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INSTRUCTIONS FOR THE OPERATION OF
DODDS AUTOMATIC DOVETAILER

Serial Numbers
C-1341 - C-1867

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INSTRUCTIONS FOR GRINDING DOVETAIL BITS

PRODUCT CATALOGS

1. Stearns Installation and Maintenance Data Sheet No. 300, 12/1/64
2. Norgren, Micro-Fog Lubricator, Type 10-009
NIP 28/8M/6-63/N
3. Norgren, Liquid Level Control Switch, Type 18-023
NIP 48c/6M/10-66/N
4. Norgren, Automatic Drain Filter, Type 12-001
NIP 46a/5M/6-66/N
5. Norgren, Pressure Regulator, Type 11-002
NIP 6e/60M/3-66/N

INSTRUCTIONS FOR INSTALLATION, LUBRICATION AND OPERATION
OF DODDS AUTOMATIC DOVETAILER
FOR CUTTING DRAWER FRONTS, BACKS AND SIDES

This DODDS dovetailer has been completely tested under power, and it is in perfect operating condition before shipment. It will give excellent service for a long time if treated with reasonable care. After the machine arrives, inspect it for any damage in shipment, and if any, make immediate claim to carrier.

INSTALLATION

The machine should be accurately leveled. It may be bolted down if desired or required. Remove the wooden blocks. Be sure there is sufficient oil in cam gear housing. After correct current has been connected, check the machine for rotation by using the cutters as a guide. DO NOT START MACHINE BEFORE FOLLOWING LUBRICATION INSTRUCTIONS.

LUBRICATION

The clamp head and carriage operate on ball bushings and are life lubricated at the factory. If any dragging develops, a few drops of oil on the shafts will correct it.

We do not recommend any particular brand of oil and grease; therefore, the following should serve only as a guide in using equivalent types and grades of oil and grease. The spindle housing unit is a closed system and the parts are lubricated by a Norgren Micro-Fog oil mist lubricator.

*Spindle Housing - Use Mobilmist #36 oil or exact equivalent in the Norgren Micro-Fog lubricator.

Bearings - Use Mobilux No. 2 or equivalent.

Gear Reducer - Use Mobil Compound FF or equivalent.

Cam Gear Housing - Use Mobil Compound FF or equivalent.

Air Line Lubricator - Use Model DTE Heavy Medium or equivalent.

Spindle Motor - Use Mobilplex Ep No. 1 or equivalent.

Item numbers 2 and 3 of the following have been serviced before shipment of the machine. (EXCEPT 2B WHICH SHOULD BE FILLED TO PROPER LEVEL BEFORE OPERATING THE MACHINE.)

1. Check each week:
 - a. The oil level of the Norgren Micro-Fog lubricator. The oil level must always be visible in the gauge glass.
- *WE CANNOT BE RESPONSIBLE FOR DAMAGE RESULTING FROM USE OF IMPROPER OIL IN THE SPINDLE HOUSING UNIT.**

* * * * *

SUPPLEMENTARY LUBRICATING INSTRUCTIONS
FOR THE SPINDLE HOUSING

The C.A. Norgren Company has tested the lubricants listed below only to determine their suitability for use in the Norgren Micro-Fog lubricator.

<p>* <i>CHEVRON</i> Socony Mobil Oil Company Texas Company Standard Oil Company Gulf Oil Corporation Shell Oil Company</p>	<p><i>INDUSTRIAL R # 0 #115</i> Mobilmist #36 Regal F (R & O) oil Stanoil 52 oil Harmony 69 oil Tellus 69 (Code 3795) oil</p>
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The recommended rate of the oil flow in the sight glass on the lubricator is a constant flow of oil at 15 PSI. The lubricator has been adjusted for this rate of oil flow at the factory. Use only fresh, clean oil. CHECK EACH DAY TO BE SURE THAT OIL IS FLOWING THROUGH LUBRICATOR.

The air pressure for the Norgren Micro-Fog system should be between 10 and 20 PSI on the large gauge and 12 PSI on the small gauge. Do not exceed 20 PSI. The large regulator of the Micro-Fog system is for the fog lubrication. The small regulator of the Micro-Fog system is for the pressure jets which force the fog lubrication to the proper bearing surfaces in the spindle unit.

NOTE: AIR PRESSURE OUT OF MICRO FOG UNIT SHOULD BE AT 20" OF WATER COLUMN.
Do not let the oil accumulate more than 2" deep in the bottom of the spindle drive box. Drain at regular intervals.

IT IS VERY IMPORTANT THAT ANY OF THE ABOVE SPECIFIC OILS OR THEIR EXACT EQUIVALENT BE USED IN THE NORGRN MICRO-FOG LUBRICATOR FOR LUBRICATING THE PARTS IN THE ENCLOSED SPINDLE HOUSING. WHEN REFILLING, IT IS VERY IMPORTANT THAT THE LUBRICATOR BE CLEAN SO THAT NO SAWDUST OR FOREIGN MATTER GETS INTO THE RESERVOIR. IF OIL LINES BECOME CLOGGED, SERIOUS DAMAGE WILL RESULT TO SPINDLES, BEARINGS AND GEARS.

If you have any questions about the Norgren lubricating system, contact your local Norgren Representative.

* *CURRENT RECOMMENDED OIL*

2. Grease or oil every twelve months:
 - a. Check oil in gear reducer
 - b. Check oil level of cam gear housing unit
3. Grease once a year:
 - a. Bearings on cam gear housing unit
 - b. Motor for driving spindles
4. Cam followers are factory lubricated and require no attention.

CONNECTING AIR

Pipe air to the air fitting on the pressure regulator located on the rear of the machine. Adjust the air pressure to 75 pounds for the clamping. The amount of pressure can be increased or decreased according to your experience. This machine is equipped with an air line lubricator which is adjusted to allow a few drops of oil to pass into the air line every three or four days.

TO OPERATE MACHINE

After the installation, lubrication and air connecting instructions have been followed, the machine is ready to operate. Turn selector switch to HAND and then button marked START. Depress foot switch and release. The machine will now make one cycle.

To obtain maximum efficiency of this machine, we recommend the use of DODDS dovetail bits only. These bits are manufactured specifically for this machine. The use of other bits may result in costly repairs.

CAMS

The machine when shipped is set up for cutting drawer sides. Cam number 2 is stamped for the stock thickness (refer to page 15, items 86 and 87). Item 86 is the location of Cam number 2 or number 3. Item 87 is the location of Cam number 1. Only number 3 Cam is used when cutting drawer fronts and backs. The numbers on the Cams should always be on the same side as the lock nut. Be sure that the cams are attached securely in place before operating the machine. WHEN USING CAMS, NUMBERS 1 AND 2, HAVE CARRIAGE LOCK FULLY RETARDED OR REMOVED. (Refer to page 20, item number 21.)

CUTTING DRAWER SIDES

Cam numbers 1 and 2 are used when cutting drawer sides. (Refer to section on Cams for proper setup.) Insert vertically by pairs, back to back, two or four drawer sides, depending upon the size of the machine and the width of the drawer sides, inside the front clamp and against the stop on one side when cutting two drawer sides and against the stops on both sides when cutting four drawer sides. Set the edges of the drawer sides firmly against the stops (page 14, items 20L or 20R) and resting on the finger plate. Depress the foot pedal and clamping and cutting operate simultaneously. At the end of each cycle, the clamping is automatically released and the feed operation stops. The stock is then turned upside down and the other ends are cut in the same manner. (Refer to page 14, items 20L and 20R.) Adjust these stops for position of the dovetail tenon across the width of the stock. To center the tenons when cutting two drawer sides at one time, loosen the two nuts (refer to page 19, item 93) on the Cam Follower, and move Cam Follower forward or backward. The adjustment usually required is very slight. WHEN USING CAMS NUMBER 1 AND 2, HAVE CARRIAGE LOCK FULLY RETARDED OR REMOVED. (Refer to page 20, item 21).

CUTTING DRAWER FRONTS AND BACKS

Only number 3 Cam is used when cutting drawer fronts and backs. (Refer to section on Cams for proper setup.) The aluminum stop, (page 18, items 50 and 51) furnished with the machine, replaces the front clamp (page 15, figure 2, items 80 and 81) used in cutting drawer sides. This stop is fastened to each end of the head with the cap screws from stops 20R and 20L and is adjustable for depth of cut. (Refer to page 18, item 52). When using Cam number 3, be sure to secure carriage with carriage lock (refer to page 20, item 21). Face the back of the machine and place horizontally two drawer fronts or backs, one on each side of the table under the top clamp and against the front and side stops. Make the cut and the stock is then turned around and the other ends are cut in the same way. The two threaded rods between the two top cylinders on the head are used when cutting one drawer front or back at a time. Insert one drawer front or back under center of clamp bar (refer to page 18, item 75). Then, cycle machine and stop in clamped position. To stop machine, depress foot pedal and hold and then push stop button and stop machine.

Turn down nuts on threaded rods finger tight and then retard 1/6 of a turn and lock with lock nut. Start the machine and finish cycle. This adjustment of the threaded rods prevents the pressure bar from tilting. (Refer to page 15, figure 2, items 18 and 19.) These items are the stops for adjusting the position of the dovetails across the width of the stock.

CUTTING SERPENTINE DRAWER FRONTS

The table should be in the same position as used in cutting regular drawer fronts. Remove incline back (refer to page 18, item 67) and insert your jig. The cutting is completed in the same manner as in cutting regular drawer fronts.

If necessary, we can furnish a finger plate to be attached to the finger board. (Refer to page 18, item 66.)

CUTTING BLIND DOVETAILS

The same cams are used in cutting drawer fronts and backs or drawer sides.

1. The carriage locking screw should be fully retarded (unlocked). This step is very important. (Refer to page 20, item 21.)
2. The number 1 regular dovetail cam is replaced with cam marked number 2 BLIND.
3. The number 2 regular dovetail cam is replaced with cam marked number 2 BLIND.
4. When cutting drawer sides, the clamp used in cutting regular dovetails on drawer sides is attached in place (refer to page 15, figure 2, items 80 and 81) and the stops for positioning the dovetails across the width of the stock are placed in their proper location and ready to make the Blind Dovetail Cut in the drawer sides. Drawer sides must be at least 5/8" thick.
5. When cutting drawer fronts or backs, the clamp for the drawer sides and the stops for the drawer sides are removed. The aluminum finger stops used in cutting regular dovetails on the drawer fronts and backs (refer to page 18, items 50 and 51) is attached to the head with a 3/4" wooden filler strip inserted between the head and the aluminum stop. BE SURE TO USE THE HOLES THAT PLACE THE ALUMINUM FINGERS ABOVE THE CUTTERS. This stop is adjusted by means of elongated slots and may be adjusted to the desired depth. After the stops for positioning the dovetails across the width of the stock are placed in their proper positions, the machine is ready to make the Blind Dovetail Cut.

CUTTING LIPPED DRAWER FRONTS

These drawer fronts are cut in the same manner as the regular drawer fronts. The regular stop on the machine will accommodate drawers with the lips up to 1-3/4" long.

ADJUSTMENTS

Variable Feed

The feed speed can be varied to any rate of speed between 10 and 25 CPM to most efficiently handle the dovetailing to be done. The speed is altered by turning the hand wheel of the speed selector drive which is located in front of the feed motor. (Refer to page 15, figure 3, item 95.) When the feed speed is changed, the carriage may not stop in the proper place. The Cam (refer to page 18, item 111) may be advanced or retarded to stop the carriage in the proper position.

The pin of the cam roller, (refer to page 18, figure 12, item 88), and the shaft of the cam (refer to page 18, item 86), should be in line.

CUTTER WEAR

The cutters, as they are sharpened, become smaller and this results in a smaller mortise and a larger tenon so that the dovetail joint is too tight. To remedy this condition, the 1/2" machine screw with lock nut, which is located inside the frame against the slide on the side of the machine where the motor is (refer to page 17, item 17) should be turned slightly until the correct adjustment is made.

Keep your bits sharpened to a keen edge and they will last much longer. A dull tool wears fast and is hard on the machine. Always sharpen the complete set of cutters to keep them uniform in size.

If burning occurs when the cutters are sharp, it indicates that the feed is too slow.

TO CENTER CUT ON DRAWER SIDES

See instructions for cutting drawer sides.

AUTOMATIC CYCLING

When the selector switch marked AUTO is turned to the right, the machine will cycle and then delay from 1/5 of a second to three minutes and then recycle automatically. The length of the delay is controlled for loading and unloading by adjusting slotted screw in cycle-timer (refer to page 20, cycle timer).

CARRIAGE LOCK

WHEN USING CAMS NUMBERS 1 AND 2, FOR CUTTING DRAWER SIDES, BE SURE TO HAVE THE CARRIAGE LOCK FULLY RETARDED OR REMOVED. (Refer to page 20, item 21.)

INCLINE AND INCLINE BACK

Incline (refer to page 18, item 67A) and Incline Back (refer to page 18, item 67) can be turned over to make a flat table by removing bolt (refer to page 18, item 68). Bolts in the fingerboard (refer to page 18, item 57H) adjust the table for height or mortise cut.

BITS (INSERTION AND REMOVAL)

Remove finger plate (refer to page 13, item 15B) to facilitate the removing or inserting of the dovetail bits.

Open the two toggle clamps located on the front of the machine and remove the finger plate. Hold spindles stationary by inserting crank, which is furnished with the machine, into the end of the Drive Shaft and have handle of crank against frame. Loosen each bit. Pull crank out slightly so that the handle misses the frame. Hold each bit and crank out or in. CAUTION--REMOVE CRANK BEFORE STARTING MACHINE.

To obtain maximum efficiency of this machine, we recommend the use of DODDS dovetail bits only. These bits are manufactured specifically for this machine. The use of other bits may result in costly repairs.

SPINDLES

The spindles operate in radial ball bearings and are at a fixed height. The spindle unit can be removed from the drive housing by disconnecting the main oil line at the oil manifold and then removing the bolts connecting the spindle unit to the drive housing. (See instructions, To Remove Spindles and Bearings in Ball Bearing Spindle Assembly, page 21.)

Do not permit sawdust to collect in top of spindles as this may result in breakage of the bits.

BEARINGS

The ball bearings in the spindle unit were engineered for this application and we, therefore, recommend that replacements be purchased from us. We cannot be responsible for damage resulting from the use of or the premature wear of bearings not obtained from us.

PARTS LIST FOR DODDS AUTOMATIC DOVETAILER

In order to maintain accuracy, it is necessary and economical to replace worn parts. This listing has been prepared to simplify the ordering of parts.

WHEN ORDERING

1. List serial number of machine.
2. List size of the machine (number of spindles).
3. List number and name of part as shown in listing.
4. Specify amount wanted.

As some parts are fitted in assembly, these parts will be finished as far as possible with allowance for fitting where required.

PART NUMBER

NAME OF PART

17	1/2" x 3" sq. head set screw (for adjusting cutter wear)
19	Rear stop for drawer fronts and backs
20L	Left stop for drawer sides
20R	Right stop for drawer sides

27

Dovetail bits

To obtain maximum efficiency of this machine, we recommend the use of DODDS dovetail bits only. These bits are manufactured specifically for this machine. The use of other bits may result in costly repairs. When ordering bits, give the number required.

12 spindle machine	6 right hand - 6 left hand
15 spindle machine	6 right hand - 9 left hand
20 spindle machine	8 right hand - 12 left hand
25 spindle machine	10 right hand - 15 left hand

The size of the bit, as stamped, or the size of the bit ordered, will cut that length tenon or that height mortise, whether ST or OT. The OT has a sharper angle than the ST type. Dovetail bits are available in High Speed Steel, and with Tungsten Carbide Tips. The High Speed Steel bits used on this machine have a 5/16" - 24 thread shank.

28 Spindle drive motor
30 V-belt - B-46
50 Finger stop for drawer fronts and backs
51 Finger stop bracket
52 3/8" - 16 NC x 3/4" hex head cap screw
53 3/8" - 16 NC x 3/4" hex head cap screw
55 & 56 1-1/2" shaft for slide
57 Slide
57A Slide tie bar
57B 3/4" tension spring #170
57H Incline adjusting bracket
58 1-1/2" Thompson ball bushing
59 1-1/2" dust seal
60 & 61 3/4" shaft for fingerboard
62, 65 & 66 Fingerboard
63 & 64 3/4 bearing block
67 Incline back
67A Incline
68 1/2" - 13 NC x 1" hex head cap screw
69 Head
71 & 72 1/2" x 1-1/4" hex head cap screw

73 Air cylinder OOFNC 4002

75 Top clamp bar

76 Air cylinder 11 ENC 2001

78 Front clamp bar

80 Front chipbreaker

81 Back chipbreaker

82 5/16" x 1-1/2" stripper bolt

83 Compression spring C 43 C

84 Chipbreaker hangers

85 5/16" x 1-3/4" hollow head set screw & nut

86 Straight motion cams, #2 for cutting
 drawer sides

- 5/16" drawer sides	- 1/2 " drawer sides
- 3/8 " drawer sides	- 9/16" drawer sides
- 7/16" drawer sides	- 5/8 " drawer sides

Cam for cutting one drawer side to 1-1/16"
 thick Blind Dovetail

- #3 Cam for cutting drawer fronts and backs

87 Side motion cam

- #1 Cam for regular dovetails
- #1 Cam for blind dovetails

88 Straight motion cam follower

89 Side motion cam follower

90 Side motion cam follower bracket

91 3/8" x 1" cap screws

92 Straight motion cam follower bracket

93 5/8" x 11 NC hex nuts

94 1/3 or 1/2 HP brake motor

95 Speed selector control

96	V-Belt A 38 or A 35
97	6 M speed selector sheave
102	Speed reducer SB 1860 C
103	Sprocket 82 B 30
104	Cam gear housing
105	Single roller chain #35
106	Sprocket 35 B 30
107	Long cam shaft
108	Helical Mitre Gear LSA 104 R
109	Helical Mitre Gear LSA 104 L
110	Short cam shaft
111	Limit-switch cam
112	Limit-switch CR9440K1J1
116	Pilot valve BV 40606-A
117	Speed selector 4C
119	Foot switch AW 6
150	Finger plate
151	Finger plate clamp
152	Drive gear
153	Pinion
154	Lower gear regular spindles (L-R-R-L)
155	Upper gear regular spindles (L-R-R-L)
156	Lower gear drive spindle LH
157	Upper gear drive spindle LH
158	Upper spindle bearing (see *)
159	Lower spindle bearing

160 Lower drive spindle bearing

*These are special bearings and must be purchased from the Alexander Dodds Company or their authorized representative. We cannot be responsible for damage resulting from the use of other bearings.

161 Drive cover window

162 Bearing lock collar (R & L)

163 Bearing spacer

164 Top bearing cover

165 Upper bearing housing

167 Lower bearing housing

169 Drive spindle bearing housing

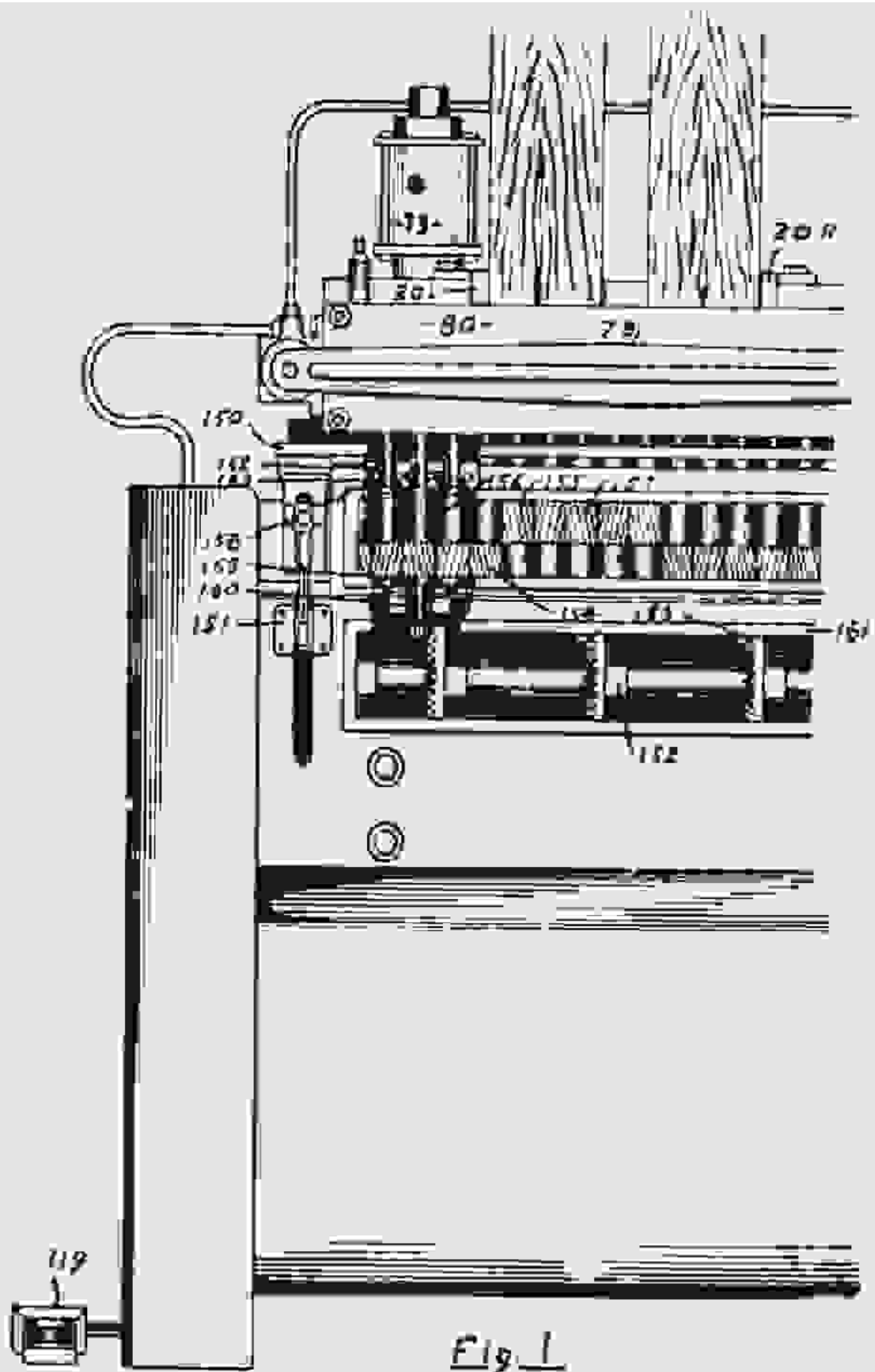


Fig. 2.

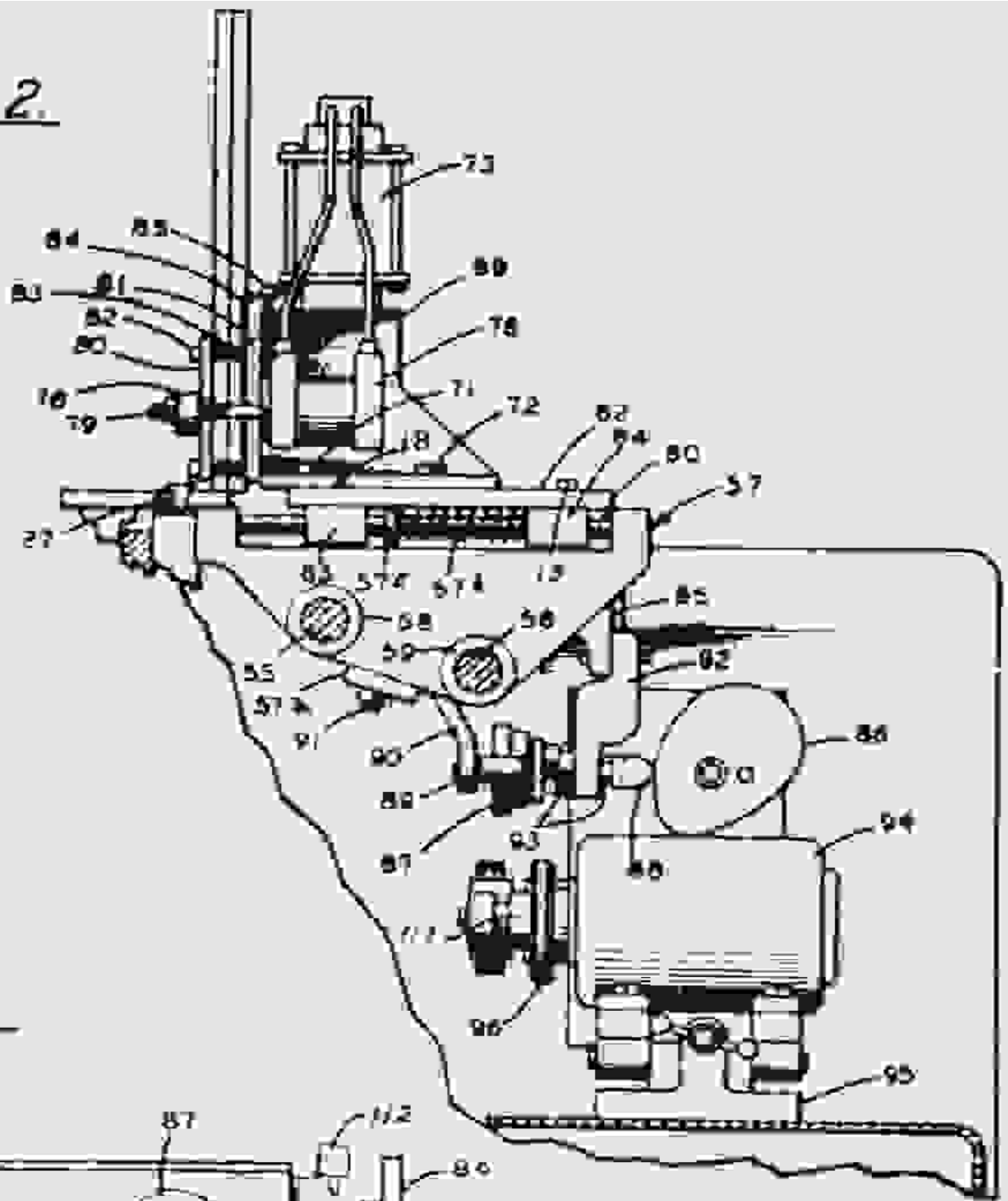


Fig. 3.

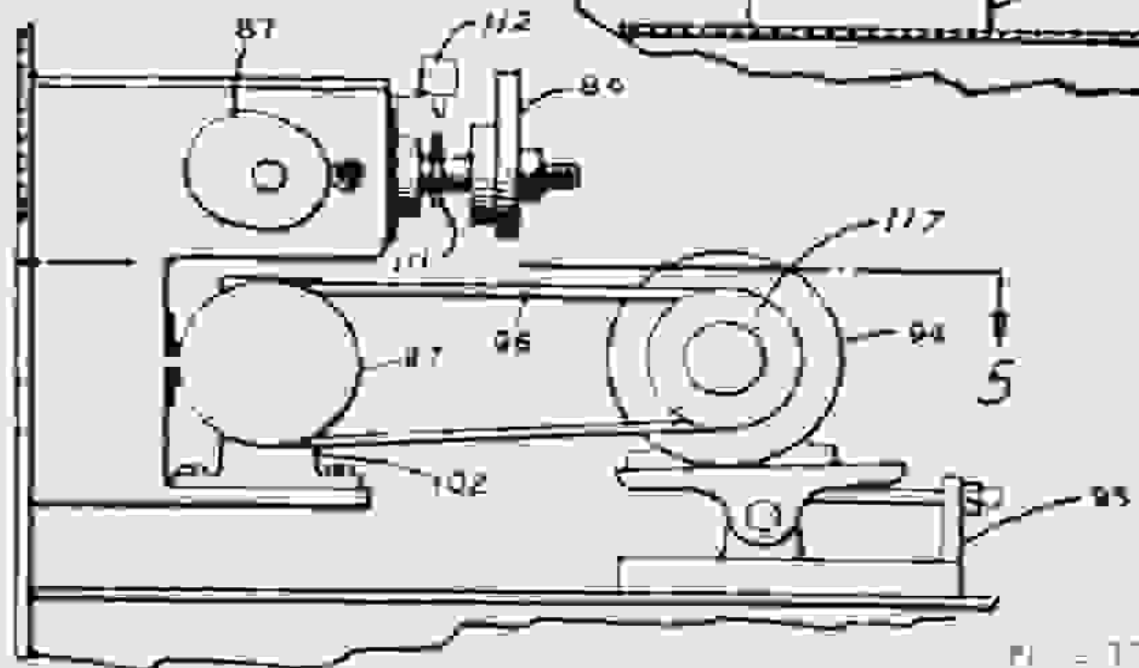


Fig. 4.

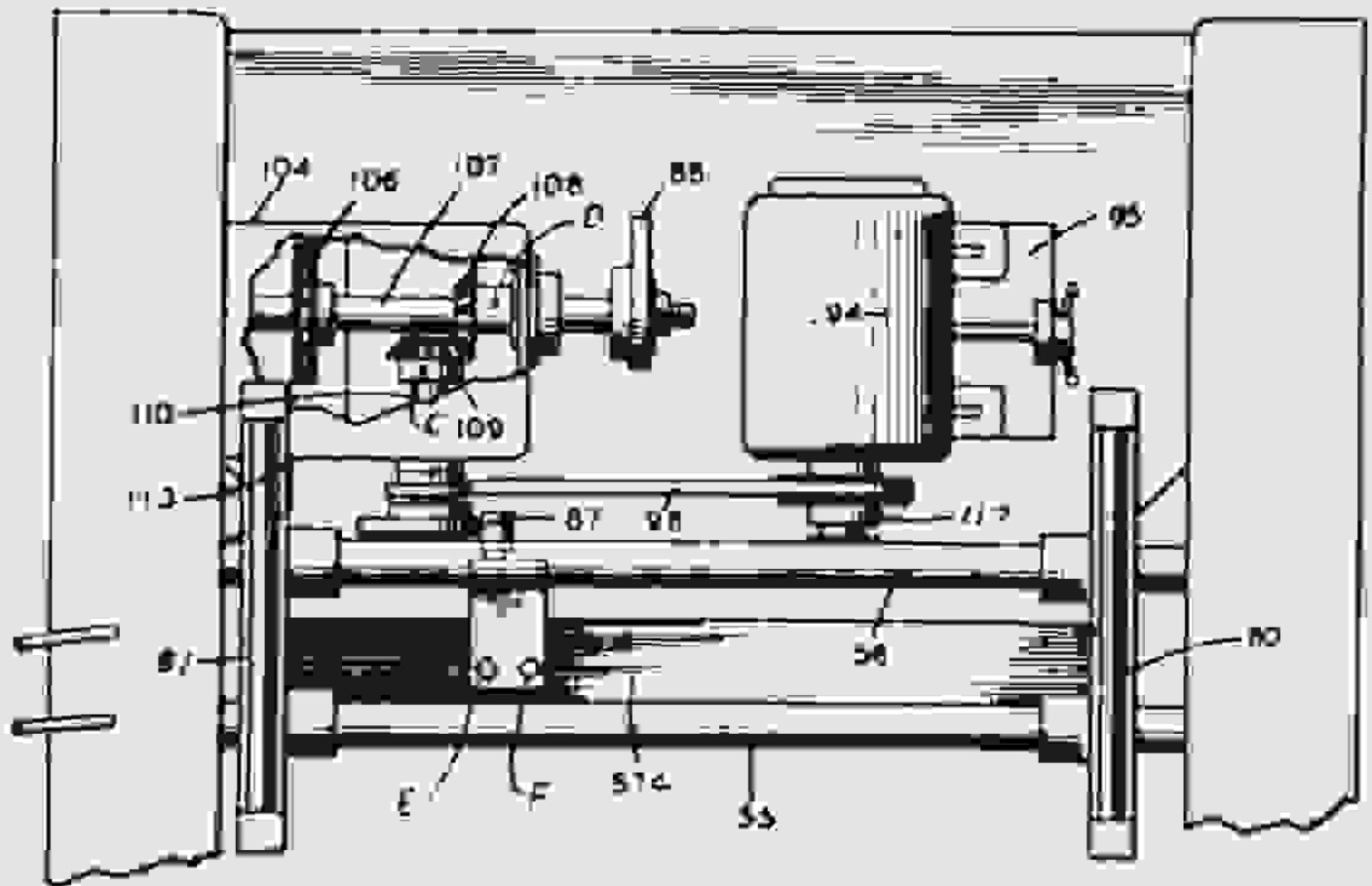
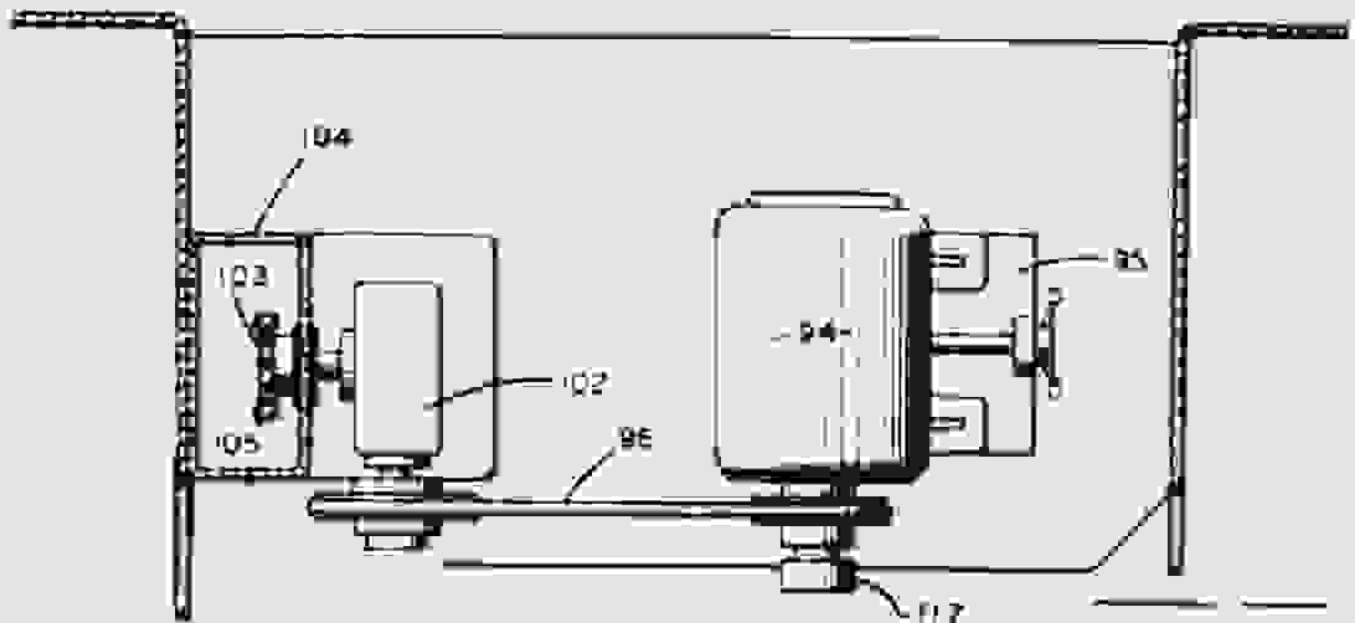


Fig. 5.



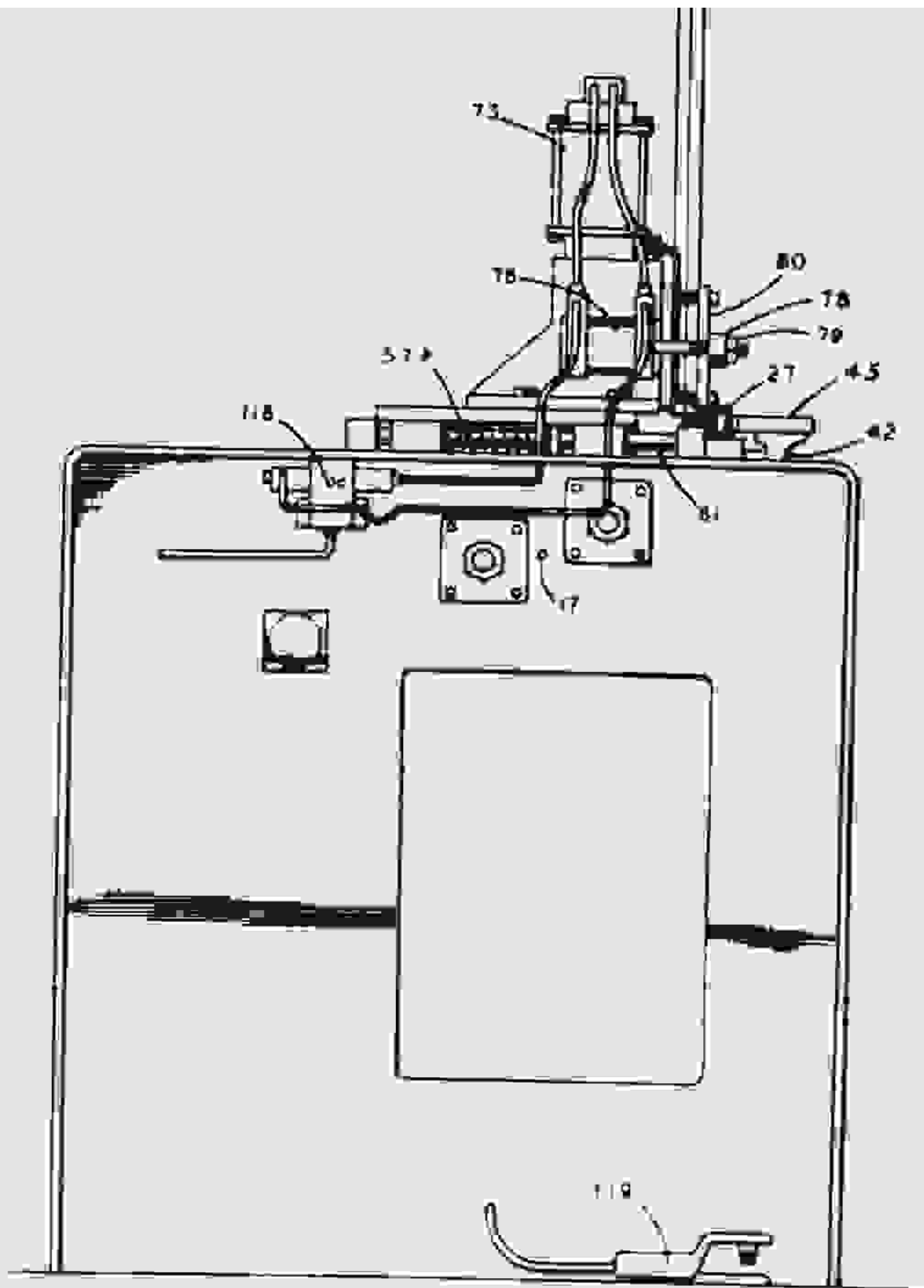


Fig. 6.

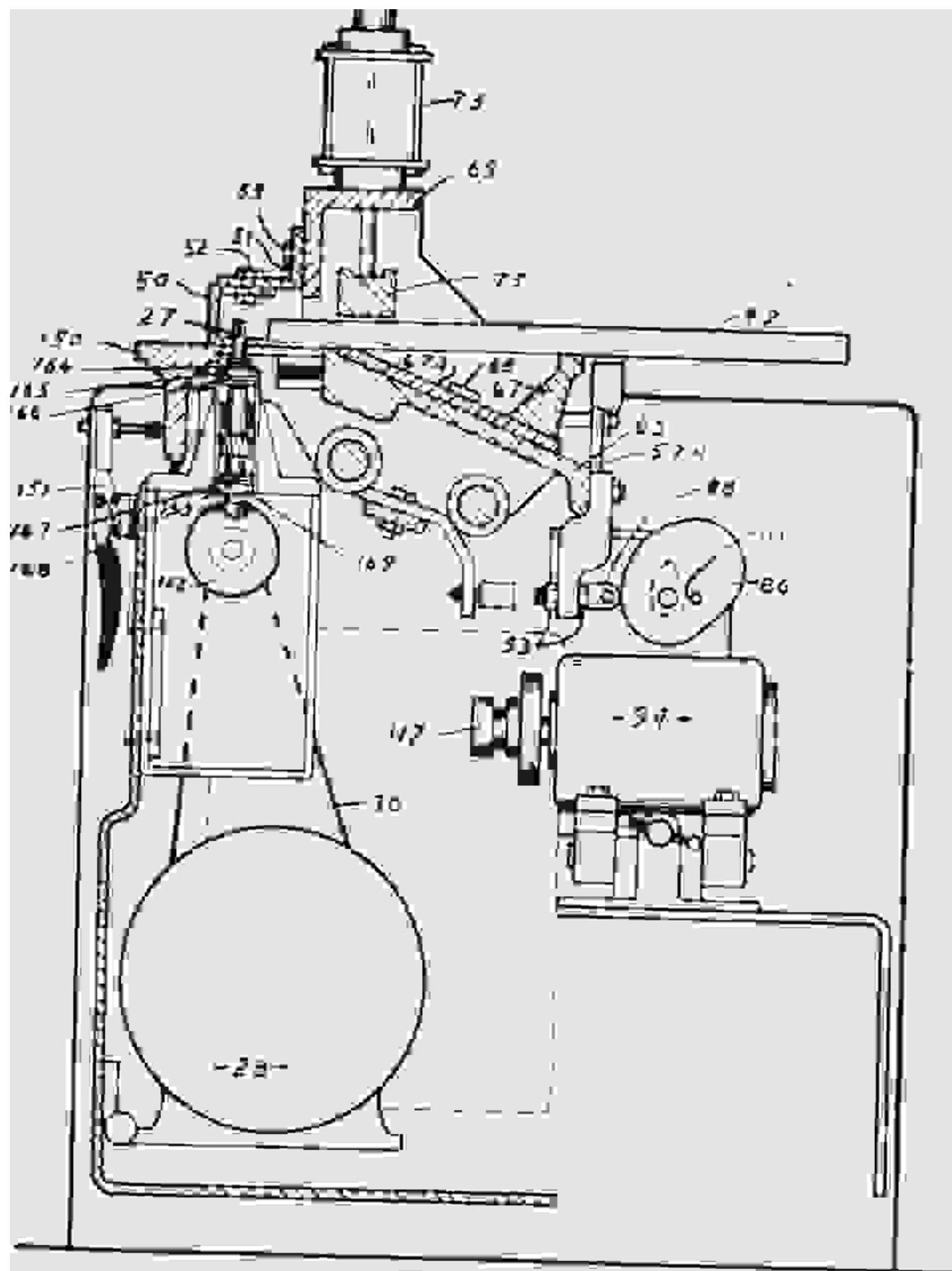


Fig 12

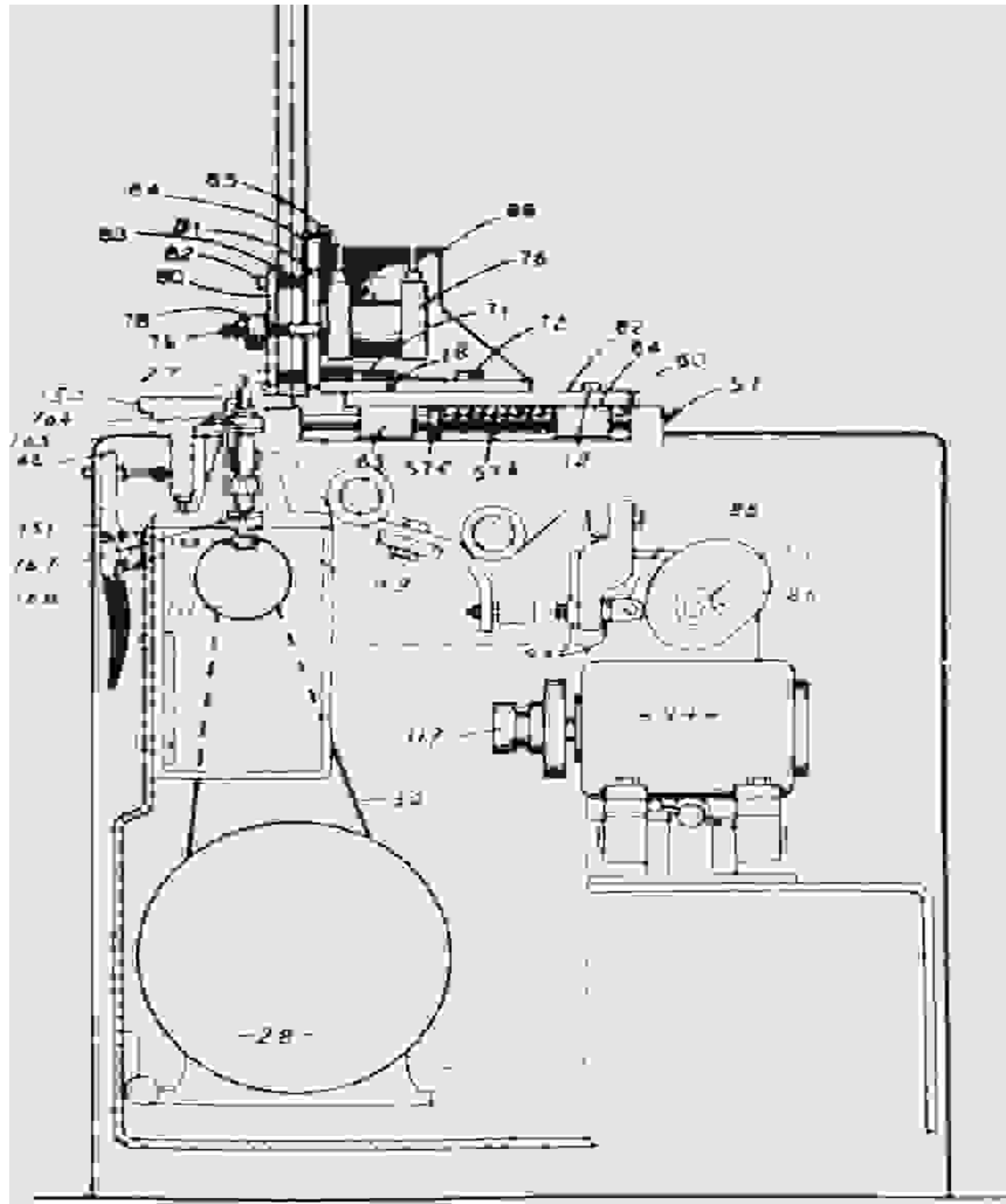
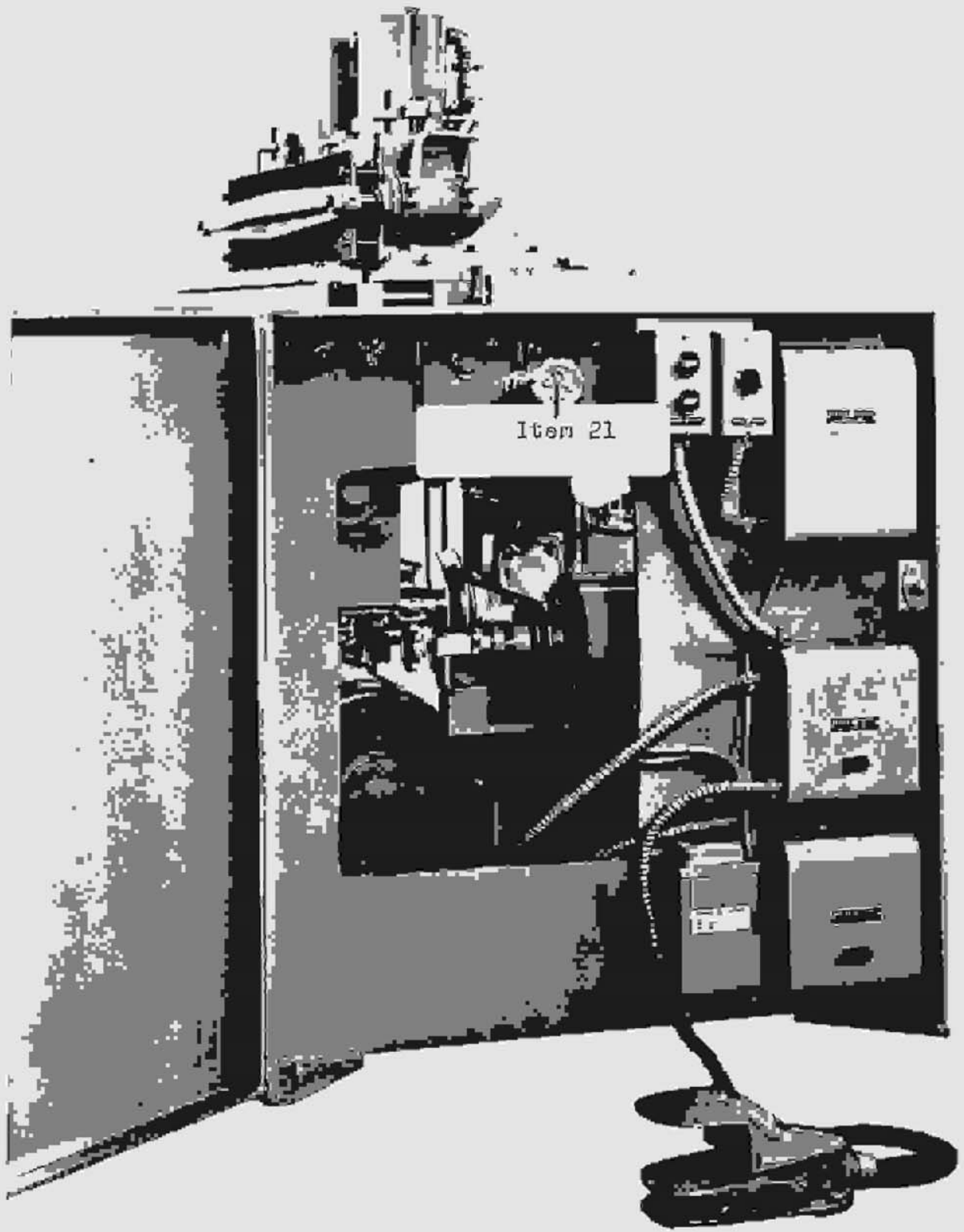
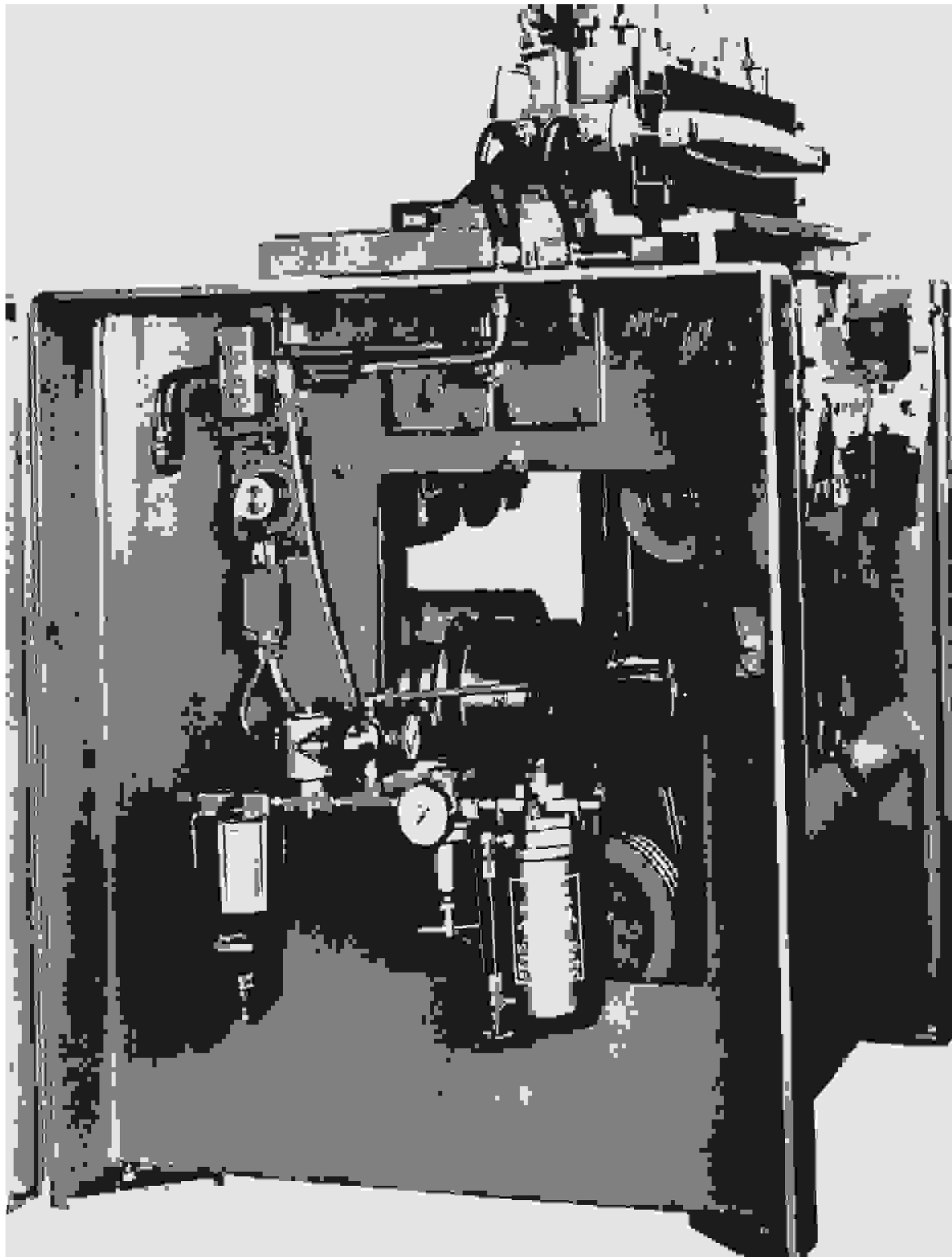


Fig 12





TO REMOVE SPINDLES AND BEARINGS
IN BALL BEARING SPINDLE ASSEMBLY

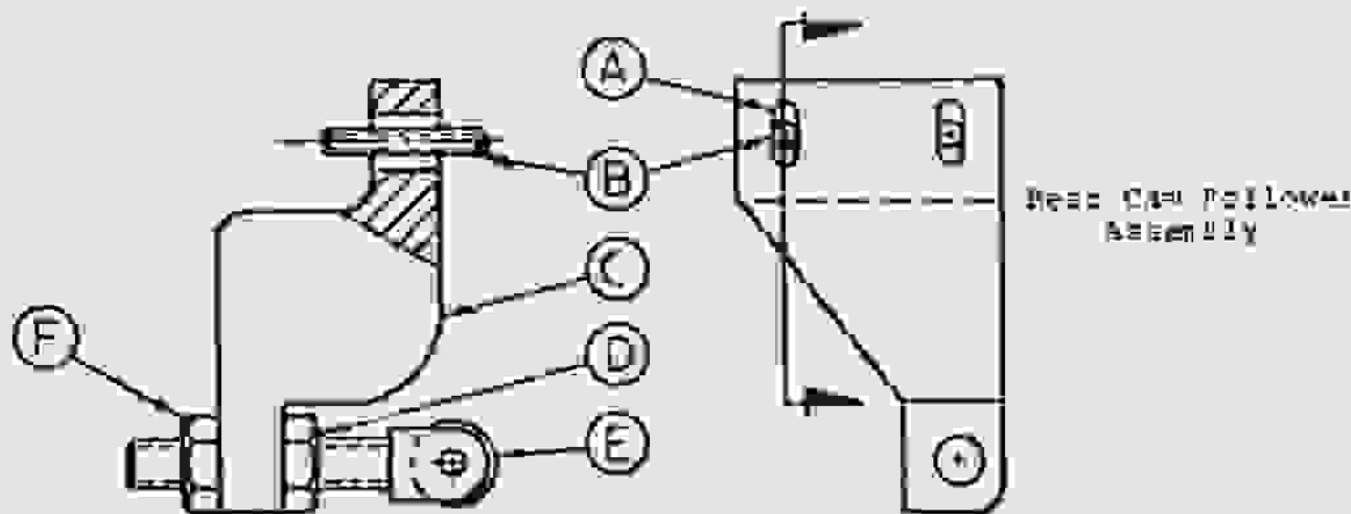
This is a high speed precision unit and it should be treated with reasonable care. When parts are replaced, be sure that all parts are clean before reassembling the unit.

1. Secure drive shaft with crank and remove all spindle nuts. (Please note that the nuts are both right and left hand.)
2. Disconnect the 1/4" oil lines from back of spindle unit.
3. Remove the two 1/4" dowel pins from the front cover of the drive box and remove the Allen Head Cap screws holding the spindle assembly to the drive box.
4. Remove spindle assembly and secure in vise, with front cover up. (Be careful that you do not lose bearing spacers.) Remove the front cover after removing the two Allen Head Cap screws holding the bearing housings for the drive spindles.
- 4A. For replacing bearings, pinion gear, or other parts in the drive spindle area, refer to instructions on the following page.
5. Remove the four Allen Head cap screws from the lower bearing plate. Remove lower bearing plate with the spindles by inserting a 1/4" rod in top of spindle and then tapping lightly so that all spindles are removed at one time with the plate.
6. Remove spindle with lower bearing and replace bearing.
7. Replace upper bearing by removing the Allen Head cap screws holding the two upper plates. (Be sure numbers on left hand side of plates and castings are located together.) Separate the plates and remove old bearing. When replacing new bearing, remove one seal and insert in bearing plate with open side down.
8. File off any burrs that may have occurred when the parts were disassembled.
9. After replacing the parts needed, PRIME all spindle gears, pinions, and drive gears with Gulf Harmony #69 oil, or exact equivalent.

10. Reassemble spindle assembly by reversing the above procedure.
11. Use a straight edge on top of spindles and make certain that all of the spindles are level. The new spindle or spindles may be slightly higher. If so, file level with other spindles with a flat file.

THE DRIVE GEAR AND PINION ARE MESHED CORRECTLY WHEN THE NUT ON THE UPPER PART OF THE DRIVE SPINDLE WILL MOVE FREELY BACK AND FORTH APPROXIMATELY $1/32$ ".

PROCEDURE FOR CENTERING AND STRAIGHTENING DOVE-TAIL CUTS



REAR CUT FOLLOWER ASSEMBLY

LINE OF CUTTERS

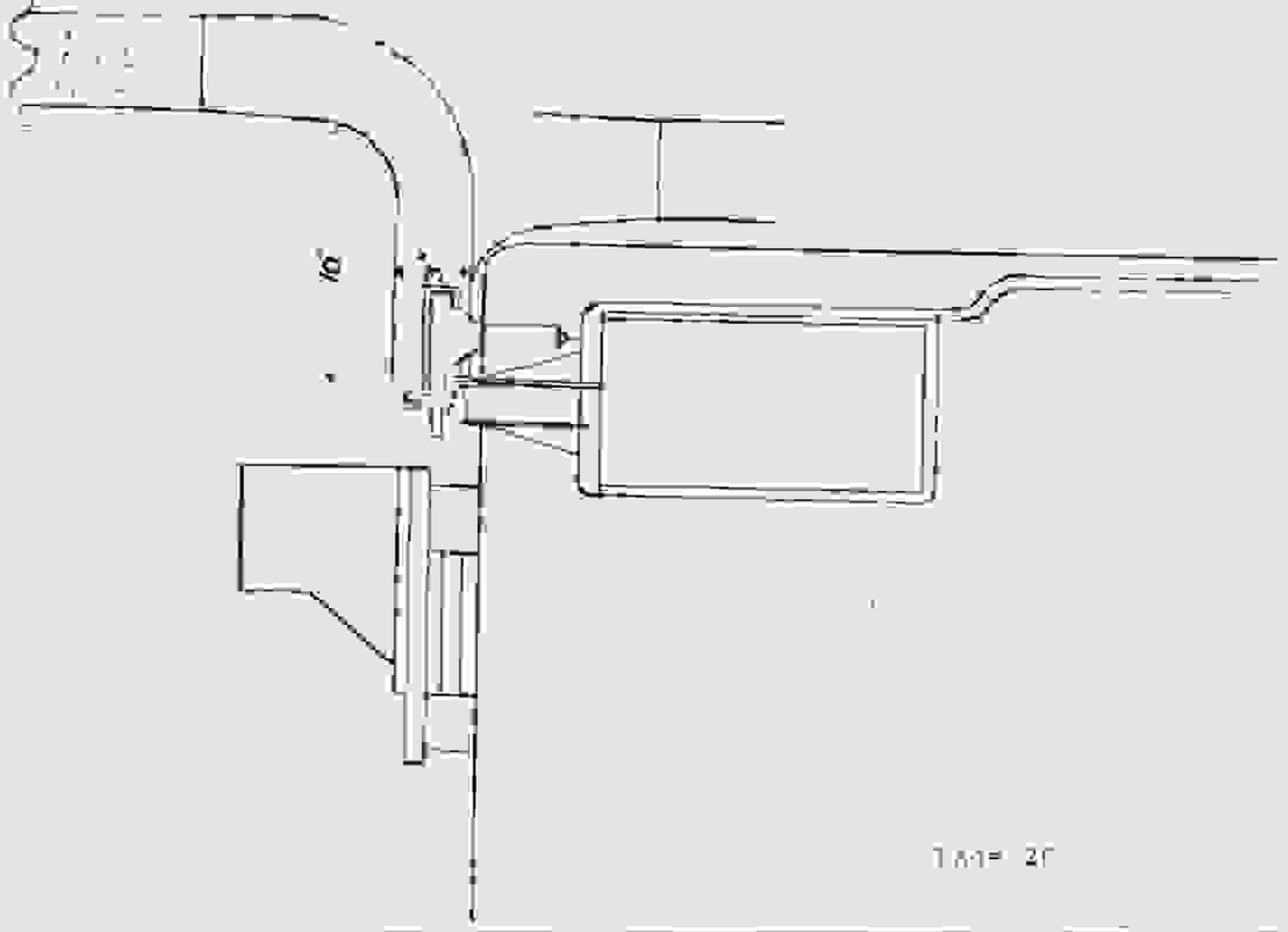


DRIVER MATERIAL
REAR CHIPBREAKER

BOTTOM VIEW AS DRAWN: BLOCK AS PLACED IN MACHINE
(EXAGGERATED DIVERGENCE CONDITIONS SHOWN)

- CONDITION I Too much flat area at front of stock.
Correction: Hold roller B level and loosen nut F. Turn nut B toward bracket C the desired amount and re-tighten nut F. (Each 1/6 of a turn of either nut will move carriage ahead or back approximately 1/64".)
- CONDITION II Too much flat area at back of stock.
Correction: Hold roller B level and loosen nut D. Turn nut D toward bracket C the desired amount. (CAUTION: Do not adjust nut D beyond point where there is no flat on back side of cut, see description under Condition I. If the carriage is started too far forward, it will catch the spool box at the forward end of the cut.) Retighten nut D.
- CONDITION III Ends of dovetails are not rounding properly as the dovetails appear to lean to the left when stock is held in position as shown.
Correction: Loosen screws B and slide bracket E downward slightly in slots A. Retighten screws and check the cut. Continue this procedure until cut is rounding properly.
- CONDITION IV Ends of dovetails are not rounding properly as the dovetails appear to lean to the right when stock is held in position as shown.
Correction: Loosen screws B and slide bracket E upward slightly in slots A. Retighten screws and check the cut. Continue this procedure until cut is rounding properly.

Build to match
1/2" = 1'



10"



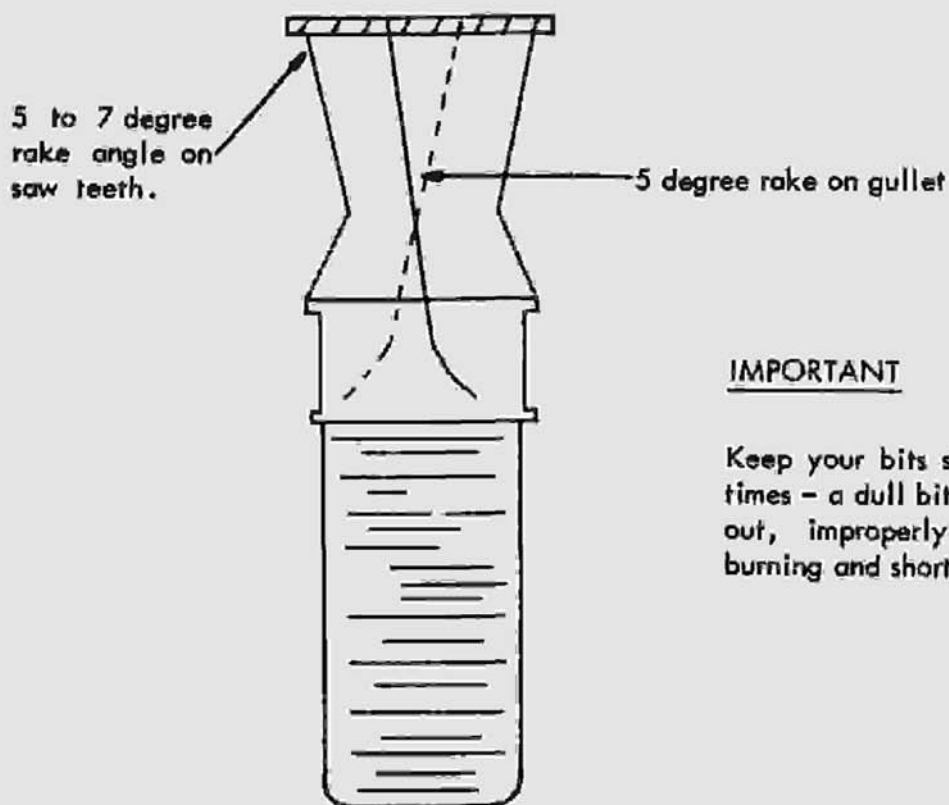
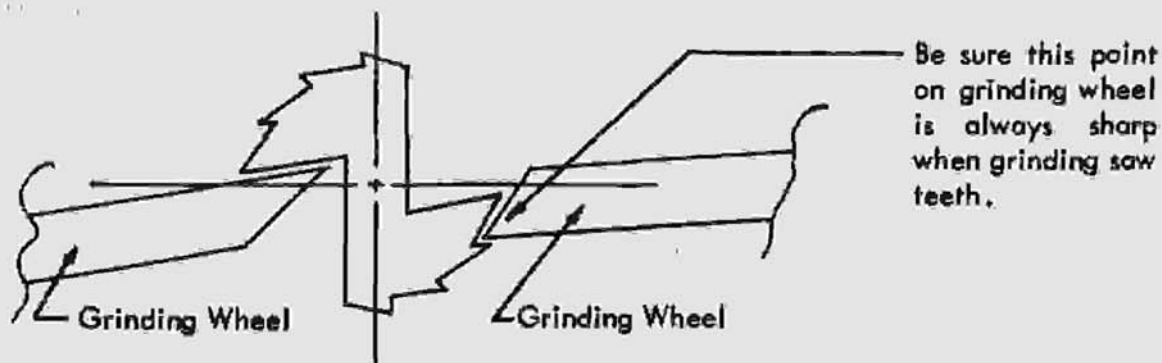
3 3/8"



1" (LOCATION OF THIS PIPE CONN
POSS. IN BARBER'S SHED)

ALEXANDER DODDS CO.	
GRAND RAPIDS, MICHIGAN	
NAME	SUBMITTED
NO. 1110	DUST COLLECTOR
MATERIAL	CAST IRON
SCALE	1/2" = 1'
DATE	MAY 27 1910

Instructions for grinding DOVETAIL BITS



IMPORTANT

Keep your bits sharpened at all times - a dull bit results in tear-out, improperly fitting joints, burning and shorter bit life.

We recommend a 7" diameter, 100 grit wheel for this application. These wheels can be furnished by us at a nominal cost.

Alexander Dodds Company

MANUFACTURERS OF

Woodworking Machinery

1014 SCRIBNER AVE., N.W. PHONE 459-7344 — AREA CODE 616
GRAND RAPIDS, MICHIGAN 49504 U.S.A.



MICRO-FOG LUBRICATOR TYPE 10-00Y INSTALLATION

Install the lubricator from the pressure side of the system. A filter and regulator should be installed directly ahead of it in the air pressure line. Note the arrow on the body which indicates the direction of air flow.

A $\frac{1}{4}$ " supply line is ample to take care of maximum flow (minimum velocity). Be sure to use flares and fittings large enough to allow free air flow. Do not install any valves, pressure regulators or other restricting devices between the lubricator and the point of fog application. Drill standard tapered holes in the main distribution lines on bypass surfaces (ports are standard size), providing the fitting does not project into the line.

OPERATION

The maximum operating pressure is 5 psig for all sizes. The maximum pressure is 20 psig for $\frac{1}{8}$ " size, 2 1/2 psig for $\frac{1}{4}$ ", and 10 psig for 1" size.

RATED LUBRICATING CAPACITY

The only adjustment on this lubricator is the bypass adjustment screw (4). This can be done with a $\frac{1}{16}$ " Allen wrench. To increase air flow turn the adjustment screw clockwise. To decrease turn it in a clockwise direction.

Line Size	Operating Pressure	Air Supply	Air Flow	Working Pressure
$\frac{1}{8}$ "	5 psig	100 cfm	1 cfm	20
$\frac{1}{4}$ "	2 1/2 psig	250 cfm	2 cfm	100
$\frac{1}{2}$ "	10 psig	500 cfm	5 cfm	200
1"	20 psig	1000 cfm	10 cfm	500

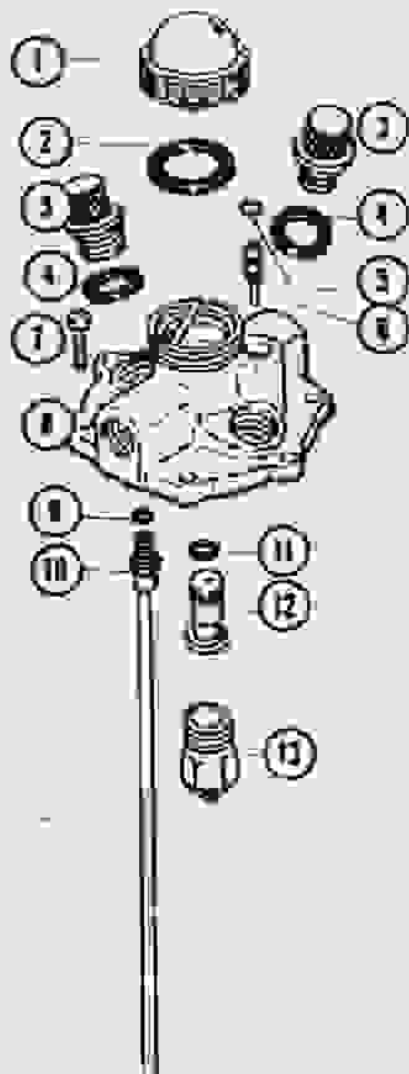
The flow is controlled by a combination of pressure and by-passed air. The number of unit actuators will determine the correct pressure for the lubricator. The pressure in the fog distribution system at a point farthest from the lubricator should be at least a pressure of eight inches water column. To determine this install a manifold gauge in the system or use the method described in the Design Manual NP-40.

To reduce the fog output, reduce the pressure on the lubricator, turn open the bypass valve and the fog distribution system pressure again reaches its normal operating value.

MAINTENANCE

To service or to clean the lubricator disassemble as follows. Shut off the air pressure. Remove the bowl or reservoir and unscrew the diffusing plug (13). Then unscrew the bypass valve (11). Take out the adjustment screw (1) and push the venturi plug (12) out downward. Stop the bypass adjusting screw (10) can be removed out all the way.

Before reassembly clean and check each part carefully. If any are damaged replace them, ordering from the Parts List on the reverse side of this manual. To clean the Safety-Clean Bowl Wash it in a petroleum solvent such as kerosene. DO NOT USE acetone, kerosene, benzene, diethylene ethyl acetate, Inquest Solvents, naphtha, kerosene, carbon tetrachloride, etc. as these solvents may deteriorate the bowl.



C. A. NORRGREN CO.

2402 SOUTH BLATT STREET

ENGLEWOOD, COLORADO

MICRO-FOG LUBRICATOR

TYPE 10-009

REPAIR KIT

1. Sight-glass screw	1449-01	\$.50
2. Sight-glass dome gasket	409-01	
4. Filler plug gasket - Hand	1792-01	
6. By-pass adjusting screw (with "O" ring)	1956-01	
9. Siphon tube gasket	1862-01	
12. Venturi plug & "O" ring	1741-01	
15. Filler plug gasket - Tank	1991-01	
16. Reservoir gasket	1929-01	

REPAIR KIT OIL LEVEL GAUGE GLASS

19 ounce cap	2272-02	1.50
45 ounce cap	2273-01	1.50
141 ounce or 282 ounce cap	2274-01	1.75

(Kit contains backing III and 21.
nut 19 and 22, gauge glass fit-good
21, indicator ball 20)

REPLACEMENT PARTS

3. Filler plug (with gasket)	1206-02	.50
5. By-pass adjusting screw (with "O" ring)	1962-02	.50
7. Screw (per set of 6)	1574-02	.01
10. Siphon tube (with gasket 9)		
for 10 ounce cap	1091-01	1.70
for 45 ounce cap	1091-01	1.70
for 141 ounce cap	1042-01	1.70
for 282 ounce cap	1042-01	1.70
12. Venturi plug (with "O" ring)		
1/2" pipe size	1999-02	3.00
1" pipe size	1965-01	4.00
13. Diffusion plug for 1/2" pipe size	1965-01	2.50
for 1/2" and 1" pipe sizes	1958-01	2.50
14. Filler plug (with gasket 15)	1997-02	1.00
17. Upper gauge glass bracket	2087-01	2.00
25. Lower gauge glass bracket		
19 ounce and 45 ounce cap	2087-01	2.50
141 ounce and 282 ounce cap	2087-01	2.50
26. Draw cock	644-01	.15
27. Pipe plug	136-01	.10
28. Reservoir assembly - 10 ounce cap	648-25	15.00
15 ounce cap	648-33	24.75
141 ounce cap	1306-02	50.00
282 ounce cap	1208-01	65.00

PARTS NOT NORMALLY REPLACED

II. Body

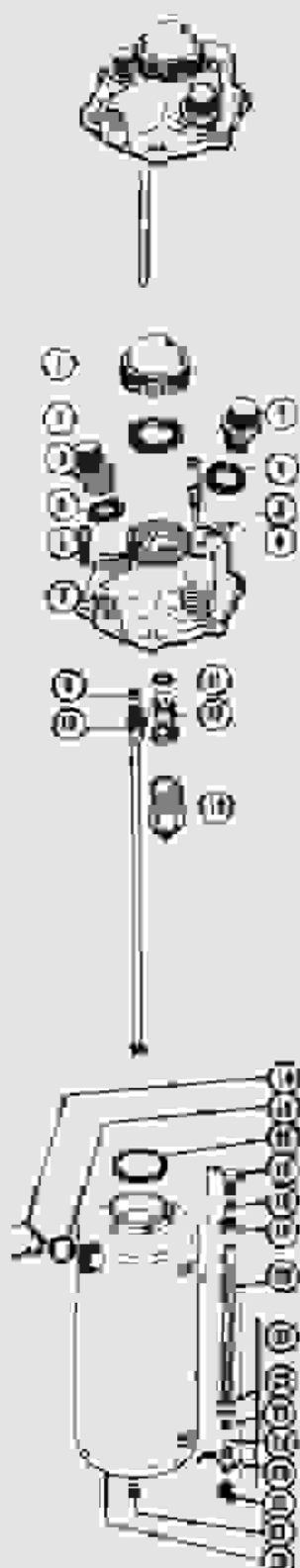
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C. A. NORRGREN CO.

1406 SOUTH ELATI STREET

INGLEWOOD, COLORADO

N10-38/8M/a-01/10



LIQUID LEVEL CONTROL SWITCH

Type 18-023



1. Remove cover from body.
2. Remove gasket from gasket and gasket and install the new gasket.
3. Insert the new gasket into the gasket and install the gasket through the hole in the gasket and install the gasket.
4. Insert the gasket into the gasket and install the gasket.
5. Make certain the gasket is properly installed and the gasket is properly installed.
6. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
7. Make certain the gasket is properly installed and the gasket is properly installed.
8. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
9. Make certain the gasket is properly installed and the gasket is properly installed.
10. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
11. Make certain the gasket is properly installed and the gasket is properly installed.
12. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
13. Make certain the gasket is properly installed and the gasket is properly installed.
14. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
15. Make certain the gasket is properly installed and the gasket is properly installed.
16. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
17. Make certain the gasket is properly installed and the gasket is properly installed.
18. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.
19. Make certain the gasket is properly installed and the gasket is properly installed.
20. Insert the gasket (2) into the gasket and install the gasket into the gasket and install the gasket into the gasket.

NOTE: For wiring hookup refer to original equipment manufacturer.

When used in a liquid level control and liquid level control system, the liquid level control switch has a maximum liquid level of 100-150 mm (4" - 6") and a maximum liquid level of 100-150 mm (4" - 6") and a maximum liquid level of 100-150 mm (4" - 6").

For more information, contact your distributor or contact your distributor.

(Continued on inside cover)

A member of the Norgren Group



C. A. NORGREN CO.
5400 SOUTH WYOMING
LITTLETON, COLORADO

World's largest manufacturer of pneumatic
linear regulators, solenoid valves, air
control valves. Write for literature today.

WIRING DIAGRAM FOR LIQUID LEVEL CONTROL SWITCH Type 18-023 & 18-024

PARTS LIST

1	Wiring	325-002	\$5.50
2	Straw	100-418	10
3	Nut	100-171	20
4	Wing	100-411	20
5	Stearic Acidless	100-414	40
6	Adapter (5/16" spacing 2/12" diameter) (100 number)	100-416	50
7	Insulator (Not in LPE models)	100-419	20
8	Resistor	100-422	200



Double Throw - Center - independent in the sense as the Term 18-024 Liquid level control switch. Electrical connections will be through the block and plate with plate side the door is in the lower part of the block. Electrical connections will be through the block and the wiring is done in center of the door.

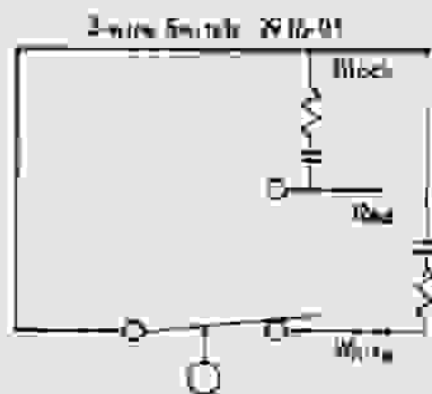
CHECK AND REPAIR OF FLUX

Resistor and Capacitor should be tested in circuit and when they are tested they should be tested in circuit. Check for resistance of the capacitor with working light of the water in tank.

Capacitor - 4.5 Micro Farad

Resistor - 100 Ohm 1/2 watt

This liquid level control switch will control the liquid level.



Wiring Diagram (Flux Down)

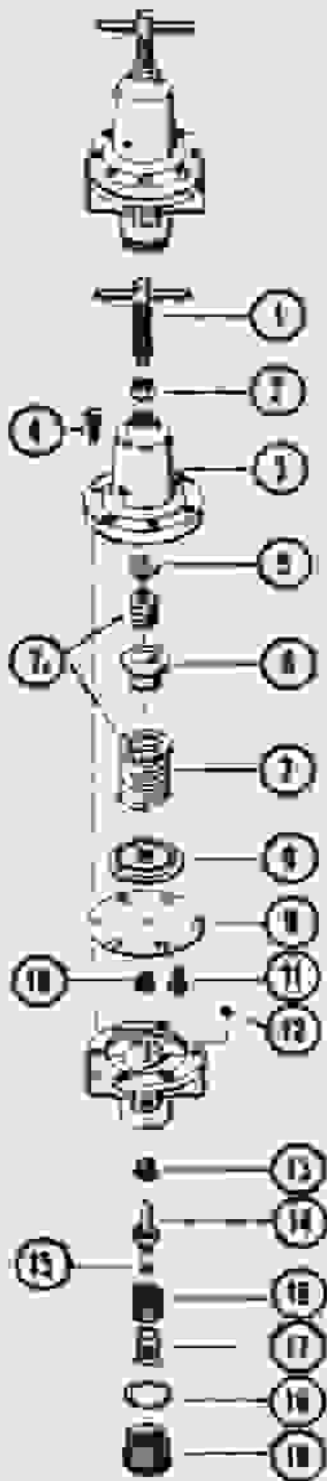
Model 18-01 Control
Printed in U.S.A.



C.A. Norgren Co., 5400 South Delaware/Littleton, Colorado

PRESSURE REGULATOR

Type 11-002



Parts List

	Pipe Size	1/2"	3/4"	1"	1 1/2"
REPAIR KITS					
1	and 1/2" non-adjusting	528-01			\$2.00
2	and 1/2" adjusting	528-02			2.00
3	and 3/4" adjusting		111-01		1.00
4	and 1" adjusting		111-02		1.25
5	and 1 1/2" adjusting			531-01	1.25
6	and 1 1/2" adjusting			531-02	1.50

Rim Admin					
1	Handwheel	881-01	881-01	881-01	
12	1/2" plug	717-01	717-01	717-01	
14	Valve (no handle) 1/2" plug 11/2"	496-01	497-01	498-01	
15	Spring screw	501-01	511-01	511-01	
17	Valve spring	501-01	507-01	508-01	
18	TOP ring for plug	610-01	517-01	517-01	

REPLACEMENT PARTS

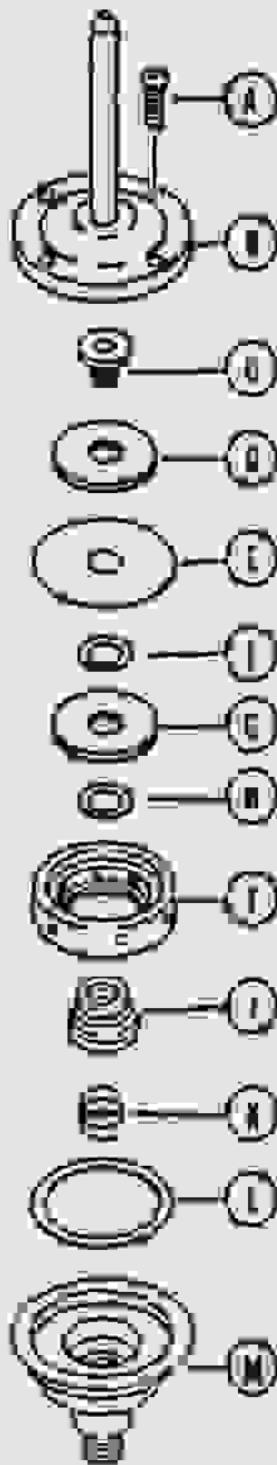
1	Adjusting screw	1054-01	1001-01		50
	Adjusting screw			1001-01	75
2	Lock nut	1475-01	1005-01	1401-01	05
4	Washer (each)	1117-01	1011-01		05
	Screw (each)			6041	01
5	Crush washer (each)	1418-01	1411-01		20
	30 psig			1324-01	1.50
	125 psig	477-01	477-01		20
	125 psig			478-01	25
	275 psig	1400-01	1400-01		25
7	Intermediate spring seat				
	125 psig	524-01	511-01		10
	125 psig			525-01	10
7	Regulating spring	497-01	190-01		25
	30 psig			496-01	20
	150 psig	501-01	504-01		20
	125 psig	502-01	503-01		20
	275 psig			003-01	1.00
6	Bottom spring seat	479-01	479-01		25
	Bottom spring seat			001-01	1.10
10	Seat from relieving tap	520-01	520-01	520-01	
11	Valve seat	18-514			15
	Valve seat		184-01		20
	Valve seat			181-01	20
19	Valve guide plug	517-01			05
	Valve guide plug		513-01		005
	Valve guide plug			011-01	0.05

PARTS NOT NORMALLY REPLACED

1	Body	175-01	175-01	175-01	
---	------	--------	--------	--------	--

AMP-46, 1067, 1/20/51
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AUTOMATIC DRAIN ASSEMBLY

(Part 213 on Form 114)

Note: The drain assembly has been opened upon the board upon previous repair. Remove the screws (A) and separate the drain cap (B) from the drain body (M). Then the message, (C) the valve (D) and the wire seat (E) will lift out together. To separate them use a "W" flag (F) as the message comes (G) and holding the valve (H) screws.

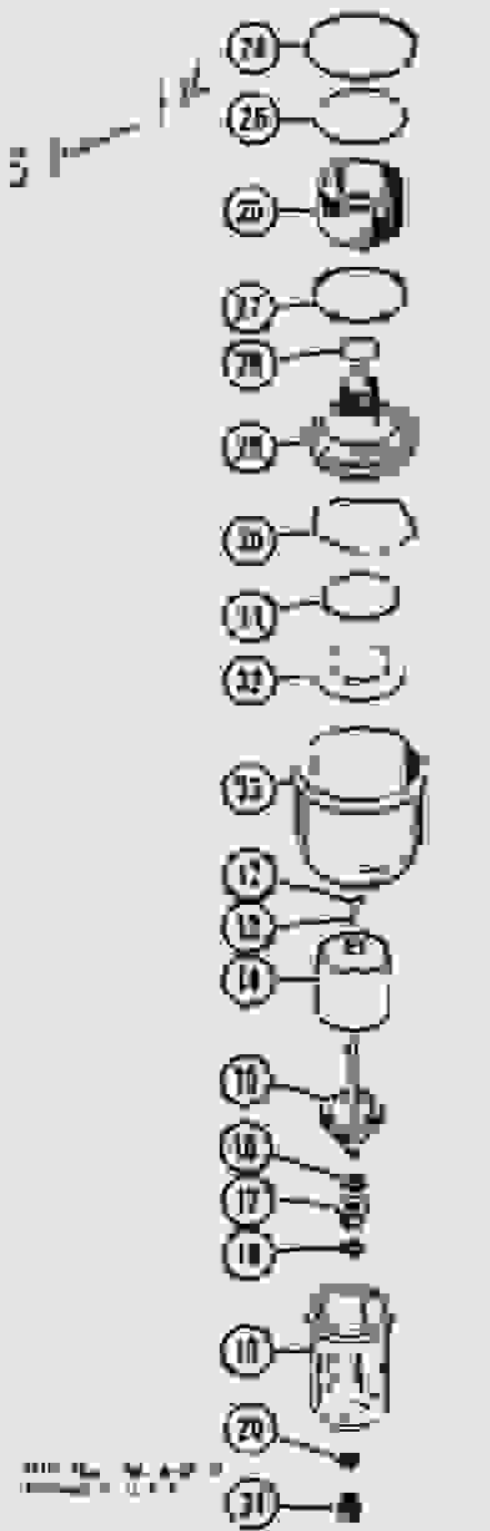
Note: Check pins thoroughly before reassembly. Be sure that wire (I) is inserted right.



AUTOMATIC-DRAIN FILTER

Type 12-001

Parts List



PIPE SIZES: (See accompanying page for "I", "L", & "S" sizes)

REPAIR KIT

Part No.	Description	Part No.	QTY
24	"O" ring	1925-01	1
25	Gasket for filter for electrical houses (flange only)	214-01	1
26	Gasket for filter for electrical houses (flange only)	214-01	1
27	"O" ring	1925-01	1
28	"O" ring	1925-01	1
29	Flange ring	214-01	1
30	Flange valve	214-01	1
31	Flange valve	214-01	1
32	"O" ring for electrical houses	1925-01	1
33	Flange ring	214-01	1

FOR SERVICE (See accompanying page)

1	Discharge	740-01	1
2	Valve	214-01	1
3	Flange	214-01	1
4	Valve	214-01	1
5	Flange	214-01	1

REPLACEMENT PARTS

10	Filter housing assembly	710-01	1
11	Flange	214-01	1
12	Flange ring	214-01	1
13	Flange valve	214-01	1
14	Flange ring	214-01	1
15	Flange valve	214-01	1
16	Flange ring	214-01	1
17	Flange valve	214-01	1
18	Flange ring	214-01	1
19	Flange valve	214-01	1
20	Flange ring	214-01	1
21	Flange valve	214-01	1
22	Flange ring	214-01	1
23	Flange valve	214-01	1
24	Flange ring	214-01	1
25	Flange valve	214-01	1
26	Flange ring	214-01	1
27	Flange valve	214-01	1
28	Flange ring	214-01	1
29	Flange valve	214-01	1
30	Flange ring	214-01	1
31	Flange valve	214-01	1

PARTS NOT NORMALLY REPLACED

1	Body	710-01	1
---	------	--------	---

Always use only the original parts and accessories when repairing this filter. Do not use any other parts or accessories.

SECTION "A"—ADJUSTMENT FOR FRICTION DISC WEAR

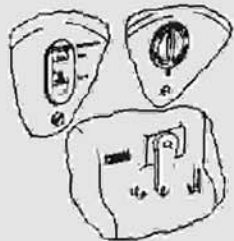


FIG. A

HOW TO DETERMINE IF BRAKE IS IN NEED OF ADJUSTMENT

With current off, indicator at "NORMAL" or "ON" position indicates brake is in proper adjustment. When indicator is at the "ADJUST" position, or if marked increase in stopping time is noted, adjustment for wear is necessary. For brakes MOUNTED VERTICALLY, remove plastic release cover (if present) and depress lever or turn knob in release direction until spring pressure is felt. If indicator is at the "ADJUST" position at this point, adjust for wear.

SECTION A-1

STEPS



FIG. A-1

1. Remove pipe plug in Housing.
2. Insert Screwdriver and turn Adjusting Stud in Clockwise direction until indicator returns to the "ON" or "NORMAL" position.
3. Replace pipe plug

SECTION A-4

STEPS



FIG. A-4

1. Remove Housing.
2. Insert Screwdriver and turn Adjusting Stud in Clockwise direction until proper solenoid gap is attained. (See Table No. 2, SOLENOID GAPS.)
3. Replace Housing.

SECTION A-2

STEPS

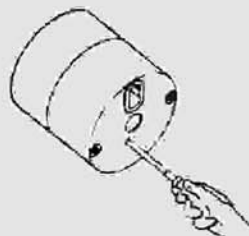


FIG. A-2

1. Remove pipe plug in Housing.
2. Insert Screwdriver and turn Adjusting Stud in Counter-Clockwise direction until indicator returns to the "ON" or "NORMAL" position. (For 48,000 Series, turn both Adjusting Studs equal amount until "on" position is reached.)
3. Replace pipe plug.

SECTION A-5

STEPS



FIG. A-5

1. Remove Housing.
2. Insert Screwdriver and turn Adjusting Stud in Counter-Clockwise direction until proper solenoid gap is attained. (See Table No. 2, SOLENOID GAPS.) (For 48,000 Series, turn both Adjusting Studs equal amount to maintain equal Solenoid Gaps.)
3. Replace Housing.

SECTION A-3

STEPS

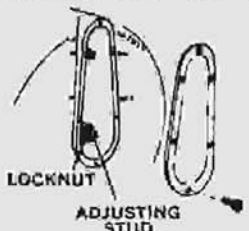


FIG. A-3

1. Remove Manual Release Cover.
2. Loosen Locknut by turning in a Counter-Clockwise direction.
3. Insert Screwdriver into slot in Adjusting Stud and turn Clockwise until indicator is at approximately the "ON" position.
4. Tighten Locknut against Adjusting Stud and replace Manual Release Cover.

SECTION A-6

STEPS

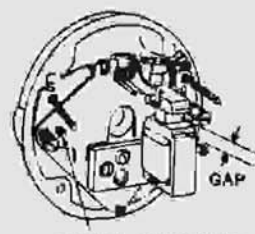


FIG. A-6

1. Remove Housing.
2. Turn both Adjusting Screws equal amounts, approximately $\frac{1}{8}$ turn Clockwise, until proper solenoid gap is attained. (See Table No. 2, SOLENOID GAPS.)
3. Maximum torque may be obtained after operating brake several times, then turning Adjusting Screws very slightly either way and noting which position of fine adjustment provides satisfactory stopping without changing solenoid gap.
4. On Brakes with manual release Knob or button integral with housing, energize brake before installing Housing or turn housing so Knob assembly is about 20° to left of vertical centerline. After mating with endplate rotate housing to right to align with mounting studs. In other models, mount and attach.

NOTES: 1. After brake has been adjusted, energize coil or depress plunger to close gap, then manually rotate shaft (DO NOT START MOTOR) and make certain that shaft rotates freely. This will insure sufficient turning clearance exists between frictional parts.

2. WARNING: DO NOT ATTEMPT TO ALTER TORQUE RATING BY RE-ADJUSTING SOLENOID GAP.

SECTION "B"—RENEWAL OF FRICTION DISCS

STEPS

1. Follow Step 1 of Installation Instructions. (Section "D")
2. Follow Step 4 of Installation Instructions. (Section "D"), replacing old Friction Disc(s). To insure proper brake operation, be sure that Friction Discs move freely but not loosely, on hub. If snug, file internal edges *lightly* until free movement is attained.
3. "Turn Out" (reverse direction than for adjusting) Adjusting Stud or Screws to compensate for adjustments that had been made to brake (for proper direction, see AD-

JUSTMENT for WEAR, Section "A") before assembling Support Plate Assembly to Endplate. If it becomes difficult to tighten Support Plate Screws, "turn out" Adjusting Stud or Screws further. For 87,000 Series Brakes, simply mount Support Plate Assembly to Endplate.

4. Adjust brake as described in Section "A"—Adjustment for Wear. (See Table No. 1 for proper instruction section.) For 87,000 Series Brakes, lift Plunger until Solenoid Lever hits Stop. This will reset self-adjusting mechanism.
5. Replace Housing and Housing Screws.

SECTION "C"—COIL REPLACEMENT

SECTION C-1



STEPS

1. Disconnect electrical leads (page 1)
2. Remove electrical lead pin
3. Lift Hanger from discharge valve
4. Remove coil from frame. Firm and Individually wrap up and clean with compressed air.
5. Slide coil down to left of the compressor, allow the coil to rest on the edge of a packing or tape board and wrap in compressed coil toward the coil rigging.

SECTION C-2



STEPS

1. Disconnect electrical leads (page 1)
2. Remove electrical lead pin
3. Lift Hanger from discharge valve
4. Remove coil from frame. Firm and Individually wrap up and clean with compressed air.
5. Place coil on discharge coil rigging. Lay out of two year coil to prevent it from becoming distorted and damaged.
6. The new coil must be mounted in the same relative position as the old one. Stop and remove wires to be identified by markers found on each section. To avoid any coil damage remove the pressure from the system.

SECTION C-3



STEPS

1. Disconnect electrical leads (page 1)
2. Insert Serviceable mounting support, coil and lead wire, wrap up in Plastic Sealing Pin and Sealing Cap with discharge lead and Hanger.
3. Remove coil from the compressor. Coil must be wrapped in Plastic Sealing Pin and Sealing Cap with discharge lead and Hanger. Lay out of two year coil to prevent it from becoming distorted and damaged.
4. Place coil on discharge coil rigging. Lay out of two year coil to prevent it from becoming distorted and damaged.

TROUBLE SHOOTING

FAILURE TO STOP

1. Check the oil level in the compressor.
2. Check the oil level in the condenser.
3. Check the oil level in the evaporator.
4. Check the oil level in the receiver.

EXCESSIVE HUMMING

Check the oil level in the compressor, condenser, evaporator, and receiver. Check the oil level in the condenser.

TROUBLE

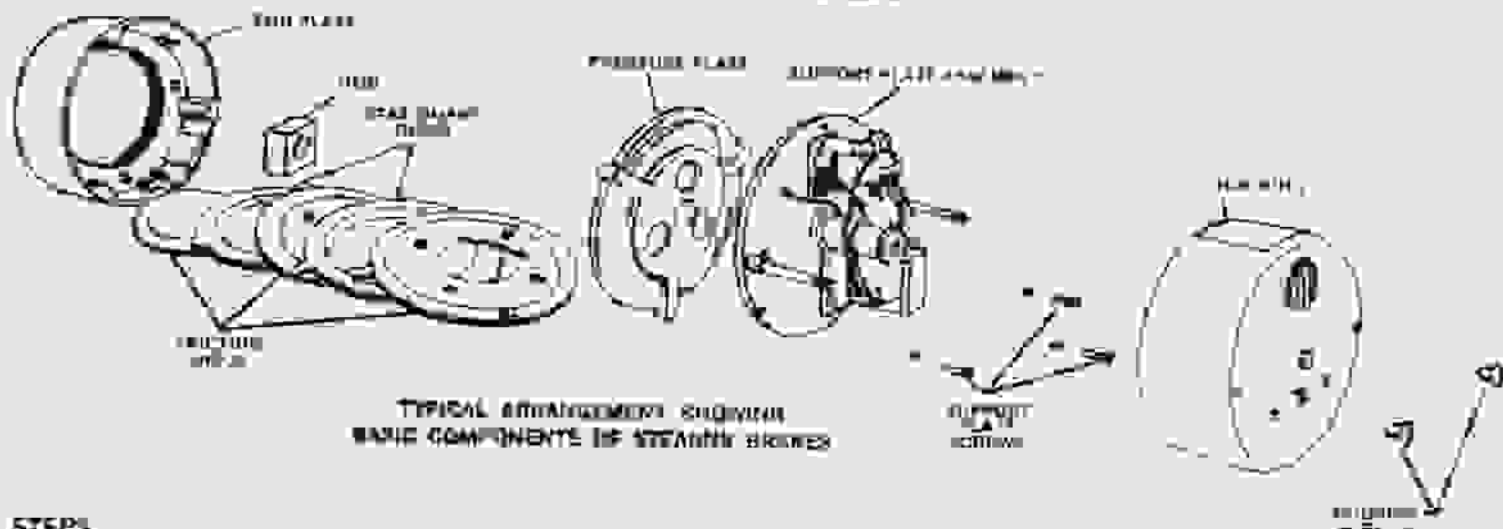
1. Check the oil level in the compressor, condenser, evaporator, and receiver.
2. Check the oil level in the condenser.
3. Check the oil level in the evaporator.
4. Check the oil level in the receiver.

FAILURE TO RELEASE

Check the oil level in the compressor, condenser, evaporator, and receiver. Check the oil level in the condenser.

1. Check the oil level in the compressor, condenser, evaporator, and receiver.
2. Check the oil level in the condenser.
3. Check the oil level in the evaporator.
4. Check the oil level in the receiver.

SECTION "D"—INSTALLATION PROCEDURES



TYPICAL ARRANGEMENT SHOWING BASIC COMPONENTS OF STEAM MOTOR

STEPS

1. Unassemble Motor Flange, Motor Housing End Joint Plate Screws Support Flange Assembly Pressure Plate Flange (Fig. 4) and Stationary Choke (Fig. 5) and install all carefully, making sure all gaskets are installed. Use compound of asbestos with oil for gasket packing. Do not use lead or lead solder in gasket.

2. Mount Endplate to Motor Housing. Mounting surface of motor housing is M-4 x 1/2 Plate. In the case of Motor Mounted Brake, mounting flange attaching bracket to frame and plate mounted brake must be carefully mounted with respect to frame and plate alignment. The use of shims to insure permanent positioning is suggested. (See 4) Defeat motor manufacturer's installation instructions.

3. Connect End of Motor Shaft to drive screw assembly.

Mount the drive screw assembly on the shaft of the motor. The drive screw assembly should be mounted on the shaft of the motor. The drive screw assembly should be mounted on the shaft of the motor. The drive screw assembly should be mounted on the shaft of the motor.



FIG. 10

4. Reassemble Endplate to Motor Housing. Reassemble the endplate to the motor housing. If mounted with the motor, the endplate should be mounted with the motor.

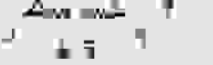
5. Mount Support Plate Assembly to Endplate and with plate electrical connections from Stationary Choke (Fig. 5) to Motor. (See Fig. 11) for details.

6. Perform Running and Hoisting tests.

EXCEPTION: If it is not necessary to disconnect the motor from the power source, the motor should be connected to the power source through the motor controller. The motor should be connected to the power source through the motor controller. The motor should be connected to the power source through the motor controller.

CONNECTING AC SOLIDIFIED COILS OR COILS FOR TYPE 220/240 VOLTS MOTOR

1. The motor is connected to the power source through the motor controller. The motor is connected to the power source through the motor controller. The motor is connected to the power source through the motor controller.



IF FRICTION LINKS BREAK
 1. Do not touch the motor or the motor controller.
 2. Do not touch the motor or the motor controller.
 3. Do not touch the motor or the motor controller.
 4. Do not touch the motor or the motor controller.
 5. Do not touch the motor or the motor controller.

IF AN EXPLOSION PROOF BRAKE IS PROVIDED
 1. Do not touch the motor or the motor controller.
 2. Do not touch the motor or the motor controller.
 3. Do not touch the motor or the motor controller.

1. Do not touch the motor or the motor controller.
 2. Do not touch the motor or the motor controller.
 3. Do not touch the motor or the motor controller.

Stearns

ELECTRIC CORPORATION
 100 South Broadway, Milwaukee, Wis. 53226

installation and maintenance data

GENERAL INSTRUCTIONS FOR STEARNS ELECTRIC DISC BRAKES

GENERAL INSTRUCTIONS FOR STEARNS ELECTRIC DISC BRAKES

FIND BRAKE MODEL IN TABLE NO. 1 — THIS TABLE APPLICABLE TO ALL DISC BRAKE MODELS. REFER TO SECTION 10 FOR DISC BRAKE INSTALLATION.

TABLE NO. 1 — BRAKE INSTALLATION INDEX

Brake Model	Installation Section	Adjust For Wear	Minimum Clearance	Revised Or Section Note
H 30		A 0	0.001	
H 35		A 8	0.001	
H 40		A 0	0.001	
H 45		A 0	0.001	
H 50		A 0	0.001	
H 55		A 0	0.001	
H 60		A 0	0.001	
H 65		A 0	0.001	
H 70		A 0	0.001	
H 75		A 0	0.001	
H 80		A 0	0.001	
H 85		A 0	0.001	
H 90		A 0	0.001	
H 95		A 0	0.001	
H 100		A 0	0.001	
H 105		A 0	0.001	
H 110		A 0	0.001	
H 115		A 0	0.001	
H 120		A 0	0.001	
H 125		A 0	0.001	
H 130		A 0	0.001	
H 135		A 0	0.001	
H 140		A 0	0.001	
H 145		A 0	0.001	
H 150		A 0	0.001	
H 155		A 0	0.001	
H 160		A 0	0.001	
H 165		A 0	0.001	
H 170		A 0	0.001	
H 175		A 0	0.001	
H 180		A 0	0.001	
H 185		A 0	0.001	
H 190		A 0	0.001	
H 195		A 0	0.001	
H 200		A 0	0.001	
H 205		A 0	0.001	
H 210		A 0	0.001	
H 215		A 0	0.001	
H 220		A 0	0.001	
H 225		A 0	0.001	
H 230		A 0	0.001	
H 235		A 0	0.001	
H 240		A 0	0.001	
H 245		A 0	0.001	
H 250		A 0	0.001	
H 255		A 0	0.001	
H 260		A 0	0.001	
H 265		A 0	0.001	
H 270		A 0	0.001	
H 275		A 0	0.001	
H 280		A 0	0.001	
H 285		A 0	0.001	
H 290		A 0	0.001	
H 295		A 0	0.001	
H 300		A 0	0.001	
H 305		A 0	0.001	
H 310		A 0	0.001	
H 315		A 0	0.001	
H 320		A 0	0.001	
H 325		A 0	0.001	
H 330		A 0	0.001	
H 335		A 0	0.001	
H 340		A 0	0.001	
H 345		A 0	0.001	
H 350		A 0	0.001	
H 355		A 0	0.001	
H 360		A 0	0.001	
H 365		A 0	0.001	
H 370		A 0	0.001	
H 375		A 0	0.001	
H 380		A 0	0.001	
H 385		A 0	0.001	
H 390		A 0	0.001	
H 395		A 0	0.001	
H 400		A 0	0.001	
H 405		A 0	0.001	
H 410		A 0	0.001	
H 415		A 0	0.001	
H 420		A 0	0.001	
H 425		A 0	0.001	
H 430		A 0	0.001	
H 435		A 0	0.001	
H 440		A 0	0.001	
H 445		A 0	0.001	
H 450		A 0	0.001	
H 455		A 0	0.001	
H 460		A 0	0.001	
H 465		A 0	0.001	
H 470		A 0	0.001	
H 475		A 0	0.001	
H 480		A 0	0.001	
H 485		A 0	0.001	
H 490		A 0	0.001	
H 495		A 0	0.001	
H 500		A 0	0.001	
H 505		A 0	0.001	
H 510		A 0	0.001	
H 515		A 0	0.001	
H 520		A 0	0.001	
H 525		A 0	0.001	
H 530		A 0	0.001	
H 535		A 0	0.001	
H 540		A 0	0.001	
H 545		A 0	0.001	
H 550		A 0	0.001	
H 555		A 0	0.001	
H 560		A 0	0.001	
H 565		A 0	0.001	
H 570		A 0	0.001	
H 575		A 0	0.001	
H 580		A 0	0.001	
H 585		A 0	0.001	
H 590		A 0	0.001	
H 595		A 0	0.001	
H 600		A 0	0.001	
H 605		A 0	0.001	
H 610		A 0	0.001	
H 615		A 0	0.001	
H 620		A 0	0.001	
H 625		A 0	0.001	
H 630		A 0	0.001	
H 635		A 0	0.001	
H 640		A 0	0.001	
H 645		A 0	0.001	
H 650		A 0	0.001	
H 655		A 0	0.001	
H 660		A 0	0.001	
H 665		A 0	0.001	
H 670		A 0	0.001	
H 675		A 0	0.001	
H 680		A 0	0.001	
H 685		A 0	0.001	
H 690		A 0	0.001	
H 695		A 0	0.001	
H 700		A 0	0.001	
H 705		A 0	0.001	
H 710		A 0	0.001	
H 715		A 0	0.001	
H 720		A 0	0.001	
H 725		A 0	0.001	
H 730		A 0	0.001	
H 735		A 0	0.001	
H 740		A 0	0.001	
H 745		A 0	0.001	
H 750		A 0	0.001	
H 755		A 0	0.001	
H 760		A 0	0.001	
H 765		A 0	0.001	
H 770		A 0	0.001	
H 775		A 0	0.001	
H 780		A 0	0.001	
H 785		A 0	0.001	
H 790		A 0	0.001	
H 795		A 0	0.001	
H 800		A 0	0.001	
H 805		A 0	0.001	
H 810		A 0	0.001	
H 815		A 0	0.001	
H 820		A 0	0.001	
H 825		A 0	0.001	
H 830		A 0	0.001	
H 835		A 0	0.001	
H 840		A 0	0.001	
H 845		A 0	0.001	
H 850		A 0	0.001	
H 855		A 0	0.001	
H 860		A 0	0.001	
H 865		A 0	0.001	
H 870		A 0	0.001	
H 875		A 0	0.001	
H 880		A 0	0.001	
H 885		A 0	0.001	
H 890		A 0	0.001	
H 895		A 0	0.001	
H 900		A 0	0.001	
H 905		A 0	0.001	
H 910		A 0	0.001	
H 915		A 0	0.001	
H 920		A 0	0.001	
H 925		A 0	0.001	
H 930		A 0	0.001	
H 935		A 0	0.001	
H 940		A 0	0.001	
H 945		A 0	0.001	
H 950		A 0	0.001	
H 955		A 0	0.001	
H 960		A 0	0.001	
H 965		A 0	0.001	
H 970		A 0	0.001	
H 975		A 0	0.001	
H 980		A 0	0.001	
H 985		A 0	0.001	
H 990		A 0	0.001	
H 995		A 0	0.001	
H 1000		A 0	0.001	

NOTE 1 — Friction adjustment is not required on all disc brake models. Refer to Section 10 for disc brake installation.

TABLE NO. 2 — SOLENOID GAPS

Brake Series	Solenoid Stroke Size	Adjustment Value
H 30	1/2" Stroke	1/16"
H 35	1/2" Stroke	1/16"
H 40	1/2" Stroke	1/16"
H 45	1/2" Stroke	1/16"
H 50	1/2" Stroke	1/16"
H 55	1/2" Stroke	1/16"
H 60	1/2" Stroke	1/16"
H 65	1/2" Stroke	1/16"
H 70	1/2" Stroke	1/16"
H 75	1/2" Stroke	1/16"
H 80	1/2" Stroke	1/16"
H 85	1/2" Stroke	1/16"
H 90	1/2" Stroke	1/16"
H 95	1/2" Stroke	1/16"
H 100	1/2" Stroke	1/16"
H 105	1/2" Stroke	1/16"
H 110	1/2" Stroke	1/16"
H 115	1/2" Stroke	1/16"
H 120	1/2" Stroke	1/16"
H 125	1/2" Stroke	1/16"
H 130	1/2" Stroke	1/16"
H 135	1/2" Stroke	1/16"
H 140	1/2" Stroke	1/16"
H 145	1/2" Stroke	1/16"
H 150	1/2" Stroke	1/16"
H 155	1/2" Stroke	1/16"
H 160	1/2" Stroke	1/16"
H 165	1/2" Stroke	1/16"
H 170	1/2" Stroke	1/16"
H 175	1/2" Stroke	1/16"
H 180	1/2" Stroke	1/16"
H 185	1/2" Stroke	1/16"
H 190	1/2" Stroke	1/16"
H 195	1/2" Stroke	1/16"
H 200	1/2" Stroke	1/16"
H 205	1/2" Stroke	1/16"
H 210	1/2" Stroke	1/16"
H 215	1/2" Stroke	1/16"
H 220	1/2" Stroke	1/16"
H 225	1/2" Stroke	1/16"
H 230	1/2" Stroke	1/16"
H 235	1/2" Stroke	1/16"
H 240	1/2" Stroke	1/16"
H 245	1/2" Stroke	1/16"
H 250	1/2" Stroke	1/16"
H 255	1/2" Stroke	1/16"
H 260	1/2" Stroke	1/16"
H 265	1/2" Stroke	1/16"
H 270	1/2" Stroke	1/16"
H 275	1/2" Stroke	1/16"
H 280	1/2" Stroke	1/16"
H 285	1/2" Stroke	1/16"
H 290	1/2" Stroke	1/16"
H 295	1/2" Stroke	1/16"
H 300	1/2" Stroke	1/16"
H 305	1/2" Stroke	1/16"
H 310	1/2" Stroke	1/16"
H 315	1/2" Stroke	1/16"
H 320	1/2" Stroke	1/16"
H 325	1/2" Stroke	1/16"
H 330	1/2" Stroke	1/16"
H 335	1/2" Stroke	1/16"
H 340	1/2" Stroke	1/16"
H 345	1/2" Stroke	1/16"
H 350	1/2" Stroke	1/16"
H 355	1/2" Stroke	1/16"
H 360	1/2" Stroke	1/16"
H 365	1/2" Stroke	1/16"
H 370	1/2" Stroke	1/16"
H 375	1/2" Stroke	1/16"
H 380	1/2" Stroke	1/16"
H 385	1/2" Stroke	1/16"
H 390	1/2" Stroke	1/16"
H 395	1/2" Stroke	1/16"
H 400	1/2" Stroke	1/16"
H 405	1/2" Stroke	1/16"
H 410	1/2" Stroke	1/16"
H 415	1/2" Stroke	1/16"
H 420	1/2" Stroke	1/16"
H 425	1/2" Stroke	1/16"
H 430	1/2" Stroke	1/16"
H 435	1/2" Stroke	1/16"
H 440	1/2" Stroke	1/16"
H 445	1/2" Stroke	1/16"
H 450	1/2" Stroke	1/16"
H 455	1/2" Stroke	1/16"
H 460	1/2" Stroke	1/16"
H 465	1/2" Stroke	1/16"
H 470	1/2" Stroke	1/16"
H 475	1/2" Stroke	1/16"
H 480	1/2" Stroke	1/16"
H 485	1/2" Stroke	1/16"
H 490	1/2" Stroke	1/16"
H 495	1/2" Stroke	1/16"
H 500	1/2" Stroke	1/16"
H 505	1/2" Stroke	1/16"
H 510	1/2" Stroke	1/16"
H 515	1/2" Stroke	1/16"
H 520	1/2" Stroke	1/16"
H 525	1/2" Stroke	1/16"
H 530	1/2" Stroke	1/16"
H 535	1/2" Stroke	1/16"
H 540	1/2" Stroke	1/16"
H 545	1/2" Stroke	1/16"
H 550	1/2" Stroke	1/16"
H 555	1/2" Stroke	1/16"
H 560	1/2" Stroke	1/16"
H 565	1/2" Stroke	1/16"
H 570	1/2" Stroke	1/16"
H 575	1/2" Stroke	1/16"
H 580	1/2" Stroke	1/16"
H 585	1/2" Stroke	1/16"
H 590	1/2" Stroke	1/16"
H 595	1/2" Stroke	1/16"
H 600	1/2" Stroke	1/16"
H 605	1/2" Stroke	1/16"
H 610	1/2" Stroke	1/16"
H 615	1/2" Stroke	1/16"
H 620	1/2" Stroke	1/16"
H 625	1/2" Stroke	1/16"
H 630	1/2" Stroke	1/16"
H 635	1/2" Stroke	1/16"
H 640	1/2" Stroke	1/16"
H 645	1/2" Stroke	1/16"
H 650		