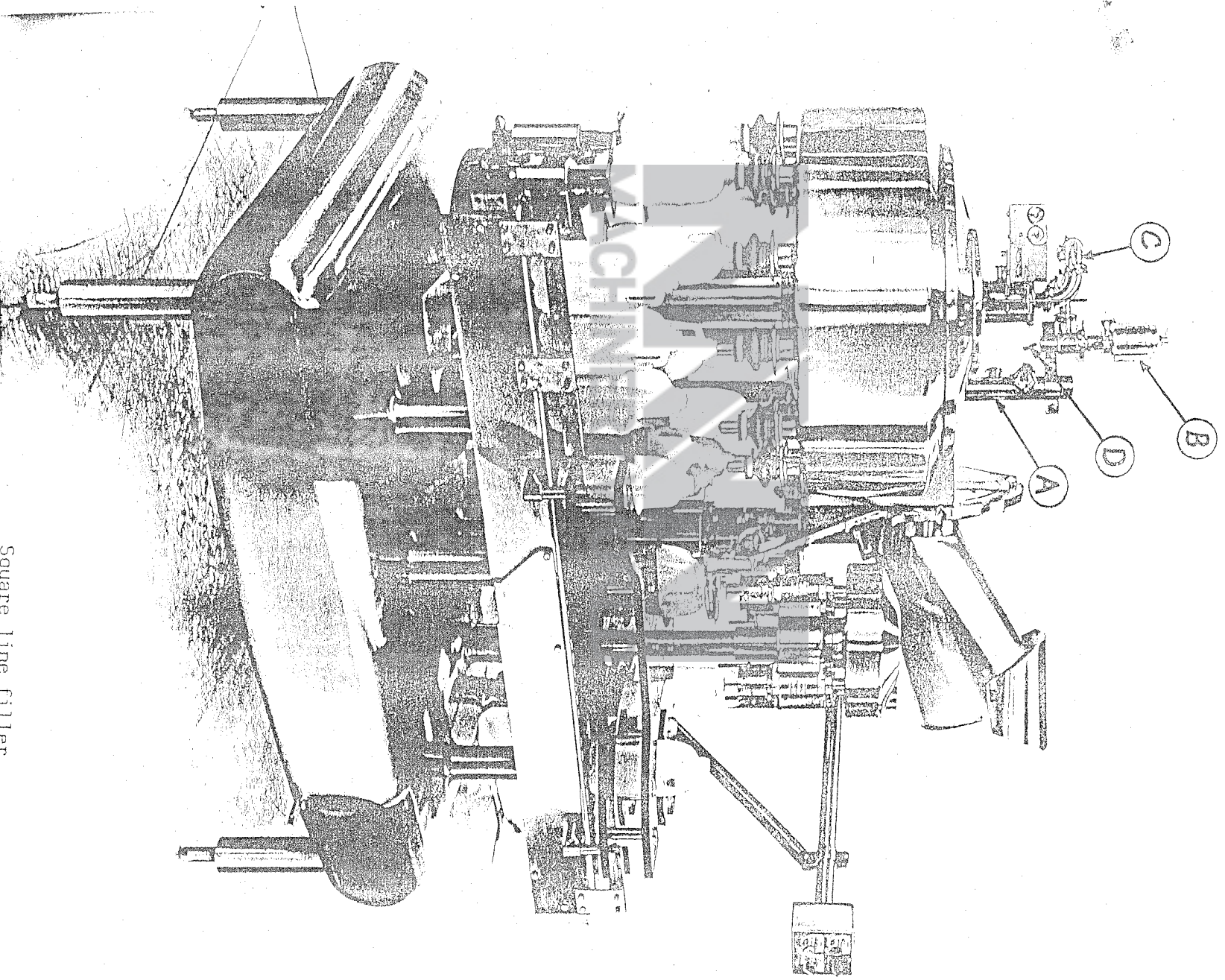


IMPORTANT INSTALLATION INFORMATION



Square line filler

- A. A C.I.P. column or plain post. This post is used to mount the throttling valve as is shown in the above photograph. The post goes into a housing in the base. It is secured by the threaded rod and nut.
- B. The throttling valve is mounted in the position shown with a clamp assembly provided.
- C. Product piping from the valve outlet to the filler inlet is provided. It is important that this piping be used. This provides for the raising and lowering of the filler bowl without disturbing the product connection or the liquid level control system.
- D. If a C.I.P. column is provided; the piping from the column to the valve is for C.I.P. only. This piping is removed for product hook-up.

The client should operate this machine in accordance with local health and safety laws. The information in this manual is for reference only.

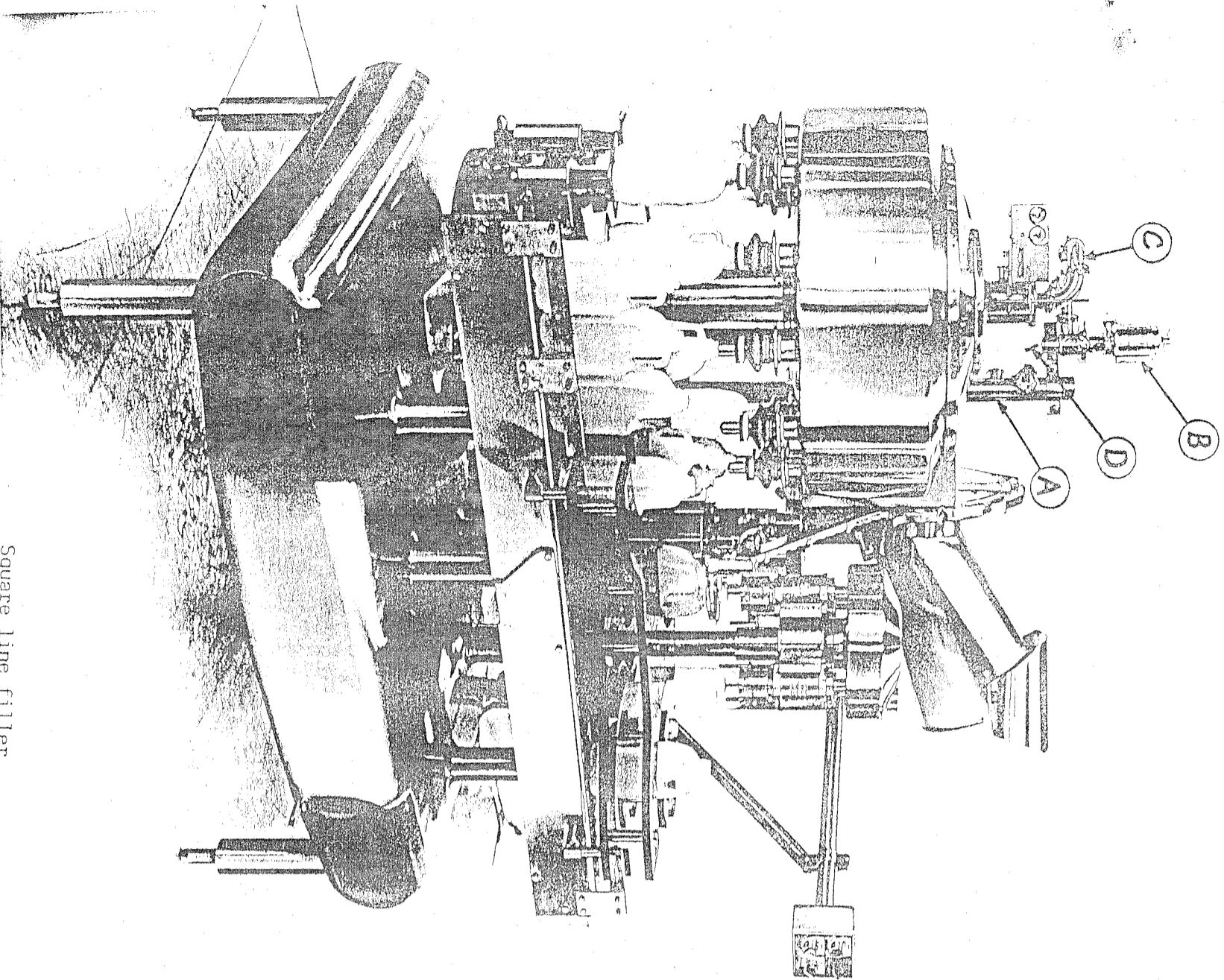
If in any doubt about the operation or maintenance of this machine contact the supplier

48-559

IMPORTANT INSTALLATION INFORMATION

- A. A C.I.P. column or plain post. This post is used to mount the throttling valve as is shown in the above photograph. The post goes into a housing in the base. It is secured by the threaded rod and nut.
- B. The throttling valve is mounted in the position shown with a clamp assembly provided.
- C. Product piping from the valve outlet to the filler inlet is provided. It is important that this piping be used. This provides for the raising and lowering of the filler bowl without disturbing the product connection or the liquid level control system.
- D. If a C.I.P. column is provided; the piping from the column to the valve is for C.I.P. only. This piping is removed for product hook-up.

The client should operate this machine in accordance with local health and safety laws. The information in this manual is for reference only. If in any doubt about the operation or maintenance of this machine contact the supplier.



Square Line filler

48-559

## GUIDE FOR SAFE FILLER OPERATIONS

### INSTALLATION:

THE FILLER SHOULD BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDED PROCEDURE SHOWN IN THE INSTALLATION SECTION OF THIS MANUAL.

ALL ELECTRICAL CONNECTIONS ARE TO BE PROPERLY GROUNDED AND INSULATED AT INSTALLATION; AND IN ACCORDANCE WITH THE LOCAL ELECTRICAL CODE.

WARNING: NO WORK OR ADJUSTMENTS ARE TO BE MADE TO FILLER WHEN IT IS IN MOTION.

### FILLER LAYOUT:

THIS FILLER IS DESIGNED TO BE OPERATED FROM THE FRONT (CONVEYOR SIDE), THE FILLER CONTROL PANEL IS LOCATED ON A STAINLESS STEEL COLUMN, EXTENDED; ON THE DISCHARGE END OF THE FILLER. ALL MODELS ARE EQUIPPED WITH A STOP (RED) AND START BUTTON (LOW SPEED AND HIGH SPEED START BUTTONS ON THOSE FILLERS WITH TWO-SPEED FILLER DRIVE MOTORS).

### OPERATOR INSTRUCTION:

NO PERSON SHOULD OPERATE, CLEAN, OR WORK AROUND THE FILLER UNLESS THEY HAVE BEEN INSTRUCTED ON THE LOCATION OF THE FILLER CONTROLS, THE PROPER PROCEDURE FOR STOPPING AND STARTING AND THE FUNCTION OF ALL OTHER CONTROLS ON THE CONTROL STATION.

WARNING: THE FILLER MUST BE STOPPED EACH TIME AN ADJUSTMENT IS REQUIRED, A BOTTLE OR CAP IS TO BE REMOVED, PARTS ADDED OR REMOVED AND DURING THE CLEANING AND SANITIZING OPERATION.

### SANITATION INSTRUCTIONS:

A THOROUGH DISASSEMBLY AND HAND CLEANING OF ALL PRODUCT CONTACT COMPONENTS IS NECESSARY BEFORE THE FIRST PRODUCT RUN. THIS SHOULD INCLUDE ALL COMPONENTS THAT MAY BE USED FOR CLEANING THE FILLER IN PLACE.

## POINTS OF CAUTION:

1. STARWHEELS: THE STARWHEELS ARE USED TO TRANSFER BOTTLES FROM THE CONVEYOR (INFEED) TO THE FILLING VALVE AND FROM THE FILLING VALVE TO THE CAPPER (TRANSFER) AND FROM THE CAPPER TO THE CONVEYOR (DISCHARGE). NO ATTEMPT SHOULD BE MADE TO MAKE ADJUSTMENTS, ADD OR REMOVE BOTTLES AND CAPS OR CLEAN JAMS WITH THE FILLER IN MOTION. LOOSE CLOTHING OR LONG HAIR MUST BE KEPT AWAY FROM THE STARWHEELS OR OTHER MOVING PARTS. THE STARWHEELS OR BOTTLE GUIDE MUST NOT BE USED AS STEPS OR STOOD ON TO REACH THE TOP OF THE FILLER.
  
2. FILLER AND CAPPER PLATFORM ASSEMBLIES: THE BOTTLES TRAVEL THROUGH THE FILLER ON THESE ASSEMBLIES. THE FILLER PLATFORMS ARE RAISED AND LOWERED TO ALLOW THE FILLING OF THE BOTTLE AND THE CAPPER PLATFORMS ARE RAISED AND LOWERED FOR APPLYING THE CAP. THE FILLER MUST BE STOPPED BEFORE RETRIEVING BOTTLES, CAPS OR OTHER OBJECTS FROM BETWEEN, ON TOP OR FROM UNDER THE FILLER OR CAPPER PLATFORMS.
  
3. DO NOT USE THE FILLER BASE OR TRANSFER TABLE AS A STEP. THE BASE HAS BEEN DESIGNED WITH SLOPING SURFACES TO PROVIDE COMPLETE DRAINING AND IS HIGHLY POLISHED MAKING IT EXTREMELY SLIPPERY WHEN WET. A STEP STOOL OR STEPLADDER MUST BE PROVIDED WHEN IT IS NECESSARY TO ASSEMBLE, DISASSEMBLE OR MAKE ADJUSTMENTS TO COMPONENTS ON TOP OF THE FILLER.
  
4. NO ATTEMPT SHOULD BE MADE TO CLEAN OR REMOVE OBJECTS (CONTAINERS, GLASS, ETC.) FROM THE FILLER BASE WHILE THE FILLER IS IN MOTION. THE BASE IS DESIGNED TO BE CLEANED WITH A STREAM OF WATER OR A LONG HANDLED BRUSH.

INSTALLATION INSTRUCTIONS	299-87	1-2
OPERATOR'S GUIDE	362-48	3-8
TIMING	354-48	9
BOWL RAISING AND FILLER TABLE ASSEMBLY	87-443	10
FILLER HEIGHT ADJUSTING GROUP	35-24-75G	11
CAPPER COLUMN ASSEMBLY	87-458	12
CAPPER HEIGHT ADJUSTING GROUP	75-73	13
CAPPER CAM ASSEMBLY	87-459	14
STARWHEEL SHAFT AND HUB ASSEMBLY	77-435	15
BOTTLE GUIDE, STARWHEEL AND TRANSFER TABLE ASSEMBLY	57-332	16
REDUCTION GEARBOX ASSEMBLY	75-71	17
CONVEYOR TRACK ASSEMBLY	48-460	18
CAP FEEDER SUPPORT COLUMN	87-440	19
LUBRICATION CHART	48-461	20

INFORMATION CONCERNING FILLING VALVES, CAPPING EQUIPMENT, ELECTRICAL AND CLEAN-IN-PLACE EQUIPMENT MAY BE FOUND IN THE OPTIONAL EQUIPMENT SECTION OF THIS MANUAL.

61032/124 D.V. 8-24-87

① VALVES

'J2E' FILLER VALVE FACTS

355-48

21

INSTRUCTIONS FOR PROPER DISASSEMBLY AND

348-38

22-2

METHODS OF ADJUSTING FILL HEIGHTS AND  
WEIGHT USING THE 'J2E' VALVE

38-556

24-2

WEIGHT CONTROL FOR PLASTIC BOTTLE

350-38

26

FILLING WITH 'J2E' VALVE

356-48

27-2

② LEVEL CONTROLAIR-OPERATED (TRI-CLOVER) LEVEL CONTROL WITH  
STATIONARY COVER AND SPRAYBALL

97-472

29

LIQUID LEVEL CONTROL SERVICE MANUAL

LLC-87

30

TRI-FLO AIR-ACTUATED THROTTLING VALVE

371-82

31

SERVICE MANUAL

ASSEMBLY PRINT FOR THROTTLING VALVE

371-10-215

32

ASSEMBLY PRINT FOR VALVE ACTUATOR

25-263B-S

33

PNEUMATIC DIAGRAM

360-48

34

SERVICE INSTRUCTIONS-MOORE BOOSTER RELAY

SD-66

35

③ CAPPING EQUIPMENT

CAPPING INSTRUCTIONS

357-48

36-3

CAP APPLIER ADJUSTMENT

L-10675-A

38

LEVELING PLATE ASSEMBLY

38-550

39

UNIVERSAL CAPPER TURRET AND DRIVE ASSEMBLY

97-494

40

SCREW CAPPER ASSEMBLY

48-562

41

FEDERAL ROTARY CAP FEEDER

08-522

42

④ ELECTRICAL DIAGRAMS

WIRING SCHEMATIC FOR FILLER	27052-C	43
WIRING DIAGRAM FOR CONTROL BOX	27053-C	44
WIRING DIAGRAM FOR DISCONNECT BOX	27054-C	45
INSTRUCTION MANUAL FOR SCR MOTOR SPEED CONTROL	8500-8	46
INSTRUCTIONS FOR ISOLATION BOARD FOR SECO CONTROLLER	370-48	47-4
WIRING SCHEMATIC FOR ISOLATION BOARD	26020-D	50

⑤ CLEANING-IN-PLACE

CLEAN-IN-PLACE OPERATION	358-48	51
C.I.P. PROCEDURE	308-97(E)	52-5
PORTABLE C.I.P. FLOW DIAGRAM	40316	54
DIAGRAMS FOR AUTOMATED C.I.P. SYSTEMS	359-48	55

INSTALLATION INSTRUCTIONS  
FEDERAL 'VACU-MATIC' FILLER  
WITH THRU-FEEDTRACK

Checking of Shipment

- a. Check packing list to make certain all parts are received and are in good condition.
- b. Check to see if there is any damage to machine resulting from shipping.

Installation of Machine

- a. Set machine in desired position and level carefully. Level from individual filler platforms in the raised position. Height adjustment of legs may be made by turning leg screws in or out as required. Make sure that the weight of machine is distributed properly on all four legs.
- b. Attach conveyor track and drive. Be certain that connecting track is adequately supported and does not disturb levelling of filler. After track is connected check to see that wear strip which is attached to inner conveyor rail is flush with transfer table and that there is clearance between wear strip and transfer table. Move filler if necessary to get required clearance.

Checking for Proper Adjustment after Installation and Before First Production Run

- A. Centering of bottles under valves and cappers.  
Run one bottle of each size through machine to check if bottles are centering properly under valves and cappers. If centering is not satisfactory, check the following:
  1. If starwheels do not place bottle in center of platform, check to make certain you are using correct starwheels and bottle guides. Make certain none of the starwheels and starwheel hubs are turned out of position. The starwheel hubs can be advanced or retarded by loosening acorn nut, moving hub as required and tightening nut. If the filler was tested with customer's sample bottles, no adjustment should be necessary.



B. Bottle Platform Height Adjustment.

The filler and capper platforms are adjusted for proper height with transfer table at the factory. If bottles stumble on any certain platform, determine if platform or transfer table is bent. If platform is level, proceed as follows to raise or lower platforms.

1. Filler with wheel type filler cam
  - a. The height of filler platforms can be adjusted by turning in or turning out the stop screw under each platform
2. Fillers with pull-down filler cam (Spring Loaded Lifters)
  - a. Rotate the filler so that the platform to be adjusted is in a position where the platform is pulled down all the way. Note the difference in height between filler platform and transfer table.
  - b. Rotate filler until platform requiring adjustment is off of filler cam and in a convenient working position.
  - c. Remove roller and roller stud
  - d. Loosen Allen set screw in lower end of platform spindle
  - e. Turn head of eccentric bushing to raise or lower roller. Requires thin wrench with 1-1/4" opening.
  - f. Tighten set screw
  - g. Reassemble roller and roller stud
3. Capper platform adjustment
  - a. The height of the capper platforms can be adjusted by turning in or turning out the stop screw under each platform

C. Releasable Drive Pulley Adjustment.

A ball clutch is provided in the drive pulley assembly. Refer to "Reduction Gear Group". Note, parts S, T, U, V, & W.

Adjust spring tension at screw "W": releasable screw. Set pressure so that drive will just carry the load without disengaging, then if any condition occurs to jam the machine this clutch will relieve and prevent damage to filler and to bottle handling equipment.

Note to Installation Man.

All of the above adjustment should be checked before first milk run. If it is apparent during milk run that adjustments are necessary, make them if possible before end of run so that results can be observed. Always observe machine during operation after any adjustment is made.

## OPERATOR'S GUIDE

This is an operator's guide for the 'All-Stainless' 'Vacu-Matic' gravity filler,

Your company has made an investment in this filler to fill and cap plastic bottles efficiently with a minimum of loss. With proper care it will serve you and your company for many years. It is in your best interest to learn all you can about the construction and features of the filler to obtain the most safe and efficient operation of the filler possible.

FILLER CONTROLS: The operator control panel is located on the right-hand front of the filler. The panel contains FILLER STOP/START, SPEED CONTROL potentiometer and CAP DISPENSER ON/OFF. Become familiar with this panel before attempting to start the filler.

Before starting the filler make sure that all persons are clear of the filler, all tools and wrenches have been removed and that the filler bowl is raised high enough to keep the filler valves from being damaged when the bowl is rotated.

STARTING THE FILLER: If you are starting the filler for the first time for the days operation turn the SPEED CONTROL KNOB down to 10 or lower and then push the start button. (The button must be held momentarily until the filler starts.) The speed control is a potentiometer that regulates the amount of current to the filler drive motor thus controlling the speed. The numbers on the speed control represent percent of total speed.

FILLER BOWL RAISING: This filler is equipped with a manual filler bowl raising assembly. A long handled hand crank is provided for this operation. On the BACK side of the filler a squared end shaft extends through the stainless steel shroud. Insert the hand crank and push the shaft until the pinion gear has engaged. The hand crank is then rotated to raise or lower the filler bowl. When the bowl height has been adjusted to the proper level the shaft should be pulled out to its original position. DO NOT RAISE BOWL HIGHER THAN THE RED MARK ON THE FILLER COLUMN.

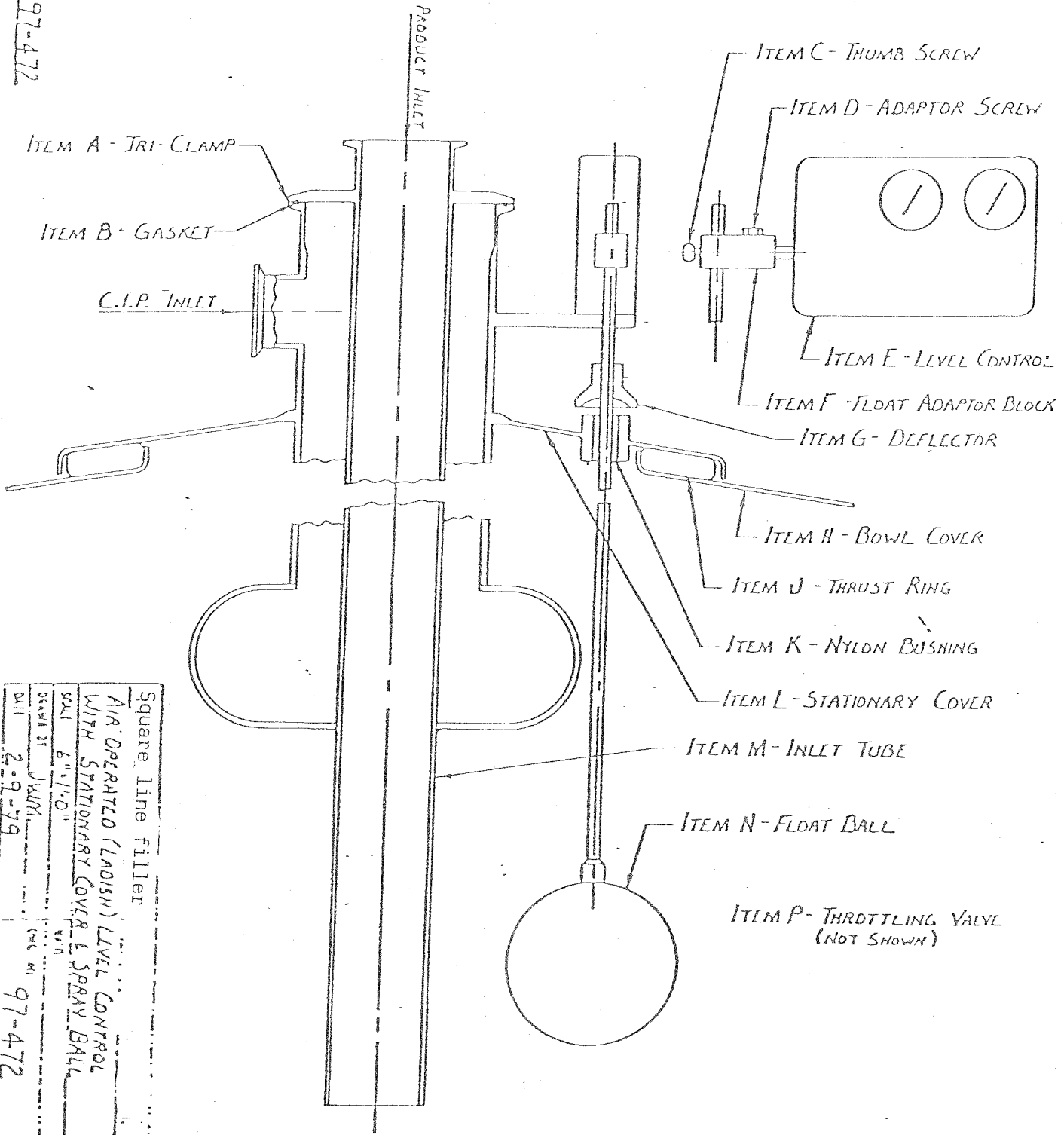
FILLING OPERATION: When the filler has been properly cleaned, assembled and sanitized; use an empty container to gauge the proper bowl height setting.

BOWL HEIGHT SETTING: With an empty bottle under the filling valve, before the bottle starts to rise up to open the valve, there should be a clearance of 1/4 inch between the top of the bottle and the tip of the filling valve. This will give full opening of the valve assembly.

FILL HEIGHT CONTROL: See parts page 38-556 of the J2E valve. To increase the height of fill remove the flat sealing rubber and add flat white delrin spacers. To decrease the fill height remove some of the flat white delrin spacers. After the spacers have been added or removed the flat sealing rubber should be replaced. Spacers are supplied in 1/4, 1/8 and 1/16 inch thicknesses.

FILLER BOWL LIQUID LEVEL CONTROL: Controlling the level in the filler bowl is very important in filling bottles. A B.W.C. (ball with control) level control system has been supplied to maintain a pre-set level in the filler bowl. See parts page 97-472. This level control system is constructed so that the liquid level in the filler bowl may be changed to affect the filled weight and filling speed. The height is adjusted by loosening thumbscrew C and raising or lowering float ball N. When adjusting, make sure the float rod moves freely, as binding of the rod will cause erratic operation of the product throttling valve (see page 351-48). The initial setting of the float ball should produce a level that is approximately 1-1/2 inches (38mm) below the tops of the vent tubes. The level may be changed to regulate the filling weights.

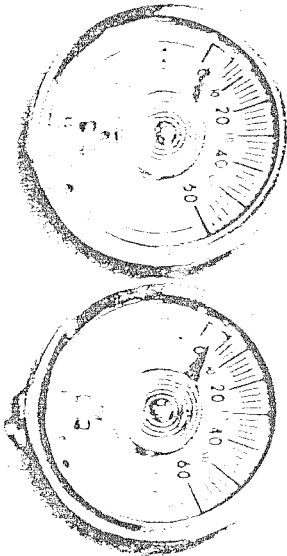
97-472



Square line filler  
 AIR OPERATED (LAOISH) LEVEL CONTROL  
 WITH STATIONARY COVER & SPRAY BALL  
 SCALE 6" = 1'-0"  
 DRAWN BY JWM  
 DATE 2-9-79  
 97-472

BMC (BALL WITH CONTROL)  
LIQUID LEVEL CONTROL SYSTEM

NOTE: THE PROPER ASSEMBLY OF THE  
LADISH CONTROL TO THE STATIONARY  
COVER IS IMPORTANT TO THE OPERATION  
OF THE SYSTEM.



A

B

C

WHEN MOUNTING THE LADISH  
CONTROL (A) IT SHOULD BE  
POSITIONED SO THAT THE FLOAT  
ROD (B) MAY MOVE UP AND DOWN  
FREELY THROUGH ACTUATOR ROD  
BLOCK (C). THIS SHOULD BE  
TESTED DAILY BEFORE SECURING  
THE FLOAT ROD.

362-48 50F6

351-48

PROPER TIMING OF THE FILLER: The proper timing of the filler is extremely important. This may or may not be the responsibility of the operator. In any case it is important for the operator to recognize when the filler is not in proper time and see that the necessary corrections are made.

### TIMING

Timing which affects the forward movement of the bottle. Timing must be carried out in the following sequence.

1. FILLER PLATFORMS: The filler platform should be centered directly under the filling valves. Consult your filler manual or the factory for procedure to correct this problem.
2. INFEED STARWHEEL: The infeed starwheel centers the bottle under the filler valve. The starwheel may be advanced or retarded by loosening the acorn nut in the center of the starwheel, adjusting and retightening.
3. TRANSFER STARWHEEL: The only function of the transfer starwheel is to transfer the bottle smoothly from under the filling valve and through the cap picker up. The bottle should not move forward or fall backward as it is picked up by the starwheel. This is adjusted the same as the infeed.
4. CAPPER PLATFORM: If the bottle is not being centered properly on the platform this may be corrected by raising the capper heads clear and loosen screws under the capper table to relieve the clamp ring. The table may then be rotated in either direction to place the bottle in the center of the platform. After adjustment, retighten the cap screws. (See parts page 87-442)
5. CAPPER HEADS: After centering the bottles on the platforms they may not be properly centered under the capping heads. This may be corrected by loosening the six (6) cap screws on top of the adaptor hub. The capping heads may be rotated to properly center over the bottles. Retighten the cap screws. (See parts page 57-354)
6. DISCHARGE STARWHEEL: This starwheel should gently remove the bottle from under the capper head and discharge it to the bottle conveyor. This starwheel may be adjusted the same as the infeed and transfer starwheels.

Positioning of bottles radially. (Not too far inside or outside of the filling and capping circle)

BOTTLE GUIDE: The bottle guide is used to guide the bottles in the transfer from one station to another and to properly position the bottle under the circle of filling valves and cappers.

The guide rests on the bottle guide support. When problems are experienced with the guide, make sure the support is secured in the proper position.

If you experience further problems with the bottle guide properly positioning the bottle, you should consult the factory.

Adjustments for smooth transfer.

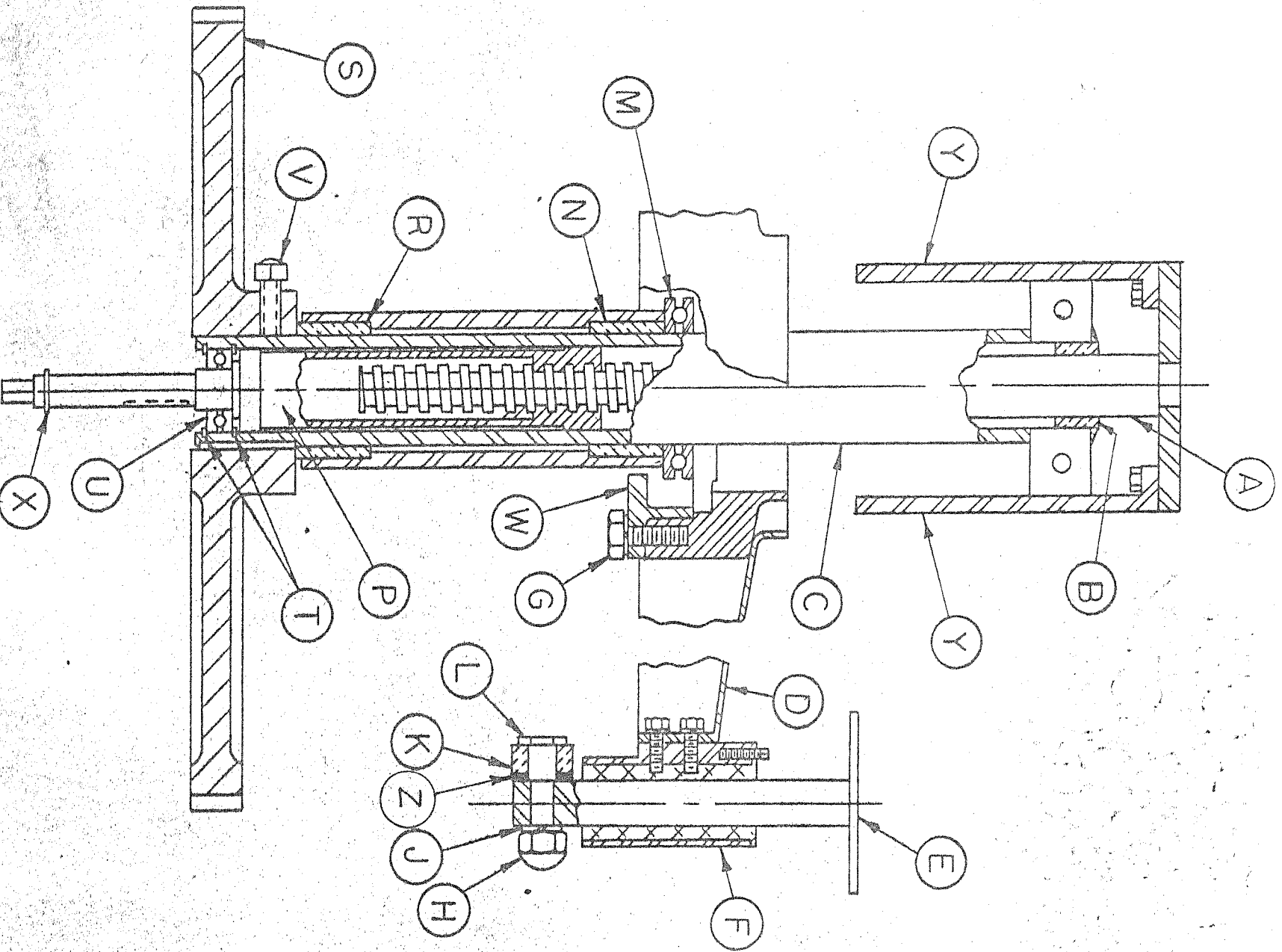
TRANSFER TABLE: The position and condition of the transfer table is very important. At the points where the bottle is transferred onto or off of a filler or capper platform, the table should exactly match the height of the platform. If a rough edge or curl has developed, this should be removed with a file. On older fillers that may be used for glass or has been in the past; a path may be deeply worn. A replacement table should be considered.

**NOTE:** If the bottle platforms are not properly adjusted to meet the transfer table properly, refer to the filler manual for the proper procedure in adjusting the platform height.



Parts List

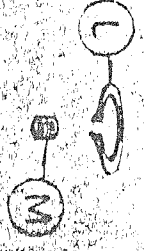
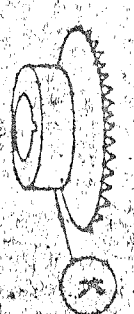
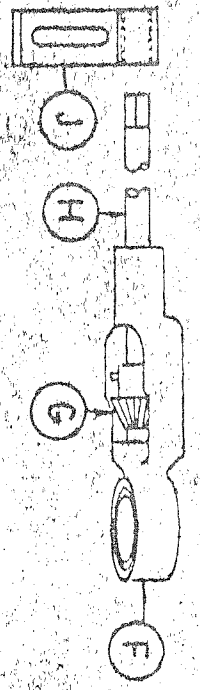
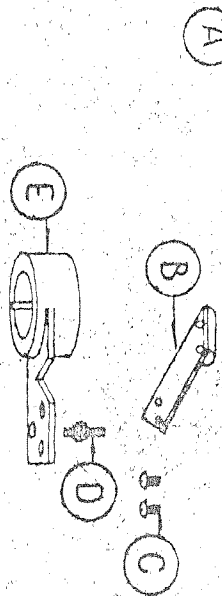
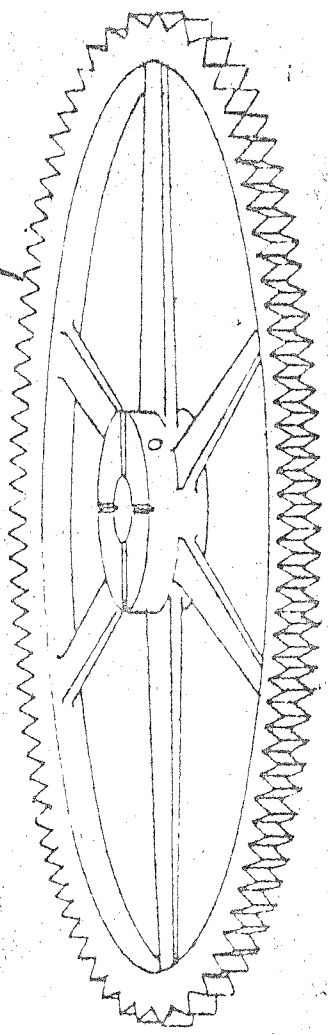
Federal 'Vacu-Matic' Milk Bottle Filler  
 Bowl Raising Filler Table Assembly  
 Models GW/GWS155, GW/GWS185



ITEM	DESCRIPTION
A	Filler Bowl Raising Screw
B	Bowl Raising Screw Guide Bushing
C	Filler Column Assembly
D	Filler Table
E	Filler Platform Assembly
F	Filler Platform Bearing Block With Plastic Insert
G	Hex Head Cap Screw With Lockwasher
H	Acorn Nut
J	Lock Washer
K	Roller - (57W.57z. Ball Brs.)
L	Roller Shaft
M	Upper Filler Ball Thrust Bearing
N	Upper Filler Column Bushing
P	Filler Bowl Raising Nut
R	Lower Filler Column Bushing
S	Filler Gear
T	Tru-Arc Ring
U	Lower Filler Ball Thrust Bearing
V	Square Head Set Screw
W	Filler Table Clamp Ring
X	Tru-Arc Ring
Y	Torque Rod
Z	SPACER - (ROLLER SHAFT)

35-24-75G

35-24-75G



PARTS LIST

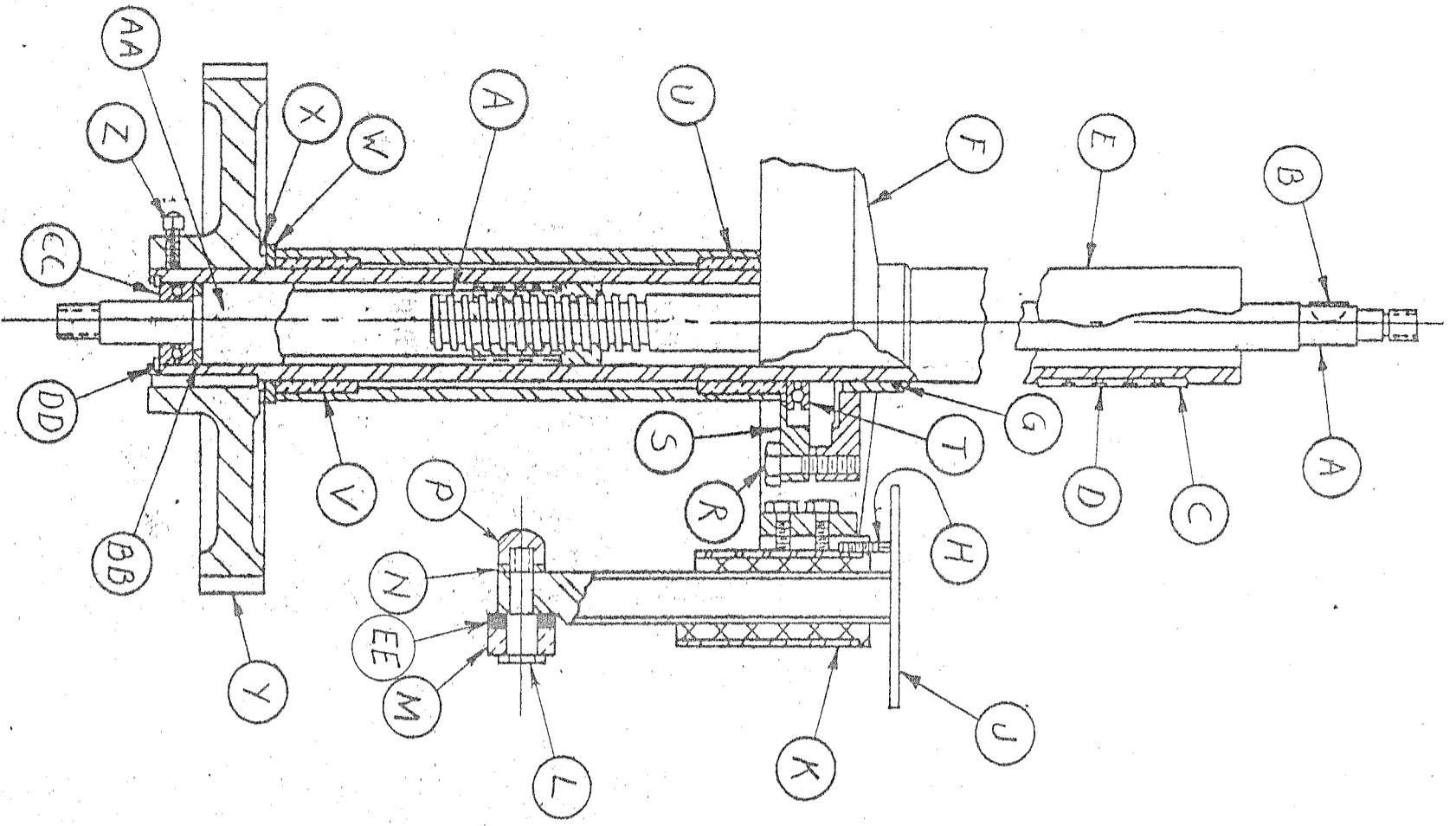
FILTER HEIGHT ADJUSTING GROUP

Item	Description
A	Filter Gear,
B	Latch Spring Assembly
C	1/4-20 x 1/2 Round Head Screws
D	1/4-20 x 3/4 Socket Head Screws w/IM
E	Filter Spring Lock Spacer
F	Raising Pinion Support w/bushings
G	Raising Pinion
H	Raising Pinion Shaft
J	Raising Shaft Oxide
K	Barrel Case
L	Barrel Plug
M	1/8 Brass Balled Plug

35-24-75G

PARTS LIST

CAPPER COLUMN ASSEMBLY

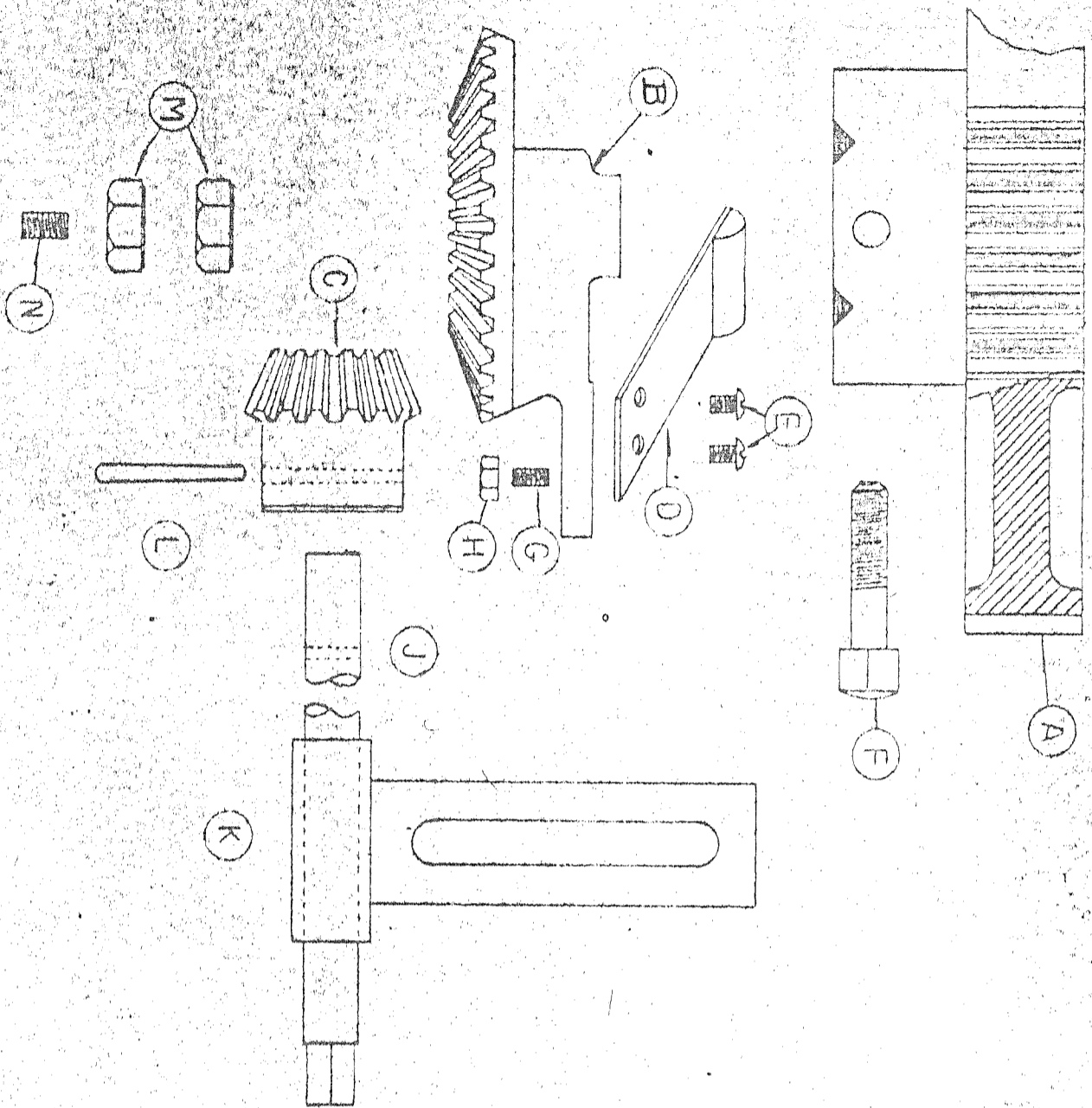


ITEM	DESCRIPTION
A	CAPPER RAISING SCREW
B	WOODRUFF KEY
C	CAPPER COLUMN KEY
D	HEX. SOCKET HEAD CAP SCREW
E	CAPPER COLUMN
F	CAPPER TABLE
G	CAPPER TABLE SEAL RING
H	CAPPER PLATFORM ADJ. SCREW
J	CAPPER PLATFORM ASSEMBLY
K	CAPPER PLATFORM BEARING BLOCK WITH PLASTIC INSERT
L	CAPPER ROLLER SHAFT
M	ROLLER - (57M. STL. BALL BRG.)
N	LOCK WASHER
P	ACORN NUT
R	HEX. HEAD CAP SCREW WITH LOCKWASHER
S	CAPPER TABLE CLAMP RING
T	UPPER CAPPER BALL THRUST BEARING
U	UPPER CAPPER COLUMN BUSHING
V	LOWER CAPPER COLUMN BUSHING
W	THRUST WASHER
X	THRUST PLATE
Y	CAPPER GEAR
Z	SQUARE HEAD SET SCREW
AA	CAPPER RAISING NUT ASSEMBLY
BB	SHOULDER WASHER
CC	LOWER CAPPER BALL THRUST BEARING
DD	TRU-ARC RING
EE	SPACER - (ROLLER SHAFT)

PARTS LIST

MANUAL OPERATED

CAPPER HEIGHT ADJUSTING GROUP



Item	Description
A	Capper Gear
B	Bevel Gear & Spring Holder
C	Bevel Gear Pinion
D	Latch Spring Assembly
E	10-24 x 1/2" Round Head Screws
F	1/2"-13 x 1" Square Head Set Screws
G	1/4-20 x 3/4" Socket Head Set Screw
H	1/4-20 Hex Jam Nut
J	Shaft
K	Shaft Support Assembly
L	1-1/2" Long Taper Pin
M	3/4-16 NF Hex Jam Nut
N	1/8" Pressure Relief Fitting

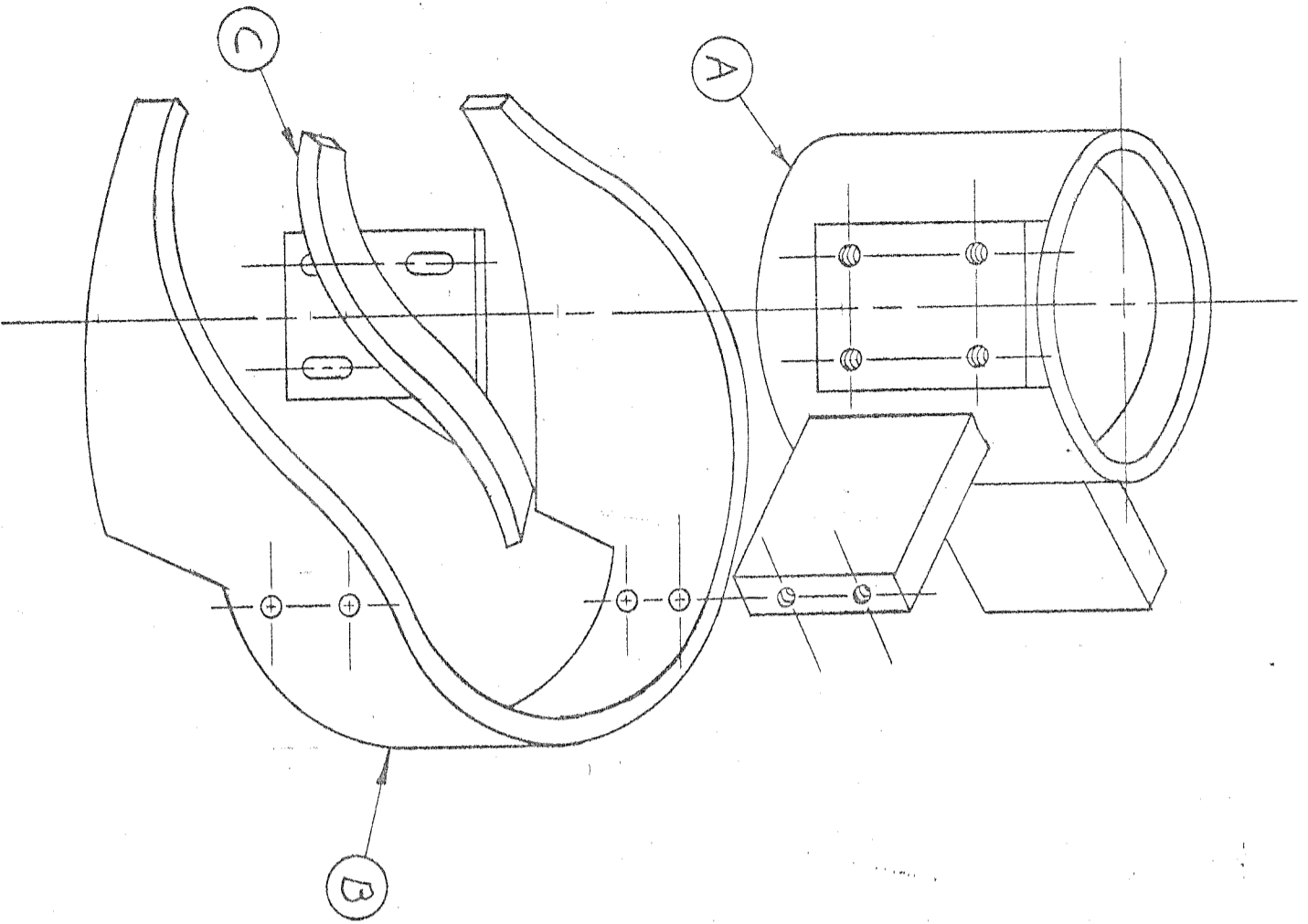
75-73

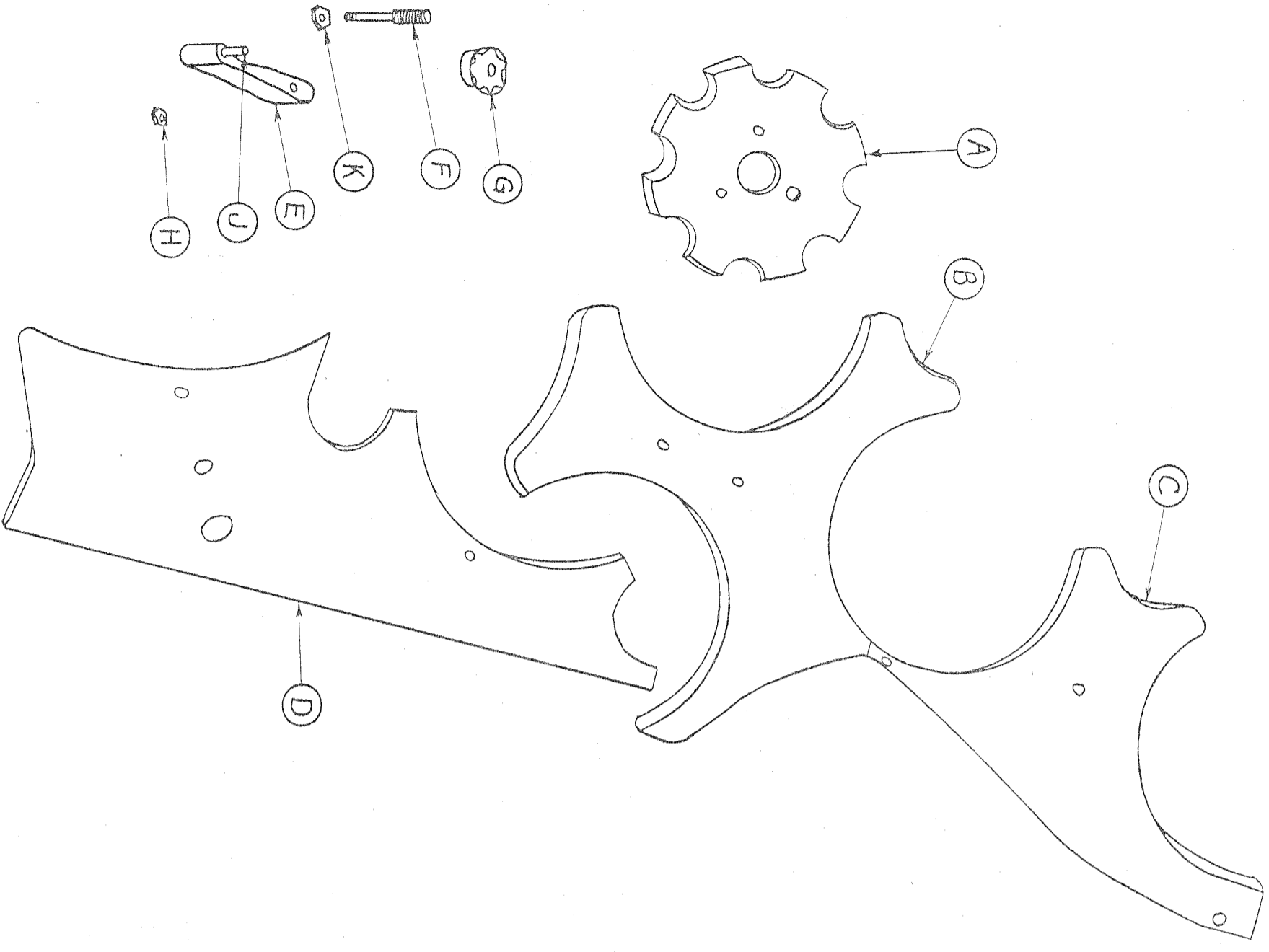
75-73

PARTS LIST

CAPPER CAM ASSEMBLY

<u>ITEM</u>	<u>DESCRIPTION</u>
A	CAPPER CAM SUPPDRT HOUSING
B	CAPPER RAISING CAM
C	CAPPER LOWERING CAM





PARTS LIST

BOTTLE GUIDES, STARWHEELS AND  
TRANSFER TABLE

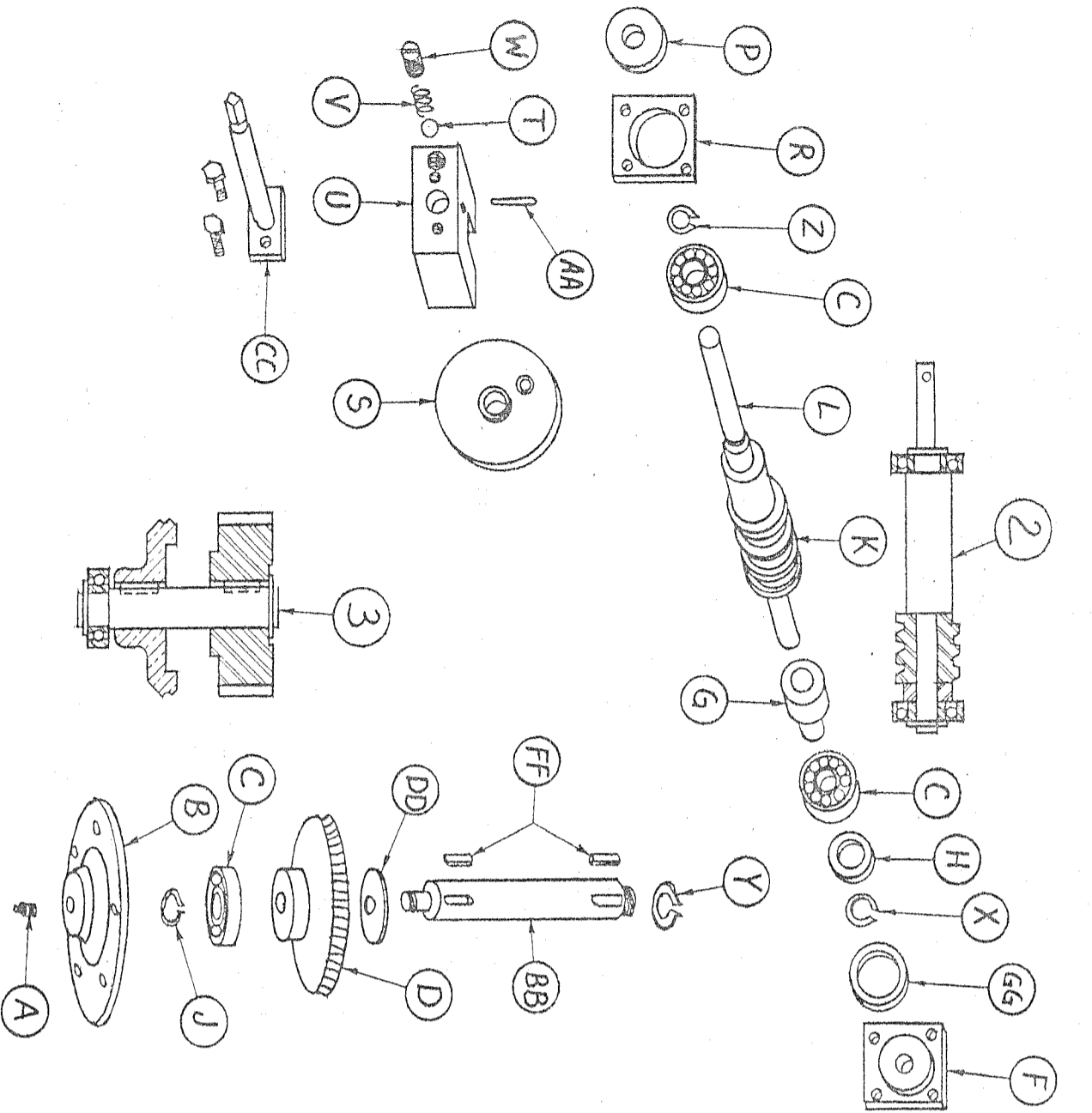
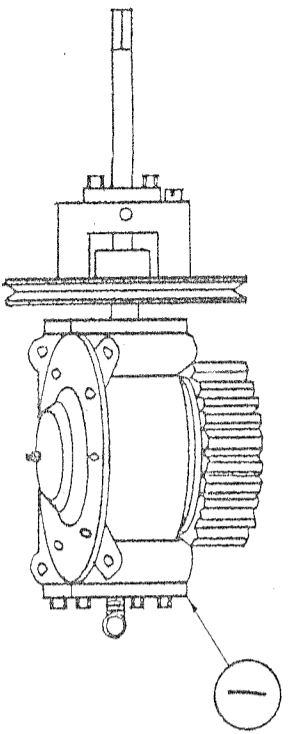
MODELS

GS155, AP186, SP186, GHS155, GWS185  
SWP3615, SWP3612

<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
A		Starwheels- When ordering be sure to state bottle style and capacity.
B		Infeed Section Bottle Guides- When ordering, be sure to state container style and capacity.
C		Discharge Section
D		Transfer table assembly.
E		Bottle guide support
F		Bottle guide stud
G		Bottle guide nut
H		Bottle guide support hex nut
J		Bottle guide pin pressed in
K		Bottle guide stud nut and lockwasher 3/8-24

PARTS LIST

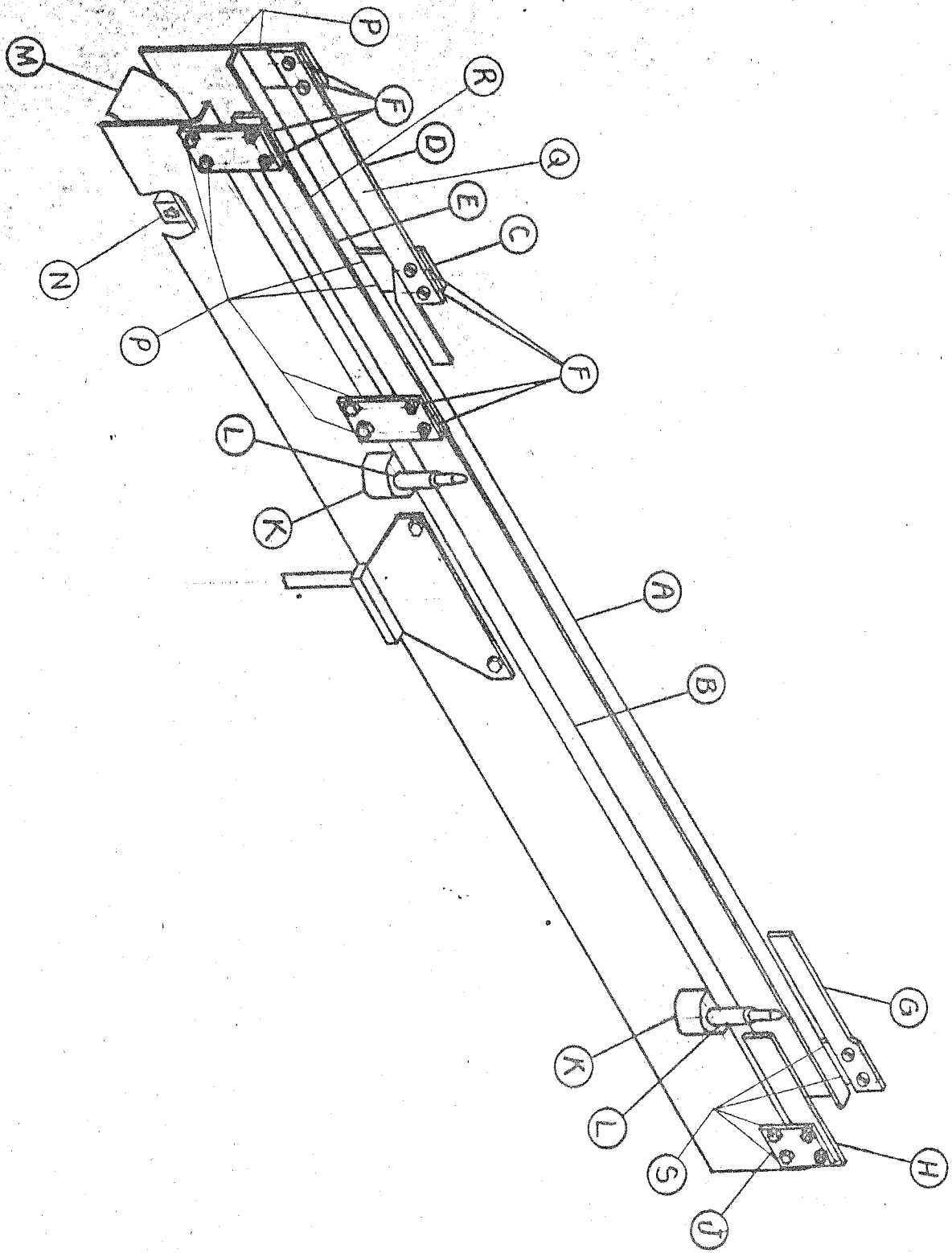
REDUCTION GEAR



ITEM	DESCRIPTION
1	Gear box, clutch & pulley assembly complete
2	Worm shaft completely assembled as shown
3	Worm gear, shaft & pinion gear assembled as shown

A	1/2 I.P. Plug
B	Worm housing bottom
C	Ball thrust bearing
D	Worm gear
F	Worm housing and plate
G	Worm bearing bushing
H	Worm shaft washer
J	Tru-arc ring
K	Worm
L	Worm shaft
P	Oil seal
R	Oil seal adaptor
S	Drive pulley assembly; specify O.D.
T	1/2" S.S. ball
U	Slip clutch block
V	Spring
W	Clutch torsion adjusting screw
X	Tru-arc ring
Y	Tru-arc ring
Z	Tru-arc ring
AA	#2 Taper pin
BB	Worm gear shaft
CC	Worm shaft extension
DD	Worm gear thrust washer pinned to gear case
FF	1/4 x 1/4 Keys
GG	Spacer

CONVEYOR TRACK ASSEMBLY  
PARTS LIST



ITEM	DESCRIPTION
A	Inner Conveyor Angle
B	Outer Conveyor Angle
C	Infeed Bolting Plate
D	Inner Infeed Rail
E	Outer Infeed Rail
* F	Infeed Spacers (Not Shown) 1/2 gal. conveyor track only
G	Inner Discharge Rail
H	Outer Discharge Rail
J	Discharge Bolting Plate
K	Bottle Guide Support Bracket
L	Bottle Guide Support Pin
M	Chain Return Plate
N	Chain Return Plate Bracket
* P	Infeed Spacers (Not Shown) Gal. & 1/2 gal. conveyor track
* Q	Inner Infeed Rail Insert (Not Shown) Gal. & 1/2 gal. conveyor track
* R	Outer Infeed Rail Insert (Not Shown) Gal. & 1/2 gal. conveyor track
* S	Discharge spacers (Not Shown) Gal. & 1/2 gal. conveyor track

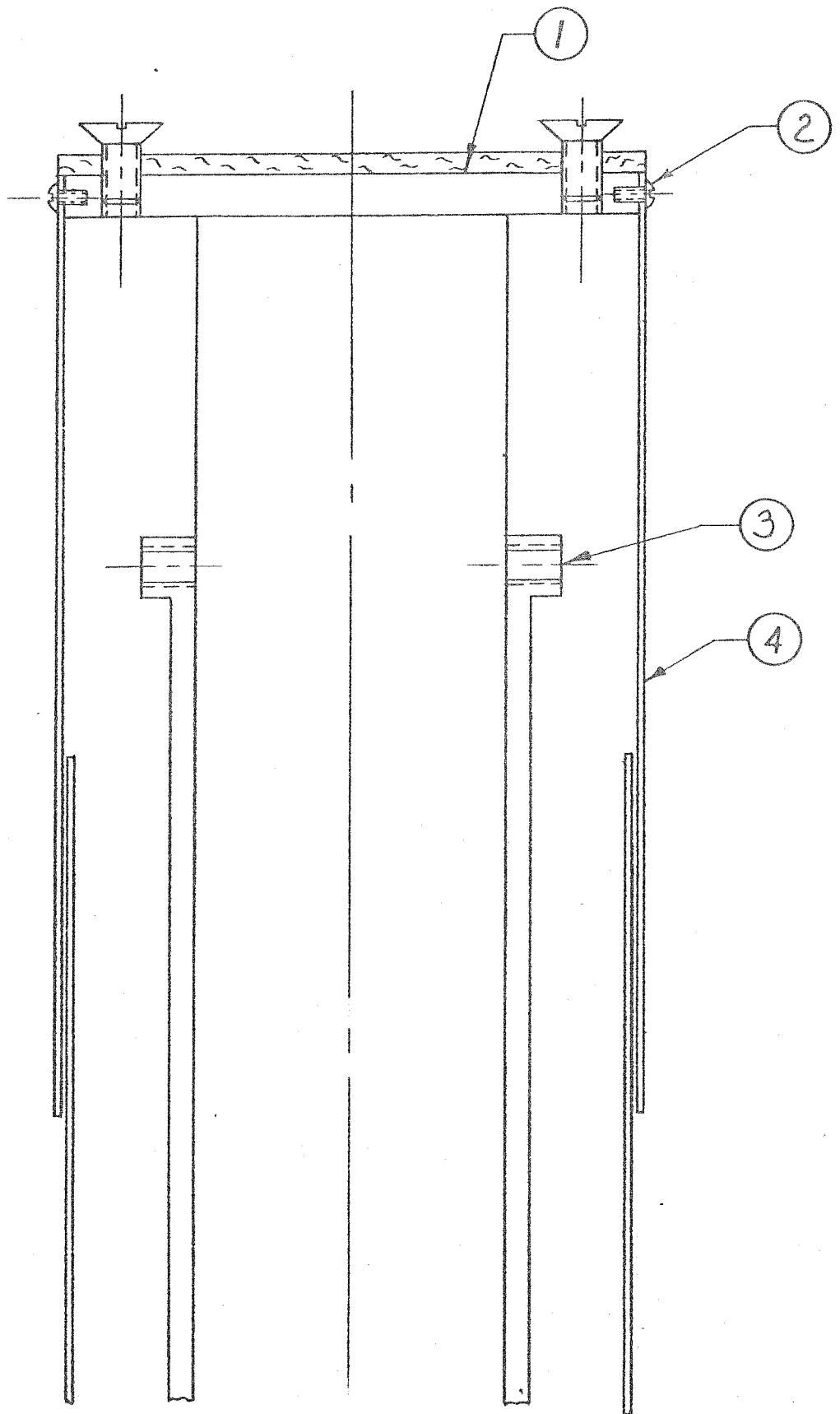
\* ITEM NOT SHOWN, BUT LOCATION IS SHOWN.

48-460

48-460



CAP FEEDER SUPPORT COLUMN ASSEMBLY



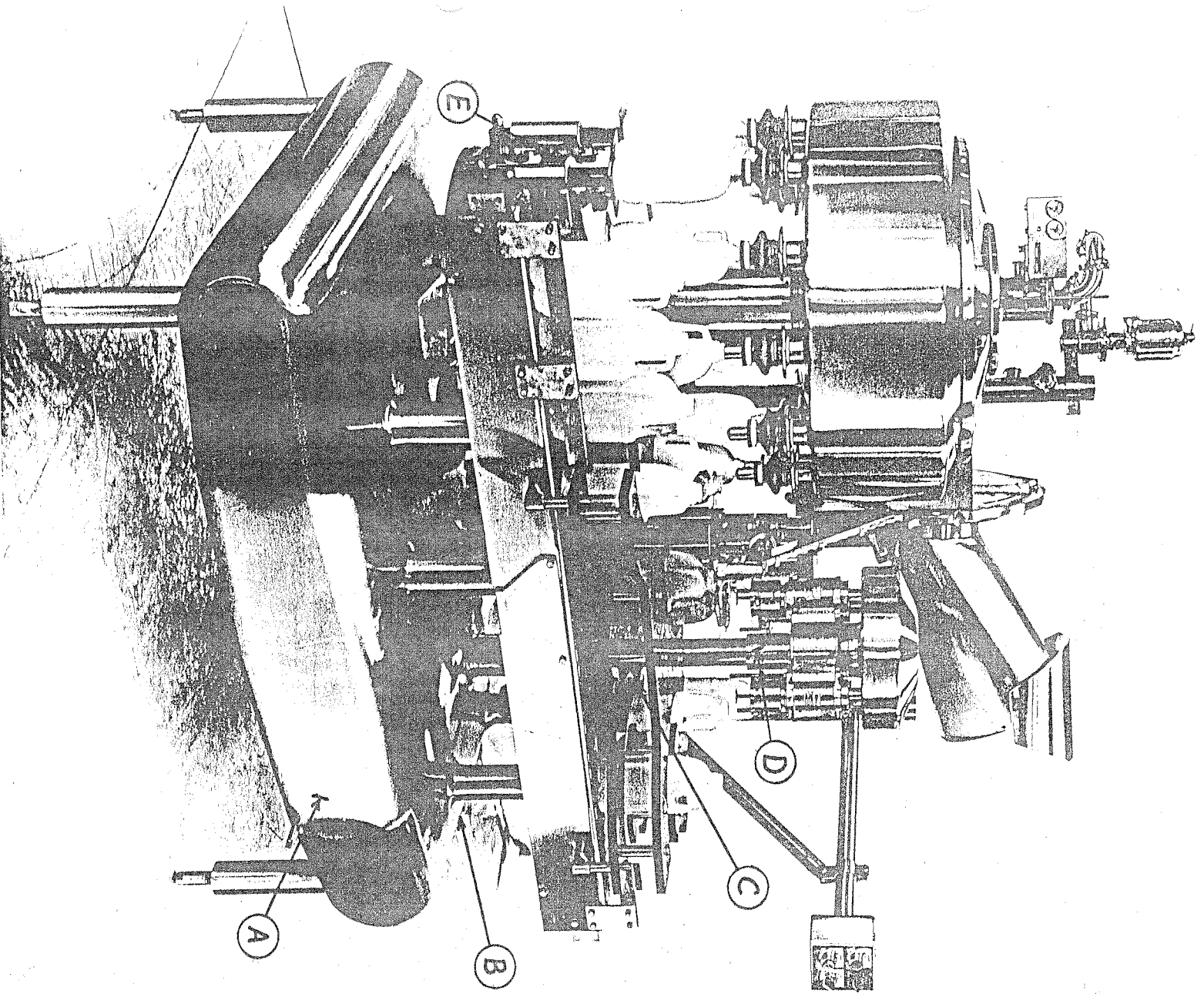
PROCEDURE FOR ADJUSTING HEIGHT OF COLUMN:

1. Remove screws (2) and lower cylinder (4) to expose set screws (3)
2. Loosen set screws (3) and adjust feeder to required height.
3. Tighten set screws (3) and replace cylinder (4) with screws (2)

DWG "A"

87-440

LUBRICATION



- A. Reduction Gear - Drain by removing 1/2" pipe plug under gear box. Refill or add oil thru pipe extension on side of filler. Use 80 or 90 S.A.E. oil, capacity 3/4 pint. Any excess will drain out through top vent hole under pinion gear. Change twice per year.
- B. Zerk fitting - Five points. One connects to filler column, one to capper column and three to starwheel shaft columns. Grease liberally regularly.
- C. Zerk fitting - On capper table - supplies grease to ball thrust supporting capper column.
- D. Zerk Fitting - Supplies grease between capper column sleeve and column.
- E. Zerk Fitting - On filler table this fitting connects to grease-way to ball thrust bearing which supports filler table and bowl assembly.

Filler valve

I. REMOVE VENT TUBE: ITEM (A)

Remove vent tube seal (B). Remove valve rubber (C), diaphragm (E), condensate deflector (F) and deflector grommet (G). Then remove snout (D) from diaphragm (E). Rotate vent tube until locking cross bar on vent tube is in alignment with entry slots in valve flange. Lift vent tube out of slots in bowl flange and remove vent tube. Wash and rinse all parts thoroughly.

TO REASSEMBLE:

- (A). Insert vent tube (A) into bowl flanges. They should be positioned so bar locks are 90 degrees to entry slots in valve flanges. By turning vent tube 90 degrees, this automatically locks vent tube into bowl flange.
- (B). Assemble condensate deflector (F) onto grommet (G) and slide up to shoulder on bowl flange.
- (C). Apply a thin film of sanitary lubricant to the O.D. of the valve snout (D) and assemble into diaphragm (E). Slide large end of diaphragm (E) onto bottom of bowl flange--push up on diaphragm to expose vent tube groove and assemble vent tube seal (B) into groove. Check

vent tube assembly so that valve snout slides freely over vent tube. Check to see that drain position on deflector is toward center of bowl.

II. ASSEMBLE VALVE RUBBER:

Slip valve rubber (C) over end of valve sleeve and into position on snout (D).

III. CHECK FOR PROPER ASSEMBLY OF VALVE:

When valve is properly assembled, cross bar on vent tube will be at right angles to line drawn from valve to center of bowl. Check to see that drain position on deflector is toward center of bowl.

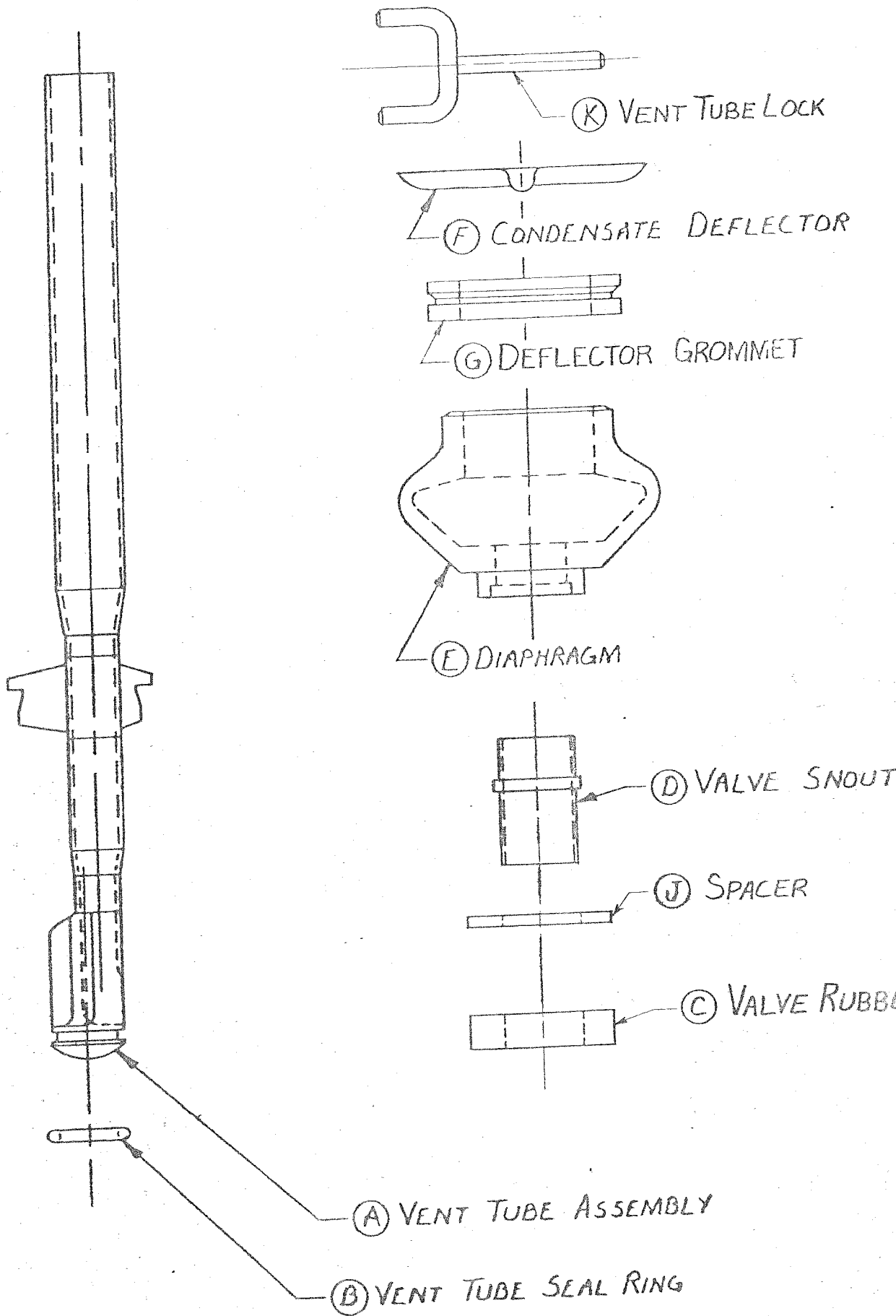
Move completely assembled valve up and down several times to note if valve moves freely and closes without drag. If drag is noticed, locate reason and correct before starting filling operation.

IV. The height of fill may be adjusted by placing a spacer or spacers between the diaphragm and the flat sealing rubber; several thicknesses of spacers are shipped with your valve assembly.

V. VENT TUBE LOCK:

A lock is provided to prevent the vent tube from turning and becoming unlocked during operation; the prongs of the lock should be placed over the long portion of the vent tube cross bar and into the entry slots in the valve flange.

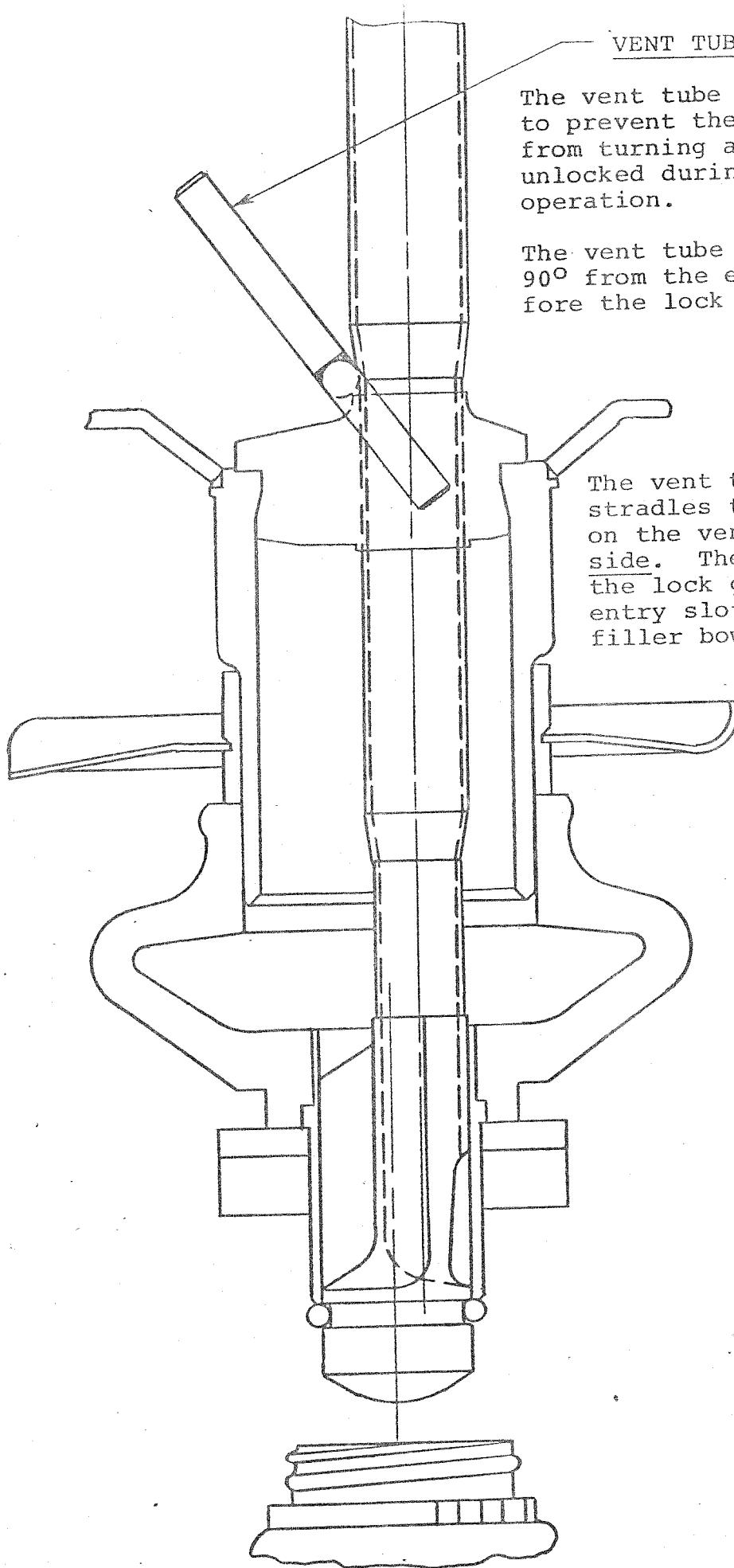
Filler Valve



VENT TUBE LOCK

The vent tube lock is used to prevent the vent tube from turning and becoming unlocked during the filling operation.

The vent tube must be turned 90° from the entry slots before the lock is inserted.



The vent tube lock straddles the bar lock on the vent tube long side. The prongs of the lock go into the entry slots of the filler bowl flange.

METHODS OF ADJUSTING FILL HEIGHTS  
AND WEIGHTS USING THE FILLER VALVE

The J2E valve assembly consisting of the following parts:

1. Vent tube, side entry type,  
locked in place in the filler  
bowl flange
2. Valve grommet
3. Condensate deflector
4. Diaphragm
5. Valve snout
6. Valve seal ring
7. Delrin spacer
8. Flat sealing rubber

The valve grommet and deflector are assembled and are pushed up on to the undercut portion of the valve flange. The valve snout is inserted in the diaphragm. This square shoulder of the snout should be seated in the recessed seat provided in the diaphragm. The valve snout and diaphragm assembled is pushed up on the valve flange as far as possible or against the grommet. The valve snout is then pushed up to allow placing the vent tube seal ring in the groove in the bottom of the vent tube.

Depending on the required height of fill a flat delrin spacer and flat sealing rubber are then pushed up on to the valve snout. If a lower fill level is desired a thinner spacer is used to provide a greater length of valve snout into the bottle giving a lower fill. If a higher fill level is required a thicker spacer or additional spacers should be added to the snout above the flat sealing rubber. Once the required spacers are determined the filler bowl height should be set so that there is some travel left in the diaphragm when the bottle is in the filling position.

Having settled on the fill height of the bottle, the weight of the bottle may be varied or regulated by changing the level of the liquid in the filler bowl. If the filler is run at an extremely slow speed it may be necessary to lower the level in the filler bowl to keep from being excessively overweight. The longer the bottle stays under the filling valve the heavier it becomes because of the force of the milk in the filler bulging the bottle during the time after the bottle has been filled and before it is discharged from under the filling valve. Increasing filling speeds can decrease fill weight. Decreasing the level in the filler bowl will decrease weights. Inversely decreasing filler speeds will increase weights and increasing the liquid level in the filler bowl will increase weights.

## WEIGHT CONTROL FOR PLASTIC BOTTLE FILLING

Many questions are asked regarding controlling the filled weight of ultra-lightweight plastic gallon and half-gallon bottles.

First of all the nature of the plastic bottle needs to be stated. The plastic bottle is a flexible container affected by temperature, age and pressures both inside and out. The extent of how much a container is affected may be determined by type of resin, weight, distribution of material, design, cooling rates, cycle times and many other factors.

Those people involved in supplying blow-molding bottles should be relied upon for the proper sizing of containers.

During the process of filling the plastic bottles, what are those factors that affect the finished weight?

A. ROTATING SPEED OF THE FILLER:

If the bottle fills half-way around the filler, the remainder of the time that the bottle is under the valve it increases in size, therefore increasing in weight. To decrease the weight of the filled bottle, the rotation can be increased or the bottle can be sized for the desired filling speed.

B. SPEED OF FILL:

The speed of fill is the number of seconds after the fill valve is opened before the bottle is filled and there are no fine air bubbles being discharged from the bottle. Slow filling may not allow enough time for the fine air bubbles to work their way to the top of the bottle before the fill valve is closed. This will result in variation in weights or possibly short fills in the storage room or market.

Slow filling may be caused by too much clearance between the bottle and the fill valve, insufficient valve opening or excessively foamy product.

C. HEAD PRESSURE:

The head pressure is the force of the product in the filler bowl acting through the fill valve on the filled bottle. Once the bottle is filled the head pressure acts to increase the size of the bottle. If the level varies greatly the size of the filled bottle and weight will vary. This is why it is important to maintain a precise level in the filler bowl.



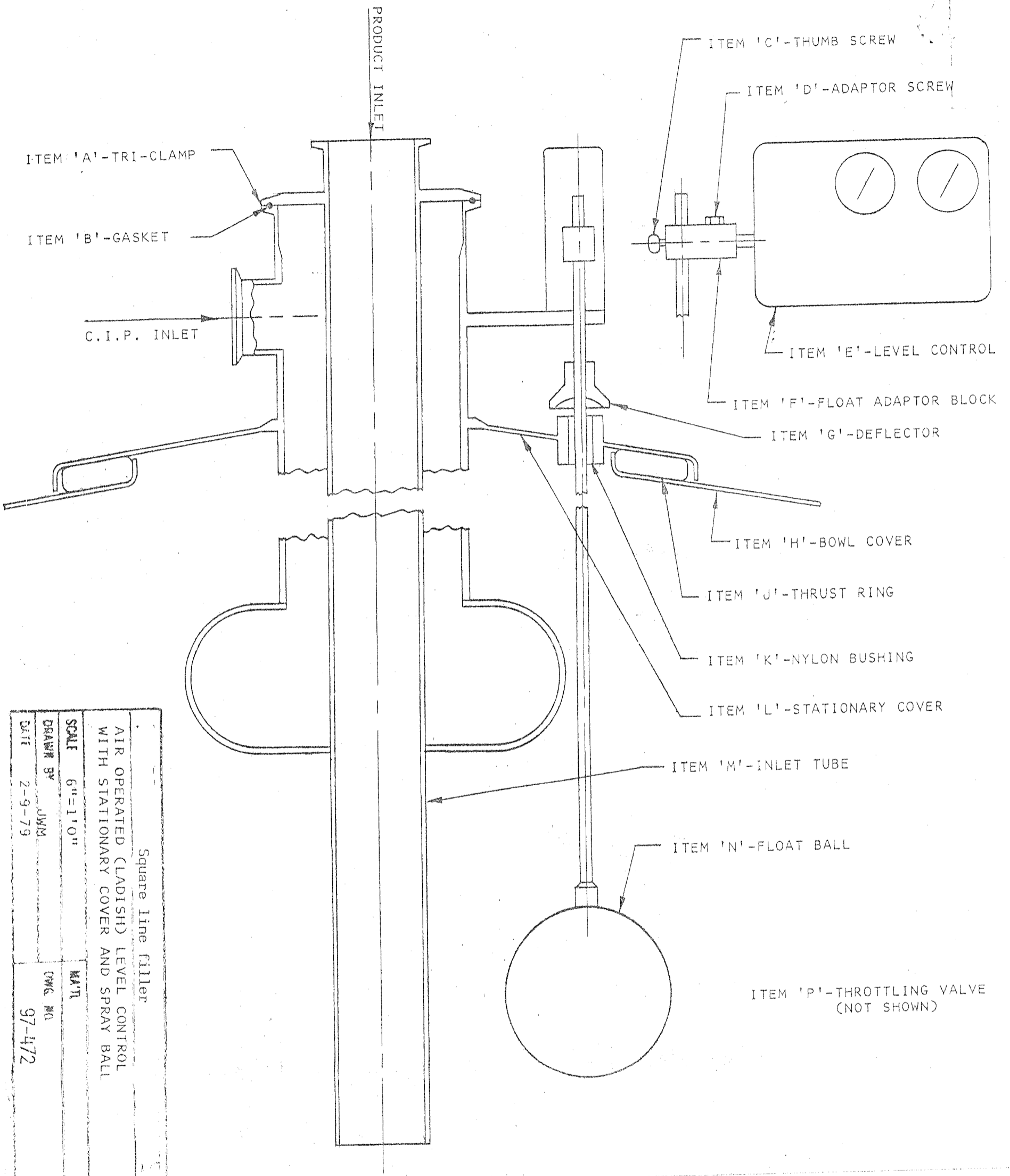
The BWC liquid level control system from Cw Ltd not only aid in maintaining a constant liquid level but allow the increase or decrease of the level to increase or decrease the size and weight of the filled container.

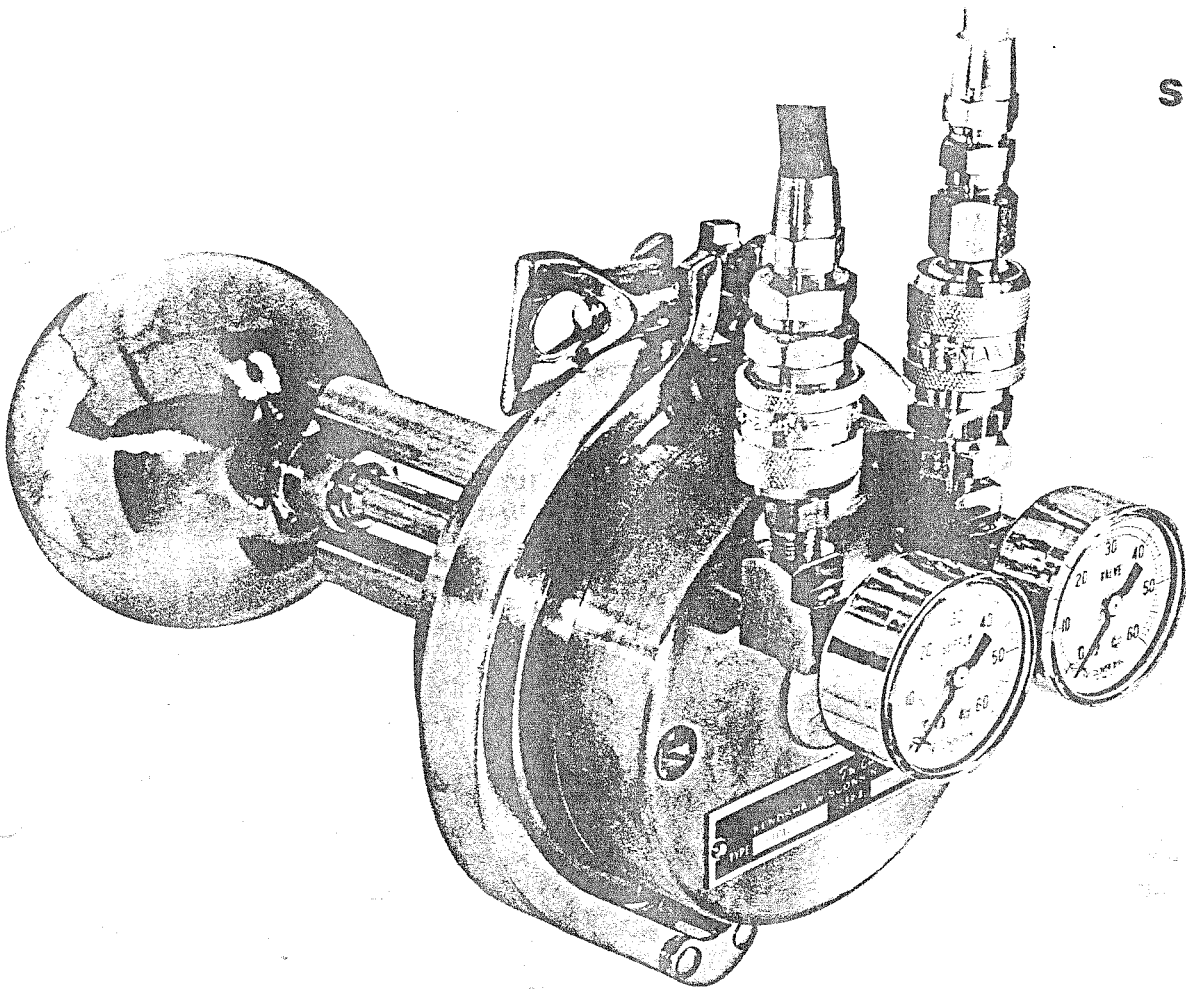
D. FILL LEVELS:

It is important to be able to maintain consistent fill levels. This is possible with the filling valve operating properly.

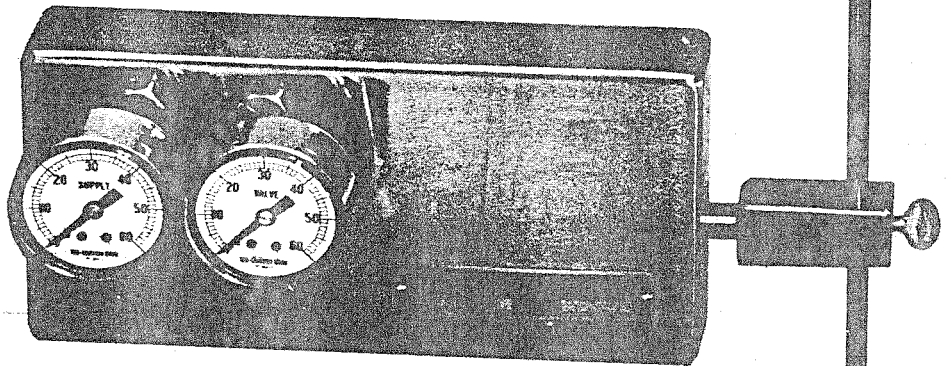
The level of the product in bottles may be controlled in the following ways.

1. Proper valve combination.
2. Raising or lowering filler bowl.
3. Proper selection of delrin spacers that are located above the flat sealing rubber.
4. Increasing or decreasing level of product in filler bowl.



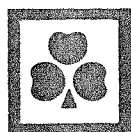


**LIQUID  
LEVEL  
CONTROL**



MODEL# 30-104-01

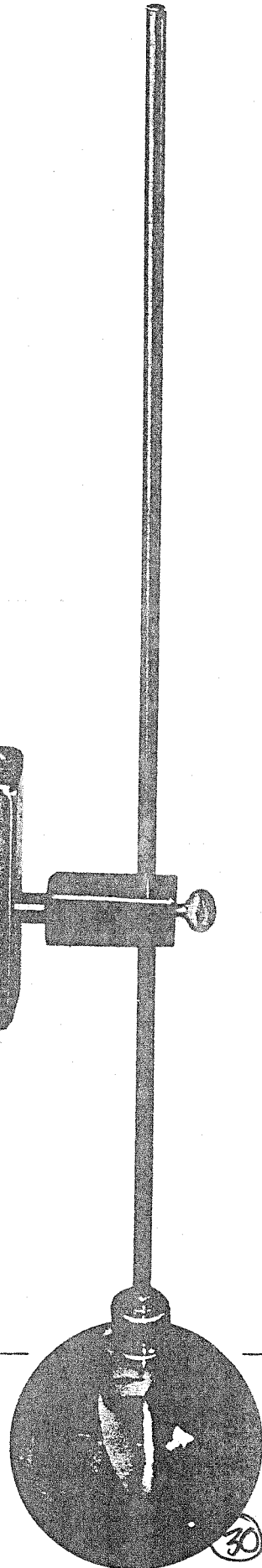
SERIAL# 200331



**Tri-Clover, Inc.**

Kenosha, Wisconsin 53141

Alfa-Laval Group



# INTRODUCTION

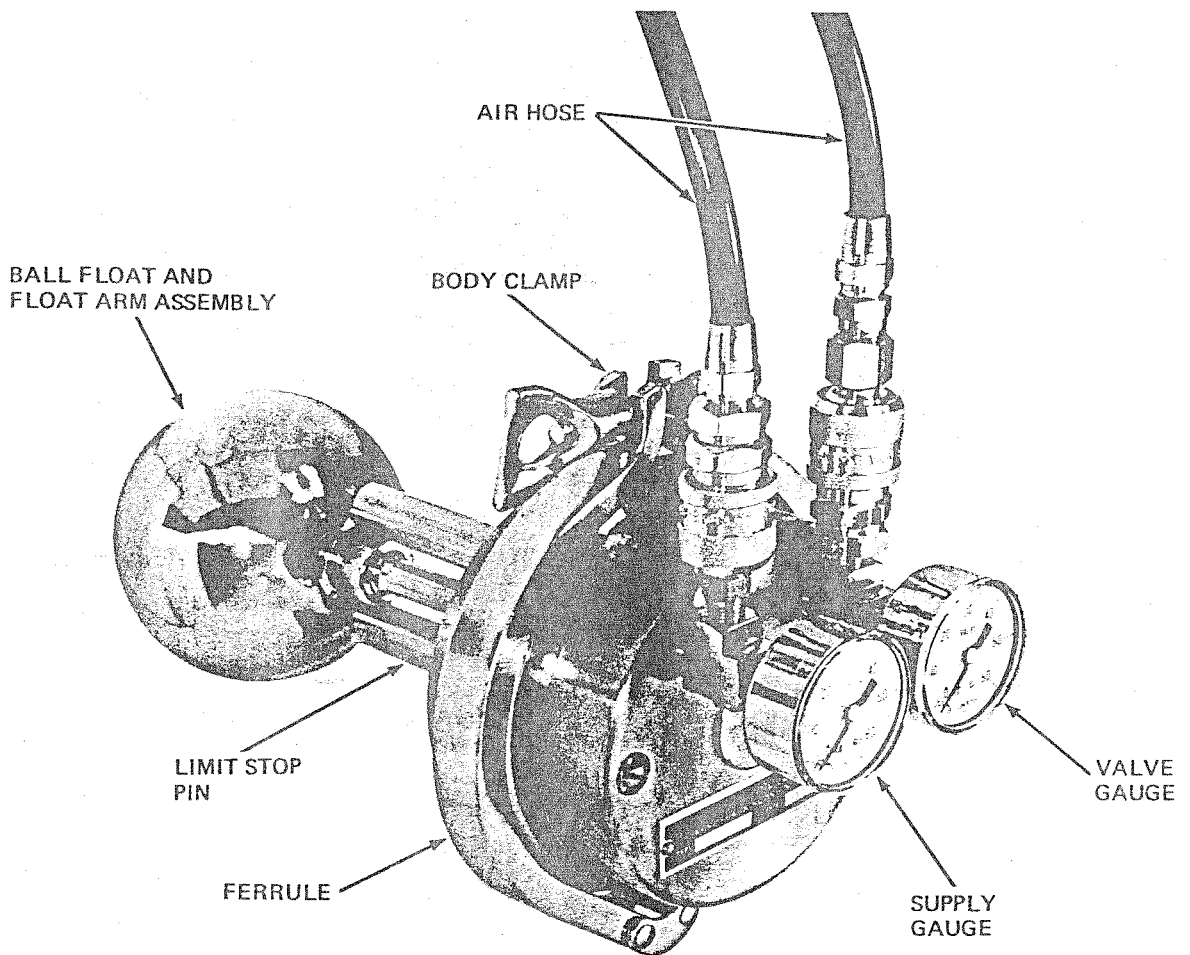


Figure 1. Model 30-101 and 30-102 Level Control

## General

This manual contains installation, operation, and repair instructions, trouble shooting, with parts list, for Models 30-101, 30-102, 30-103, and 30-104 Level Controls manufactured by Tri-Clover, Inc., Kenosha, Wisconsin.

All Tri-Clover Level Controls should be considered in the same category as precision instruments and are to be handled in the same manner. While it is a rugged instrument, any abuse, rough handling or improper installation may affect its operating efficiency. The air pilot valve assembly, which is the heart of the Level Control, is a precision made three-way pilot valve. This pilot valve controls the flow of air to and from the throttling valve. The actual movement of the plunger is .007 of an inch. Because of the short travel any small particle or foreign material could affect plunger travel and cause erratic operation.

## Description

The Tri-Clover Level Controls are designed to provide responsive and accurate control of liquid levels in open and closed tanks and kettles. Models 30-101 and 30-102 (Figure 1) are designed for closed

tank mounting. Models 30-103 and 30-104 (Figure 2) are easily adaptable to open tank mounting by means of a simple bracket.

## Principle of Operation

The float arm or "packless flexible shaft" with the ball float is the force (when actuated by a change in liquid level) that positions the plunger in the pilot valve - which in turn controls the air signal required to regulate the throttling valve. The packless flexible shaft has a flattened section of tube which is the fulcrum and also provides the tension required to keep the float riding on the liquid level. Any strain or force exerted on this shaft in any other way than a vertical motion will cause malfunction of the unit by destroying this built-in tension. The vertical motion of the shaft is protected by limit stop pins to keep the shaft well within its elastic limit during operation. These Level Controls operate on the change of force which results from the buoyancy of the float - not on the motion of a float riding on a liquid level. (The actual motion of the float is approximately 1/32".) The response of the Level Controls is such that a buoyancy change of less than six ounces will provide full actuation of the pilot valve.

# INSTALLATION

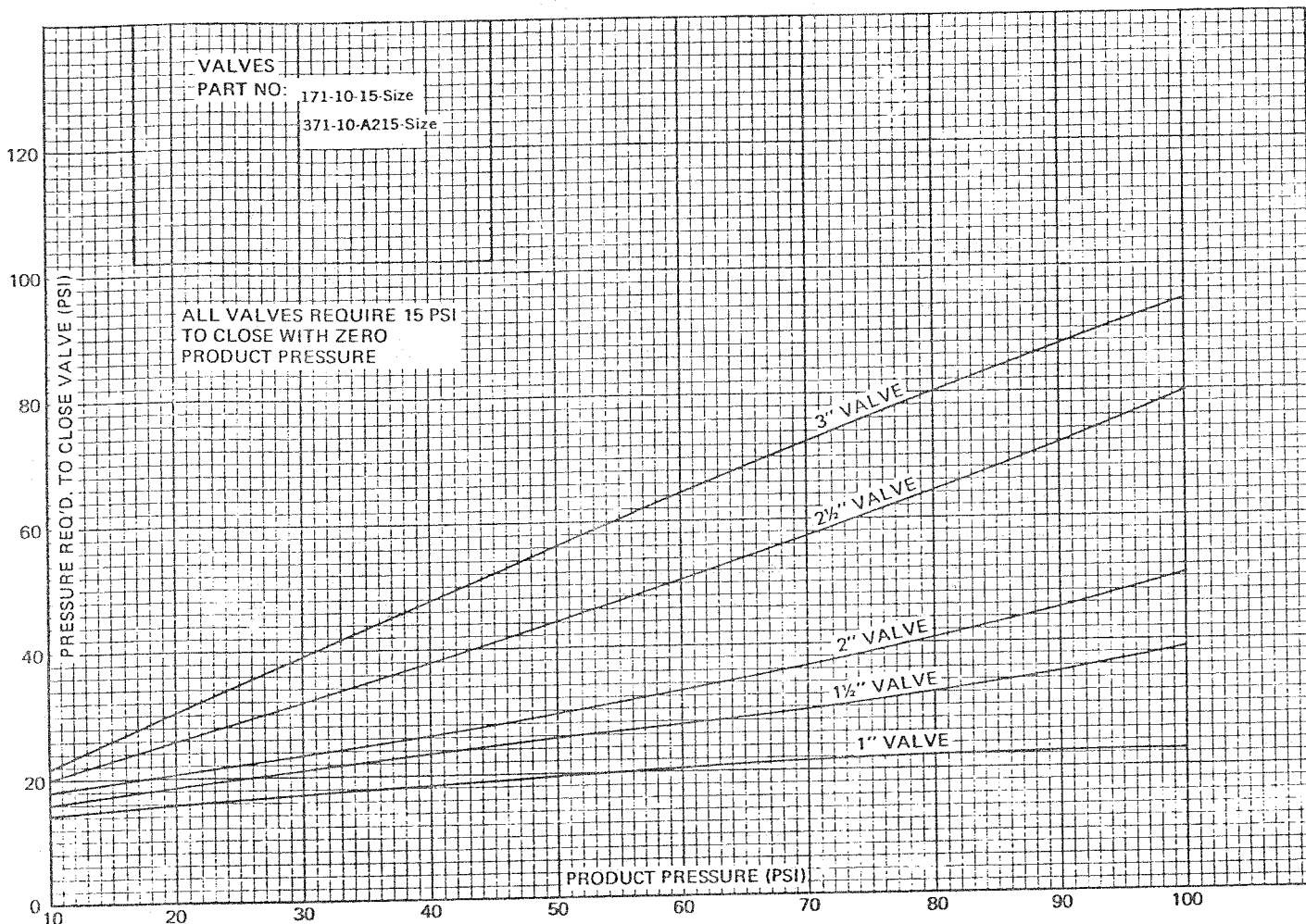


Figure 3. Valve Supply Pressure vs. Product Pressure

## General

These Level Controls must be mounted with the flexible shaft in a horizontal position. The flattened section of the flexible shaft must be parallel to the liquid level. In installations where there is the possibility of constant or severe agitation and surging, the Level Control ball float should be suitably baffled or mounted in a float chamber.

The air supply must be dry, filtered, and regulated. For best results the 33-13A Filter and Regulator should be used. Depending on valve style, several different actuators can be used - Type 15 & A215 diaphragm (normally open type) or A20 & A220 Piston (normally closed type). Refer to Figure 3 for operating pressures for valves with diaphragm actuators.

The Type 15 & A215 Diaphragm Actuator can usually be actuated with a standard air supply of 20 PSI. This reading should appear on the "Supply" gauge of the Level Control. If the unit is used in an installation having high product pressure, the air pressure supply to the Level Control can be increased to 30-32 PSI (maximum). The Level Control will require readjustment in this case. When valves (using 20 PSI air pressure) are located twenty feet

or more from the Level Control, there is usually a time lag between level change and valve action. This time lag can be shortened by using a 1.1 booster relay (Figure 4) to speed the valve action.

The Type A20 & A220 Piston Actuator requires an air pressure supply in excess of 30 PSI to function properly. To achieve this high pressure, while using a standard 20 PSI air supply from the Level Control, a booster relay of the proper ratio (2.1) must be used (see Figure 4).

## Mounting

The Models 30-101 and 30-102 Controls can be mounted to side of tank by use of a 4" Tri-clamp connection. The ferrule should be welded in the tank at the proper position to maintain the desired level. The level to be maintained will be approximately 1/2 of the way up on the float ball.

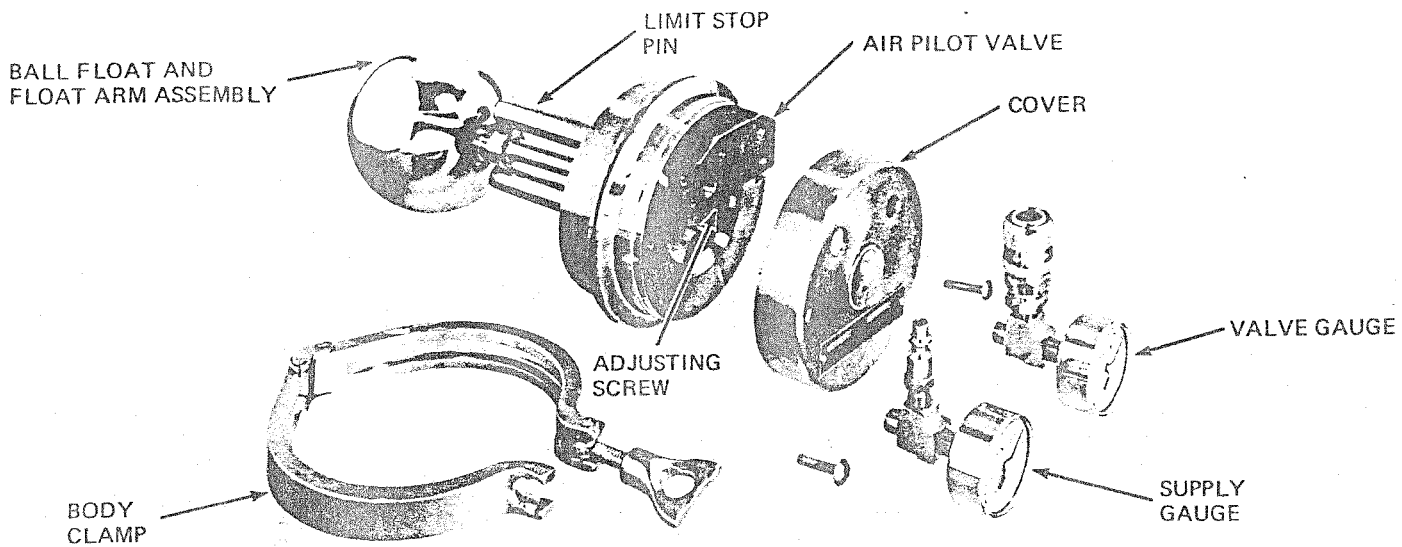


Figure 5. Model 30-101 and 30-102 Level Control - Disassembled

Adjusting Level Controls 30-102 and 30-104.  
(Level rise increases valve air)

1. Level Control should be mounted in a horizontal position. Check horizontal alignment and relation of flattened section to liquid level. Vessel, hopper or filler bowl should be empty. Model 30-104 should have the float connected to the flexible shaft.
2. Make air connections to Level Control and Valve. (Check for leaks at all connections between Level Control and Valve.)
3. Air Supply Gauge should read 20 PSI (or other than standard 20 PSI as required).
4. Remove hole plug.

5. If "Valve" gauge shows a reading, turn adjusting screw (Figure 5 or 6) counter-clockwise until reading is zero or until air stops escaping from the unit. If "Valve" gauge reads zero, turn adjusting screw clockwise until there is a reading - then turn the adjusting screw counter-clockwise until reading is zero or until air stops escaping from the unit.

#### IMPORTANT

Do not turn adjusting screw too far - it takes less than 1/3 of a turn to cause full actuation of pilot valve. If adjusting screw is turned too far-back-off until air starts to bleed again.

6. Replace hole plug. Level Control is ready to operate.

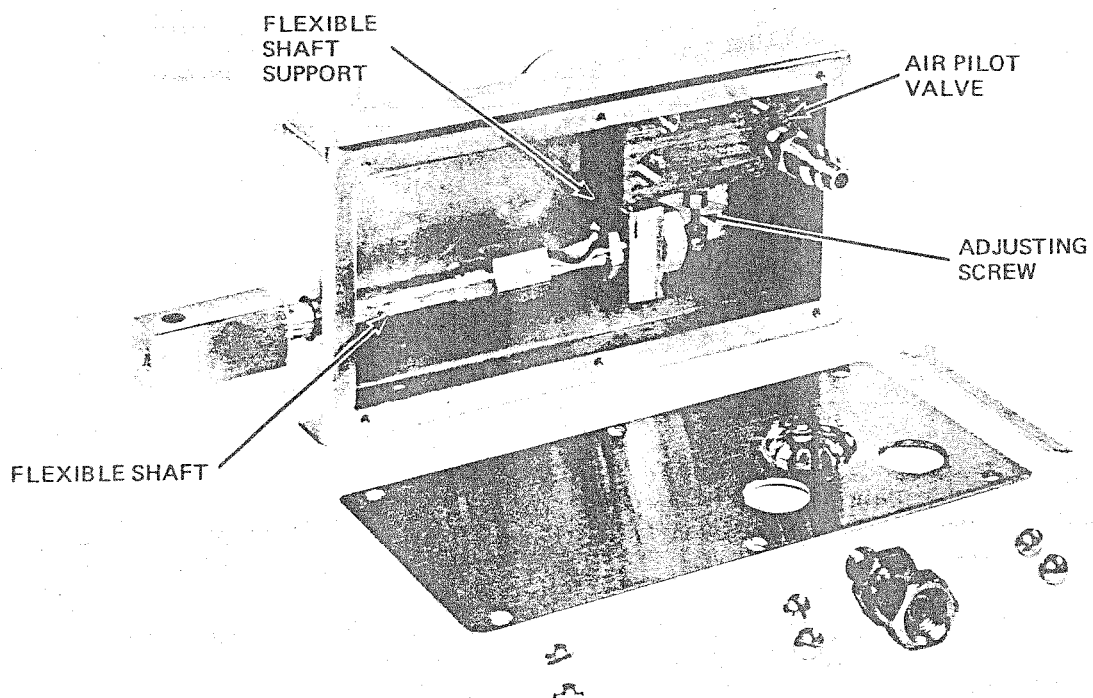


Figure 6. Model 30-103 and 30-104 Level Control - Disassembled

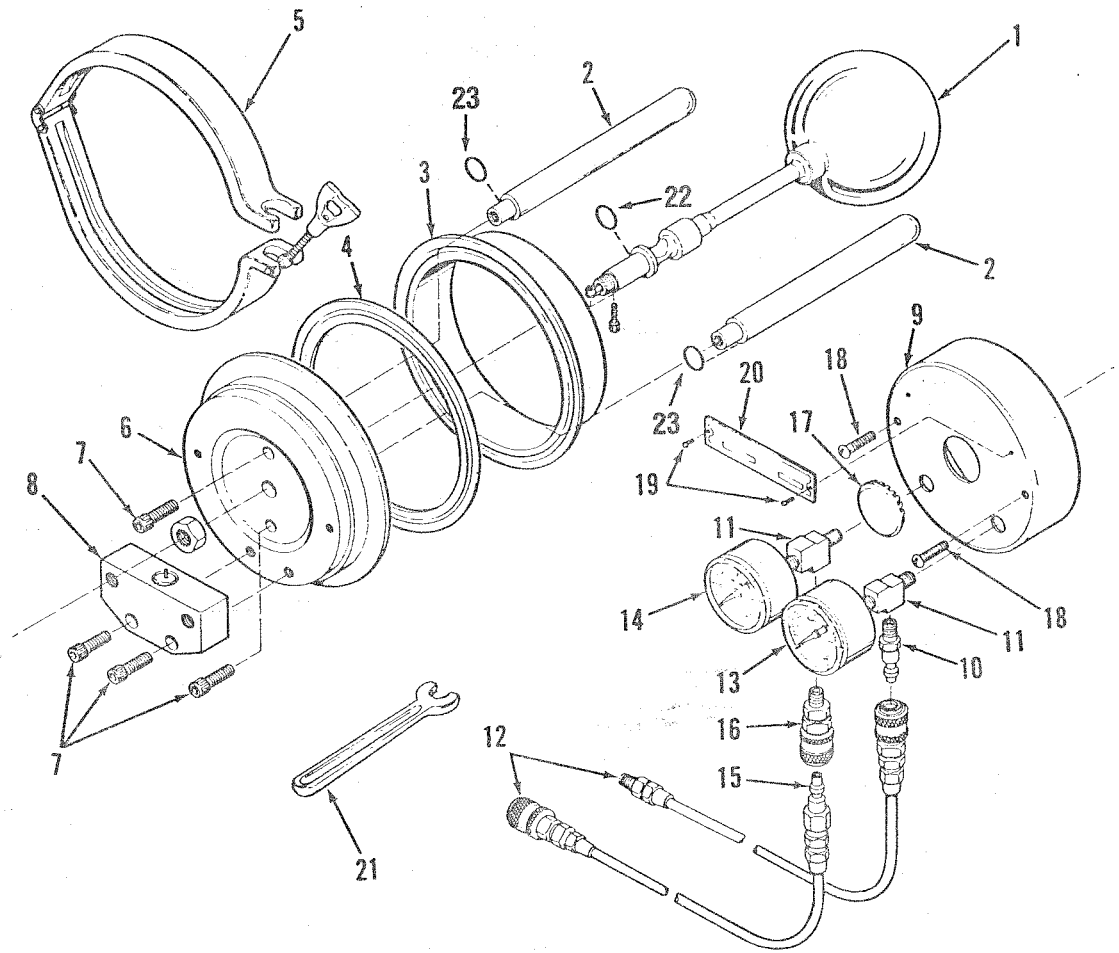


Figure 8. Models 30-101 and 30-102 Level Controls - Exploded View

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
1	55-4-316	Ball Float and Float Arm Assembly.....	1
2	9-12	Limit Stop Pin.....	2
3	L14AM-4-S	Ferrule.....	1
4	40MP-U-4	Gasket.....	1
5	13MHHM-4-S	Clamp.....	1
6	32-481	Cap - Special 4 inch.....	1
7	14-16	Screw, Socket Head Cap.....	4
8	54-2	Air Pilot Assembly.....	1
9	23-3-SS	Cover.....	1
10	25-361-210-06-S	Plug - Coupler.....	2
11	42-15-58CP	Tee - Street.....	2
12	41-10-4'	Hose Assembly - Air.....	1
13	54-53-V	Gauge - Valve, 0-60 PSI.....	1
14	54-53-S	Gauge - Supply, 0-60 PSI.....	1
15	37-19	Plug - Coupler.....	1
16	37-91	Body - Coupler.....	1
17	13-28	Plug - Hole.....	1
18	14-46	Screw - Truss Head.....	2
19	14-1	Screw - Drive.....	2
20	38-8	Name Plate.....	1
21	07-1152	Wrench.....	1
22	17-322	Gasket.....	1
23	17-323	Gasket.....	2







# TRI-CLOVER ACTUATOR TYPE 215 for Series 371 Valves

## DISASSEMBLY AND REASSEMBLY - TYPE 215 ACTUATOR

### INTRODUCTION

The 215 actuator is an air to close-spring to open unit, which utilizes a diaphragm for reduced friction.

Actuator disassembly can be accomplished by inserting the two flats on the actuator bonnet ferrule in a vise. This will prevent the actuator bonnet from turning when removing the actuator cylinder. See Figure 1.

### ACTUATOR DISASSEMBLY

#### WARNING

#### WARNING SPRING UNDER LOAD

Actuator cylinder may eject with sufficient force to cause serious injury. Remove actuator from valve before disassembling actuator.

The actuator spring is not contained. Although the preload force is low, caution should be used when the spring force is released. Hand pressure should be applied to the top of the cylinder to restrict its travel.

1. Apply air to the actuator, to extend the stem. Unscrew the coupler. Release air.
2. Remove actuator cylinder from bonnet by applying a strap wrench to the cylinder and turning in a counterclockwise direction until cylinder and bonnet can be separated. See Figure 1.

When the cylinder is completely unscrewed the spring force will push it up. Apply hand pressure as noted in the "Warning" note above. See Figure 2.

3. Remove the cylinder from the bonnet.
4. Remove the spring from the bonnet.
5. Remove air coupler adapter, gasket, and sealing nut.
6. Slide cylinder off actuator internals.
7. Slide body insert and diaphragm from outer diaphragm clamp/retainer.
8. Remove stem, adapter, and retainer assembly nut. Retainer nut may be readily removed by inserting a punch in a hole in the retainer nut face, and tapping the nut in a counterclockwise direction. See Figure 3.
9. Separate top and inner diaphragm clamp/retainers, freeing diaphragm.

### INSPECTION

Examine diaphragm and gasket for cuts, abrasions, and excessive wear.

Inspect the actuator stem for galling, nicks, and scratches. Check the bushing bore in the bonnet for wear.

#### NOTE

If inspection reveals a worn bushing in the bonnet, press out the bushing. These components may be damaged when removed. Remove only if necessary.

Replace all worn or damaged parts.

Check the inside walls of the actuator cylinder and the diaphragm clamps to be sure they are free from score or scratch marks.

Check the coupler, to see that the balls are in place and move freely when the coupler sleeve is raised.

Inspect all air lines and fittings for leaks and tighten when and where necessary.

### ACTUATOR REASSEMBLY

1. Spray diaphragm with a silicone spray lubricant and install between top and inner diaphragm clamp/retainers.
2. Install retainer nut assembly, adapter and stem.
3. Roll diaphragm onto outer diaphragm clamp/retainer. Slide body insert onto outer diaphragm clamp/retainer.
4. Carefully slide cylinder over diaphragm so that diaphragm is not abraded or torn.
5. Spray gasket with silicone spray lubricant. Install sealing nut, gasket, and air coupler adapter.

#### NOTE

Now insert the two flats of the actuator bonnet back into a vise.

6. Place spring in bonnet.

#### IMPORTANT

Lubricate the cylinder threads with Tri-Clover C13<sup>7</sup> lubricant. This will prevent the stainless steel thread from galling.

Place cylinder on spring.

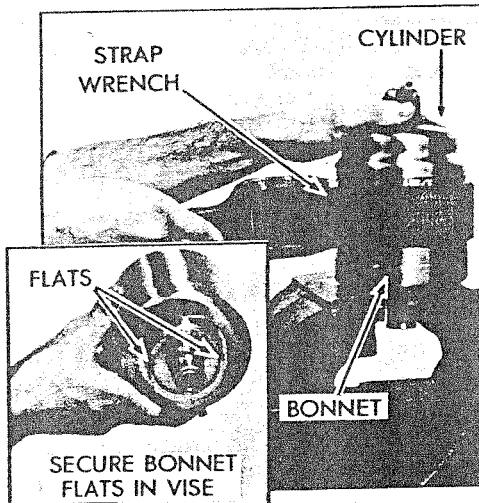


Figure 1. Removing Actuator Cylinder

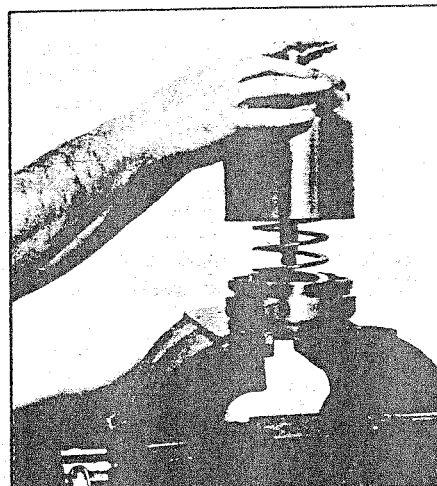


Figure 2. Apply Hand Pressure to Restrict Cylinder

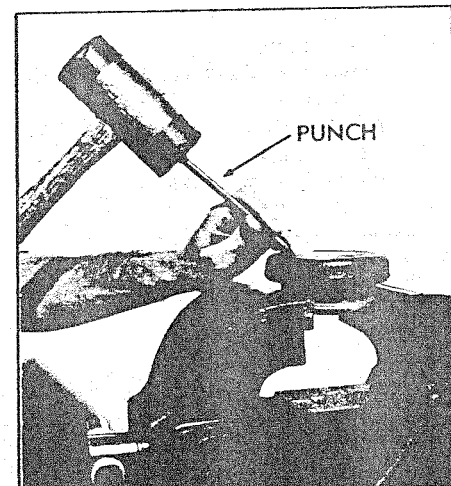
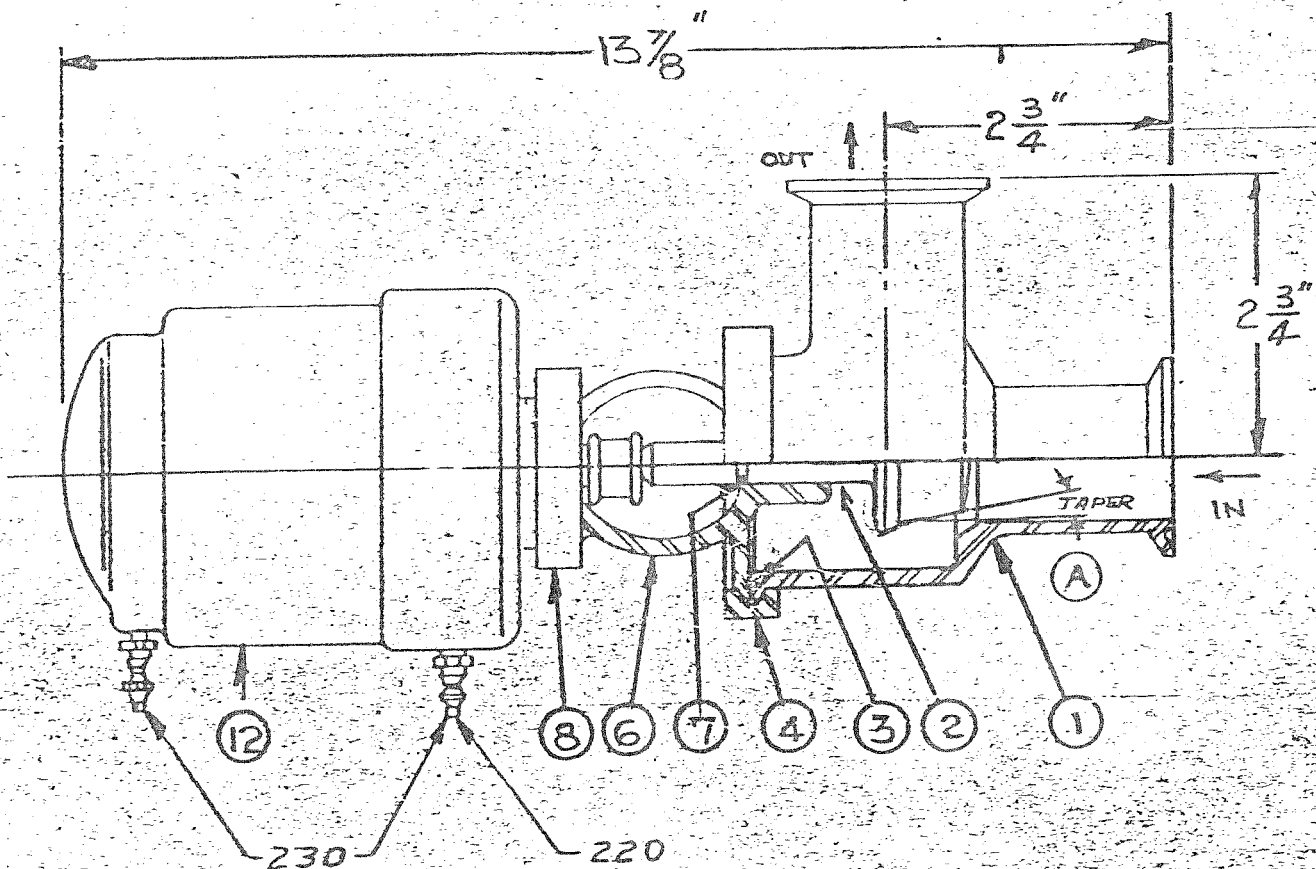


Figure 3. Tap Retainer Nut to Remove

PARTS LIST

371-10-<sup>215</sup><sub>220</sub>-1 1/2 x TAPER

SIZE X TAPER	12 ACTUATOR									
	1	2	3	4	6	7	8	215	220	230
1 1/2 x 10°	7 B1847-1 1/2	19-997-1 1/2 x 10°	17 A62-2	13 MHHM-3	12 B146-1 1/2	17 A1	13 MHHM-2	25A263 B	25-361-220	25-361-230
1/2 x 20°		19-997-1 1/2 x 20°						25A263 B	25-361-220	25-361-230
1/2 x 6°		19-997-1 1/2 x 6°						25A263 B	25-361-220	25-361-230
1 1/2 x 9°		19-997-1 1/2 x 9°						25A263 B	25-361-220	25-361-230



215 - USES DIAPHRAGM ACTUATOR

MICROFILMED

LADISH CO. — TRI-CLOVER DIV'  
 KENOSHA, WISCONSIN  
 1/2 THROTTLING VALVE  
 371-10 SERIES  
 WITH SPECIAL TAPER

DR. BY	V.P.	3-16-72	DRAWING NUMBER	215
CKD BY	RJN	3-30-72	371-10- <sup>215</sup> <sub>220</sub> -1 1/2 x TAPER	230
TR. BY				
SCALE	N.T.S.			
REVISION	A	PICTORIAL CHANGE	BY	HAE
			DATE	6-2-73

21

# TRI-FLO AIR ACTUATED THROTTLING VALVES SERIES 371

## INTRODUCTION

This manual contains disassembly and reassembly instructions, with parts lists, for the Series 371 Tri-Flo Clean-In-Place Air Actuated Throttling Valves (Sanitary), designed and manufactured by Tri-Clover, Inc., Kenosha, Wisconsin.

**WARNING SPRING UNDER LOAD**  
Actuator cylinder may eject with sufficient force to cause serious injury. Remove actuator from valve before disassembling actuator.

## DISASSEMBLY AND REASSEMBLY

**CAUTION**

Keep hands away from valve coupling and upper body when applying or releasing air. The actuator stem assembly may move with extreme force and suddenness when air pressure is applied or released.

Spray stem and "O" ring with No. L-1011 Sanitary Lubricant.

Make sure all valve bodies are mated properly before securing with clamps. Tighten all clamps securely to assure proper alignment.

When disassembling and assembling valve, bench area should be clean to prevent marring and nicking of seats.

Valve Disassembly (Models 371-10, 21, 27, 30, and with type 215 actuators). See Figure 1, Valve Disassembly.

1. Remove body clamp, lower body and gasket.
2. Apply air to actuator. See Figure 2.
3. Lift sleeve on coupling unit and remove valve stem and remove "O" ring from valve stem. See Figure 3.
4. Release air supply.
5. Remove actuator clamp and upper body. See Figure 4 for 371-10 and 371-30 valves.

### Valve Reassembly

1. Clamp actuator to upper body with actuator clamp.
2. Install "O" ring on valve stem.
3. Apply air supply to actuator, lift sleeve on coupling unit and insert stem into coupling unit. Release coupling sleeve and air supply.
4. Replace gasket, lower body and body clamp.

Valve Disassembly (Models 371-10, 21, 30, and with type A220 actuator). See Figure 1, Valve Disassembly.

1. Apply air to actuator.
2. Remove body clamp, lower body and gasket.
3. Release air supply, lift sleeve on coupling unit and remove valve stem. Remove "O" ring from valve stem.
4. Remove actuator clamp and upper body. See Figure 4 for 361-10 and 361-30 valves.

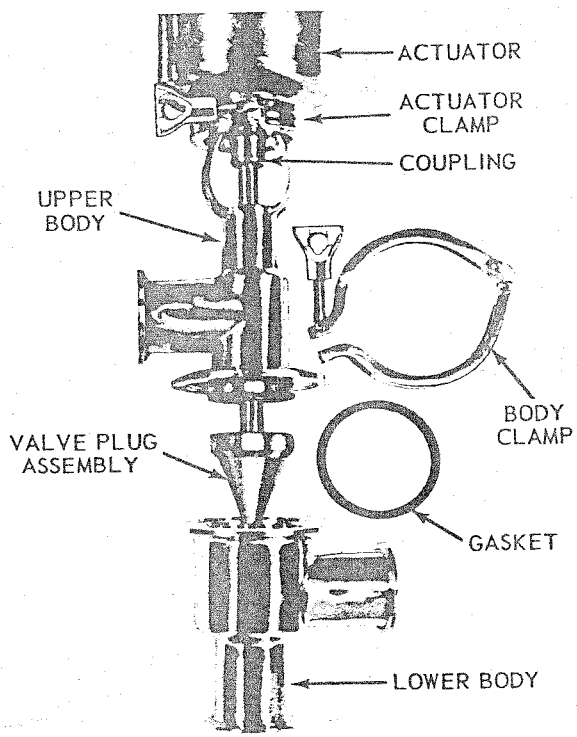


Figure 1. Valve Disassembly

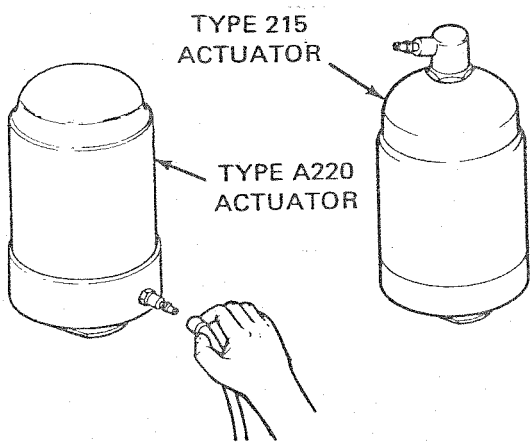


Figure 2. Applying Air to Actuator

MODEL # 371-10M-15-1 1/2 - 316

SERIAL # 202020

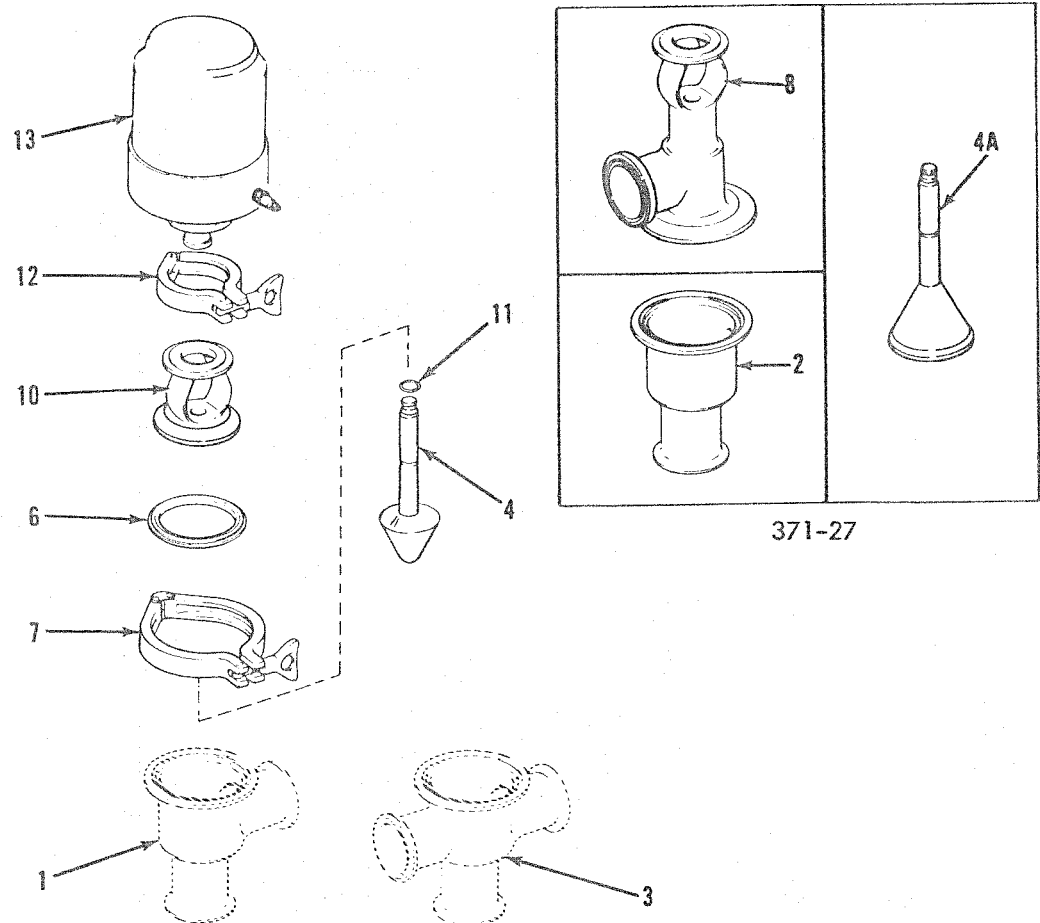


Figure 5. Type 371-10, 371-30 & 371-27 Throttling Valve, Exploded View

PARTS LIST FOR TYPES 10, 27, AND 30 THROTTLING VALVE

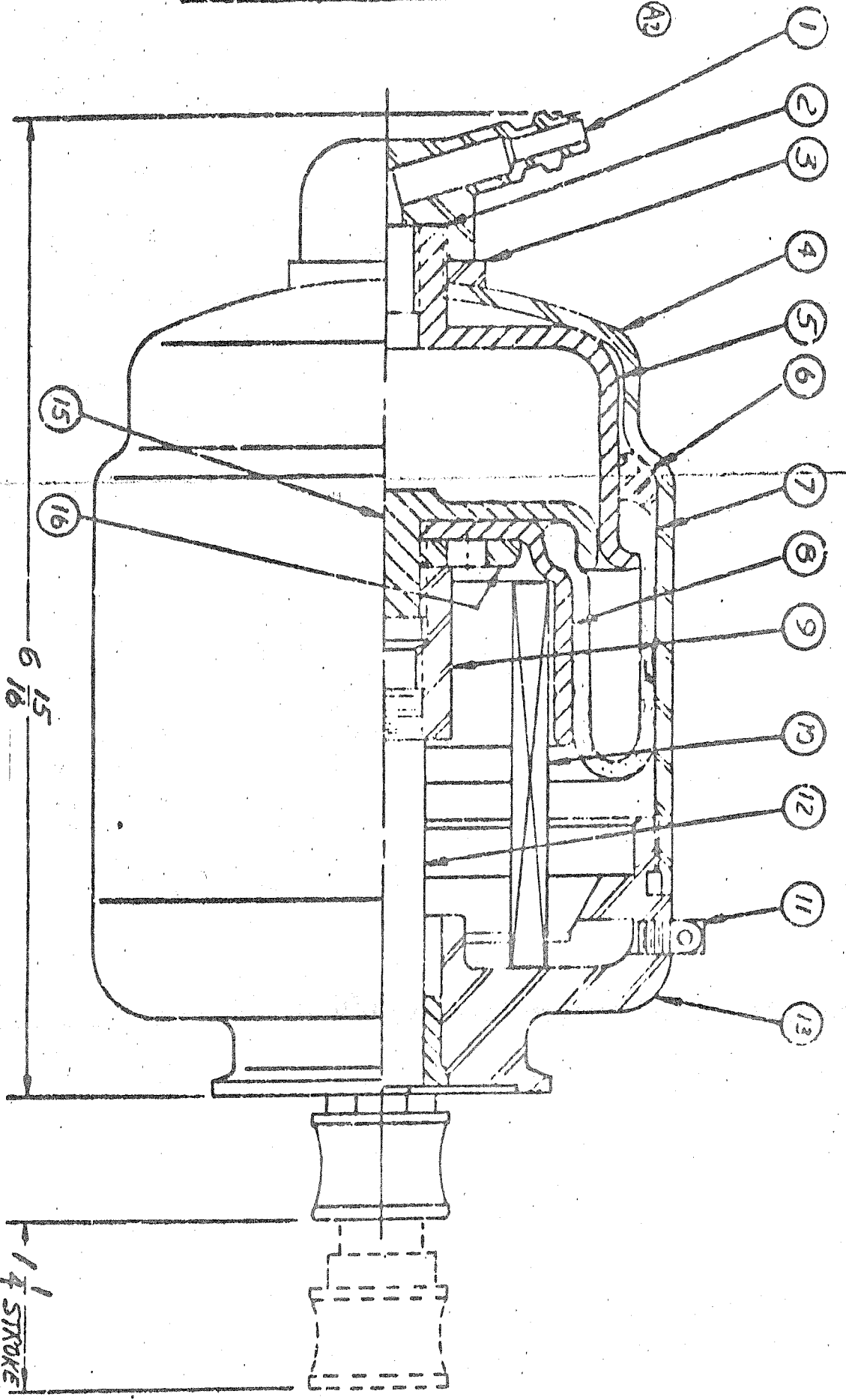
Index No.	Description	Valve Port Size				
		1"	1-1/2"	2"	2-1/2"	3"
*1	Valve, lower body - Model 10	7-225T-1-316	7-184T-1½-316	7-184T-2-316	7-184T-2½-316	7-184T-3-316
*2	Valve, lower body - Model 27		7-200A-1½-316	7-200A-2-316	7-200A-2½-316	7-200A-3-316
*3	Valve, lower body - Model 30	7-225C-1-316	7-184C-1½-316	7-184C-2-316	7-184C-2½-316	7-184C-3-316
●4	Valve, plug assembly - Models 10 & 30	19-1215-1-316	19-1215-1½-316	19-1215-2-316	19-1215-2½-316	19-1215-3-316
●4A	Valve, plug assembly - Model 27		19-1059-1½-316	19-1059-2-316	19-1059-2½-316	19-1059-3-316
●6	Body, gasket	17-62-1½-316	17-62-2-316	17-62-2½-316	17-62-3½-316	17-62-4-316
7	Body, clamp	H13MHHM-1½-S	13MHHM-3-S	13MHHVM-3-S	13MHHVM-4-S	13MHHM-5-S
*8	Valve, upper body - Model 27		7-192T-1½-316	7-192T-2-316	7-192T-2½-316	7-192T-3-316
10	Valve, bonnet - 10 & 30	12-146-1-316	12-146-1½-316	12-146-2-316	12-146-2½-316	12-146-3-316
●11	"O" ring - valve plug stem	17-1-U**	17-1-U**	17-1-U**	17-5-U**	17-5-U**
12	Actuator clamp	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S
13	Actuator - Type 215 Normally Open, Air to Close	25-263B-S	25-263B-S	25-263B-S	25-263B-S	25-263B-S
13	Actuator - Type A220 Normally Closed, Air to Open	25-361-220-S	25-361-220-S	26-361-220-S	25-361-220-S	25-361-220-S

\* Note: Specify the type of port connections required.

● It is recommended that one each of these items be stocked as spare parts.

\*\* U = Buna Matl.

ITEM	PART NO.	QTY	DESCRIPTION
1	37A5	1	COUPLER
2	17A88	1	GASKET
3	13A78	1	SEALING NUT
4	25-263B-01-S	1	CYLINDER
5	36A55	1	OUTER DIAPHRAGM CLAMP
6	37A88	1	BODY INSERT
7	35A1	1	DIAPHRAGM
8	36A3	1	INNER DIAPHRAGM CLAMP
9	37A89	1	ADAPTER
10	4A2	1	COMPRESSION SPRING
11	MS-105-58A-CP	1	VENTED PLUG
12	19A600	1	STEM ASSEMBLY
13	12-283A	1	ACTUATOR BONNET
14			
15	36A15	1	INNER DIAPHRAGM CLAMP
16	13A15	1	SPEC'L NUT



ACTUATOR FOR 371 SERIES DIAPHRAGM CYLINDER

MAR 3 1983

THIS DRAWING IS LOANED WITHOUT CHARGE TO THE BORROWER AND IS TO BE RETURNED TO THE LADISH CO. TRICLOVER DIVISION. THE BORROWER AND USER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF THIS DRAWING. IT IS NOT TO BE USED IN WHOLE OR IN PART TO ASSIST IN MAKING OR TO PURCHASE ANY IMPROVATION FOR THE MAKING OF ENGINES OR PRINTING APPARATUS OR OTHER THINGS. THE ACCEPTANCE OF THIS DRAWING WILL BE CONSIDERED AS AN ACCEPTANCE OF THE FOLLOWING CONDITIONS AND AS AN ASSUMPTION OF THE ENTIRE RESPONSIBILITY OF THE LADISH CO. TRICLOVER DIVISION AND TO THE USER.

BY	FILE 11-167	DRAWING NUMBER	25-263B-5
CHK BY	RMC 115-17		
TR BY	FULL		
DATE			
REVISION	A2 WAS 12-44-80	DATE	KID 6-5-80
REMOVED NOTE		DATE	KID 6-5-80
LADISH CO. - TRICLOVER DIV'N			
KENOSHA, WISCONSIN			
DIAPHRAGM ACTUATOR			
FOR 371 SERIES			
STAINLESS STEEL CYLINDER			

SCREW CAPPER OPERATION: Your Federal filler is equipped with a filler mounted gear driven screw capping system designed to apply 38mm screw caps on plastic bottles.

CAP PICK-UP AND APPLICATION: When the filled bottle leaves the filling valve it passes under the cap chute and applier assembly to pick up a cap. The height of the cap applier assembly is adjustable. There should be 1/16 inch clearance between the top of the bottle and the cap guides at the leading edge of the applier assembly. See parts page L-10675-A. The spring-loaded pretightener finger should turn the cap slightly as it is transferred to the capper turret.

CAP TIGHTENING: The tightening of the cap is accomplished by the C111 capping heads. Parts page 48-562 shows the assembled capper. The gripper head used will depend on the type of screw cap being used. Metal and smooth plastic caps require a rubber gripping insert. A molded plastic cap requires a segmented metal gripper head with serrations to match the notches in the bottle cap.

The cap tightness is determined by a spring-loaded clutch assembly. The amount of torque developed is determined by the weight of the torque spring. The tolerance between the cap and bottle usually determines the amount of torque required to properly tighten the cap. Four different weight torque springs are available.

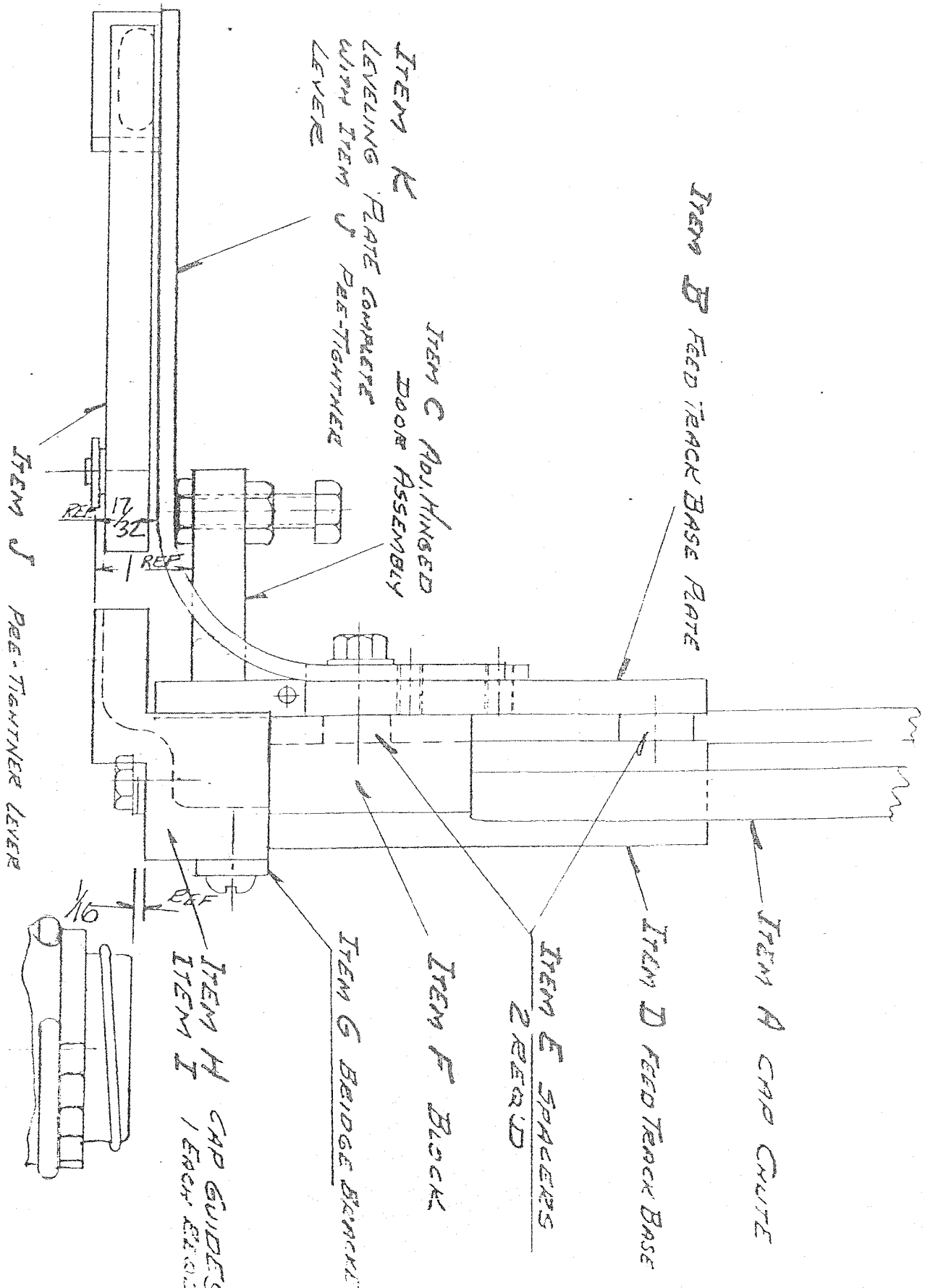
HEIGHT SETTING OF THE CAPPER: The capper head should be lowered so that the clutch assembly is compressed by 1/8 inch to

3/16 inch. With the proper torque spring this should provide enough torque to tighten the cap without stripping or damaging the cap. The gripping head and clutch assembly must be kept clean to do an effective job.

CAP FEEDING: The filler mounted rotary cap feeder, manufactured by Federal, has been tested with your particular cap samples. If the manufacturer of caps is changed alterations to the feeder may be necessary.

The feeder should rotate so that the caps are lifted from the bottom of the cap sorting chamber to the discharge chute. The hopper should be loaded with approximately 500 caps. Overloading may result in slower dispensing speeds and/or damaged caps.





ITEM B FEED TRACK BASE PLATE

ITEM A CAP GUIDE

ITEM D FEED TRACK BASE

ITEM E SPACERS  
2 REQ'D

ITEM F BLOCK

ITEM G BRIDGE BRACKET

ITEM H CAP GUIDES  
ITEM I / EACH SIDE

ITEM C ADJUSTED  
DOOR ASSEMBLY

ITEM K PLATE COMPLETE  
WITH ITEM J PRE-TIGHTENER  
LEVER

ITEM J PRE-TIGHTENER LEVER

Square Line  
Fillet

CAP APPLICATOR ADJUSTMENT FOR 38 MM

PLYSU SCREW CAP

SCALE

1/2"

MATL

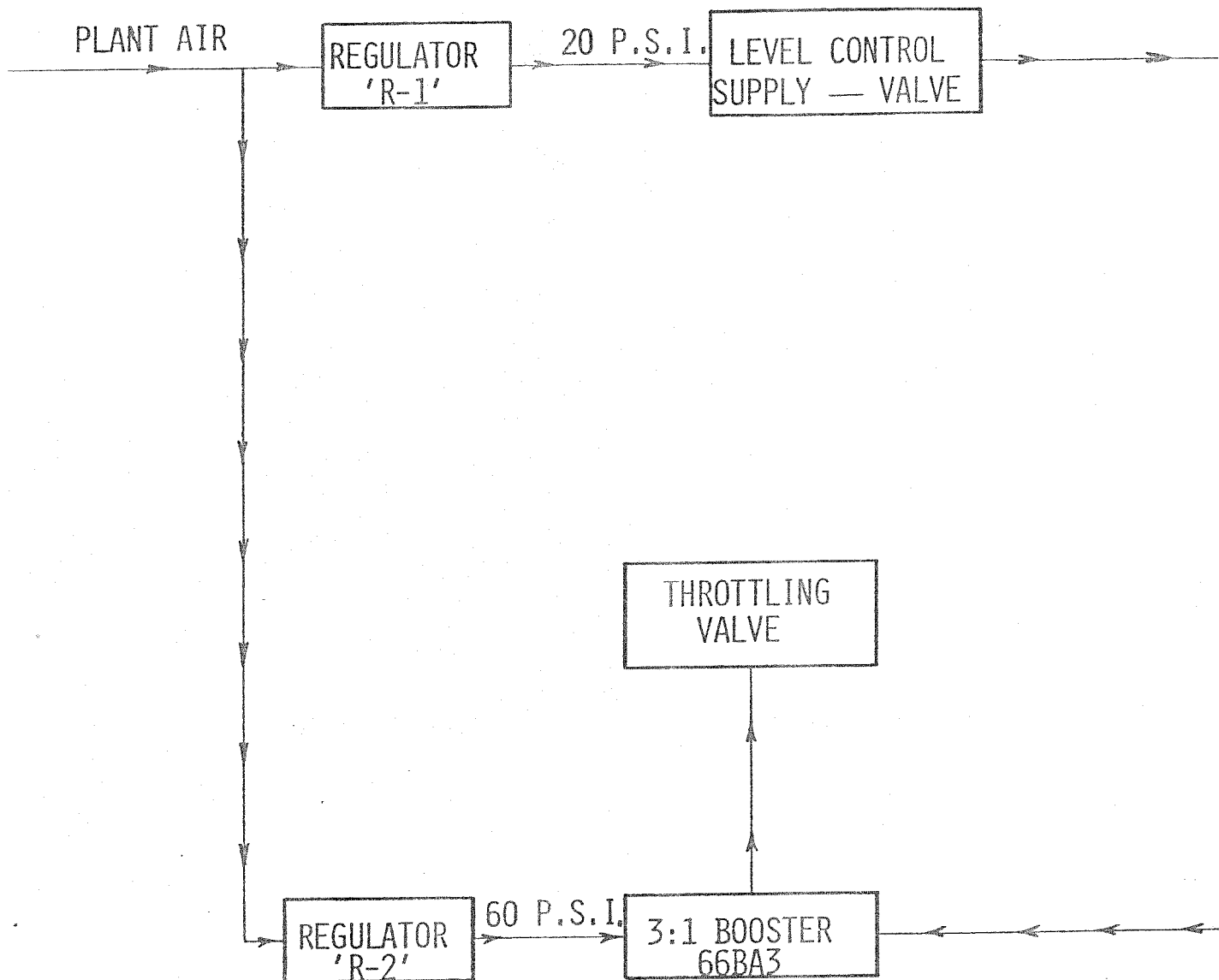
DRAWN BY H. J. SIEBE

DATE

REV

f

(50)

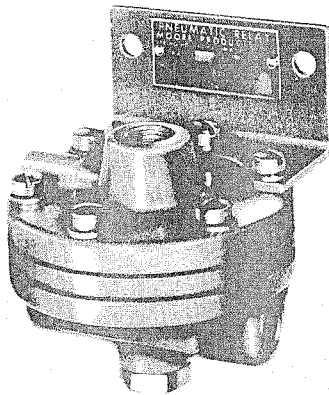


BLOCK DIAGRAM FOR B.W.C. WITH  
3:1 BOOSTER



**SERVICE INSTRUCTIONS**  
**MODEL SERIES 66**  
**AMPLIFYING AND REDUCING RELAYS**

SD66  
 Issue: 9  
 Date: 3/84



**INSTALLATION**  
**MOUNTING**

Mount the Relay in any position, in a reasonably vibration-free location. Make sure that the exhaust vent shown in Figure 1 is not blocked. The direction of instrument air flow is indicated by an arrow on the bottom forging of the Relay.

**Caution**

Exceeding the specified ambient temperature limits can adversely affect performance and may cause damage.

**PNEUMATIC CONNECTIONS**

Refer to Figure 1 for the pneumatic connections; all connections are 1/4" NPT. The recommended piping is 1/4" O.D. tubing, although any scale free piping may be used.

1. Blow out all piping before connections are made to prevent dirt, chips, etc., from entering the Relay.
2. Connect the piping to the Relay. Use pipe sealant sparingly, and then only on the male threads. A non-hardening sealant is strongly recommended.
3. Connect clean, dry, oil-free instrument air to the Relay. See INSTRUMENT AIR REQUIREMENTS.

**Caution**

Pressure in excess of 100 psig to any connection may cause damage.

**GENERAL DESCRIPTION**

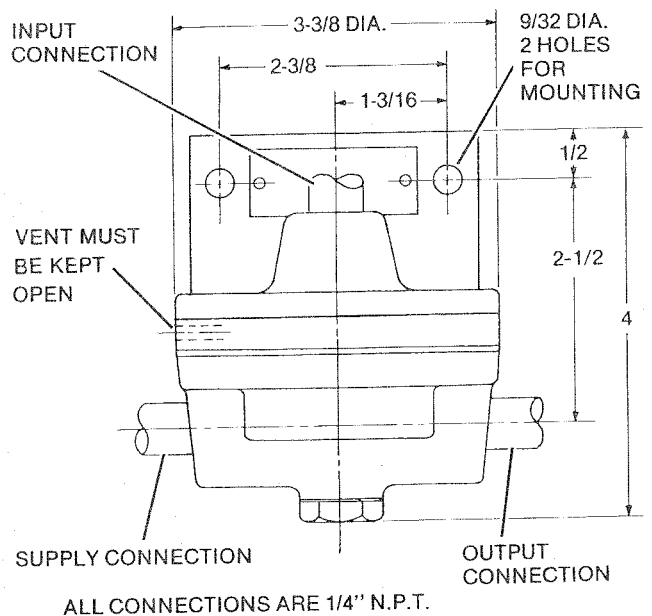
The Model Series 66 Amplifying and Reducing Relays are used in control circuits to amplify and reduce pneumatic signals. The output of a Relay is proportional to its input by the fixed gain factor of the particular Relay used.

**MODEL DESIGNATION**

Model Series	66 BA 2	
Material and Function	A — Brass, Amplifying R — Brass, Reducing	
Input-to-Output Ratio	2 — 1:2, Model 66BA2      4 — 1:4, Model 66BA4 2:1, Model 66BR2      4:1, Model 66BR4 3 — 1:3, Model 66BA3      6 — 1:6, Model 66BA6 3:1, Model 66BR3      6:1, Model 66BR6	

**GENERAL SPECIFICATIONS**

Supply Pressure	Normal - 20 psig Maximum - 80 psig Minimum - 1 psi above maximum required output
Normal Operating Range	3 to 15 psig
Operating Range Limits	Amplifying Relay - not to exceed 80 psig output Reducing Relay - not to exceed 80 psig input
Overrange Limit	100 psig to any connection
Ambient Temp. Limits	- 40°F to + 180°F (- 40°C to + 82°C)



**FIGURE 1 Installation Dimensions & Connections**

SYMPTOM	CAUSE	REMEDY
Output pressure will not decrease or decreases sluggishly with a decrease in input pressure.	Plunger is not seating properly in supply port due to dirt, chips, etc.	Refer to MAINTENANCE, CLEANING — clean plunger and supply port.
	Exhaust port is clogged due to build up on plunger and/or exhaust port.	Refer to MAINTENANCE, CLEANING — clean plunger and exhaust port.
	Exhaust vent is obstructed.	Clear obstruction.
Output pressure will not increase or increases sluggishly with an increase in input pressure.	Plunger is not seating properly in the exhaust port due to dirt, chips, etc.	Refer to MAINTENANCE, CLEANING — clean plunger and exhaust port.
	Supply port is clogged due to build up on plunger and/or supply port.	Refer to MAINTENANCE, CLEANING — clean plunger and supply port.
	Supply pressure is too low.	Raise supply pressure.
Excessive exhaust from exhaust vent.	Ruptured input diaphragm or output diaphragm assembly.	Refer to MAINTENANCE — replace input diaphragm or output diaphragm assy.
	Plunger is not seating properly in the exhaust port due to dirt, chips, etc.	Refer to MAINTENANCE, CLEANING — clean plunger and exhaust port.

## CLEANING

To clean the plunger and the supply and exhaust ports, do the following:

1. Remove supply and input pressures.
2. Remove the retaining nut from the bottom forging (see Parts List). The plunger and plunger spring should fall out.
3. Clean the plunger with non-abrasive solvent.
4. Clean the supply and exhaust ports with non-abrasive solvent (Figure 2). The supply port is readily accessible; the exhaust port can be reached with a tobacco pipe cleaner.

### NOTE

If there is excessive buildup on the supply or exhaust port, the Relay must be disassembled for thorough cleaning. Refer to the Parts List for parts orientation during disassembly and assembly.

5. Refer to the Parts List and install the plunger, plunger spring, and retaining nut.
6. Check the calibration of the Relay per the following CALIBRATION.

## CALIBRATION

### General

The only calibration adjustment for the Relay is the adjustable exhaust seat which sets the output span. This adjustment must be made if the Relay has been disassembled for parts replacement, ratio change, etc.

### Equipment Required

1. (1) regulator and test gauge for setting supply air.

2. (1) regulator and test gauge for adjusting input.
3. (1) output test gauge.
4. (1) 1/16" Allen wrench.

### Procedure

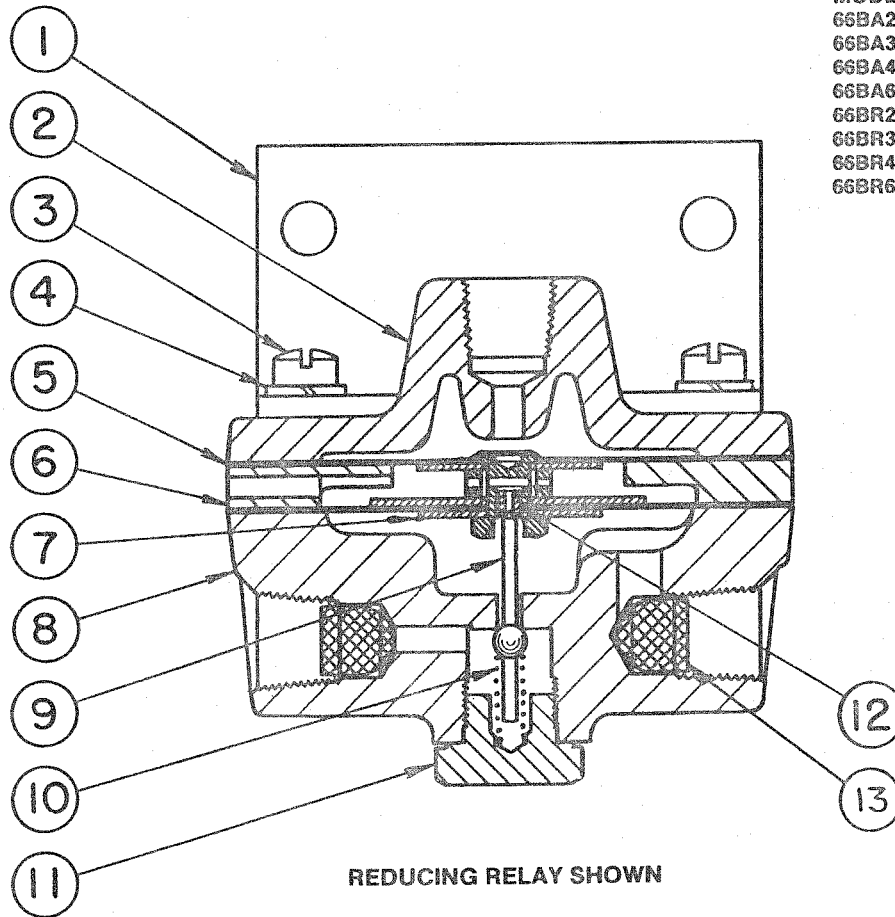
1. Connect supply regulator and test gauge to the supply connection (Figure 3).
2. Connect the input regulator and test gauge to input connection.
3. Connect output test gauge to output connection.
4. Turn on supply air.
5. Exercise the Relay by adjusting the input regulator as follows:  
 Amplifying Relay — lower input range value to upper input range value.  
 Reducing Relay — upper input range value to lower input range value.
6. Check the output span while exercising the Relay. If the output span is too small, turn the exhaust seat counterclockwise. If the output span is too great, turn the exhaust seat clockwise.

### NOTE

To gain access to the exhaust seat, turn off the supply air. Refer to the Parts List and remove the retaining nut, plunger and plunger spring.

7. Insert a 1/16" Allen wrench through the exhaust port in the bottom forging; make adjustment.
8. Install plunger, plunger spring, and retaining nut.
9. Repeat steps 4 through 8 until span is set.

**PARTS LIST**  
**MODEL SERIES 66**  
**AMPLIFYING AND REDUCING RELAY**

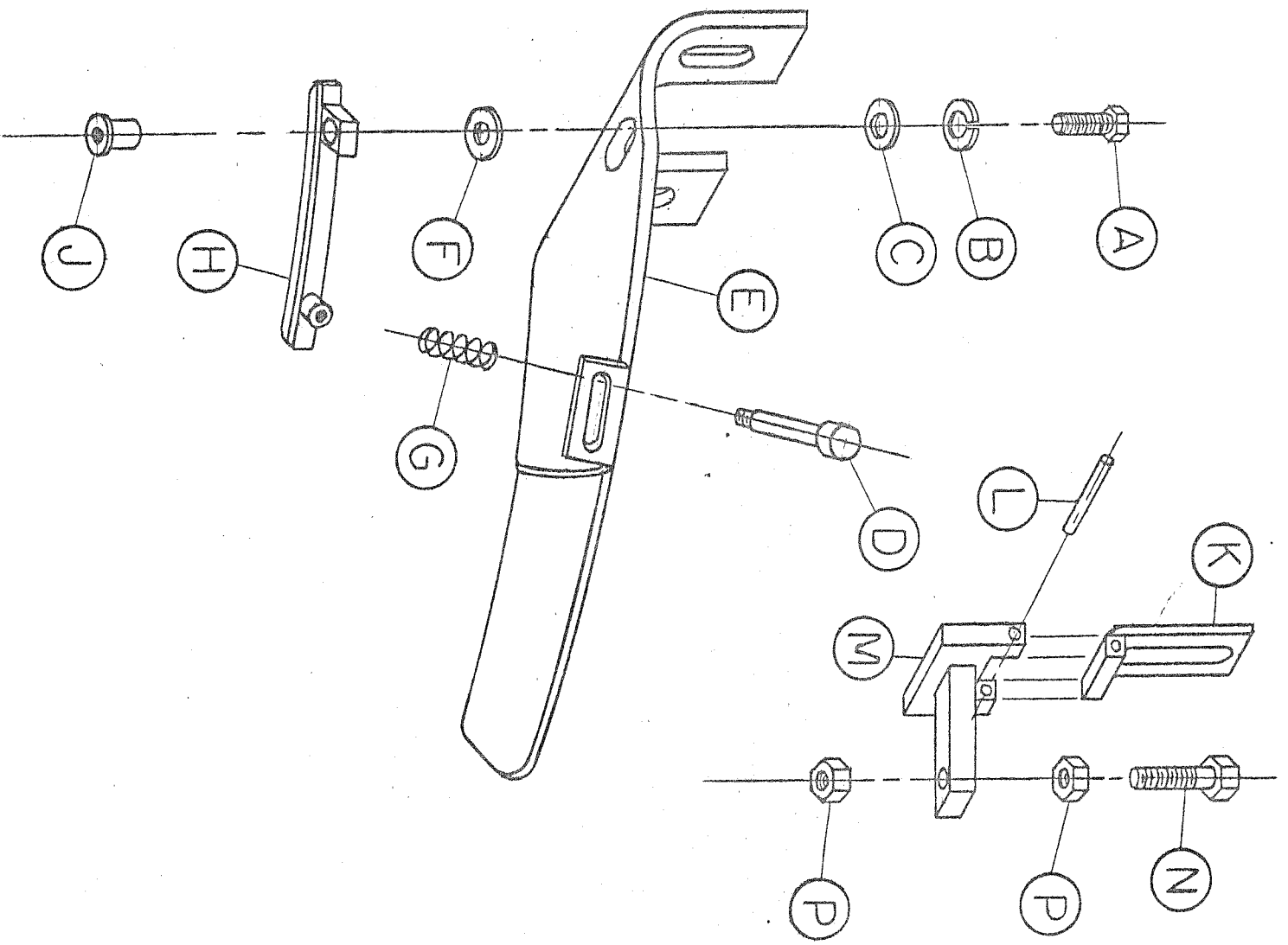


MODELS	B/M
66BA2	4297-112S3
66BA3	4297-113S3
66BA4	4297-114S3
66BA6	4297-116S3
66BR2	4297-121S3
66BR3	4297-131S3
66BR4	4297-141S3
66BR6	4297-161S3

REDUCING RELAY SHOWN

Item No.	Part No.	Description	Required								
			66BA2	66BA3	66BA4	66BA6	66BR2	66BR3	66BR4	66BR6	
1	1145-19	Mounting Bracket	1	1	1	1	1	1	1	1	1
2	4297-31	Top Forging	1	1	1	1	1	1	1	1	1
3a	CKO	1/4 — 20 x 1-1/8 Lg. Fill. Hd. Screw	3	3	3	3	3	3	3	3	3
3b	CKN	1/4 — 20 x 1 Lg. Fill. Hd. Screw	3	3	3	3	3	3	3	3	3
4	WKA	1/4 Lockwasher	6	6	6	6	6	6	6	6	6
* 5	1977-25	Input Diaphragm	1	1	1	1	1	1	1	1	1
6a	4297-22	Diaphragm Ring	1	—	—	—	1	—	—	—	—
6b	4297-23	Diaphragm Ring	—	1	—	—	—	1	—	—	—
6c	4297-24	Diaphragm Ring	—	—	—	1	—	—	—	—	1
6d	10916-2	Diaphragm Ring	—	—	1	—	—	—	—	1	—
* 7a	14240-24	Output Diaphragm Assembly	—	—	—	—	1	—	—	—	—
* 7b	14240-25	Output Diaphragm Assembly	—	—	—	—	—	1	—	—	—
* 7c	14240-26	Output Diaphragm Assembly	—	—	—	—	—	—	1	—	—
* 7d	14240-27	Output Diaphragm Assembly	—	—	—	—	—	—	—	1	—
* 7e	14240-20	Output Diaphragm Assembly	1	—	—	—	—	—	—	—	—
* 7f	14240-21	Output Diaphragm Assembly	—	1	—	—	—	—	—	—	—
* 7g	14240-22	Output Diaphragm Assembly	—	—	1	—	—	—	—	—	—
* 7h	14240-23	Output Diaphragm Assembly	—	—	—	1	—	—	—	—	—
8	1669-14	Bottom Forging	1	1	1	1	1	1	1	1	1
9	4297-49	Plunger	1	1	1	1	1	1	1	1	1
* 10	2155-7	Plunger Spring	1	1	1	1	1	1	1	1	1
* 11	2155-6	Retaining Nut	1	1	1	1	1	1	1	1	1
12	14475-45	Adjustable Seat (Included in Items 7a through 7h)	1	1	1	1	1	1	1	1	1
13	2155-225	Filter Screen	2	2	2	2	2	2	2	2	2

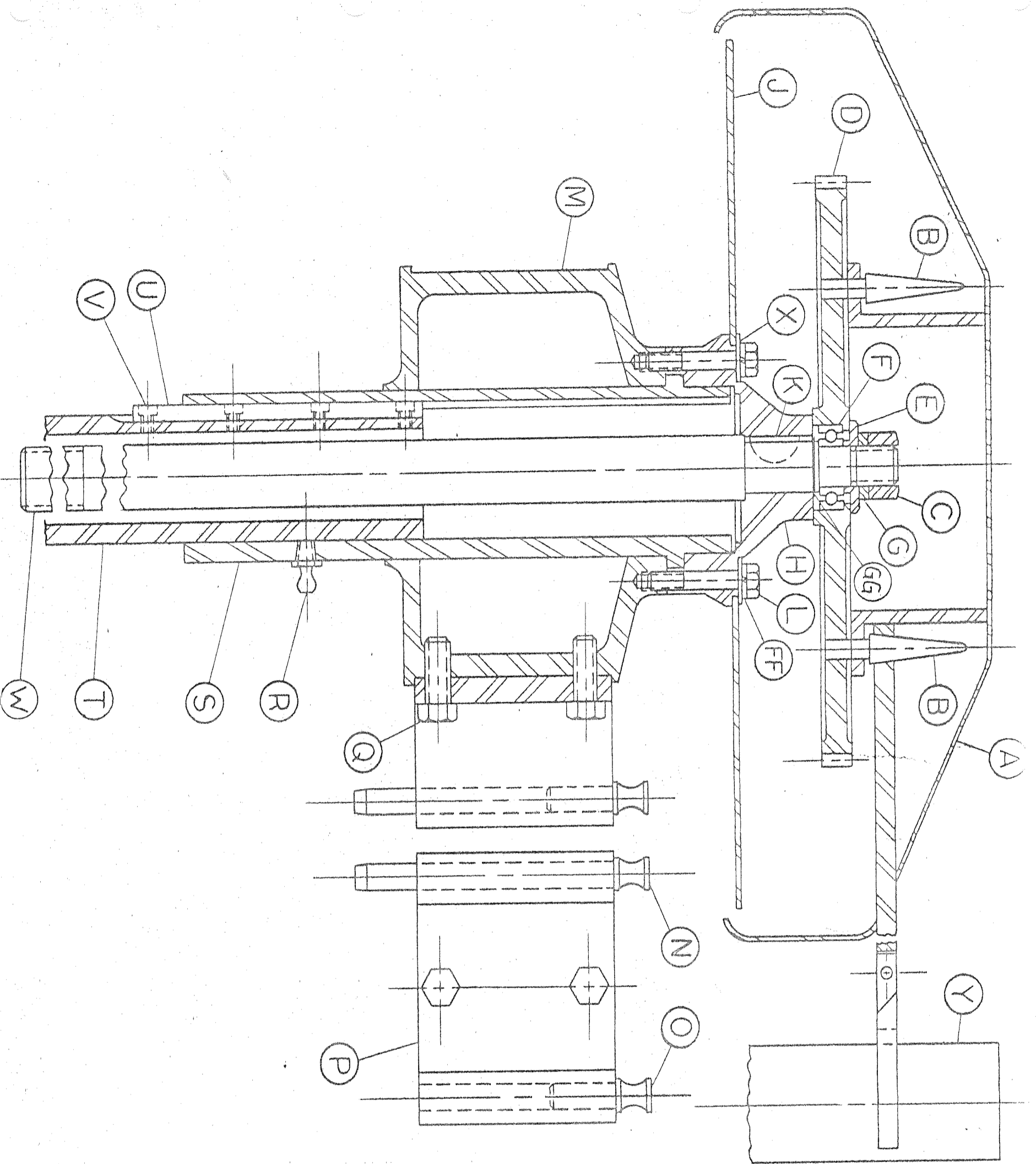
\* Recommended On -Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.



LEVELING PLATE ASSEMBLY	
ITEM	DESCRIPTION
A	1/4"-20 X 5/8" S.S. HEX HD. CAP SCREW
B	1/4" S.S. LOCKWASHER
C	1/4" S.S. FLAT WASHER
D	SHOULDER SCREW
E	LEVELLING PLATE
F	1/4" S.S. FLAT WASHER
G	PRE-TIGHTENER SPRING
H	PRE-TIGHTENER LEVER
J	BUSHING
K	LINK
L	1/8" DIA. X 1" LG. S.S. SPRING PIN
M	HINGE
N	1/4"-20 X 1" S.S. HEX HD. CAP SCREW
P	1/4"-20 S.S. NYLOC HEX NUT

38-550

38-550



PARTS LIST

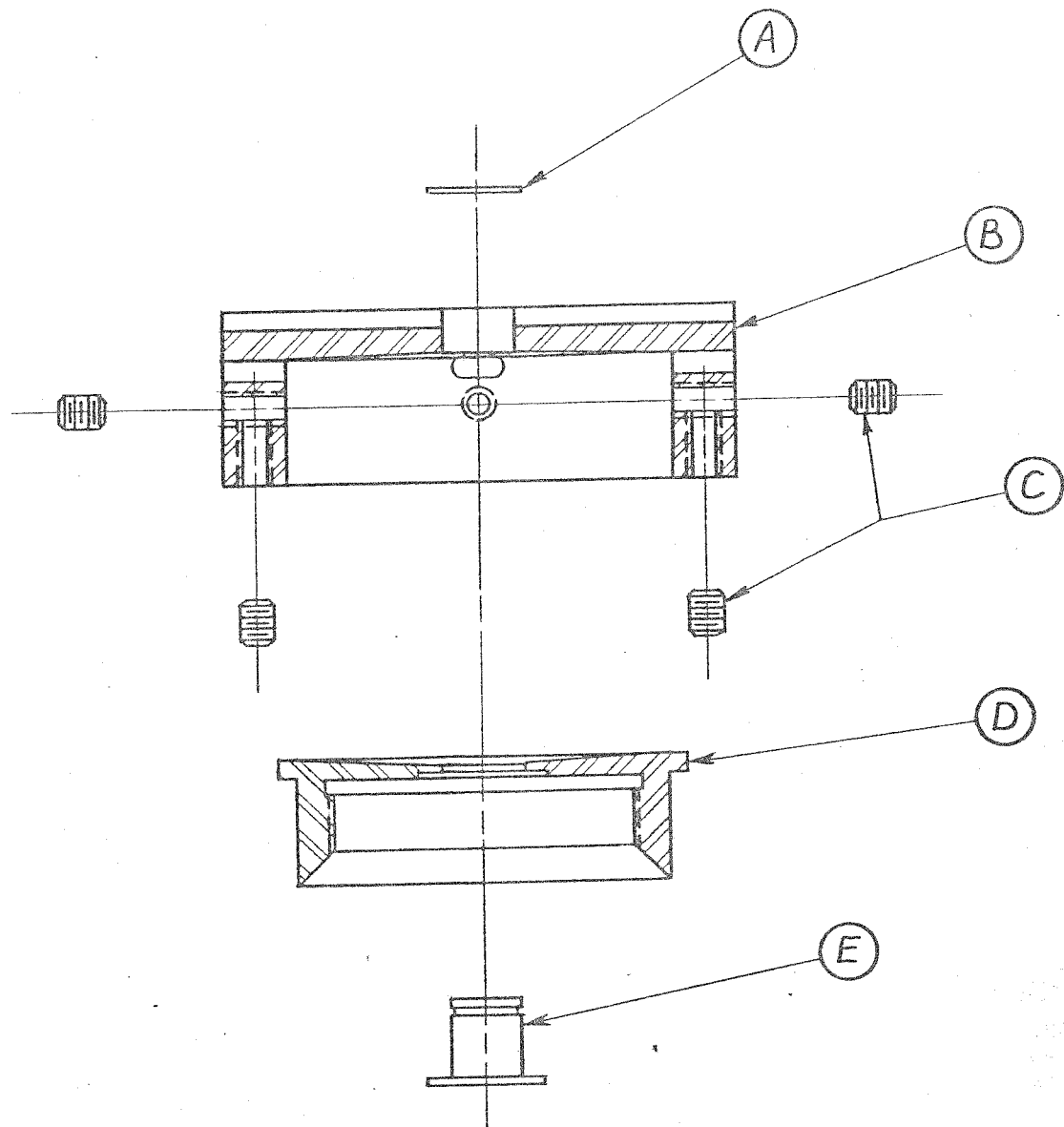
UNIVERSAL CAPPER BRACKET & DRIVE ASSEMBLY FOR  
SCREW CAPPERS ON GHS & GWS 124

R.H. FILLER

ITEM	DESCRIPTION
A	COVER & TORQUE ARM ASSEMBLY
B	TORQUE PIN
C	ST. ST. HEX NUT
D	STATIONARY GEAR
E	SPACER
F	BALL BEARING
G	ST. ST. LOCK WASHER
H	ADAPTOR CAP
I	BASE & GUARDPLATE
J	WOODRUFF KEY
K	ST. ST. HEX HD. CAP SCREW
L	ADAPTOR HUB
M	MOUNTING PIN (LONG)
N	MOUNTING PIN (SHORT)
O	ADAPTOR ARM
P	ST. ST. HEX HD. CAP SCREW
Q	GREASE FITTING
R	DRIVE SLEEVE
S	CAPPER COLUMN
T	KEY
U	HEX SOCKET CAP SCREW
V	CAPPER RAISING SCREW
W	CLAMP RING
X	TORQUE POST
Y	LOCK WASHER
FF	TRU-ARC RING
GG	

PARTS LIST  
GRIPPER HEAD ASSEMBLY

<u>ITEM</u>	<u>DESCRIPTION</u>
A	TRU-ARC RING
B	GRIPPER HEAD SHELL
C	#10-32NF x 1/4" LG. SOCKET HEAD SET SCREW
D	GRIPPER INSERT (4 SEGMENTS)
E	RETAINER SLEEVE

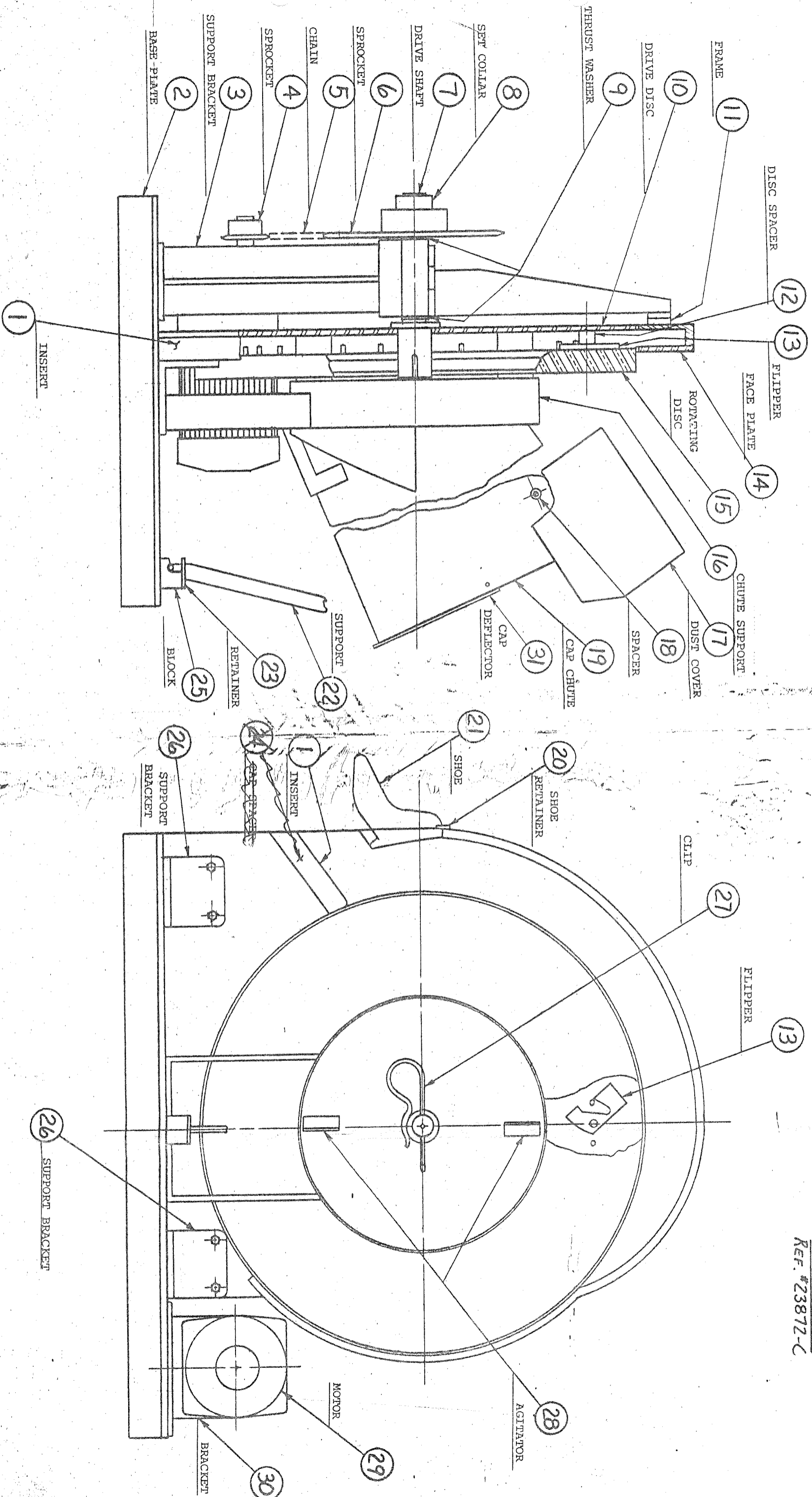


58-592

4

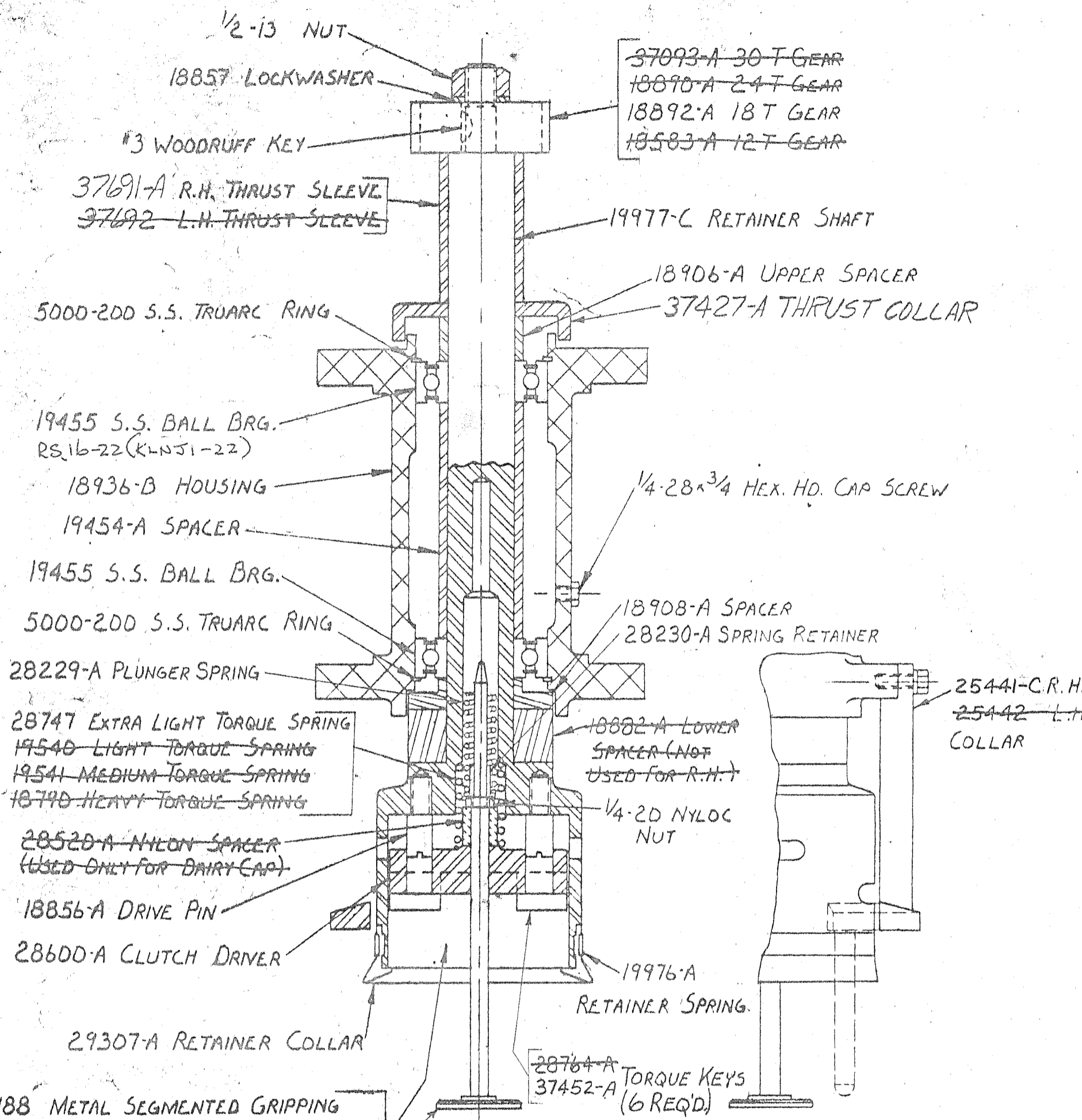


FEDERAL ROTARY CAP FEEDER  
 08-522  
 REF. #23872-C



08-522

08-522



~~37093-A 30 T GEAR~~  
~~18890-A 24 T GEAR~~  
~~18892-A 18 T GEAR~~  
~~18583-A 12 T GEAR~~

37691-A R.H. THRUST SLEEVE  
~~37692 L.H. THRUST SLEEVE~~

5000-200 S.S. TRUARC RING

19455 S.S. BALL BRG.  
 RS.16-22 (KLNJ1-22)

18936-B HOUSING

19454-A SPACER

19455 S.S. BALL BRG.

5000-200 S.S. TRUARC RING

28229-A PLUNGER SPRING

28747 EXTRA LIGHT TORQUE SPRING  
~~19540 LIGHT TORQUE SPRING~~  
~~19541 MEDIUM TORQUE SPRING~~  
~~18790 HEAVY TORQUE SPRING~~

~~28520-A NYLON SPACER~~  
~~(USED ONLY FOR DAIRY CAP)~~

18856-A DRIVE PIN

28600-A CLUTCH DRIVER

29307-A RETAINER COLLAR

19977-C RETAINER SHAFT  
 18906-A UPPER SPACER  
 37427-A THRUST COLLAR

1/4-28 x 3/4 HEX. HD. CAP SCREW

18908-A SPACER  
 28230-A SPRING RETAINER

~~18882-A LOWER SPACER (NOT USED FOR R.H.)~~

1/4-20 NYLOC NUT

19976-A RETAINER SPRING

25441-C.R.H.  
~~25442 L.H.~~  
 COLLAR

~~28764-A~~  
 37452-A TORQUE KEYS  
 (6 REQ'D)

~~15166-A~~  
 25793-A PLUNGER

\*15188 METAL SEGMENTED GRIPPING HEAD (12D SER.) FOR NEPCO & BLACKHAWK CAP  
 \*~~15232 METAL SEGMENTED GRIPPING HEAD (95 SER.) FOR OWENS ILLINOIS & DAIRY CAP~~  
 \*~~15367 GRIPPING HEAD W/18700 RUBBER CAP GRIPPING INSERT (NEUTRAL NOTCHED) FOR ALCOA, METAL CAPS & MIDWEST TAMPER-PROOF CAPS & SEGAN CAPS~~

\* SEE \*58-592  
 \*\* SEE \*58-593

NOTE:  
 FOR NORMAL OPERATION SET CAPPER TURRET HEIGHT SO THAT GRIPPING HEAD RAISES 1/8" TO 3/16"

Square line filler	
CIII SCREW CAPPER ASSEMBLY - U.K. L.H. SHOWN	
SCALE _____	MAT'L _____
DRAWN BY J.M.	DWG. NO 48-562
DATE 2-13-84	

C.I.P. RECOMMENDATIONS

1. Drain product from bowl into receptacle via drain spout.
2. Remove product supply jumper lines and hook-up C.I.P. hose from C.I.P. supply column to filler product supply line.  
NOTE: Small orifice (1/4") goes in this line.
3. Remove the flat sealing rubbers and spacers and place the special C.I.P. valve rubber on valves; disconnect air supply to supply valve.
4. Remove starwheels and bottle guide.  
NOTE: Handle starwheels with care; they will break if dropped.
5. Install two C.I.P. rings.  
NOTE: Ring with 2", 45 degree ells goes next to C.I.P. supply column.
6. Lower filler bowl down on C.I.P. rings-opening filler valves. NOTE: Lower bowl about 3/4 of the travel of filler valve.
7. Rinse inside and outside of bowl.
8. Hook-up remaining C.I.P. hoses.  
NOTE:
  - a. 2 inch hose from C.I.P. ring near C.I.P. column to suction of C.I.P. pump.
  - b. Short 1-1/2 inch hose from C.I.P. pump discharge to supply 1-1/2 inch tee.
  - c. Middle length 1-1/2 inch hose from C.I.P. column to sprayball. Place larger orifice (5/8 inch) in this line.
  - d. Long 1-1/2 inch hose from C.I.P. header 1-1/2 inch tee to the other C.I.P. ring.
9. Fill filler bowl with 160 degree water to just below sprayball.
10. Add liquid chlorinated cleaner.
11. Circulate for 30 minutes.  
NOTE: Raise and lower bowl several times during circulation to roll and clean the 'O' rings.
12. Drain and rinse.

13. During C.I.P. of bowl and valves; brush clean expandable sealing rubbers and outside of filler with manual cleaner 120 degrees F. water and rinse all parts clean.
14. Sanitize by either method listed below:

1ST METHOD:

- a. Leave all C.I.P. attachments in place.
- b. Just before filling operation; fill bowl to bottom of sprayball and add acid sanitizer.
- c. Circulate for 5 minutes.
- d. Drain bowl of all sanitizing solution. Collect a bucket full of this solution and place flat sealing rubbers and spacers in for sanitizing.
- e. Remove all C.I.P. attachments.
- f. Install flat sealing rubbers, spacers, starwheels, bottle guide and product supply jumper to filler.  
NOTE: Make sure all sanitizing solution is drained from valves.

2ND METHOD:

- a. After C.I.P. remove all C.I.P. attachments.
- b. Install flat sealing rubbers, spacers, starwheels, bottle guide and product supply jumper to filler.
- c. Just before bottling, fill bowl to overflowing with 200 ppm of chlorine solution.  
NOTE: This chlorine solution can be made up in a vat pumped through lines to filler bowl.
- d. Drain chlorine solution.  
NOTE: Make sure chlorine solution is drained from valves.

15. CAUTION: Care should be taken not to lower the filler bowl so low as to open the filler valves solid against the C.I.P. segments.

40316

PORTABLE PUMP AND CART  
ASSEMBLY CONSISTING OF:

- 1- 5 H.P. 3600 RPM CENTRIFUGAL PUMP
- 1- CART
- 1- DUMP VALVE
- 1- DIAL THERMOMETER
- 1- LOT OF CONNECTIONS, FITTINGS, CLAMP TYPE.

(A) Hose 59" x 2". Wash-ring to pump suction. (Innercoil)

(B) Hose 44" x 1-1/2". Pump discharge to 1-1/2" tee. (Innerbraid)

(C) Hose 89" x 1 1/2"x2", 1-1/2" tee to wash-ring on opposite side. (Innerbraid)

(D) Hose 44" x 1-1/2", 1-1/2" Ell on C.I.P. post to sprayball. (Innerbraid)

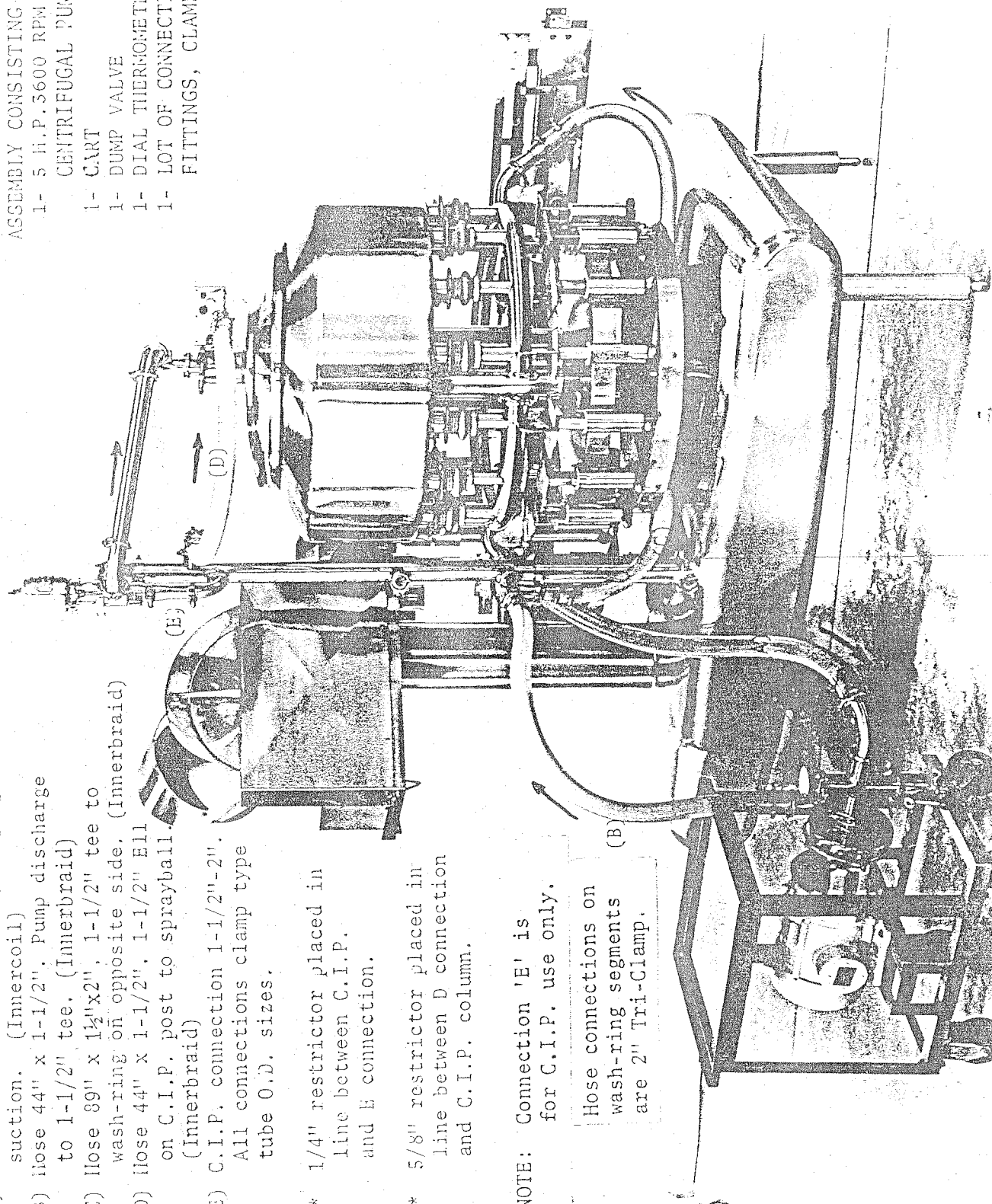
(E) C.I.P. connection 1-1/2"-2". All connections clamp type tube O.D. sizes.

\* 1/4" restrictor placed in line between C.I.P. and E connection.

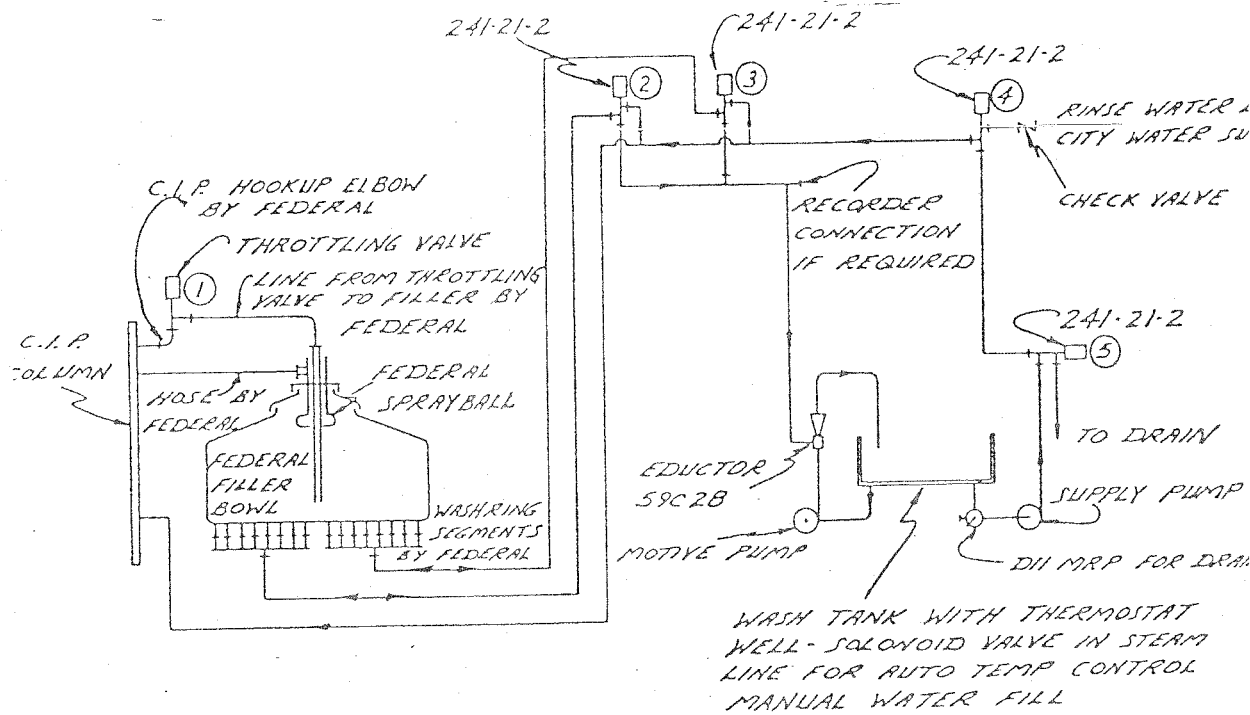
\* 5/8" restrictor placed in line between D connection and C.I.P. column.

NOTE: Connection 'E' is for C.I.P. use only.

Hose connections on wash-ring segments are 2" Tri-Clamp.

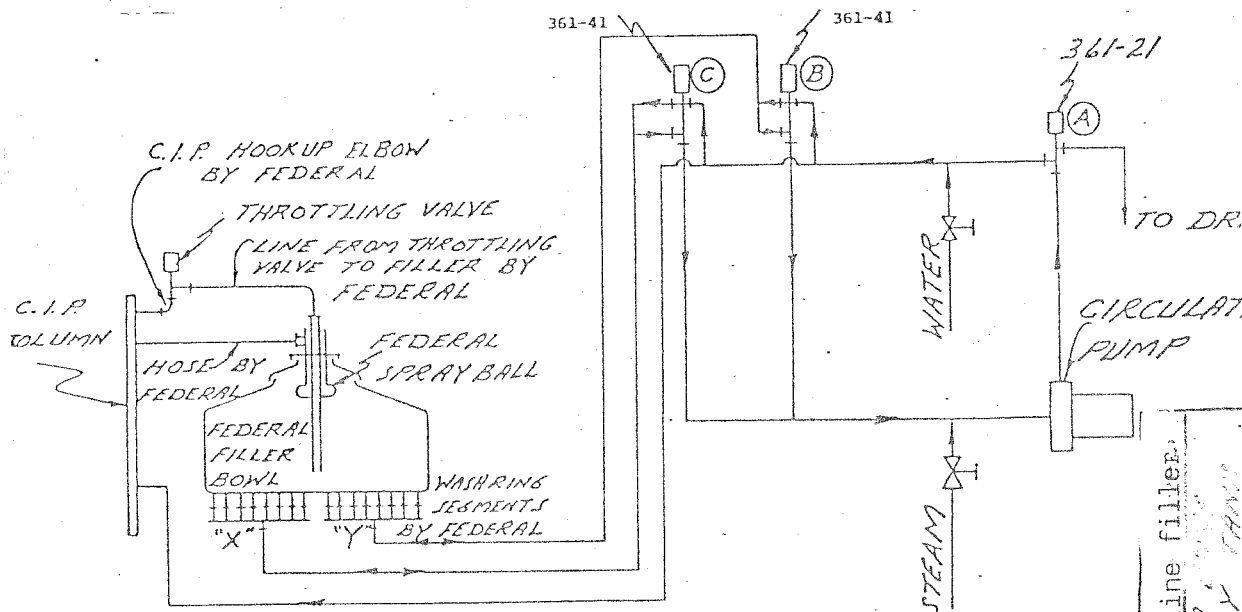


#40316



VALVES ① ② ③ ARE CONTROLLED BY  
TIMER TO PULSE DURING RINSE  
AND WASH CYCLE.  
VALVES ④ ⑤ ARE CONTROLLED  
MANUALLY BY TOGGLE SWITCH

FEDERAL MFG. CO.		MILWAUKEE
AUTOMATED C.I.P. SYSTEM USING REMOTE SUPPLY TANK AND EDUCTOR RETURN		
SCALE	NONE	MA'IL
DRAWN BY	Wm. J. GRIMM	DWG. NO.
DATE	4-30-81	L-11044



**OPERATING SEQUENCE:**

- PHASE 1: Fill system with water and heat with steam to proper temperature. Add detergent. Start pump. Circulate to ring segment "X" and C.I.P. column. Return from ring segment "Y" - drain closed.
- PHASE 2: Divert flow in valves C and B and circulate to ring "Y" and C.I.P. column. Return from Ring "X" - drain closed.
- PHASE 3: Divert flow of valves. Circulate full flow to C.I.P. column, oscillating throttling valve return from ring segments "X" and "Y" - Drain closed.
- PHASE 4: Divert valve A to drain. Pump to drain from ring segments "X" and "Y". NOTE: Valves B,C and throttling are operated from a 60 sec. cam timer. Phase 1 and 2 each take 40% of the circulation cycle. Phase 3 takes 20% of the cycle.

359-48

Square line filler.  
AUTOMATED C.I.P. SYSTEM USING REMOTE  
SUPPLY TANK AND EDUCTOR RETURN