-80
Top & Bottom Rolls 5NS-75
Side Rollers(Ball Brngs. #6201)
Top & Bottom Roller Covers 5NS-76
Roller Stud Caps 5N-109
Trackwiper 5NS-84
Plate for Carriage 7F-557
Guide Pins 5NS-91
Pad Selector Handle 5N-120
Lift for Pad Holder 5NS-94
Selector Eccentrics 5NS-93
Stud for Back Rollers 5NS-81
Clamp Plate 5NS-95
Eccentric Shaft 5NS-92
Spring Stud 5KS-17
Spring B-37
Spring Retainer 5KS-97
Equalizer Plate 5N-100
Sanding Pads 5N-220
Sanding Pad Jaws 5K-57
Clamping Screw for Sanding Pad 5NS-82
Hinge Pin 5KS-18
Clamping Screws 5KS-58

SEE COVER PAGE FOR ORDERING INSTRUCTIONS

THE BLACK ARROWS BELOW INDICATE THE APPLICABLE PORTION OF YOUR MODEL COVERED BY THIS TABULATION



MAY BE ORDERED AS CARTRIDGE KIT

MODEL NUMBERS	SCREW	HEAD	BEARING	PACKING †	BUSHING △	PIN	RING	ROTOR	VANE KIT	BUSHING △	CARTRIDGE KIT	FITTING	BODY	PACKING †	GLAND	BEARING	SHAFT	KEY	GASKET	MOUNTING	WASHER	SCREW	COVER	SCREW	GASKET KIT
V – *	125550		1703	2052		2051						3X-30630		2050	2048	1705	2058	1615							912035
VK – *																	116119								
V – * – *																	2058								
VK – * – *																	116119								
* – 25	125550	18495	1703	2052	2046	2051	24188	2042	912023	2045	912077	3X-30630	2055	2050	2048	1705		1615	–	–	–	–	–	–	912035
* – 35							2044				912078														
* – 35U							15482				912079														
* – 35X							2347				912080														
* – 45		6008			3248		3246	2065	912024	3247	912081														
* – 124		18495			2046		24188	2042	912023	2045	912077		2040										2047	1228	
* – 125													2055						6797	2302	6459	1273	–	–	
* – 134							2044				912078														
* – 134U							15482				912079		2040						–	–	–	–	2047	1228	
* – 134X							2347				912080														
* – 135							2044				912078														
* – 135U							15482				912079		2055						6797	2302	6459	1273	–	–	
* – 135X							2347				912080														
* – 144		6008			3248		3246	2065	912024	3247	912081		2040						–	–	–	–	2047	1228	
* – 145													2055						6797	2302	6459	1273	–	–	
* – 124 – 10	125550	18495	1703	2052	2046	2051	24188	2042	912023	2045	912077	3X-30630	2055	2050	2048	1705		1615		135190		1070			912035
* – 134 – 10							2044				912078														
* – 134U – 10							15482				912079														
* – 134X – 10							2347				912080														
* – 144 – 10		6008			3248		3246	2065	912024	3247	912081														

*Pump used on No. 610 Sander.

QUANTITY PER ASSEMBLY	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6	1	3	1
QUAN. PER 10 OVERHAULS	40	0	3	10	5	1	5	5	5	5	5	1	0	10	2	3	6	1	12	0	36	24	0	12	5
USAGE CODE	B	D	B	A	B	C	B	B	B	B	B	C	D	A	B	B	B	C	A	D	B	B	D	B	B

USAGE CODE = A – FAST USAGE, B – MEDIUM USAGE, C – FAIR USAGE, D – SLOW USAGE

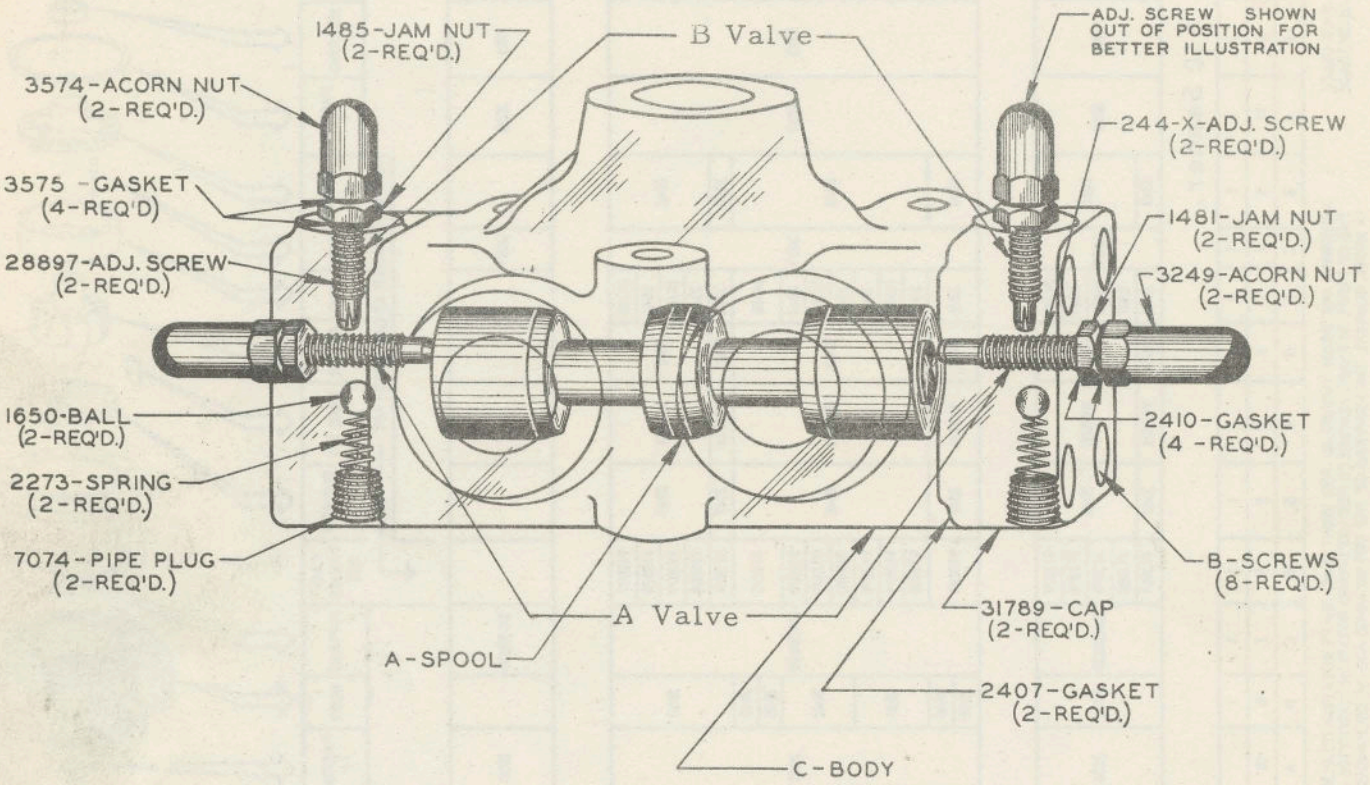
△ BUSHINGS ARE SHOWN ASSEMBLED FOR RIGHT-HAND SHAFT ROTATION (CLOCKWISE VIEWED FROM SHAFT END OF PUMP). IN PUMPS ASSEMBLED FOR LEFT-HAND ROTATION (IDENTIFIED BY SUFFIX LETTERS "LH" IN MODEL NUMBER), THE POSITIONS OF THE TWO BUSHINGS ARE INTERCHANGED. SEE MANUAL 1425-S.

† INCLUDED IN GASKET KIT 912035.

Courtesy of Vickers, Inc.

VICKERS INC.
DETROIT MICHIGAN

REPAIR PARTS
FOR SERIES C2-400-S9 & C2-1400-S9
PILOT OPERATED FOUR-WAY VALVES



	MODEL NUMBER	PIPE SIZE	A SPOOL	B SCREW	C BODY
	C2-420-S9	1/2	66764	1072	5571
*	C2-440-S9	3/4	66764	1072	20527
	C2-480-S9	1/4	6569	1072-A	6568
	C2-482-S9	3/8	6569	1072-A	30683
	C2-1420-S9	1"	33093	1072	11070

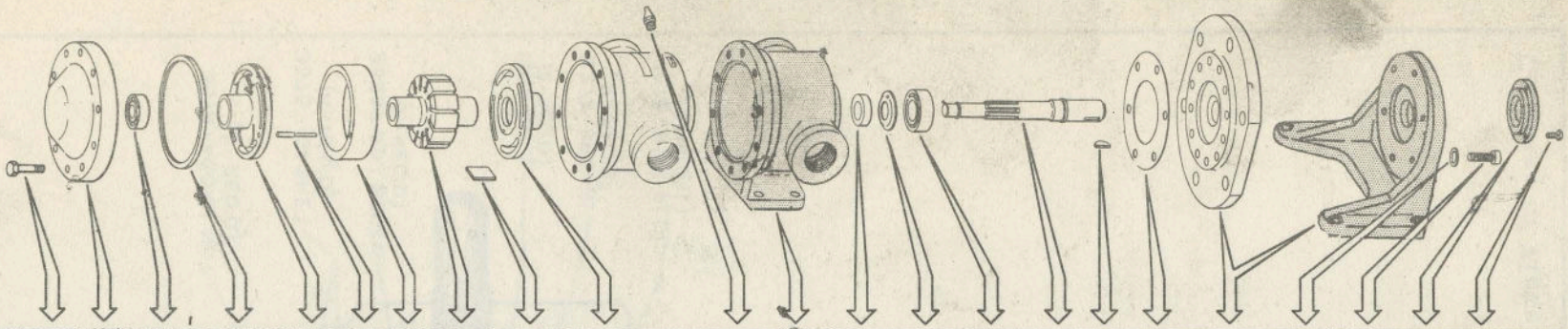
*Valve used on No. 610 Sander.

Courtesy of Vickers, Inc.

A.M.M. 2-25-43

SEE COVER PAGE FOR ORDERING INSTRUCTIONS

THE BLACK ARROWS BELOW INDICATE THE APPLICABLE PORTION OF YOUR MODEL COVERED BY THIS TABULATION



MODEL NUMBERS	SCREW	HEAD	BEARING	PACKING †	BUSHING △	PIN	RING	ROTOR	VANE KIT	BUSHING △	CARTRIDGE KIT	FITTING	BODY	PACKING †	GLAND	BEARING	SHAFT	KEY	GASKET	MOUNTING	WASHER	SCREW	COVER	SCREW	GASKET KIT
					MAY BE ORDERED AS CARTRIDGE KIT →						↓														
V – *	125550		1703	2052		2051						3X-30630		2050	2048	1705	2058	1615							912035
VK – *																	116119								
V – * – *																	2058								
VK – * – *																	116119								
↓																									
* – 25	125550	18495	1703	2052	2046	2051	24188	2042	912023	2045	912077	3X-30630	2055	2050	2048	1705		1615	–	–	–	–	–	–	912035
* – 35							2044				912078														
* – 35U							15482				912079														
* – 35X							2347				912080														
* – 45		6008			3248		3246	2065	912024	3247	912081														
* – 124		18495			2046		24188	2042	912023	2045	912077		2040										2047	1228	
* – 125													2055						6797	2302	6459	1273	–	–	
* – 134							2044				912078		2040						–	–	–	–	2047	1228	
* – 134U							15482				912079														
* – 134X							2347				912080														
* – 135							2044				912078		2055						6797	2302	6459	1273	–	–	
* – 135U							15482				912079														
* – 135X							2347				912080														
* – 144		6008			3248		3246	2065	912024	3247	912081		2040						–	–	–	–	2047	1228	
* – 145													2055						6797	2302	6459	1273	–	–	
↓ ↓																									
* – 124 – 10	125550	18495	1703	2052	2046	2051	24188	2042	912023	2045	912077	3X-30630	2055	2050	2048	1705		1615		135190		1070			912035
* – 134 – 10							2044				912078														
* – 134U – 10							15482				912079														
* – 134X – 10							2347				912080														
* – 144 – 10		6008			3248		3246	2065	912024	3247	912081														

*Pump used on No. 610 Sander.

QUANTITY PER ASSEMBLY	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6	1	3	1
QUAN. PER 10 OVERHAULS	40	0	3	10	5	1	5	5	5	5	5	1	0	10	2	3	6	1	12	0	36	24	0	12	5
USAGE CODE	B	D	B	A	B	C	B	B	B	B	B	C	D	A	B	B	B	C	A	D	B	B	D	B	B

USAGE CODE = A – FAST USAGE, B – MEDIUM USAGE, C – FAIR USAGE, D – SLOW USAGE

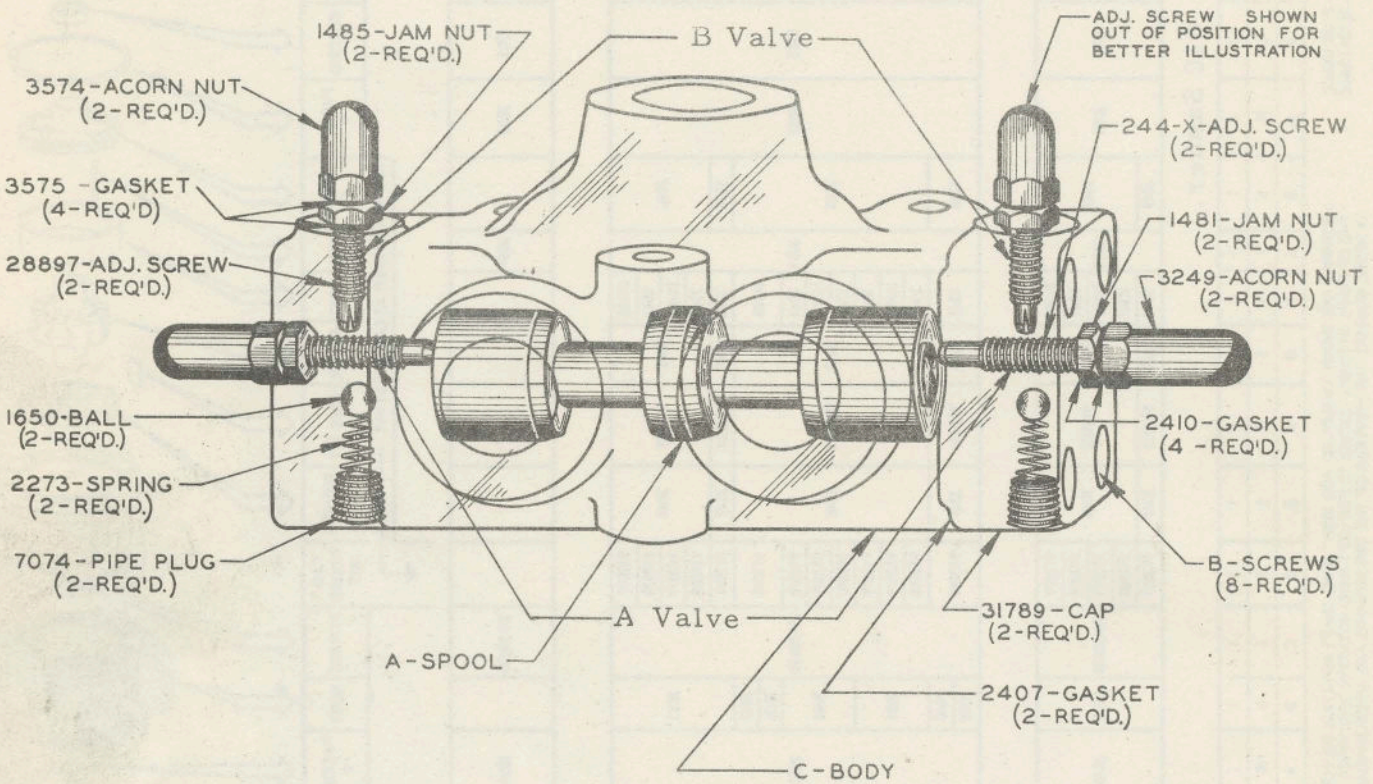
△ BUSHINGS ARE SHOWN ASSEMBLED FOR RIGHT-HAND SHAFT ROTATION (CLOCKWISE VIEWED FROM SHAFT END OF PUMP). IN PUMPS ASSEMBLED FOR LEFT-HAND ROTATION (IDENTIFIED BY SUFFIX LETTERS "LH" IN MODEL NUMBER), THE POSITIONS OF THE TWO BUSHINGS ARE INTERCHANGED. SEE MANUAL 1425-S.

† INCLUDED IN GASKET KIT 912035.

Courtesy of Vickers, Inc.

VICKERS INC.
DETROIT MICHIGAN

REPAIR PARTS
FOR SERIES C2-400-S9 & C2-1400-S9
PILOT OPERATED FOUR-WAY VALVES



	MODEL NUMBER	PIPE SIZE	A SPOOL	B SCREW	C BODY
	C2-420-S9	1/2	66764	1072	5571
*	C2-440-S9	3/4	66764	1072	20527
	C2-480-S9	1/4	6569	1072-A	6568
	C2-482-S9	3/8	6569	1072-A	30683
	C2-1420-S9	1"	33093	1072	11070

*Valve used on No. 610 Sander.

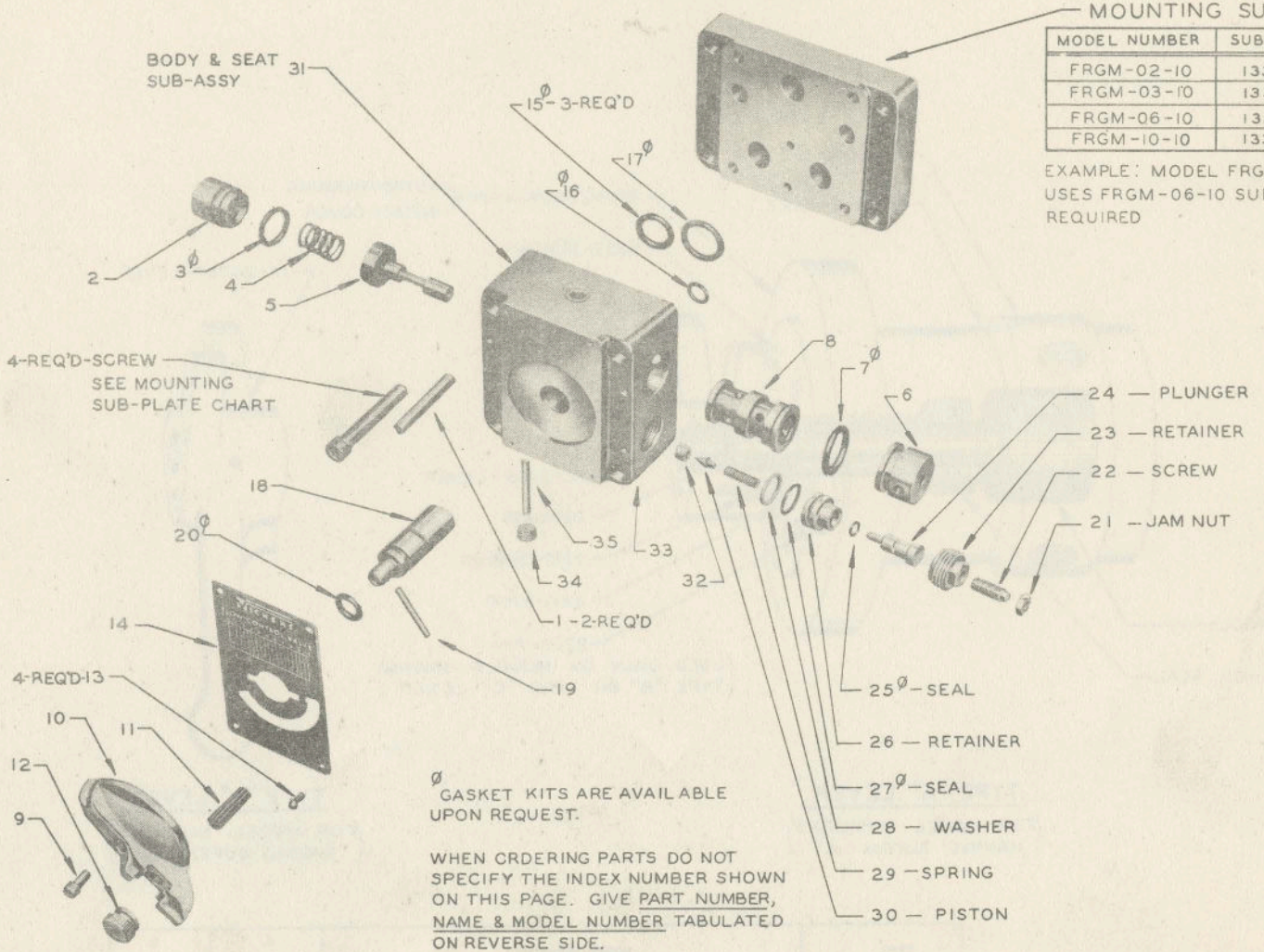
Courtesy of Vickers, Inc.

A.M.M. 2-25-43

REPAIR PARTS FOR

VICKERS FLOW CONTROL & OVERLOAD RELIEF VALVES

FRG-**-**-10 SERIES



MODEL NUMBER	SUB-PLATE	SCREW
FRGM-02-10	133987	1056
FRGM-03-10	133988	1077
FRGM-06-10	133989	7781
FRGM-10-10	133990	10980

EXAMPLE: MODEL FRG-06-**-10 USES FRGM-06-10 SUB-PLATE WHERE REQUIRED

Ø GASKET KITS ARE AVAILABLE UPON REQUEST.

WHEN ORDERING PARTS DO NOT SPECIFY THE INDEX NUMBER SHOWN ON THIS PAGE. GIVE PART NUMBER, NAME & MODEL NUMBER TABULATED ON REVERSE SIDE.

FGR-06-20-M1 Flow Control Valve
Used on No. 610 Sander

NOTE: CONSECUTIVE NUMBERING SHOWS ORDER FOR DISASSEMBLY.

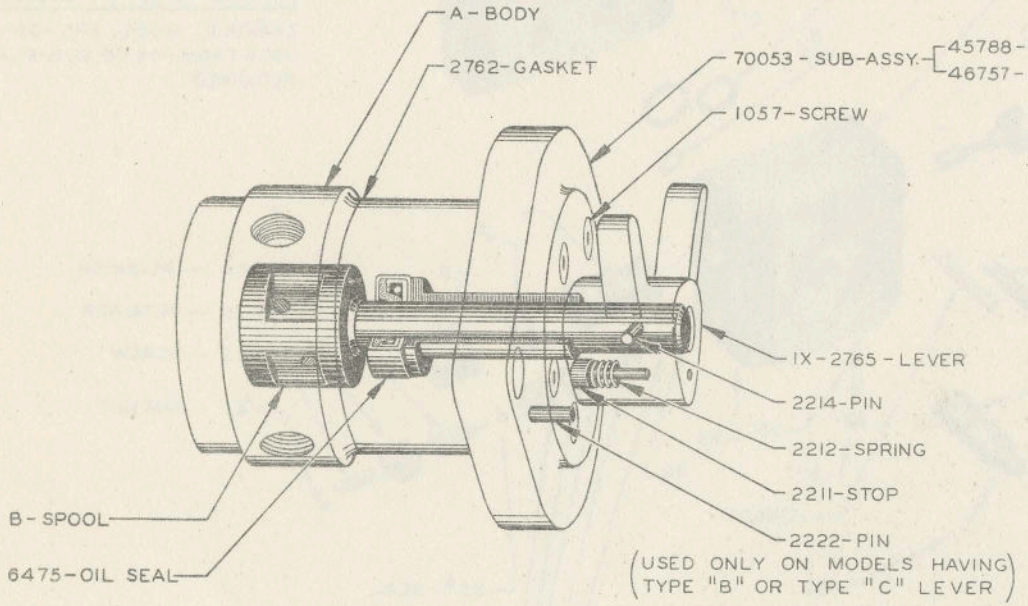
REVISED	7-28-54	WRH
DRAWN	11-29-51	H.A.B.
CHECKED	12-12-51	H.G.S
RELEASED	12-18-51	GRS

1216-S

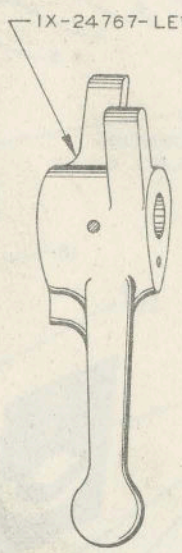
Courtesy of Vickers, Inc.

VICKERS INC.
DETROIT MICHIGAN

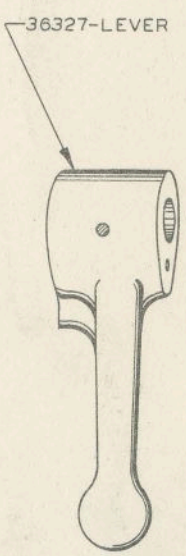
REPAIR PARTS
FOR SERIES C2-529 & C2-1529
ROTARY TYPE PILOT VALVES



TYPE "A" LEVER
(FOR MODEL NUMBERS HAVING SUFFIX "-A")



TYPE "B" LEVER
(FOR MODEL NUMBERS HAVING SUFFIX "-B")



TYPE "C" LEVER
(FOR MODEL NUMBERS HAVING SUFFIX "-C")

TYPE	MODEL NUMBERS				A BODY	B SPOOL
Internal Drain	C2-529	C2-529-A	*C2-529-B	C2-529-C	3268	45771 *
External Drain	C2-1529	C2-1529-A	C2-1529-B	C2-1529-C	7266	45780

*Valve used on No. 610 Sander

DRAWN	12-3-43	K.M.P.
RELEASED	12-10-43	

Courtesy of Vickers, Inc.

INSTALLATION AND SERVICE INSTRUCTIONS
SERIES "N"

GENERAL DATA

"N" Series Hydraulic Cylinders are designed for a maximum operating pressure of 1500 p.s.i. Standard fluid medium is a premium type of hydraulic oil of any consistency suitable for the pump.

For other fluids, special packings, gaskets or other modifications may be required.

Model Numbers are stamped on the name plate. The letter prefixed to the Series Letter ("N") indicates the type of mounting. For example, a Series "N" cylinder, foot mounted, is designated as a "CN." With a heavy-duty piston rod it becomes a "C2N." The letter "K" prefixed to the mounting letter indicates a double-end rod. So, a foot mounted "N" Series cylinder with double-end rod is a "KCN." A numeral following the Model Number, as "KCN-8," indicates the engineering design series.

Cushion Designation: Hydraulic cylinders may be supplied with integral cushions in the end caps. A cushioned end cap is indicated by the letter "C" hyphenated to the Model Number. With a cushioned rod cap a "CN" becomes a "C-CN"; with a cushioned head cap, a "CN-C." Model "C-CN-C" indicates cushioned caps at both ends.

IMPORTANT! When ordering parts for hydraulic cylinders, specify the Model Number, the Serial Number, and the bore and stroke as stamped on the name plate. If the name plate is inaccessible, give the approximate date of purchase. If the cylinder was purchased as part of a machine, give the make and Model Number of the machine.

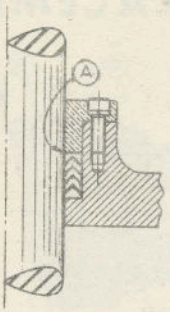
HOW TO INSTALL

Hannifin cylinders are tested at the factory before shipment and are ready for installation and operation when received.

1. Remove pipe port thread protectors, the protective wrapping from the rod and any masking tape.
2. Mount the cylinder and carefully check the alignment of the piston rod and the machine part—with the rod both extended and retracted. For "C" or "E" mounting types, fit mounting bolts in one collar or the other (not both) depending upon the application. In this way, one set of bolts will be used for taking the load of both shear and tension and the other set of bolts tension only.
3. Connect hydraulic supply lines from valve to pipe ports. Caps can be rotated to most convenient location, but, again, the collar-and-cap screws must be drawn back up very tightly if they are loosened to rotate the cap.
4. Operate the cylinder several times to make certain it is functioning properly. Check piping for leakage. If there is air in the system it can be bled at the ⅛" ports provided in "N" Series end caps.
5. If the cylinder is equipped with integral cushions in either or both end caps, turn the cushion adjusting screw or screws to obtain the degree of cushioning desired.

Note: Irregular piston rod speed may be caused by any of the following: (a) Misalignment of the cylinder. (b) Binding in the mechanism being moved. (c) Air in the system.

ADJUSTMENT OF GLAND PACKING



Recent Models (N-8 design or later) of Hannifin Hydraulic Cylinders have the gland tight against the rod end cap so no adjustment remains.

When excess oil wipage develops at packing gland, examine piston rod for scratches or other imperfections. If no flaws are visible, shims of gasket material can be added at point "A." Shims can be made of sheet packing 1/64" thick, cut to size of cavity, or they can be ordered from Hannifin.

If wipage persists, replace gland packing. (See instructions below.)

Older Cylinders had an allowance for take-up between the packing gland flange and the rod end cap. Adjustment is made on this type by tightening the screws that hold the gland to the head. These glands are repacked in the same manner as the glands on newer cylinders. We recommend using one less packing ring when repacking these older cylinders, so the gland will close as with current designs.

INSTALLATION OF GLAND PACKING

(1) If possible, disconnect piston rod from knuckle or attaching part. Remove gland screws and slide gland off rod. If this is impractical, extend rod and slide gland along rod. (2) Remove packing with a conventional flexible packing hook or a hooked tool, taking care not to scratch the rod or gland cavity; or an instantaneous application of hydraulic pressure will force packing out. (3) If necessary, cut rings to remove from rod. (4) Thoroughly clean stuffing box. (5) Install solid rings if practical, or cut each ring at the small bump on the outer crown surface, cutting each ring with a sharp knife slanted at a 45° angle. Adapter rings, male or female, may be cut at any point. (6) Install rings one at a time, seating each ring with a blunt ended piece of wood. If split rings are used, stagger the splits 90°. (7) Insert gland into stuffing box. (8) Compress packing with gland, using only the force of fingers, and measure clearance between gland flange and cap. This clearance should be approximately 1/32" on small rods (up to 2" diameter) and increasing to a maximum of 1/16" on large rods. If clearance is less, obtain washers of 1/64" or 1/32" thickness. (They may be cut from sheet packing.) If clearance is greater than specified above, remove one packing ring and add flat washers to establish clearance. (9) Insert screws and tighten gland against cap.

GLAND WIPERS

Recent models have gland wipers, made of synthetic rubber encased in a metal shell, provided to protect the piston rod. This wiper will give long service. However, if replacement is necessary, the following procedure should be followed:

The wiper shell is a press fit into a counterbore in the gland. Remove carefully so as not to damage counterbore. Insert new wiper by tapping lightly with a block of wood and a small hammer

CUSHIONED CYLINDERS

Cylinders with cushioned heads require adjustment to the load being decelerated. Cushion effect is **increased** by turning the needle valve **clockwise.** The needle valve has packing which can be adjusted by tightening the needle valve gland, Symbol 24.

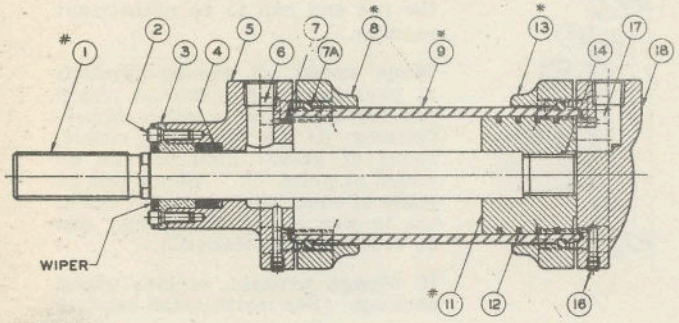
HEAD GASKETS

Recent Series "N" Hydraulic Cylinders (N-8 design or later) use "O" rings as static seals between the cylinder body and the end caps. In case the name plate cannot be seen, an identifying feature of this type cylinder is a "step" on the O.D. of the gland flange. All cylinders prior to N-8 used flat gaskets.

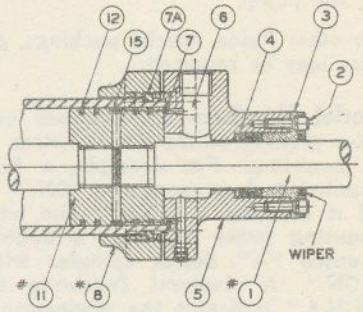
PISTON RINGS

Piston rings seldom need replacement. If for any reason the piston is removed from the cylinder body, care should be taken when replacing it. Collapse the rings one at a time, using a strong piece of twine, and enter the piston into the cylinder body one ring at a time.

REPLACEMENT PARTS LIST

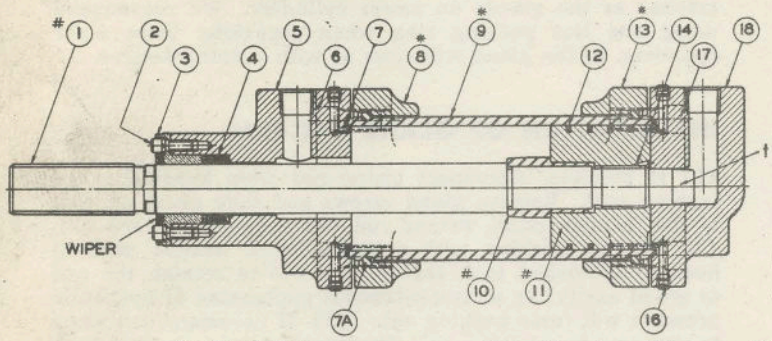


Sectional View
Cylinder With Standard Rod
(Without Cushions)

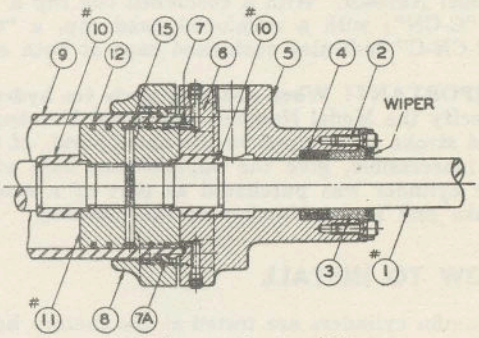


Alternate Sectional View
"K" Type Cylinder
With Double End Rod

Standard or Heavy Duty Piston Rod (Without Cushions)

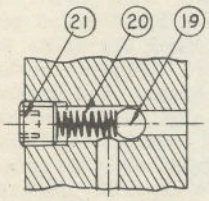


Sectional View
Cylinder With Standard Rod
(With Cushions)



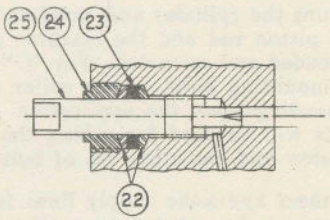
Alternate Sectional View
"K" Type Cylinder
With Double End Rod

Standard or Heavy Duty Piston Rod (With Cushions)



Partial Sectional View
Check Valve Assembly

When ordering parts, specify Bore, Model, Stroke, and Serial Number of cylinder and name of part. If for a cushioned cylinder, specify whether for cylinder with cushion on the ROD END, HEAD END, or BOTH ENDS.



Partial Sectional View
Needle Valve Assembly

SYMBOL	DESCRIPTION	No. Req'd.	SYMBOL	DESCRIPTION	No. Req'd.	SYMBOL	DESCRIPTION	No. Req'd.
1	#Piston Rod	1	9	*Cylinder Body	1	18	Head End Cap	1
2	Packing Gland Screw	4‡	10	#Cushion Sleeve	1	19	Ball for Check Valve	¶
3	Packing Gland	1	11	#Piston Body	1	20	Spring for Check Valve	¶
4	Gland Packing	1 set	12	Piston Ring	4	21	¼" Plug for Check Valve	¶
5	Rod End Cap	1	13	*Head End Collar	1	22	Needle Valve Washer	2**
6	Rod End Cap Screw	4§	14	Piston Lock Pin	1	23	Needle Valve Packing	1**
7	Gasket "O" Ring	2	15	Piston Lock Pin (K-Type)	1	24	Needle Valve Gland	1**
7A	Split Retaining Ring	2	16	⅛" Air Vent Plug	6	25	Needle Valve Assembly	1**
8	Rod End Collar	1	17	Head End Cap Screw	4§			

*Parts 8, 9 and 13 furnished as an assembly on older models.

#Parts 1, 10 and 11 furnished as an assembly on older models and on all "K" type cylinders with double end rod. Parts 10 and 11 made in one piece in certain sizes.

†Cushion Plug is a separate piece on 1" bore cylinders.

‡6 required on 7" and 8" bore "2N" cylinders with heavy duty rod.

§8 required on 7" and 8" bore cylinders.

¶Supplied in sets, or singly; 1", 1 9/16", and 2" cylinders have 1 set in each cushioned end cap; 2½", 3", 3½", 4", 4½", 5" and 7" cylinders, 2 sets each cap; 6" and 8" cylinders, 3 sets each cap.

**Required for each cushioned end cap.

Courtesy of Hannifin Corporation

SINGLE BELT (CON'D)

NO.	NAME OF PART	PART NUMBER
48	Worm Gear Bearing (Right-Hand)	7C-8
40	Worm Gear Bearing (Left-Hand)	7C-9
41	Worm Gear Housing	7C-10
42	Worm Gear Housing Cover	7C-11
43	Idler Stud Base	5K-46
44	Idler Pulley Frame	5K-47
45	Dust Hood Brackets	5K-85
46	Equalizer Linds	5N-39
47	Right-Hand Light Holder	7F-558
48	Left-Hand Light Holder	7F-559

NO. 610 AUTOMATIC STROKE SANDER (SINGLE BELT)

NO.	NAME OF PART	PART NUMBER
1	Right-Hand Column	7F-500
2	Left-Hand Column	7F-501
3	Motor Base	7F-502
4	Idler Base	7F-503
5	Table Screw Brackets	7F-504
6	Right-Hand Table Rail Bracket	7F-505
7	Left-Hand Table Rail Bracket	7F-506
8	Table Drive Gear	7F-507
9	Table Driven Gear	7F-508
10	Front Bearing Housings	7F-509
11	Front Bearing Housing Covers	7F-510
12	Back Bearing Housings	7F-511
13	Band Wheels	7F-512
14	Hinge Shaft Bearings	7F-516
15	Carriage Bar Link Bearings	7F-517
16	Weight Levers	7F-518
17	Cable Roll Brackets	7F-519
18	Counter-Weights	7F-520
19	Stroke Changing Bracket Caps	7F-523
20	Stroke Changing Worm Gear B.G.W.	7F-524
21	Tripping Dog (straight)	7F-526
22	Tripping Dog (Offset)	7F-527
23	Stroke Changing Screw Brackets	7F-528
24	Tripping Dog Nuts	7F-529
25	Stroke Arm Pivot Bearing	7F-532
26	Stroke Arm Lug	7F-533
27	Stroke Arm Connecting Link	7F-534
28	Stroke Arm Clamp Base	7F-535
29	Pad C ontrol Handle	7F-536
30	Pad Ontrol Handle Cover	7F-537
31	Hydraulic Cylinder S upport	7F-538
32	Tank Cover	7F-539
33	Pump Base	7F-540
34	Right-Hand Cylinder Slide	7F-541
35	Left-Hand Cylinder Slide	7F-542
36	Table Drive Motor Base	7F-543
37	Switch Box	7F-544
38	Table Tracks	7F-545
39	Table Rollers	7F-546
40	Handle Rod Brackets	7F-547
41	Stroke Changing Bracket	7F-553
42	Worm Gear Bearing	7F-554
43	Pilot Valve Bracket	7F-555
44	Counter Weight Rollers	7F-24
45	Belt Guard Brackets	7F-35
46	Hand Wheels	6A-33
47	Idler Pulley Slide Frame	H-75

NO. 610 AUTOMATIC STROKE SANDER (DOUBLE BELT)

NO.	NAME OF PART	PART NUMBER
1	Right-Hand Column	7F-500
2	Left-Hand Column	7F-501
3	Motor Base	7F-502
4	Idler Base	7F-503
5	Table Screw Brackets	7F-504
6	Right-Hand Table Rail Bracket	7F-505
7	Left-Hand Table Rail Bracket	7F-506
8	Table Drive Gear	7F-507
9	Table Driven Gear	7F-508
10	Front Bearing Housings	7F-509
11	Front Bearing Housing Covers	7F-510
12	Back Bearing Housings	7F-511
13	Band Wheels	7F-512
14	Motor Base Bracket	7F-513
15	Idler Slide Bracket	7F-514
16	Motor Base	7F-515
17	Hinge Shaft Bearings	7F-516
18	Carriage Bar Link Bearings	7F-517
19	Weight Levers	7F-551
20	Cable Roll Brackets	7F-519
21	Conter Weights	7F-520
22	Stroke Changing Bracket Caps	7F-523
23	Stroke Changing W orm Gear	7F-524
24	Tripping Dog (Straight)	7F-526
25	Tripping Dog (Offset)	7F-527
26	Stroke Changing Screw Brackets	7F-528
27	Tripping Dog Nuts	7F-529
28	Stroke Arm Pivot Bearing	7F-532
29	Stroke Arm Lug	7F-533
30	Stroke Arm Clamp	7F-535
31	Pad Control Handle	7F-536
32	Pad Control Handle Cover	7F-537
33	Hydraulic Cylinder Support	7F-538
34	Tank Cover	7F-539
35	Pump Base	7F-556
36	Right-Hand Cylinder Slide	7F-541
37	Left-Hand Cylinder Slide	7F-542
38	Table Drive Motor Base	7F-543
39	Switch Box	7F-544
40	Table Rollers	7F-546
41	Handle Rod Brackets	7F-547
42	Stroke Arm Connecting Link	7F-548
43	Equalizer Links	7F-549
44	Table Tracks	7F-550
45	Weight Levers	7F-551
46	Counter Weight Rollers	7F-24
47	Belt Guard Brackets	7F-57

NO.	NAME OF PART	PART NUMBER
48	Hand Wheels	6A-33
49	Hand Wheels	B-100
50	Idler Pulley Slide Frames	H-75
51	Worm Gear Bearing (Right-Hand)	7C-8
52	Worm Gear Bearing (Left-Hand)	7C-9
53	Worm Gear Housing	7C-10
54	Worm Gear Housing Cover	7C-11
55	Idler Stud Bases	5K-46
56	Idler Pulley Frames	5K-47
57	Dust Hood Brackets	5K-85
58	Idler Pulley Slide	5N-216
59	Base for Idler Stud (Right-Hand)	5V-24
60	Bearing for Idler Stud (Right-Hand)	5V-25
61	Counterweights	7F-552
62	Stroke Changing Bracket	7F-553
63	Worm Gear Bearing	7F-554
64	Pilot Valve Bracket	7F-555
65	Base	7FS-500
66	Top Frame	7FS-501
67	Table Screw (Right-Hand)	7FS-503
68	Table Screw (Left-Hand)	7FS-504
69	Table Rail Bracket Gibs	7FS-505
70	Table Rail Bracket Gibs	7FS-506
71	Rail Bracket Take Up Gibs	7FS-507
72	Cable Connecting Pins	7FS-508
73	Cable Connecting Rollers	7FS-509
74	Stroke Changing Motor Base	7FS-510
75	Motor Guide Rails	7FS-510
76	Cylinder Connections	7FS-512
77	Cylinder Connection Pins	7FS-513
78	Chain Connecting Links	7FS-514
79	Stroke Changing Screw Collars	7FS-516
80	Drive Sprockets	7FS-517
81	Drive Sprockets	7FS-518
82	Idler Sprocket Shafts	7FS-519
83	Idler Bearing Caps	7FS-520
84	Cylinder Support Gibs	7FS-521
85	Cylinder Support Gibs	7FS-522
86	Cylinder Support Take Up Gibs	7FS-523
87	Tripping Dog Gibs	7FS-524
88	Tripping Dog Gibs	7FS-525
89	Tripping Dog Rail	7FS-526
90	Thrust Washers	7FS-527
91	Worm Shaft Collar	7FS-528
92	Stroke Bar	7FS-530
93	Worm Shaft	7FS-531
94	Stroke Arm Pivot Stud	7FS-532
95	Stroke Arm Lug Pin	7FS-533

DOUBLE BELT (CON'T)

NO.	NAME OF PART	PART NUMBER
96	Stroke Arm Pivot Lug	7FS-534
97	Control Rod	7FS-535
98	Tank	7FS-536
99	Band Wheel Shafts	7FS-537
100	Control Rod (Small)	7FS-538
101	Table Stop Guide (front)	7FS-544
102	Table Stop Guide (Back)	7FS-545
103	Locking Plates	7FS-547
104	Table Stop Lugs (Front)	7FS-548
105	Table Stop Lugs (Rear)	7FS-549
106	Locking Handles	7FS-550
107	Table Stops	7FS-551
108	Center Cover Plate	7FS-552
109	End Cover Plates	7FS-553
110	Center Cover Plate Bars	7FS-554
111	Cable Connections	7FS-555
112	Motor End Dust Hood	7FS-556
113	Idler End Dust Hood	7FS-557
114	Belt Guard	7FS-558
115	Stroke Changing Sprocket	7FS-559
116	Stroke Changing Sprocket	7FS-560
117	End Angles For Table	7FS-561
118	Center Angle for Table	7FS-562
119	Bars	7FS-562
120	Lumber Stops	7FS-563
121	Table Brace R ods	7FS-3
122	Table Brace Rods	7FS-4
123	Table Handle Rod	7FS-5
124	Table Screw Collars	7FS-8
125	Carriage Bar	7FS-24
126	Collars	7FS-68
127	Gage Ring	7FS-78
128	Worm & Worm Gear	7CS-26
129	Thrust Washers	7CS-27
130	Spacing Collars	7CS-28
131	Worm Shaft	7CS-29
132	Felt Seal Clamp	7CS-30
133	Washers	5XS-11
134	Table Roller Studs	5XS-12
135	Idler Adjusting Screws	HS-86
136	Idler Studs	5KS-8
137	Ball Race Spacers	5KS-9
138	Idler Take Up Gibs	5XS-21
139	Adjusting Screw Nuts	5KS-36
140	Idler Pulley Bearing Studs	5KS-37
141	Idler Pulley Slide Screws	5KS-38
142	Idler Adjusting Screws	5KS-39
143	Idler Slide Gibs	5KS-40

DOUBLE BELT (CON'D)

NO.	NAME OF PART	PART NUMBER
144	Idler Slide Gibs	5KS-41
145	Idler Stud Base Clamp Bolts	5KS-74
146	Track Equalizer Shafts	5NS-5
147	Track Equalizer Shafts	5NS-8
148	Band Take Up Lugs	5NS-39
149	Band Take Up Screws	5NS-40
150	Brace Rod Turnbuckles	5NS-64
151	Motor Sprocket Sleeve	7FS-564
152	Locking Nut	7FS-565
153	Spring Tension Nut	7FS-566
154	Friction Washers	7FS-567
155	Chain Guard	7FS-568
156	Chain Connection Pins	7FS-586
157	Counterweight Covers	7FS-569
158	Driving Bushing	7FS-570
159	Pressure Plugs	7FS-571
160	Spring Pressure Screws	7FS-572
161	Stroke Changing Screw	7FS-573
162	Stroke Changing Screw Extension	7FS-574
163	Chain Rail	7FS-577
164	Table Drive Shaft	7FS-511
165	Tank Cover for Oil Line	7FS-578
166	Return Tubing Flanges	7FS-579
167	Chain Rollers	7FS-580
168	Chain Rollers	7FS-581
169	Chain RollerStuds	7FS-582
170	Chain Connectors	7FS-583
171	Four-Way Valve Bracket	7FS-584
172	Dust Guard Brackets	7FS-585

NO. 610 AUTOMATIC STROKE SANDER

NO.	NAME OF PART	PART NUMBER
1	Table Brace Rods	7FS-3
2	Table Brace Rods	7FS-4
3	Table Handle Rod	7FS-5
4	Table Screw Collars	7FS-8
5	Tightener Arm Pivot	7FS-12
6	Carriage Bar	7FS-24
7	Collars	7FS-68
8	Gage Ring	7FS-78
9	Valve Trip Covers	7FS-80
10	Worm and Worm Gear	7CS-26
11	Thrust Washers	7CS-27
12	Spacing Collars	7CS-28
13	Worm Shaft	7CS-29
14	Felt Seal Clamp	7CS-30
15	Washers	5XS-11
16	Table Roller Studs	5XS-12
17	Idler Adjusting Screw	HS-86
18	Tightener Roller Stud	6ES-62
19	Tightener R oller	6ES-65
20	Idler Stud	5KS-8
21	Ball Race Spacer	5KS-9
22	Idler Take Up Gib	5KS-21
23	Adjusting Screw Nut	5KS-36
24	Idler Pulley Bearing Stud	5KS-37
25	Idler Pulley Slide Screw	5KS-38
26	Idler Adjusting Screw	5KS-39
27	Idler Slide Gib	5KS-40
28	Idler Slide Gib	5KS-41
29	Idler Stud Base Clamp Bolt	5KS-74
30	Track Equalizer Shafts	5NS-5
31	Track Equalizer Shafts	5NS-8
32	Band Take Up Lugs	5NS-39
33	Band Take Up Screws	5NS-40
34	Brace Rod Turnbuckles	5NS-64
35	Wood Handle	
36	Base	7FS-500
37	Top Frame	7FS-501
38	Table Screw	7FS-503
39	Table Screw	7FS-504
40	Table Rail Bracket Gibs	7FS-505
41	Table Rail Bracket Gibs	7FS-506
42	Rail Bracket Take Up Gibs	7FS-507
43	Cable Connecting Pins	7FS-508
44	Cable C onnecting Rollers	7FS-509
45	Stroke Changing Motor Base	7FS-510
46	Motor Guide Rails	7FS-510
47	Table Drive Shaft	7FS-511

NO.	NAME OF PART	PART NUMBER
48	Cylinder Connections	7FS-512
49	Cylinder Connecting Pins	7FS-513
50	Chain Connecting Links	7FS-514
51	Stroke Changing Screw Collars	7FS-516
52	Drive Sprockets	7FS-517
53	Idler Sprockets	7FS-518
54	Idler Sprocket Shaft	7FS-519
55	Idler Bearing Caps	7FS-520
56	Cylinder Support Gibs (wide)	7FS-521
57	Cylinder Support Gibs (narrow)	7FS-522
58	Support Take up Gibs	7FS-523
59	Tripping Dog Gibs	7FS-524
60	Tripping Dog Gibs	7FS-525
61	Tripping Dog Rail	7FS-526
62	Thrust Washers	7FS-527
63	Worm Shaft Collar	7FS-528
64	Stroke Bar	7FS-530
65	Worm Shaft	7FS-531
66	Stroke Arm Pivot Studs	7FS-532
67	Stroke Arm Lug Pin	7FS-533
68	Stroke Arm Pivot Lug	7FS-534
69	Control Rod (large)	7FS-535
70	Tank	7FS-536
71	Band Wheel Shafts	7FS-537
72	Control Rod (small)	7FS-538
73	End Angles for Table	7FS-539
74	Center Angle for Table	7FS-540
75	Motor End Dust Hood	7FS-541
76	Idler End Dust Hood	7FS-542
77	Dust Hood Covers	7FS-543
78	Table Stop Guide (front)	7FS-544
79	Table Stop Guide (back)	7FS-545
80	Lumber Stops	7FS-546
81	Locking Plates	7FS-547
82	Table Stop Lugs	7FS-548
83	Table Stop Lug (rear)	7FS-549
84	Locking Handles	7FS-550
85	Table Stops	7FS-551
86	Center Cover Plate	7FS-552
87	End Cover Plates	7FS-553
88	Center Cover Plate Bars	7FS-554
89	Cable Connections	7FS-555
90	Belt Guard	7FS-100
91	Stroke Changing Sprocket	7FS-559
92	Stroke Changing Sprocket	7FS-560
93	Motor Sprocket Sleeve	7FS-564
94	Locking Nut	7FS-565

COMMERCIAL PARTS

QUANTITY	PART
2	1012 Nice Thrust Bearings
2	2309 S.K.F. Bearings
2	2307 S.K.F. Bearings
2	N-09 S.K.F. Lock Nuts
2	N-07 S.K.F. Lock Nuts
2	W-09 S.K.F. Lock Washers
2	W-07 S.K.F. Lock Washers
2	B-88 Torrington Needle Bearings
2	BR-1012 Torrington Needle Bearings
2	B-2016 Torrington Needle Bearings
13	B-1516 Torrington Needle Bearings
2	60833 Victoprene Seals
1	H-1056 B.G.W. Soft Steel Worm
1	G-1260 B.G.W. Cast Iron Worm Gear
1	HL-1066 B.G.W. Hardened Steel Worm
1	GB-1062 BronzeWorm Gear
23 Ft.	41-1/2 Pitch Roller Chain
12 Ft.	80 1" Pitch Roller Chain
1	FRC-15 5/8" Bore B.G.W. Flexible Coupling
1	6F Falk Coupling for 7-1/2 HP, 1200 Pump Motor
7 Ft.	1/4" Tiller Rope
4	Clamps for 1/4" Tiller Rope
1	1/4 HP, 1800 Table Motor
1	1/4 HP, 1800 RPM Stroke Change Motor
1	7-1/2 HP, 1200 RPM Pump Motor
1	10 HP, 1800 RPM Belt Motor
2	8736-AO-4 Square D Reversing Magnetic Starters
2	8536-DO-1 Square D Magnetic Starters
2	9001-BB4 Square D Flush Mounted Push Button Station Start-Stop
1	9001-BB7 Square D Flush Mounted Push Button, Up-Down
2	Type KB-1 Single Normally Open Square D Push Button Units (Blank)
15"	3/4" O.D. x 14 Ga. Wall Seamless Steel Tubing,
24"	1" O.D. x 11 Ga. Wall Seamless Steel Tubing

1	1-1/2" Street Ell	1	1-1/2"x1-1/4" bushing
1	1-1/4" Street Ell	1	1-1/4" x 3/4" bushing
1	1-1/4" Close Nipple	2	3/4" extension fittings
1	1-1/4" Union	2	3/4" Pipe Plugs
18"	1-1/4" Pipe		

6	A-8205 x 14 Ermeto Coupling Male connector

NO.	PART NAME	PART NUMBER
95	Spring Tension Nut	7FS-566
96	Friction Washers	7FS-567
97	Chain Connecting Pins	7FS-586
98	Chain Guard	7FS-568
99	Four-Way Valve Bracket	7FS-584
100	Counterweight Covers	7FS-569
101	Driving Bushing	7FS-570
102	Pressure Plugs	7FS-571
103	Spring Pressure Screws	7FS-572
104	Stroke Changing Screw	7FS-573
105	Stroke Changing Screw Extension	7FS-574
106	Right-Hand Light Support	7FS-575
107	Left-Hand Light Support	7FS-576
108	Chain Rail	7FS-577
109	Tank Cover for Oil Line	7FS-578
110	Return Tubing Flanges	7FS-579
111	Chain Rollers	7FS-580
112	Chain Rollers	7FS-581
113	Chain Roller Studs	7FS-582
114	Chain Connectors	7FS-583

ADDITIONAL PARTS REQUIRED FOR CENTRALIZING TABLE

1	Front Gear Box for Stop Screw	5N-47
2	Gear Box Covers	5N-48
3	Rear Gear Box for Stop Screw	5N-49
4	Crank to Adjust End Stops	5N-50
5	End Stop Nuts	5N-51
6	Front End Bearing For Screw(right-hand)	5N-52
7	Front End Bearing for Screw (left-hand)	5N-53
8	Rear End Bearings for Screw	5N-54
9	Lumber Stops	5NS-58
10	Table Screws	5NS-200
11	Crank Shaft for Table	5NS-201
12	Handle Rod	5NS-202
13	Cross Shaft Spiral Gears	5NS-203
14	Table Screw Gears	5NS-204

COMMERCIAL PARTS (CON'D)

QUANTITY	PART
4	A-8205 x 6 Ermeto Coupling Male Connector
6	A-8405 x 14 Ermeto Coupling 90° Male Elbow
4	A-8405 x 6 Ermeto Coupling 90° Male Elbow
1	A-8305 x 14 Ermeto Coupling Union
1	A-8705 x 14 Ermeto Coupling Tee
15 Ft.	3/8" O.D. x 20 Ga. Wall Seamless Steel Hydraulic tubing
27 Ft.	7/8" OD x 16 Ga. Seamless Steel Hydraulic tubing
1	V-134-U Vickers Pump
1	FRG-06-20-MI Flow Control Valve
1	C2-440-S9 Valve
1	C2-529-B Valve
1	29092 Filter
1	83961 Filler Cap Assembly
1	22576 Oil Level Gage
1	Model KCN 2" x 24" Hannifin Cylinder
2	Boston Gear Works Sprockets KUS-18
2	Boston Gear Works Sprockets KUS-15

CASTING PARTS

NO.	NAME OF PART	PART NUMBER
1	Sanding Pad Jaws	5K-57
2	Handle for Sander Pad	5N-59
3	Equalizing Plate	5N-100
4	Roller Stud Caps	5N-109
5	Pad Holder	5N-116
6	Plate for Carriage	5N-117
7	Sanding Pad Carriage	5N-118
8	Band Connection Plates	5N-119
9	Eccentric Lever	5N-120
10	Sanding Pad	5N-220

STEEL PARTS

1	Hinge Pin for Jaws	5KS-18
2	Spring Stud	5KS-17
3	Clamp Screw for Jaws	5KS-58
4	Top and Bottom Rolls	5NS-75
5	Roll Cover	5NS-76
6	Top and Bottom Roll Studs	5NS-77
7	Fill Collars for Stud	5NS-78
8	Front Roller Stud	5NS-79
9	Covers for Side Rollers	5NS-80
10	Stud for Back Roller	5NS-81
11	Lock Screw for Pad	5NS-82
12	Track Wiper for Flange	5NS-84
13	Band Connection Pin	5NS-90
14	Guide Pin	5NS-91
15	Eccentric Shaft	5NS-92
16	Eccentric	5NS-93
17	Lift for Pad Holder	5NS-94
18	Clamp Plate for Pad	5NS-95
19	Eccentric Plate	5NS-99

COMMERCIAL PARTS (CON'D)

QUANTITY	PART
4	A-8205 x 6 Ermeto Coupling Male Connector
6	A-8405 x 14 Ermeto Coupling 90° Male Elbow
4	A-8405 x 6 Ermeto Coupling 90° Male Elbow
1	A-8305 x 14 Ermeto Coupling Union
1	A-8705 x 14 Ermeto Coupling Tee
15 Ft.	3/8" O.D. x 20 Ga. Wall Seamless Steel Hydraulic tubing
27 Ft.	7/8" OD x 16 Ga. Seamless Steel Hydraulic tubing
1	V-134-U Vickers Pump
1	FRG-06-20-MI Flow Control Valve
1	C2-440-S9 Valve
1	C2-529-B Valve
1	29092 Filter
1	83961 Filler Cap Assembly
1	22576 Oil Level Gage
1	Model KCN 2" x 24" Hannifin Cylinder
2	Boston Gear Works Sprockets KUS-18
2	Boston Gear Works Sprockets KUS-15

SINGLE PAD CARRIAGE

CASTING PARTS

NO.	NAME OF PART	PART NUMBER
1	Sanding Pad Carriage	5N-108
2	Pad Holder	5N-146
3	Hand Lever for Carriage	5N-77
4	Lugs for Band	5N-72
5	Equalizing Plate	5N-100
6	Sanding Pad	5N-220
7	Sanding Pad Jaws	5K-57
8	Band Connecting Stem	5N-145
9	Band Connection Yoke	5N-144
10	Roller Stud Caps	5N-109
11	Plate for Carriage	5N-400
12	Pad	5N-401
13	Jaw	5N-402

STEEL PARTS

1	Spring Holder	5NS-101
2	Spring Holder Lug	5NS-102
3	Gibs for Stem	5NS-103
4	Lever Rest	5NS-104
5	Top and Bottom Rolls	5NS-75
6	Roll Covers	5NS-76
7	Top and Bottom Roll Studs	5NS-77
8	Fill Collars for Studs	5NS-78
9	Front Roller Studs	5NS-79
10	Covers for Side Rollers	5NS-80
11	Studs for Back Roller	5NS-81
12	Clamp Plate for Pad	5NS-83
13	Track Wiper Flange	5NS-84
14	Lock Screw for Pad	5NS-82
15	Hinge Pins for Jaws	5KS-18
16	Spring Studs	5KS-17
17	Clamp Screw for Jaws	5KS-58
18	Spring Retainers	5KS-97
19	#6201 Ball Bearings	