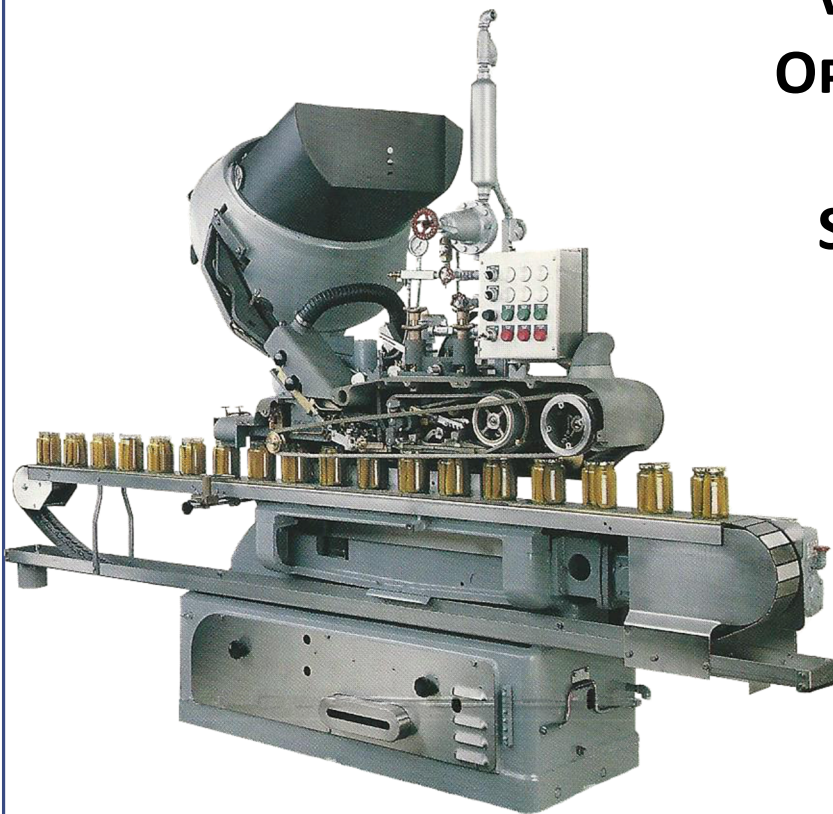




VG / VF VAPOR VACUUM CAPPER OPERATING MANUAL

SEPTEMBER 2023



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1. INTRODUCTION

1.1 Introduction

The purpose of this instruction manual is to acquaint you with the step by step procedures and adjustments that are necessary to provide efficient results with the Silgan Vapor Vacuum Sealing Machine. These recommended procedures and adjustments are the results of many years of experience with the sealing machines, operating under a wide variety of conditions and situations.

This Manual, fortified by the best of closures, equipment, and the professional services of Silgan Equipment Company, will assure you of the most efficient and trouble-free capping operation that is available.

Warning: When adjustments and setups are made on equipment, make sure that the power is shut off and the machine is not running.

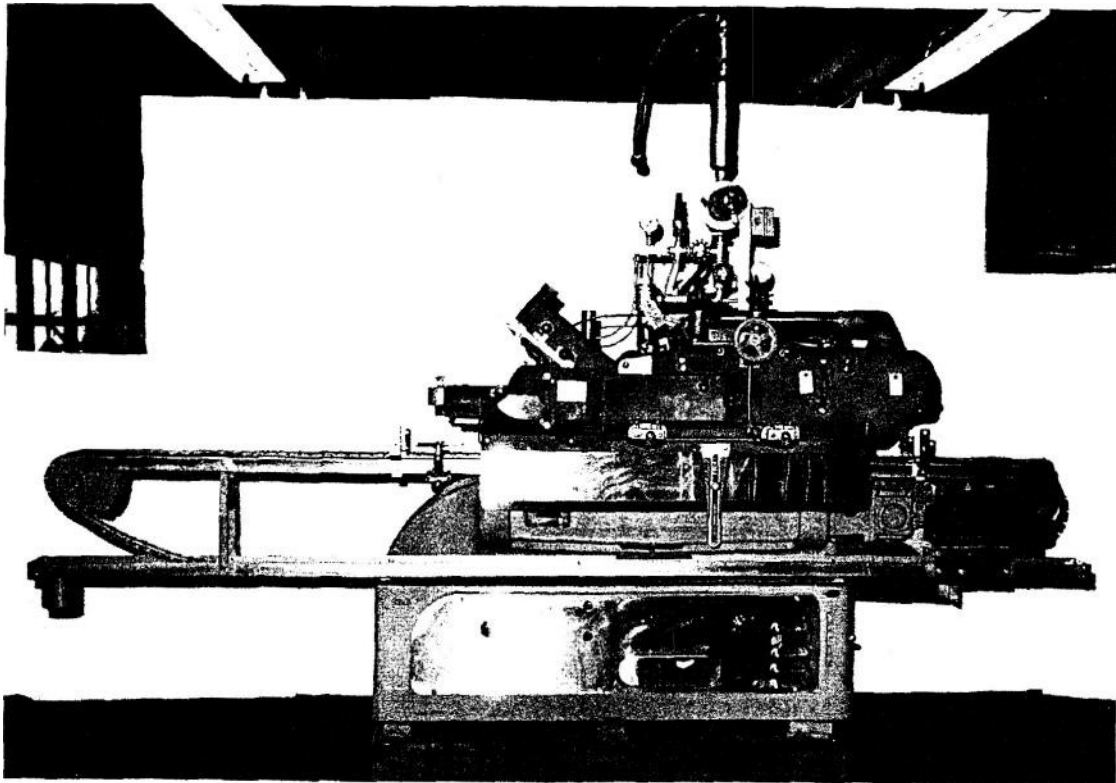


Figure 1-1: Straight Line Sealing Machine Model VG

2. GENERAL DESCRIPTION

2.1 General Description

The Sealing Machine is a straight-line automatic steam closing machine that gives individual attention to each container. It will accept random or time-fed jars at a high rate of speed.

Its mechanical patented design can accommodate a complete range of closures and containers. The machine has maximum flexibility in changeover. It can handle various sizes and shapes of glass that are normally used in mass packaging. It can achieve vacuum efficiency at any designed level, from the lowest to the highest, with complete control and consistency.

The Vapor Vacuum Sealing Machine was designed by engineers. Our research staff and design engineers are constantly striving for improvements. In fact, the design engineers have forecast, far in advance, the customer needs for line speed and flexibility. The machine was designed to accommodate various style hoppers and auxiliary equipment to meet customer requirements.

In this manual, we explain the basic set up procedures and fundamental adjustments that are necessary to achieve a good sealing operation. Understanding the equipment will lead to a properly sealed and secure package. In sealing a container, there are four important items to consider: Product, Container, Closure, and Equipment.

Product: The product should be placed in the container in such a way that there will be no obstruction, above or on the finish of the container. The container spacing is important, and should always be greater than the cap diameter to allow enough time for each cap to permanently stop for pick up.

Container: A uniform and a consistently good quality container is important.

Closure: The quality of the closure is also important. The cap should be applied by engaging the lugs of the cap in the thread of the glass. This should occur without hesitation or cross-threading. If this is not followed, it will result in a poorly applied cap. It is important when running lug caps to maintain the cap and jar top in a parallel condition at application. When seating all press-on type caps a parallel condition between cap and glass top is also required. A uniform pressure while completing the seal must be maintained.

Equipment: The machine should be set up correctly and a good, preventive maintenance job should be put into effect. This Manual includes Set Up Instruction, Pre-Production Check List, and a General Troubleshooting Guide, with Step by Step Procedure for the skilled operator and mechanic to follow and, thereby, achieve a good, secure package.

2. GENERAL DESCRIPTION

2.2 Specifications

Closure Sizes: 27mm thru 110mm (114mm closures can be run with special parts)

Closure Styles: RTO/FAO/MTO/MTB/Twist Off/DTO (Deep Twist Off)/PT (Press On Twist Off)/DSR (Deep Snap Reseal)/ SS (Side Seal) DTF

Container Height: Minimum 1-3/4

Filler Drive - VF: Maximum 11-3/4

Container Øs: Min. 1" - Max. *6-3/4 Gal. Machine

Min. 1" - Max. 4-3/4 Standard Machine

* The container diameter must be smaller at the point where the side belts make contact.

Container Shape: A large variety of containers can be run — from bottles to gallon jugs — by utilizing the appropriate roller brackets. It is always best to check with your SERVICE or SALES Representative before attempting to run unusual shape containers. Samples should be submitted, whenever possible.

Machine Weight: Approximately 3,000 pounds, with the hopper.

Overall Length: 11 feet, 4 inches

Overall Height: 7 feet, 5-3/4 inches (with 6R17 Hopper mounted and machine elevated to maximum height)

Speed: 0 to *700 jars or bottles per minute.

*The speed is dependent upon the type of cap hopper and its location. In most cases, top speeds have not been reached.

Vacuum Efficiency: The vacuum can easily be controlled, (providing steam, headspace, and deaerated product is maintained) from low vacuum (near zero) to high vacuum (approximately 26") by adjusting a valve that controls the amount of steam flow.

2. GENERAL DESCRIPTION

2.3 Requirements

Steam Line: Minimum boiler capacity is 10 boiler Horsepower or 200 kg/hr. Minimum steam pressure required is 60 pounds per square inch or 4.2 kg/cm². (Special Controls can be installed for low pressure steam system)

Water: Minimum size to Machine 3/4 inch line. The water supply should be of low mineral content. A filtering system is recommended. 3/4 inch pipe size. Hot & Cold Water valves should be installed at the machine to be used to clean and lubricate belts and related parts.

Steam Exhaust: The machine is equipped with its own exhaust blower system. The exhaust steam must be piped by way of a 6" diameter pipe to the outside atmosphere or to a common exhaust duct. Flexible section to be provided, sufficient to allow head movement unrestricted.

Electrical: 115 V.A.C. Single Phase - Hopper Blower cocked cap detector horn. 220/440 V.A.C. Three Phase Hopper Drive Motors, Exhaust Blower Motor, Sealing Machine Drive Motor. Flexible conduit to be provided for each section to provide unrestricted movement between assemblies. 4-wire electrical circuit with an outlet within 3 feet of the electrical control panel. Copper will be wired to suit the electrical requirements for any country.

Warning: When adjustments and setups are made on the equipment, make sure that the power is shut off, and the machine is not running.

2.4 Model VG and VF Capper Variables

This manual incorporates all of the information needed to operated the VG or VF Cappers. The differences will be explained in the next few pages. The reasons for establishing the VF Capper were to provide a power take-off of the capper drive for use in driving the customer's filler, and to offer a higher speed capper. The VF will perform up to 250 feet conveyor speed. All of these differences occur in the base, hence the VG Base and the VF Base. These are pictured schematically in the pages that follow. The hardware involved is identified for comparison. All the material in this book pertains to both model cappers except the bases just described. The procedures and settings can be followed in all cases. There are two designations for the base configurations of the different base assemblies. They are called the VG Base and the VF Base. The following are the differences between the two:

The gear box arrangement for the VF Base delivers power to the conveyors chain drive without the external power belt (*Figure 2-1*). There is an additional provision of a power take-off to drive the customer's filler. The VF Base also allows the conveyor chain to be run at a higher speed than the VG. The Speed Reducers in the base are of different ratios.

2. GENERAL DESCRIPTION

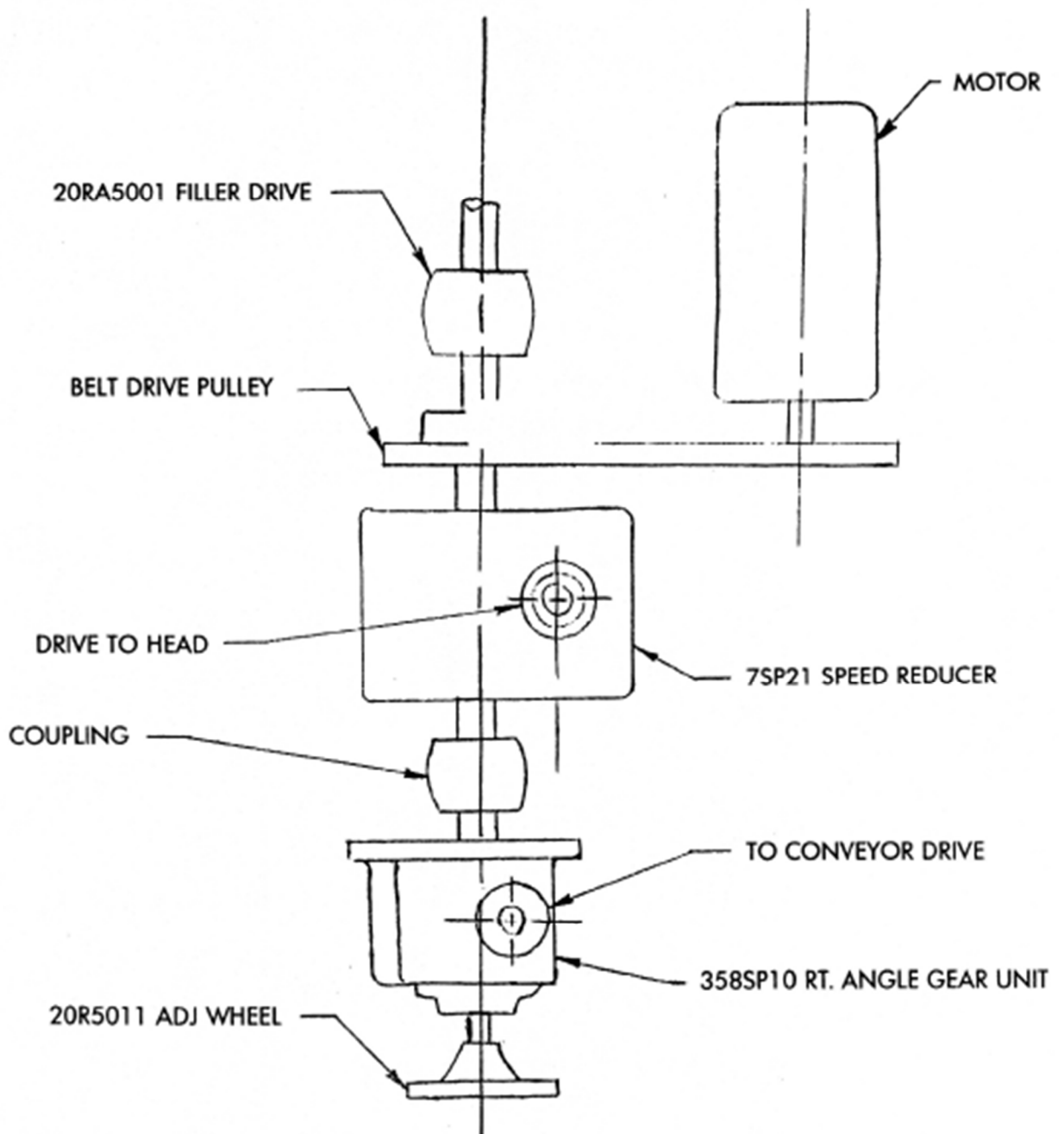


Figure 2-1: Drive of VF Capper with Filler Hook-Up

2. GENERAL DESCRIPTION

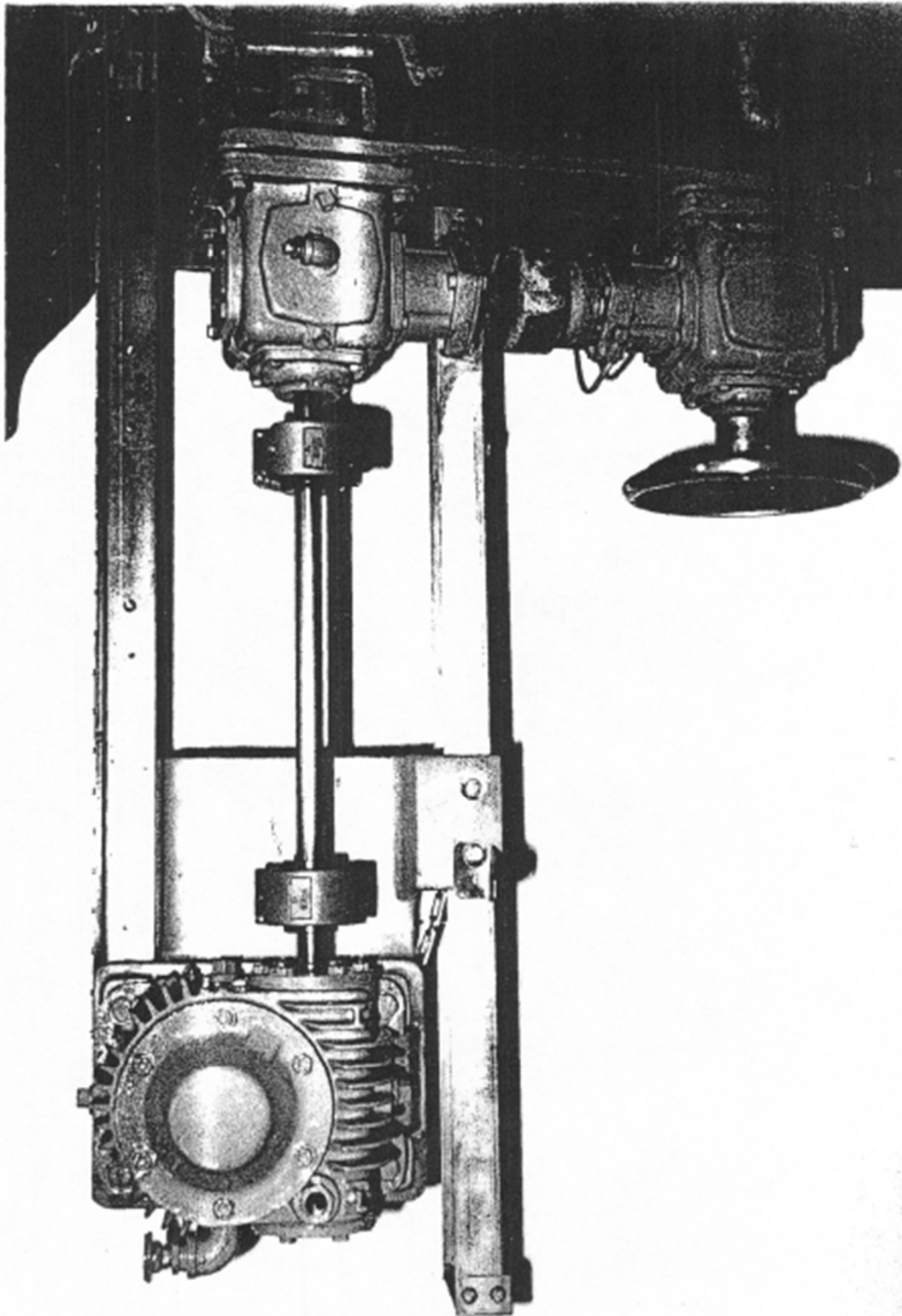


Figure 2-2: VF Base Drive

2. GENERAL DESCRIPTION

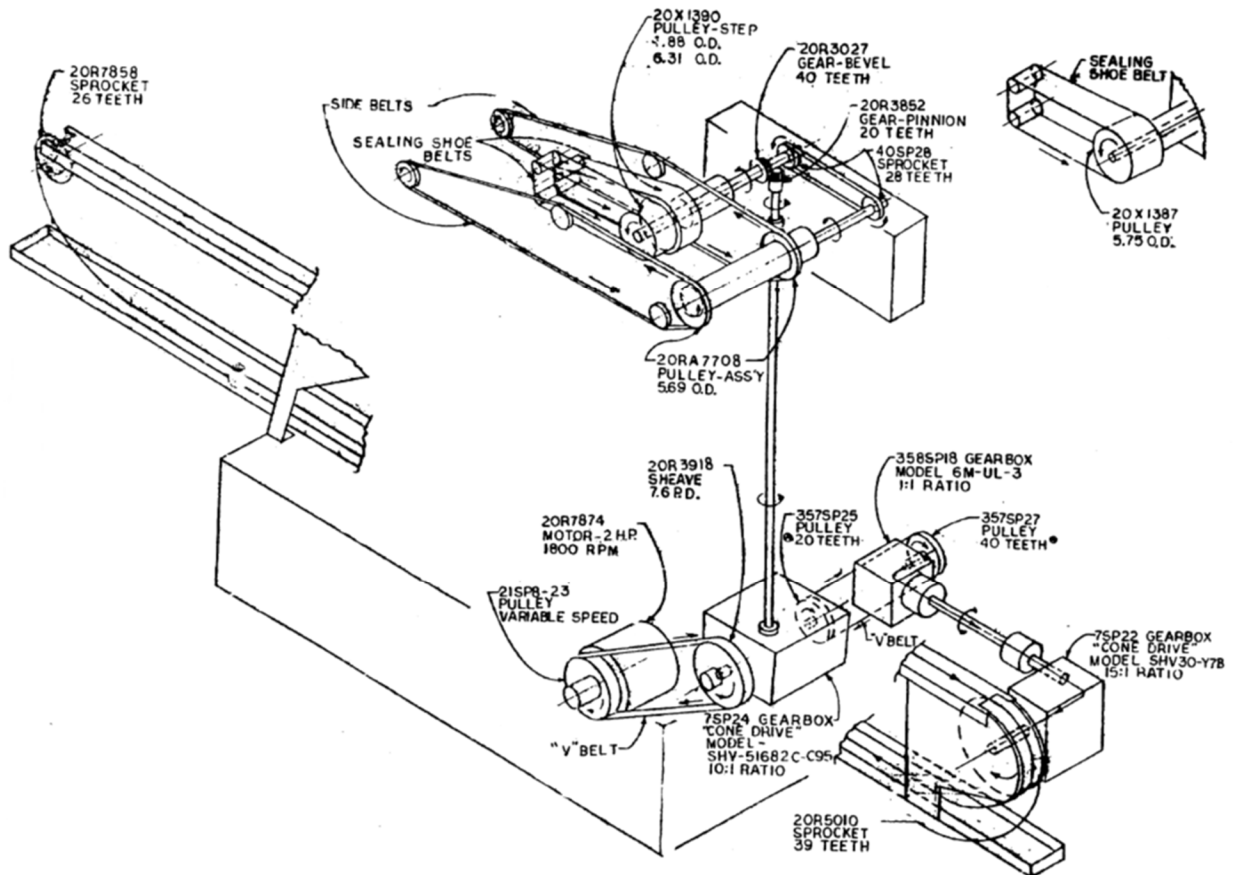


Figure 2-3: VG Base Drive Exploded Diagram

2. GENERAL DESCRIPTION

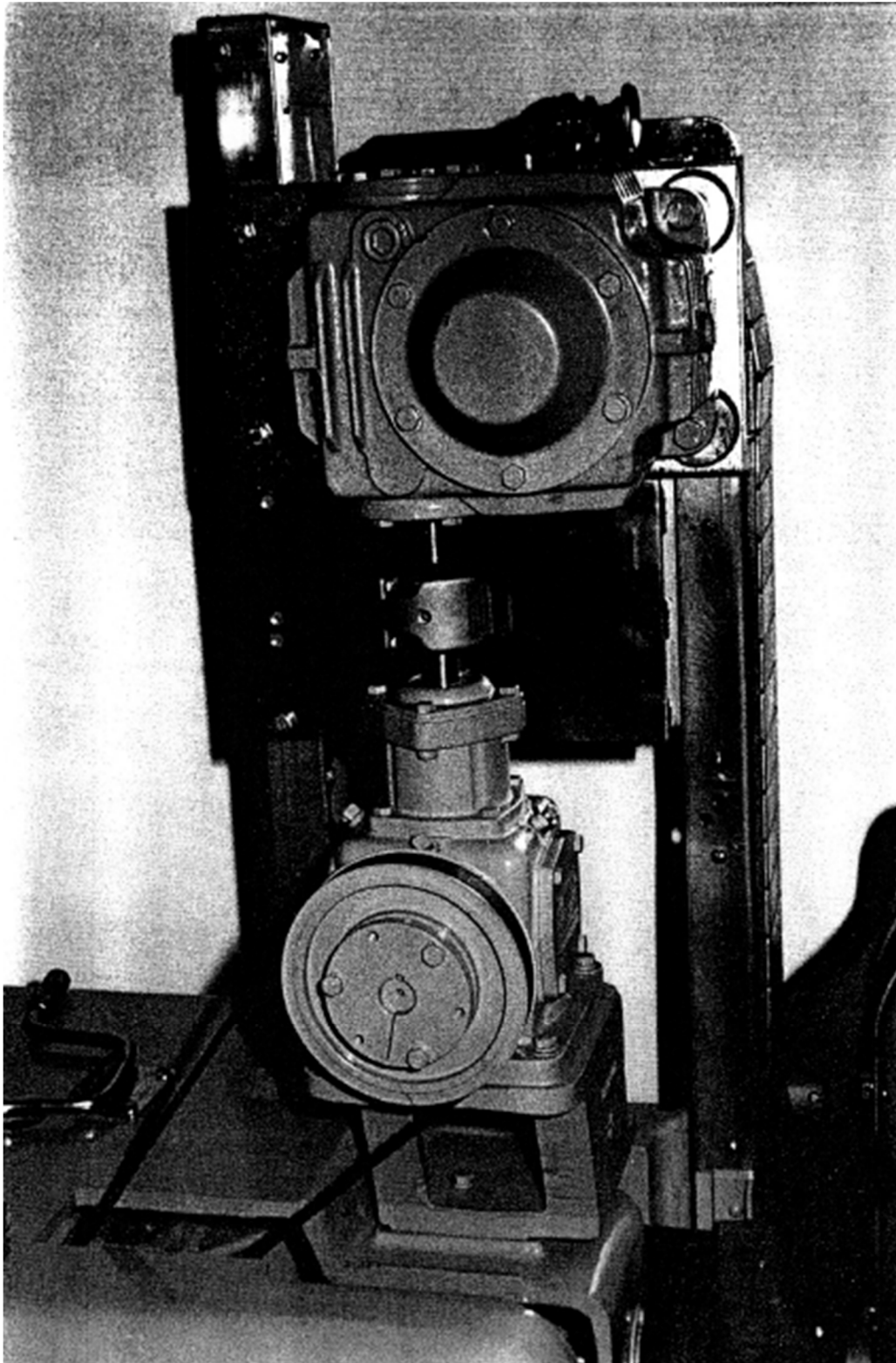


Figure 2-4: VG Rear Drive

2. GENERAL DESCRIPTION

2.5 General Safety

- Read all instructions and information supplied with equipment before attempting installation or operation.
- Except for servicing, keep electrical boxes closed at all times.
- Be sure all electrical cable and connectors are right according to local codes.
- Do not attempt to make fuse changes or wiring connections unless main electrical power is disconnected.
- Do not use fuses larger or smaller than specified.
- Do not bypass fuses or safety lock-outs.
- Do not run production with temporary electrical power lines.
- Do not allow anyone, other than qualified personnel, to service electrical components.
- Do not leave electrical power applied to equipment than will be shut down for an extended time.
- Do not run production with non standard, slipshod repairs. Install proper parts.
- When working on capper, hopper or other equipment, be sure electrical switches are in safe positions or locked out.
- To observe capper at the cap pick-up, use the small panel door on the head. Be sure steam is off.
- Do not attempt adjustments inside capper head while steam is on.
- Do not attempt to install or remove belts with hands or tools while running equipment.
- Do not work around moving equipment with loose clothing, exposed jewelry, rings or any articles in shirt pockets.
- Do not climb on machine or use a ladder at any time.
- Use proper lifting techniques when lifting the door.
- Avoid contact with all steam heated machine parts.
- Be sure other personnel in the work area are advised of your presence whenever you are involved in maintenance task that may require immediate emergency assistance.
- Maintain all safety guards in position unless removal is necessary for repairs.
- Maintain steam system in proper repair, Leaking connections can cause injury and are wasteful.
- Be sure safety relief valve is working properly and that traps are functioning. Recommended inspection every 30 days.
- While hopper is running do not attempt to free stuck caps with hands. Stop machine first.
- Keep area around capper clear of all unnecessary articles or debris.
- Remove glass and other sharp objects with gloves or tools after stopping machine.
- Wear protective clothing, including safety glasses which cleaning machine.
- Use safe cleaning compounds and solutions recommend for the job.

3. INSTALLATION

3.1 Mounting the Capper

The capping machine must be mounted on a substantial flooring material, with metal pads under each of the six leveling bolts (provided in the base of the machine).

3.2 Conveyors, Guides, & Transfers

When the machine is installed between two existing conveyors, side transfers to these conveyors are highly recommended (*Figure 3-1*). The side transfer should have sufficient conveyor overlap with a minimum of 12 inches. The transfer from one conveyor to another must be gradual. The connecting conveyor should be placed very close to the capper conveyor with no transfer plate between them.

Many capper installations will require a transfer disc at either the entrance end or the discharge end of the capper. This very efficient method uses the floor area in a plant to best advantage. The important thing to remember about the transfer disc is the relationship of the disc speed to the capper conveyor speed (*Figure 3-2*).

Many capper installations will require a transfer disc at either the entrance end or the discharge end of the capper. This very efficient method uses the floor area in a plant to best advantage (*Figure 3-2*). The important thing to remember about the transfer disc is the relationship of the disc speed to the capper conveyor speed.

Transfer discs installed at the entrance end of the machine should run a minimum of 10% slower than the capper conveyor. Transfer discs installed at the discharge end of the machine should run a minimum of 10% faster than the capper conveyor. The purpose of this differential in speed is to accommodate the slight hesitation of the jar while it is changing direction and transferring from one conveyor to the next. Varying the conveyor speeds and transfer disc speeds is the most effective method of providing adequate jar spacing at the capper.

Fabricate guide rails after the installation of the capping machine. It is important that the guide rail system be smooth at all transfer points. Sharp or abrupt turns could cause the jars to overturn. Both sides of the guide rail system should be as parallel as possible and adjustable so that the various sizes of jars may be controlled at all times. It is highly recommended that one-half inch stainless steel rods be used for the fabrication of the conveyor guide rails. This material can be readily bent into shape to follow the various turns on a conveyor system and is strong enough to withstand almost any kind of jam which may occur in the operation.

3. INSTALLATION

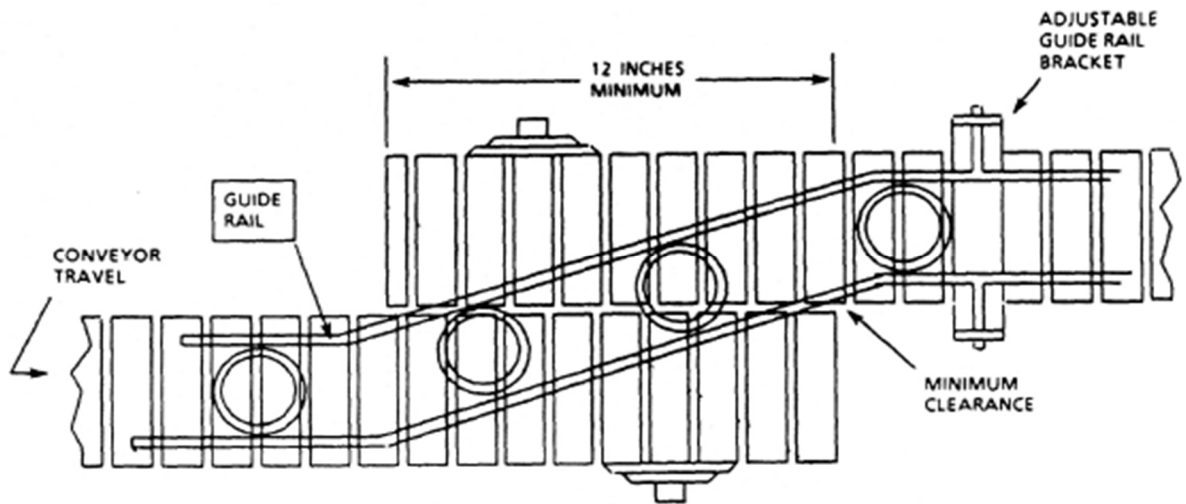


Figure 3-1: Typical Side Transfer

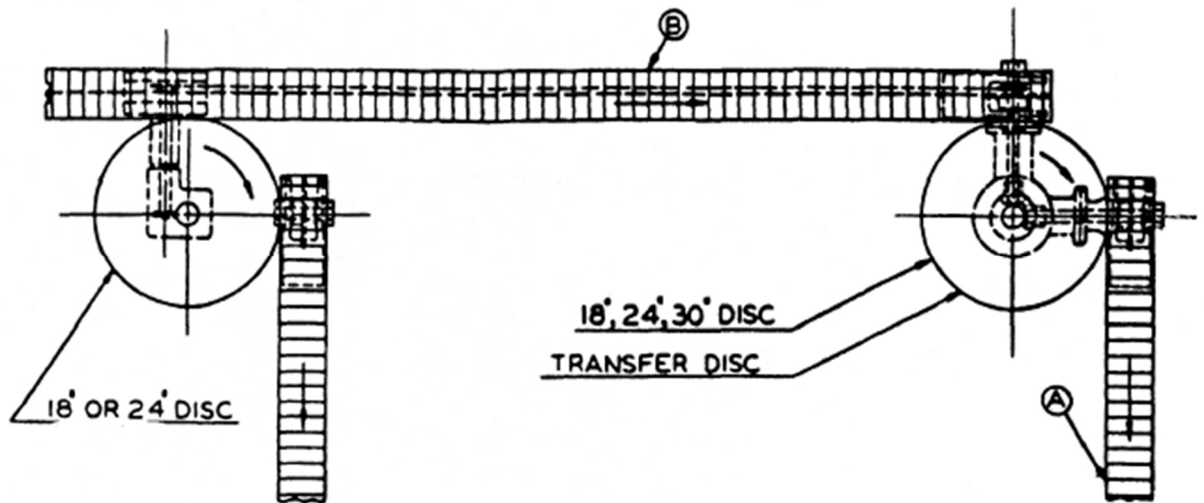


Figure 3-2: Typical Disc Transfer

3. INSTALLATION

3.3 Hopper Installation

3.3.1 Cap/Chute Connections

After the capping machine is located and connected to the other components in the line by conveyor transfer, the hopper is usually the next item to be installed. Install the hopper in the following manner:

Mount the hopper support on the hopper post. Place the hopper assembly in position on top of the hopper support, aligning the four holes (*Figure 3-4*). Bolt the Hopper to the support using (4) 3/8-16 x 1-1/2 inch hex head cap screws. Clamp hopper support in approximate position. Locate the mounting hole from hopper support to capper head and secure by bolting. Assemble the hopper to the support and clamp in approximate position.

The next step is to place the cap chute base in position and adjust hopper to suit. After locating cap chute properly the hopper base may be secured to support (*Figure 3-5*). Locate holes on machine chute plate A and B, then mount screws and finish top guides (*Figure 3-6*). Position the lower cap chute between the hopper and the machine cap chute (*Figure 3-7*). Attach the lower end of the cap chute to the machine chute using the plate provided. Attach the upper end of the cap chute to the hopper drum at the bracket on the hopper drum with one screw.

It is important that all cap transfer points are level and free of obstructing edges. Follow all instructions of previous installation except the lower end will be attached to the adapter chute plate by the plate provided (*Figure 3-8*).

Assemble the connecting tie plate to the exit end of the turnover. Position the entrance end of the turnover with the rod assembly provided under the chute base. Using contact with the rod and turnover connecting block as a pivot, swing the turnover into position with the machine chute and mark the screw holes from the chute plate to the connecting plate of the turnover. Top 10-24 threads and attach with (2) 10-24 x 1/2 long flat head screws.

3. INSTALLATION

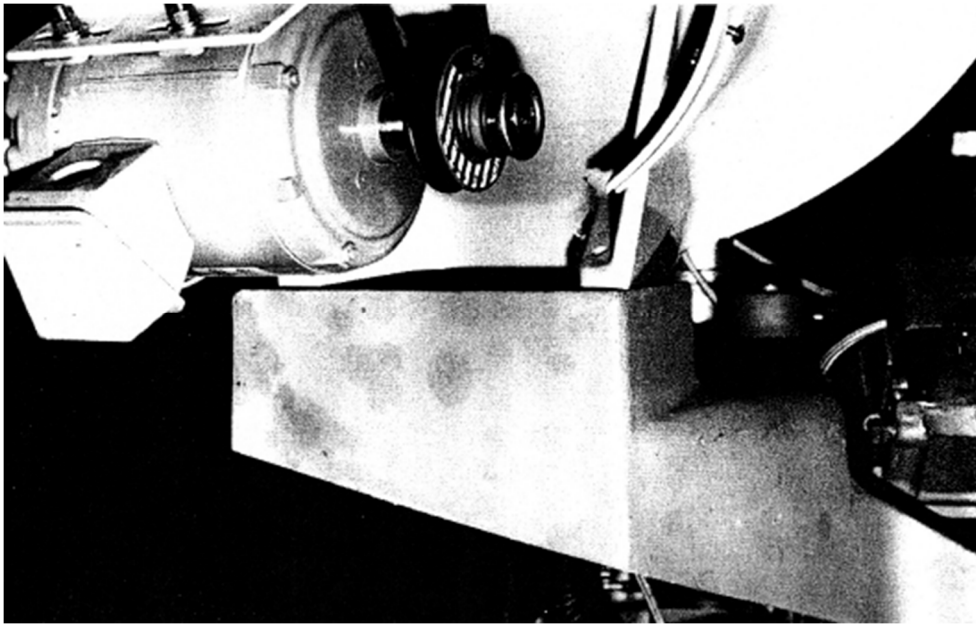


Figure 3-3: Mounting the Hopper



Figure 3-4: Hopper Fastened to the Support.

3. INSTALLATION

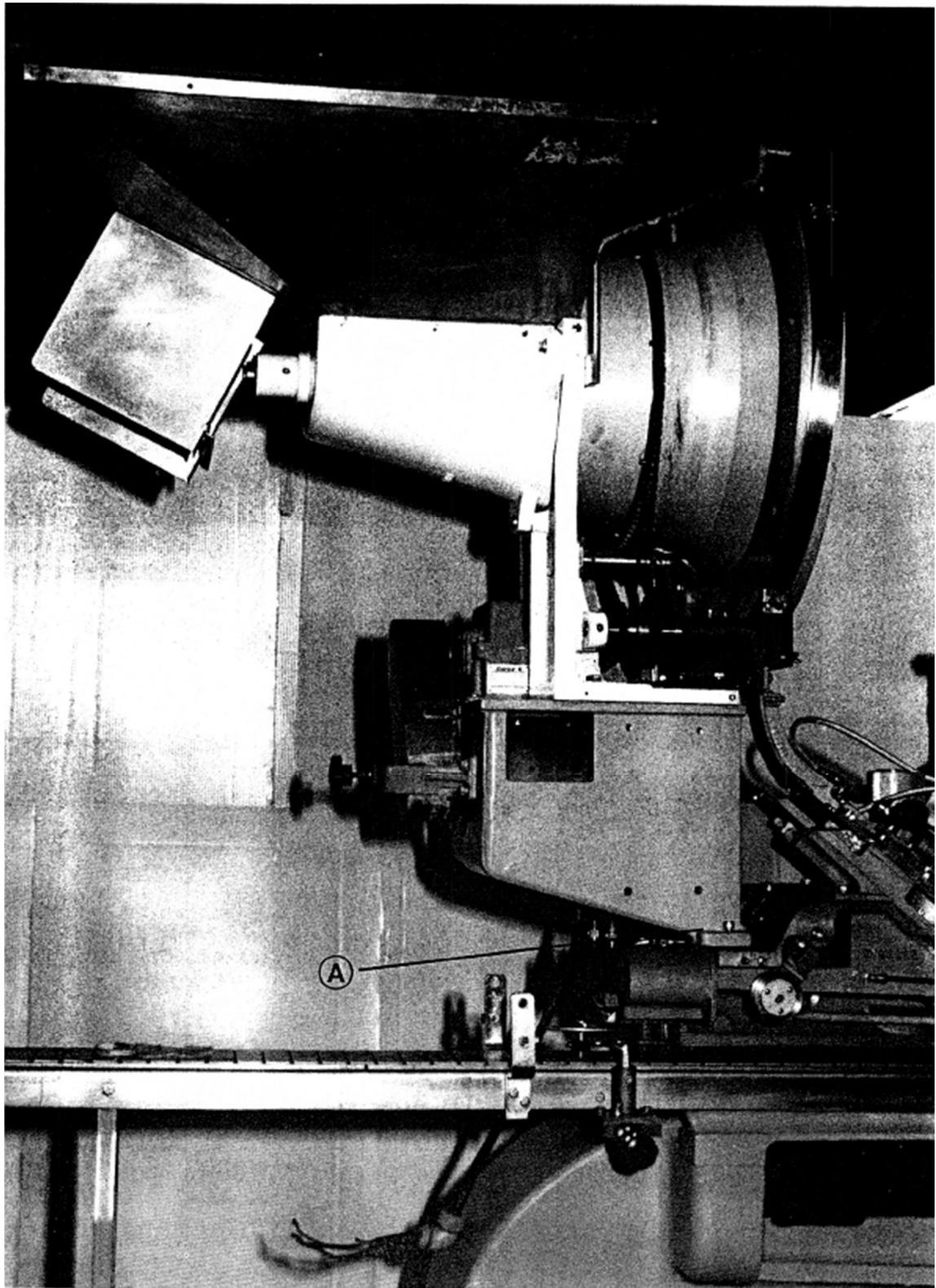


Figure 3-5: 6R24 Hopper Mounted to Capper

3. INSTALLATION

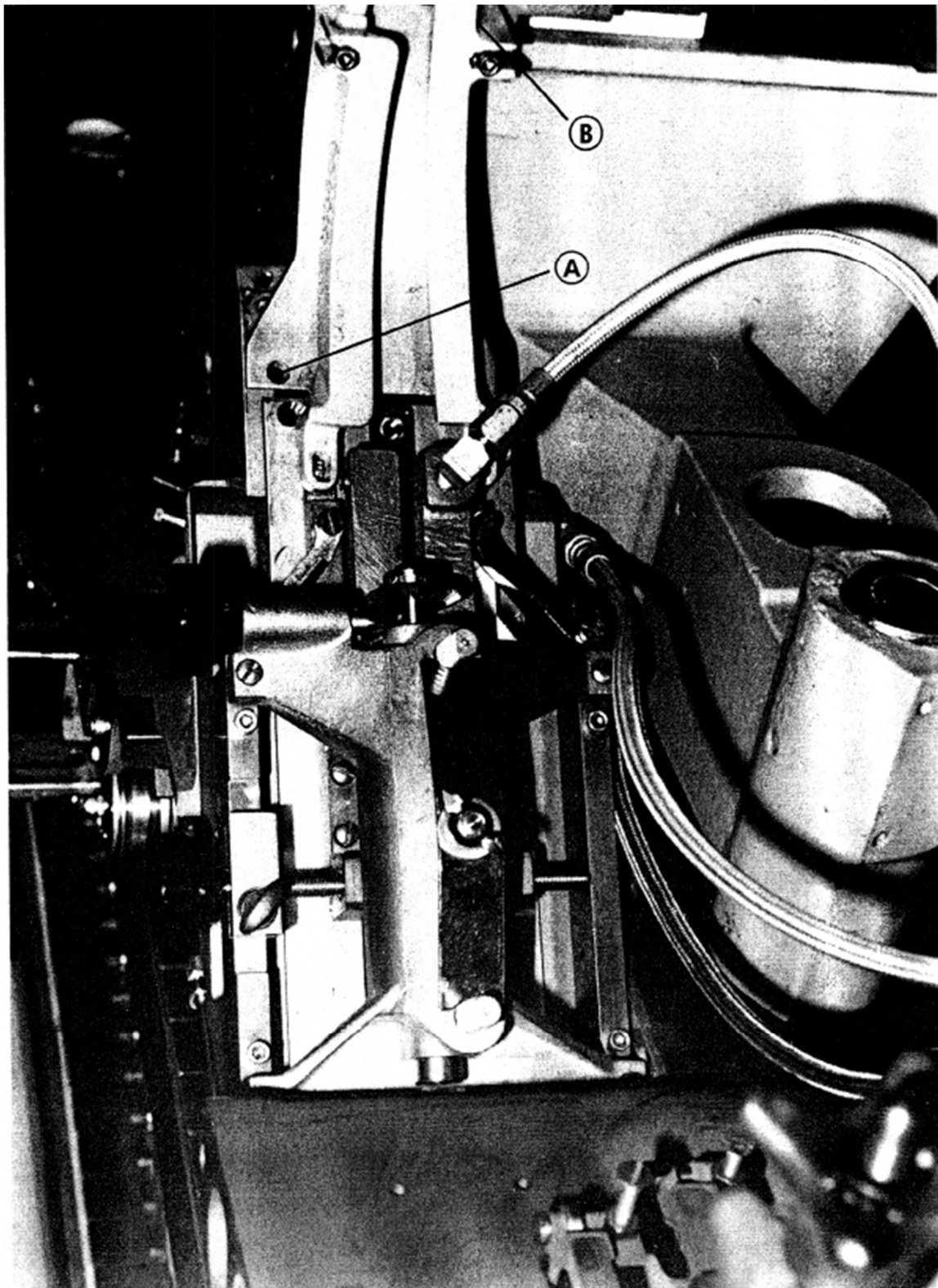


Figure 3-6: 6RA24 Hopper Chute Assembly

3. INSTALLATION

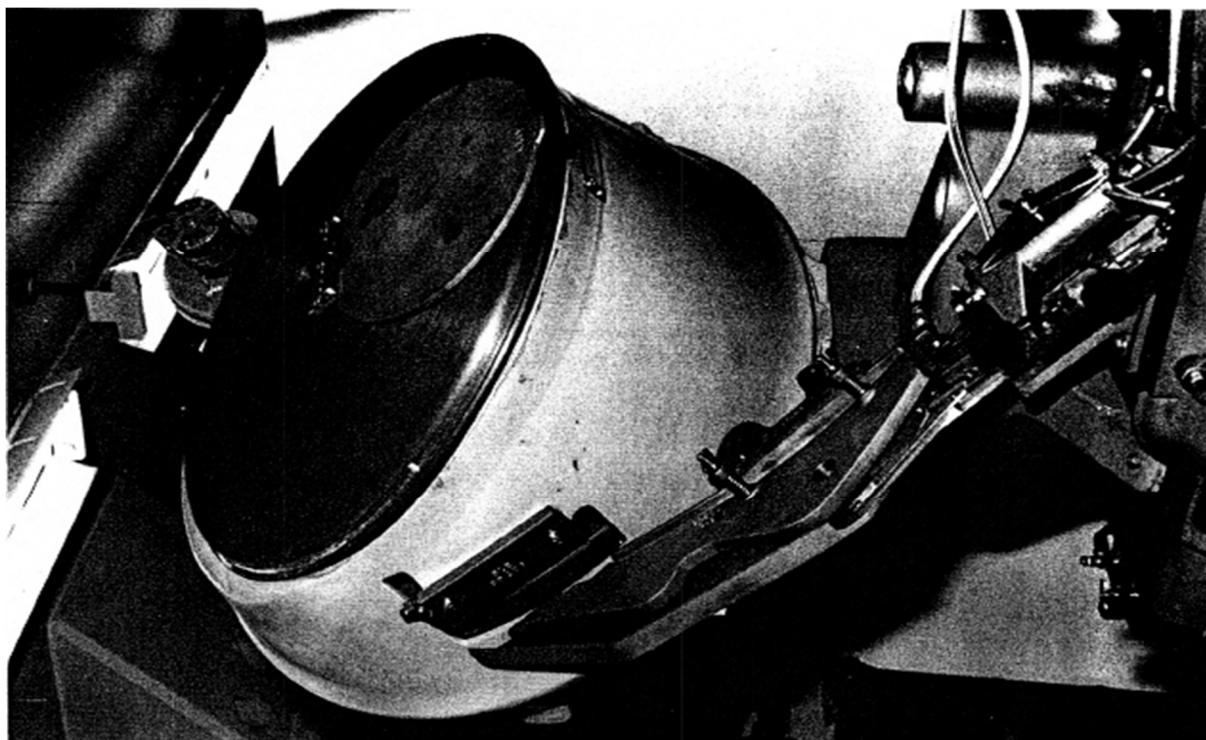


Figure 3-7: Standard "Z" Chute

3. INSTALLATION

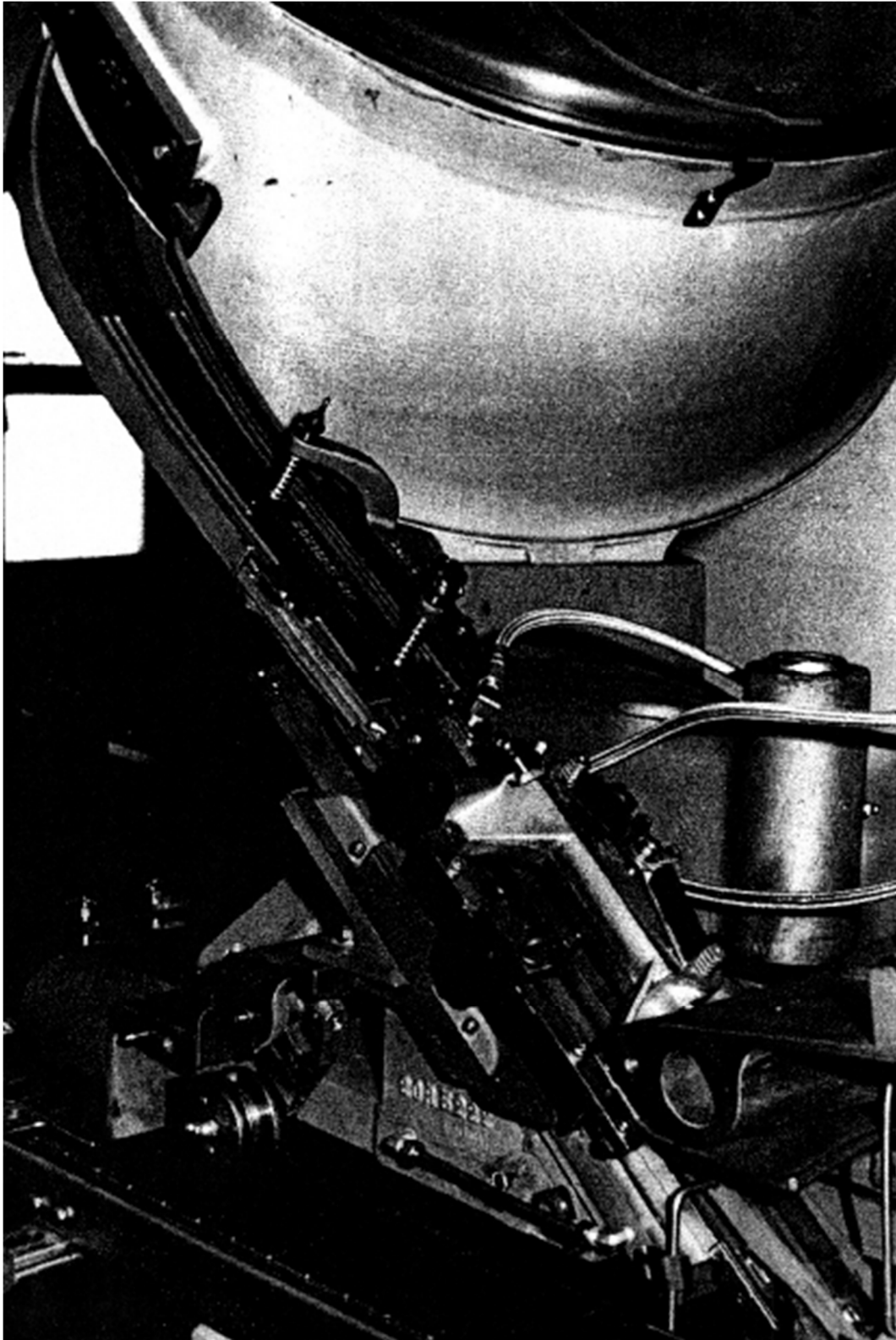


Figure 3-8: Chute Mounted at Adapter Plate

3. INSTALLATION

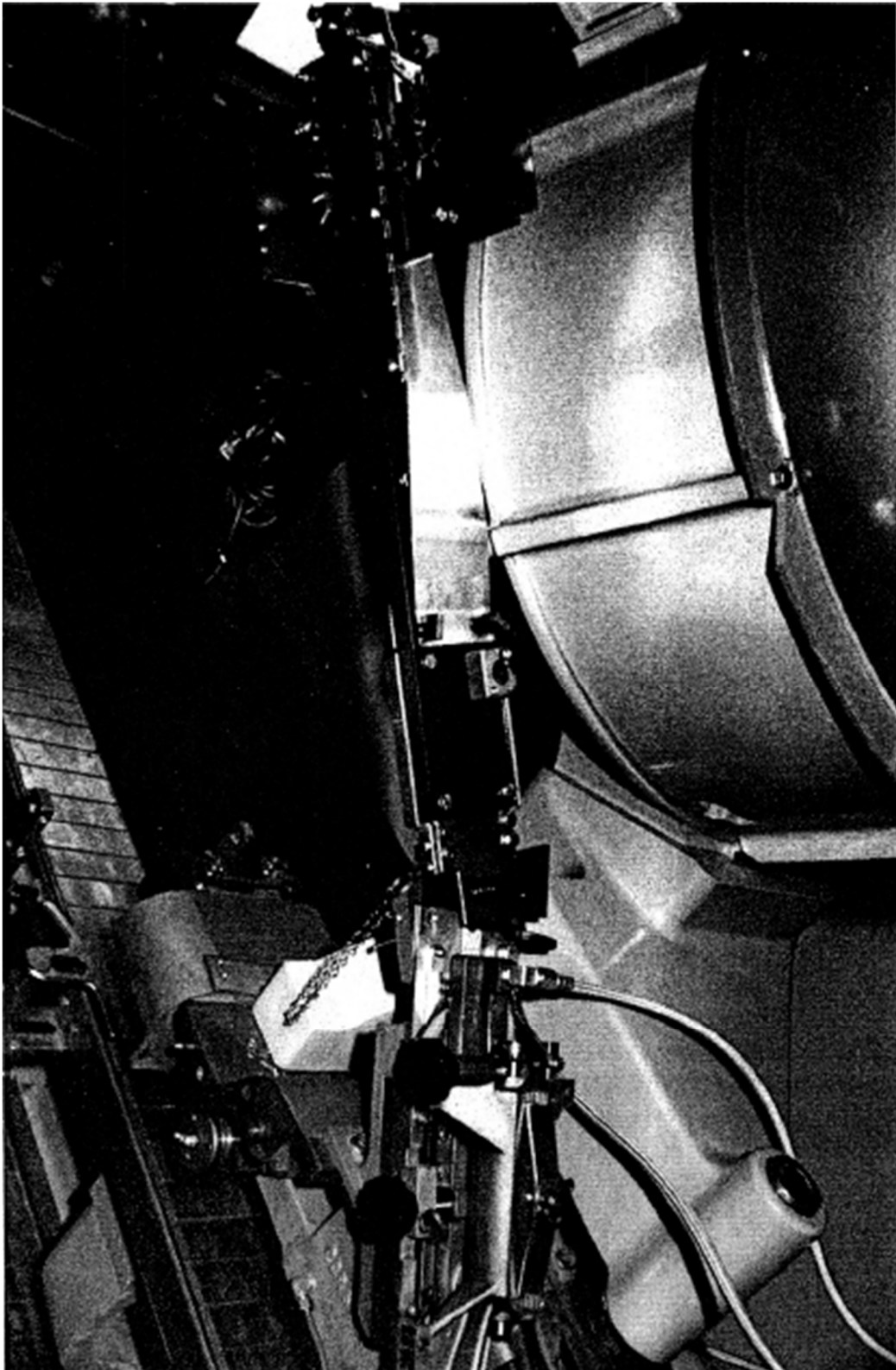


Figure 3-9: 6R25 Hopper with Cap Chute & Turnover in Place

3. INSTALLATION

3.3.2 Electrical Connections

The capping machine is furnished with an electrical box, and fully wired. The customer must provide power to the panel according to the local code. Check the direction of each motor as soon as the electrical connection is made. Correct the rotation of any motor found to be rotating in the wrong direction.

3. INSTALLATION

3.4 Water Connection

The cold water supply is connected to the cold water inlet pipe (*Figure 15*).

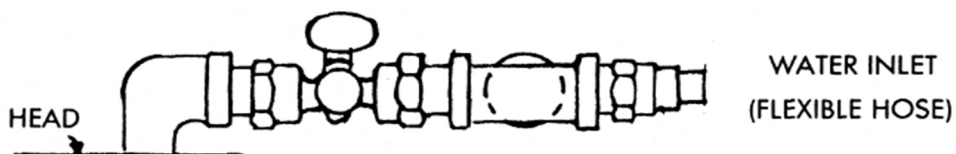


Figure 3-10: Cold Water Connection

3.5 Steam Connection

Steam rate pipe connections should be used for the steam supply line. The steam supply line should be installed approximately 14 inches above the steam control when the machine has been raised to approximately the middle of its glass height range. The flexible hose from the steam control to the supply line should bend in a uniform radius so that the hose will only bend in one direction as the machine head is adjusted up and down. The flexible hose and the supply line should be installed such that there is no area in which to trap steam condensate which could interrupt the steam flow. The supply line to the capper should come from the top side of the main supply or source. There should be a rise of 8 to 10 inches before going to the capper area. A steam pressure gauge should be installed in the supply line in clear view of the capper operator. This is in addition to the two gauges that are supplied with the capper steam control. If great fluctuations in steam pressure are encountered, it is suggested that a pressure switch be installed in the supply line to stop the machine whenever the pressure drops below a predetermined level.

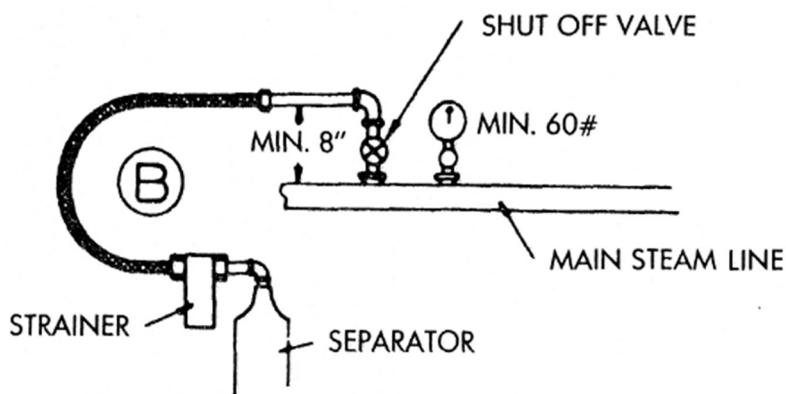


Figure 3-11: Steam Gauge & Shut Off Valve

3. INSTALLATION

3.5.1 Low Pressure Steam Supply Operating Instructions

These operations instructions pertain to the Low Pressure Steam Supply System 20RA3904(5-60PSI).

1. Open the main line before the separator and strainer to the full flow of steam. The steam supply should be operating at max. output.
2. Open fully petcocks at "H" and "J" (if mounted), these supply the cap chute and adapter (if used). Adjust valve "C" for desired steam pressure for cap heat, cap chute support or cap accelerator (if used).
3. Open fully valve "L" and run cold water checks to establish max. capper vacuum for jars to run. Record results and readings at gauges "F" and "E", with "F" not to exceed "45psi". Record the main line pressure which should be from 5-60 psig.
4. Throttle valve "L" until you reach the desired vacuum level in the package the customer's production needs. Record the settings of the gauge "E" for each package and product to be run, also note the main line pressure each time.

Each customer must furnish information on desired package results he needs compatible with the steam supply of the plant.

Note: the purpose of the steam in the capper is to heat the cap compound and dissipate the air in the headspace to achieve the final vacuum. This system is not to be used for sterilization of the product.

3. INSTALLATION

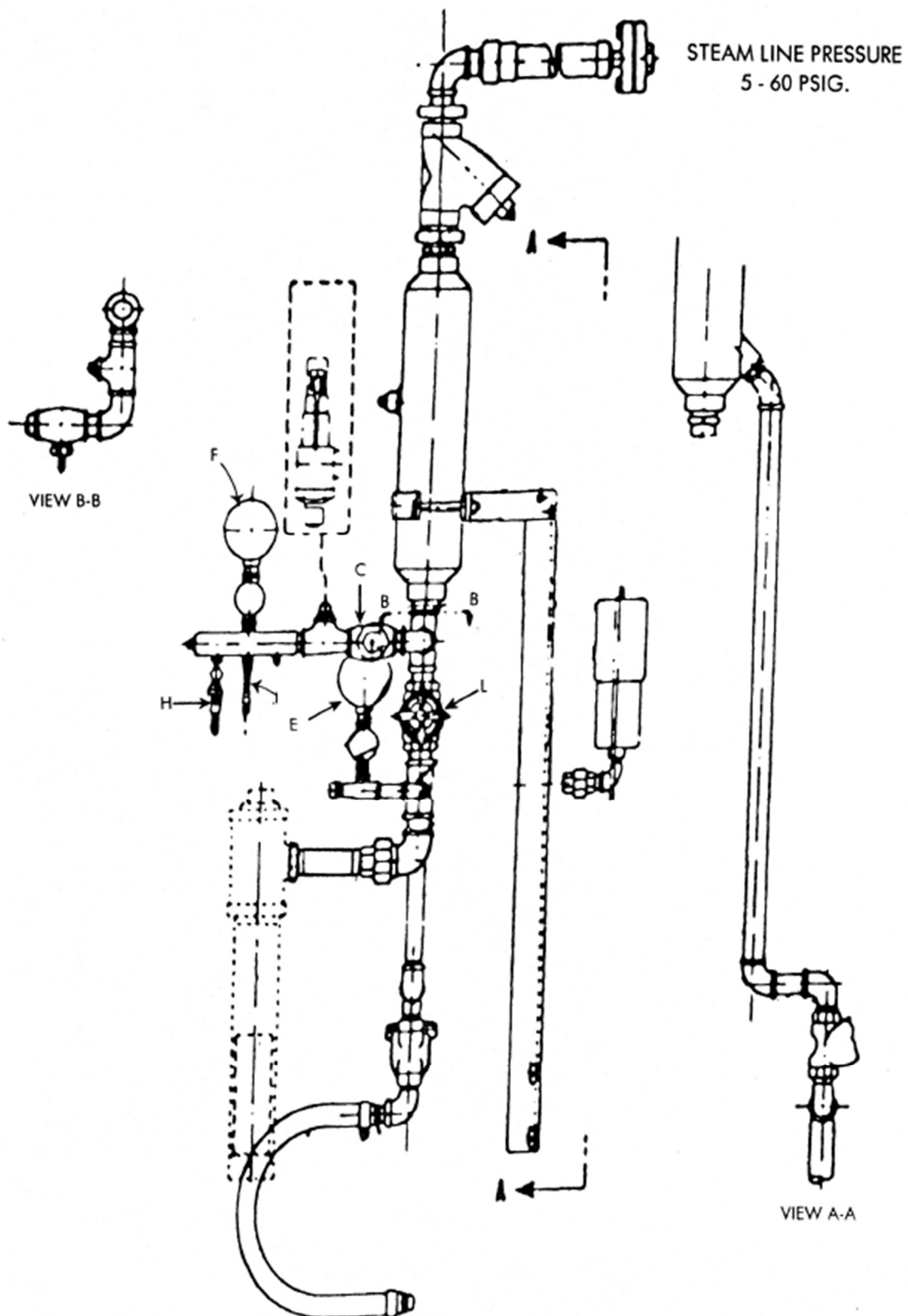


Figure 3-12: Low Pressure Steam System - 20RA3904

3. INSTALLATION

3.5.2 High Pressure Steam Supply Operating Instructions

These operations instructions pertain to the High Pressure Steam Supply System 20RA5234.

1. Open the main supply gate valve fully (supplied by customer) for a free flow of steam. The steam supply should furnish a min. of 60 psig. with a max. of 100 psig.
2. Open pet cocks "H" and "J" fully, these supply the cap chute support and adapter (if used). Open the drain needle valve on the cap chute support halfway.
3. With the valve "C" closed, open fully valve "L" and set the hi-low valve "D" open to the low side (90° to the pipe) as shown on drawing 20RA5234, view T-T.
4. Adjust the regulator "B" until the gauge "E" reads 45 psig. Open valve "C" until gauge "F" reads 30 psig which supplies steam to cap heater, cap chute support, or cap accelerator (if used).
5. Run cold water test procedure.

Following satisfactory results of the above test, the customer must now determine at what level of vacuum his product is to be run and make adjustments to the steam settings. For lower than max. vacuum, it may be determined that running with valve "D" on the low side is needed.

Note: It is to be noted that the purpose of the steam in the capper is to heat the cap compound and dissipate the air in the headspace to achieve the final vacuum. This system is not to be used for sterilization of the product.

3. INSTALLATION

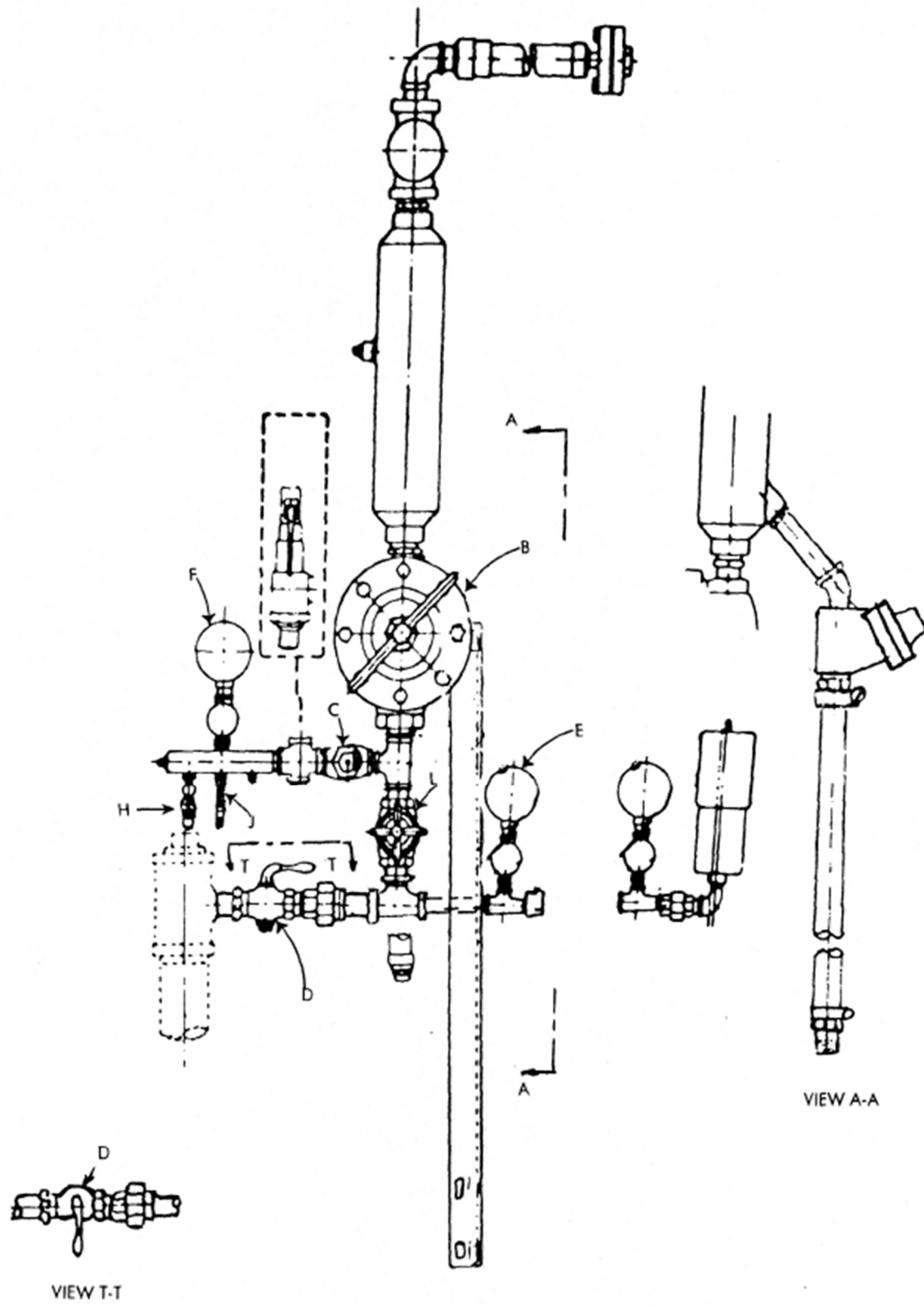


Figure 3-13: High Pressure Steam System - 20RA5234

3. INSTALLATION

3.5.3 Super Heated Steam Supply Operating Instructions

These operations instructions pertain to the Super Heated Steam Supply System 20RA5413G & 20RA5413.

1. The following steps are to be taken in order to operate the superheated steam system for its best performance.
2. Open the main supply gate valve "A" fully for a free flow of steam. Gauge "F" shows the steam pressure coming into the system. Do not exceed 100 PSIG into the system.
3. With the petcocks "H & J" fully opened to cap chute support and adaptor (if used) respectively, and with the drain needle valve on cap chute support halfway open, adjust the support-adaptor manifold "D" until the cap chute support pressure gauge "G" reads 30 psi. Petcock "K" goes to cap chute top guide.
4. Adjust the distributor regulator "B" so that the distributor pressure gauge "E" reads 7 psi with the Hi-Lo valve "C" open to high side (lever parallel to pipe). This setting will give high vacuum in the jar. Adjust distributor pressure regulator "B" for desired jar vacuum.
5. Allow the machine to warm up for 15 to 20 minutes, run cold water vacuum checks.

If low vacuum is desired, turn the Hi-Lo valve "C" to low side (lever crosswise to pipe). Adjust the distributor pressure regulator "B" to approximately 25 psi, or adjust to suit jar vacuum.

Note: The purpose of the steam in the capper is to heat the cap compound and dissipate the air in the headspace to achieve the final vacuum. This system is not to be used for sterilization of the product.

3. INSTALLATION

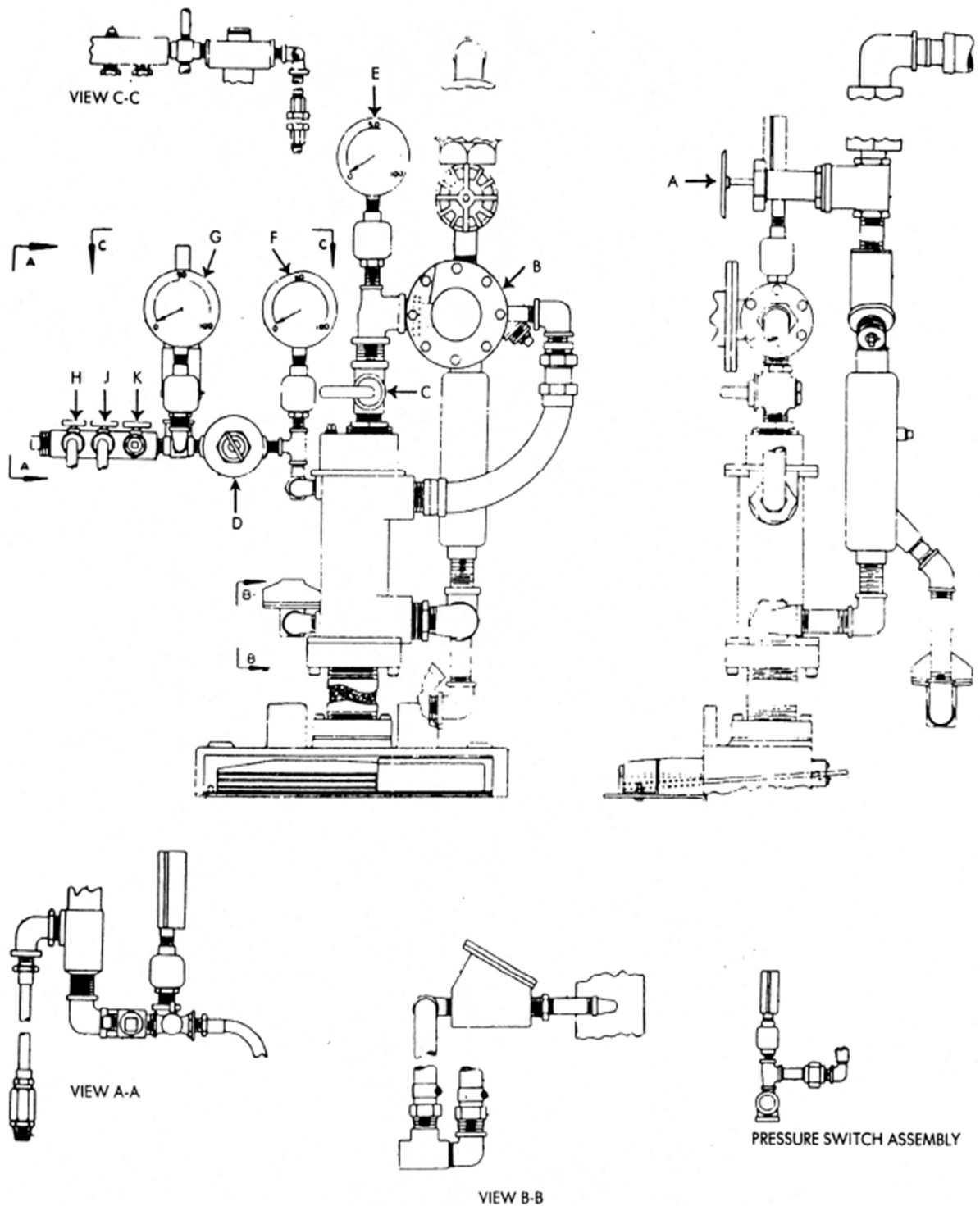


Figure 3-14: Super-Heated Steam System - 20RA5413G

3. INSTALLATION

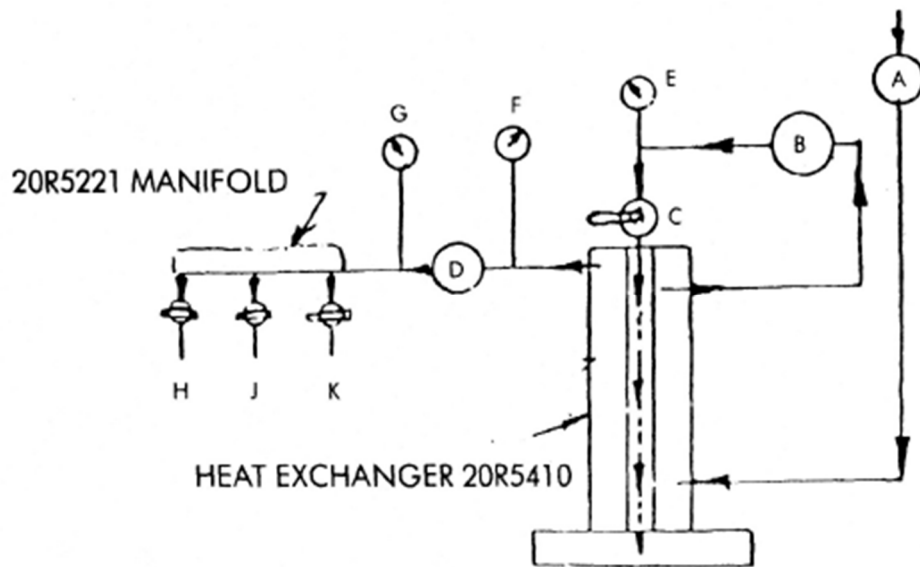


Figure 3-15: Manifold and Heat Exchanger

3.5.4 Accelerator Piping

This unit can be mounted as shown on the existing Field Assemblies. Pressure of the steam to be determined according to line requirements.

3. INSTALLATION

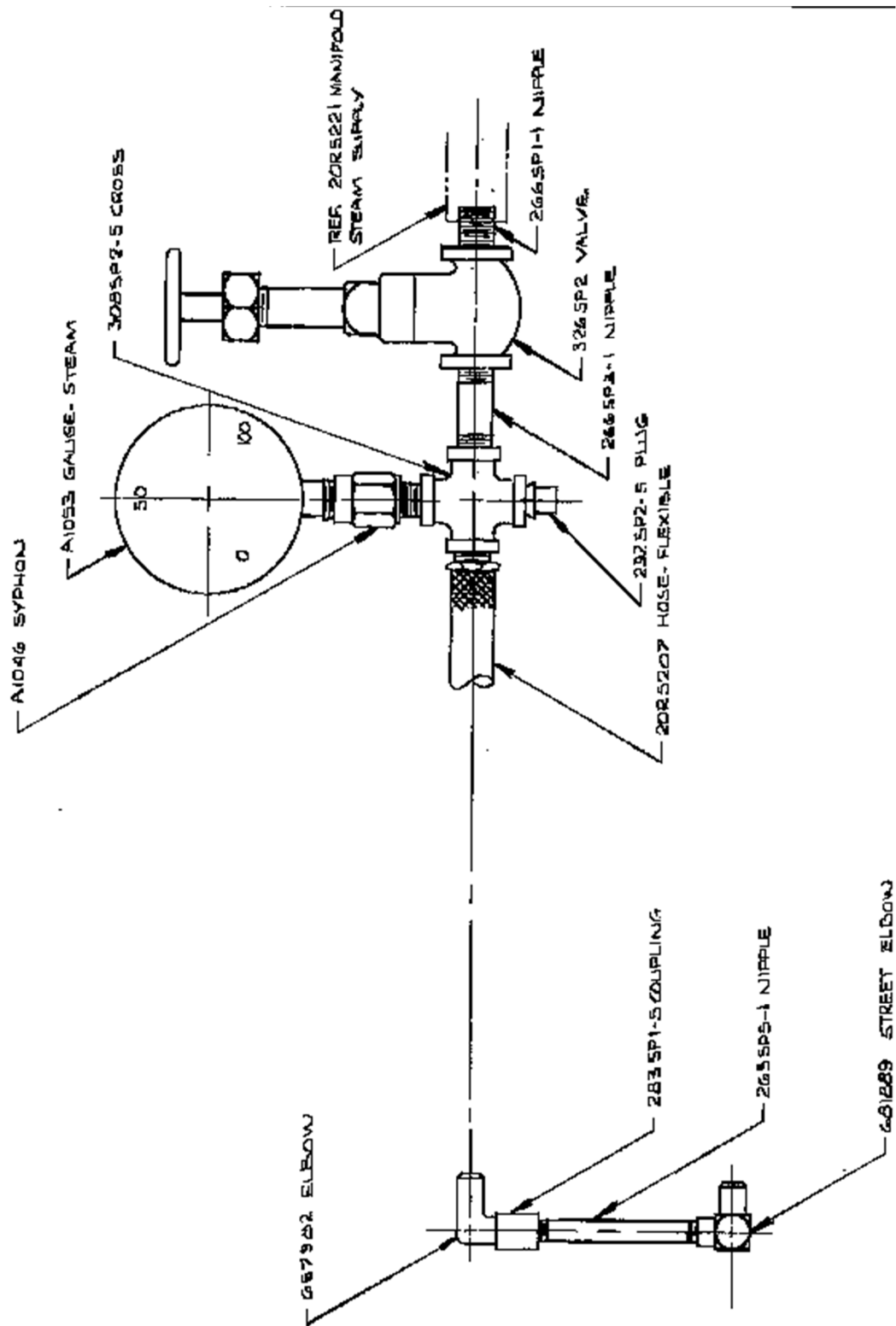


Figure 3-16: Accelerator Piping Assembly

3. INSTALLATION

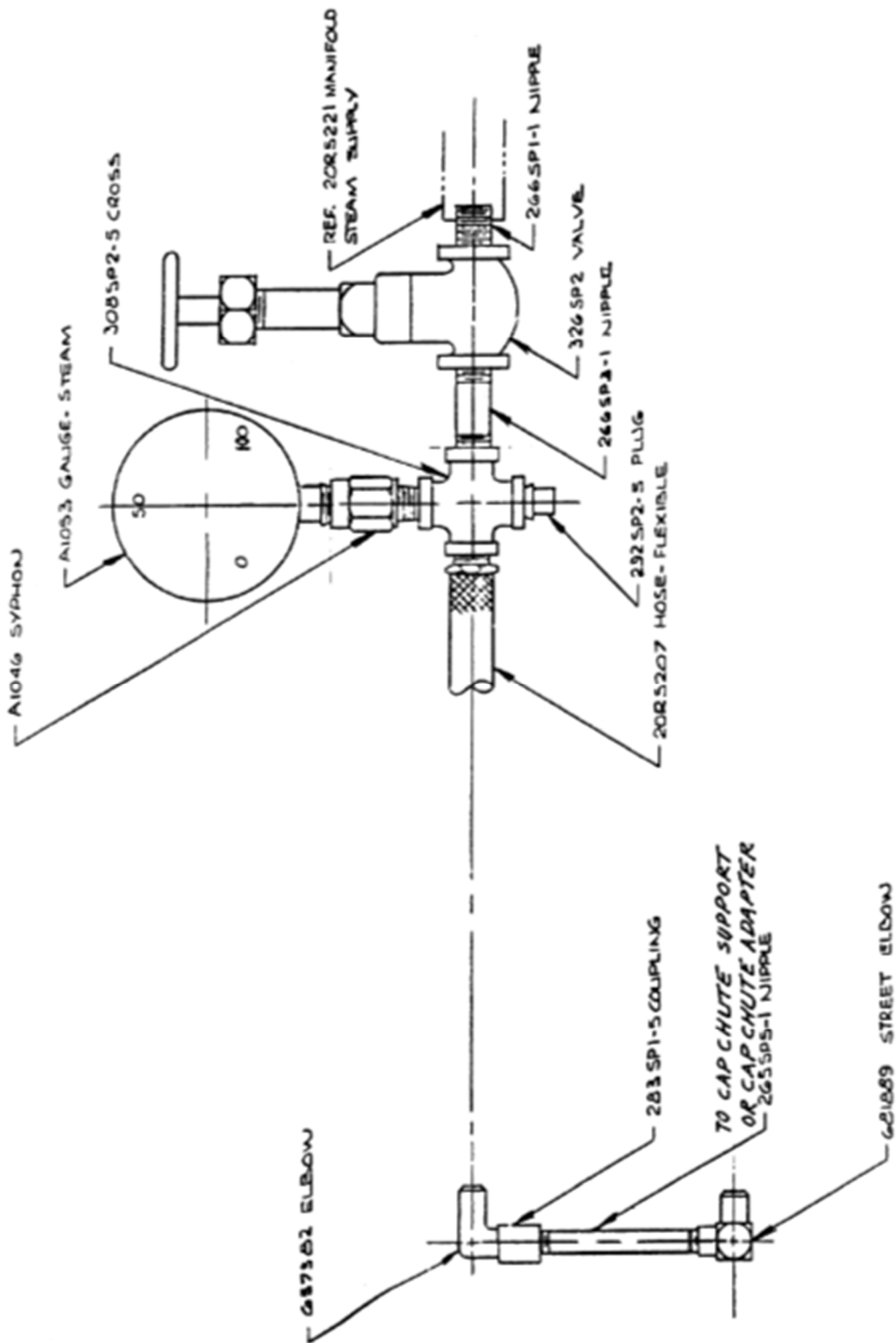


Figure 3-17: Accelerator Piping Assembly

3. INSTALLATION

3.6 Check Out Process

After the capping machine has been installed, the utilities have been connected, and the correct change parts are in place, the check out process follows.

3.6.1 Lubrication

Check all gear boxes and grease fittings. It is common for a gear box assembly to be drained of its lubricant prior to shipment. Refer to the Lubrication Schedule under the General Maintenance Section (*Section 7*).

3.6.2 Base & Head

The following information should be used to check out a new machine, an overhauled machine, or a machine that has been used during a heavy production season. When unlocking the head, be sure the head locking mechanism is fully unlocked before moving the head. The conveyor bed (*Item 1*) must be level from entrance to sealing pulley, within inch. The head (*Item 2*) must be level with the conveyor within $\pm 1/3"$ with the bottom of the sealing pulley shaft $1/4"$ higher than the hopper support rest. When in doubt, check the level of the entrance and discharge side belt roller brackets (*Item 3*). The centering device (*Item 4*) must be centered to the cap track. Forty links of the conveyor chain (*Item 5*) should measure 60". If it measures 60-3/8", change the pins. If it measures 60-1/2", change the chain.

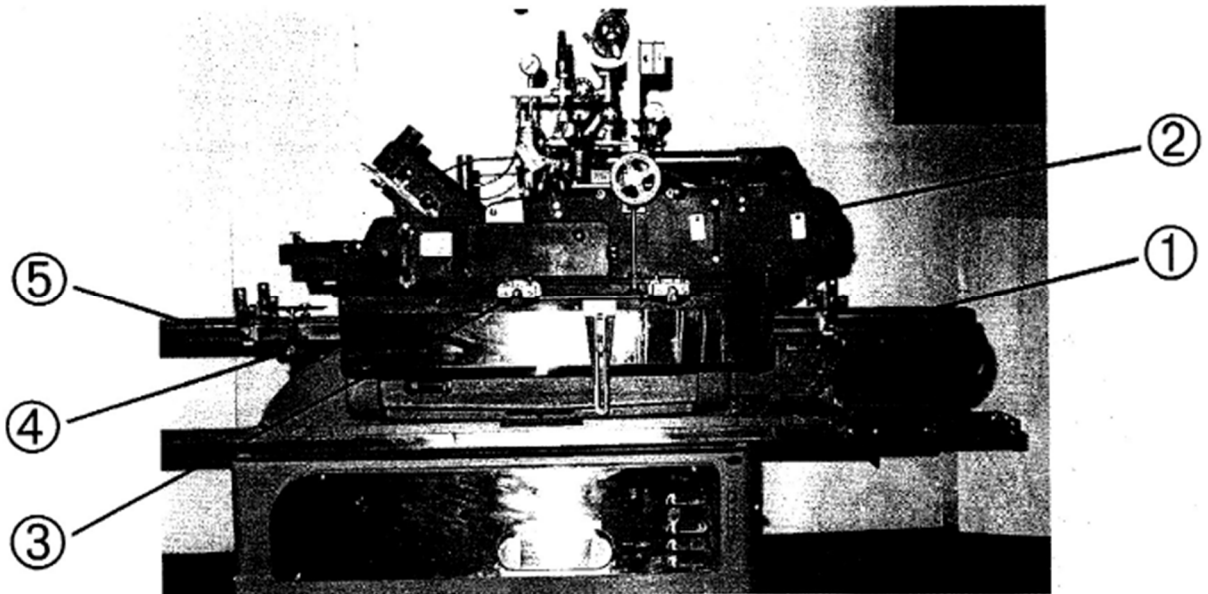


Figure 3-18: Front View of Capper

3. INSTALLATION

3.6.3 Track

The track ledges, from front to back, should be level with the conveyor within $1/32"$. The track assembly should be centered within $1/32"$. The track assemblies should be parallel within $1/32"$. The track assembly should point straight down the conveyor within $1/32"$. The entrance of the track ledge radius should blend with the cap chute plate. The track assembly should be free to bump down to level position (*Figure 3-19*).

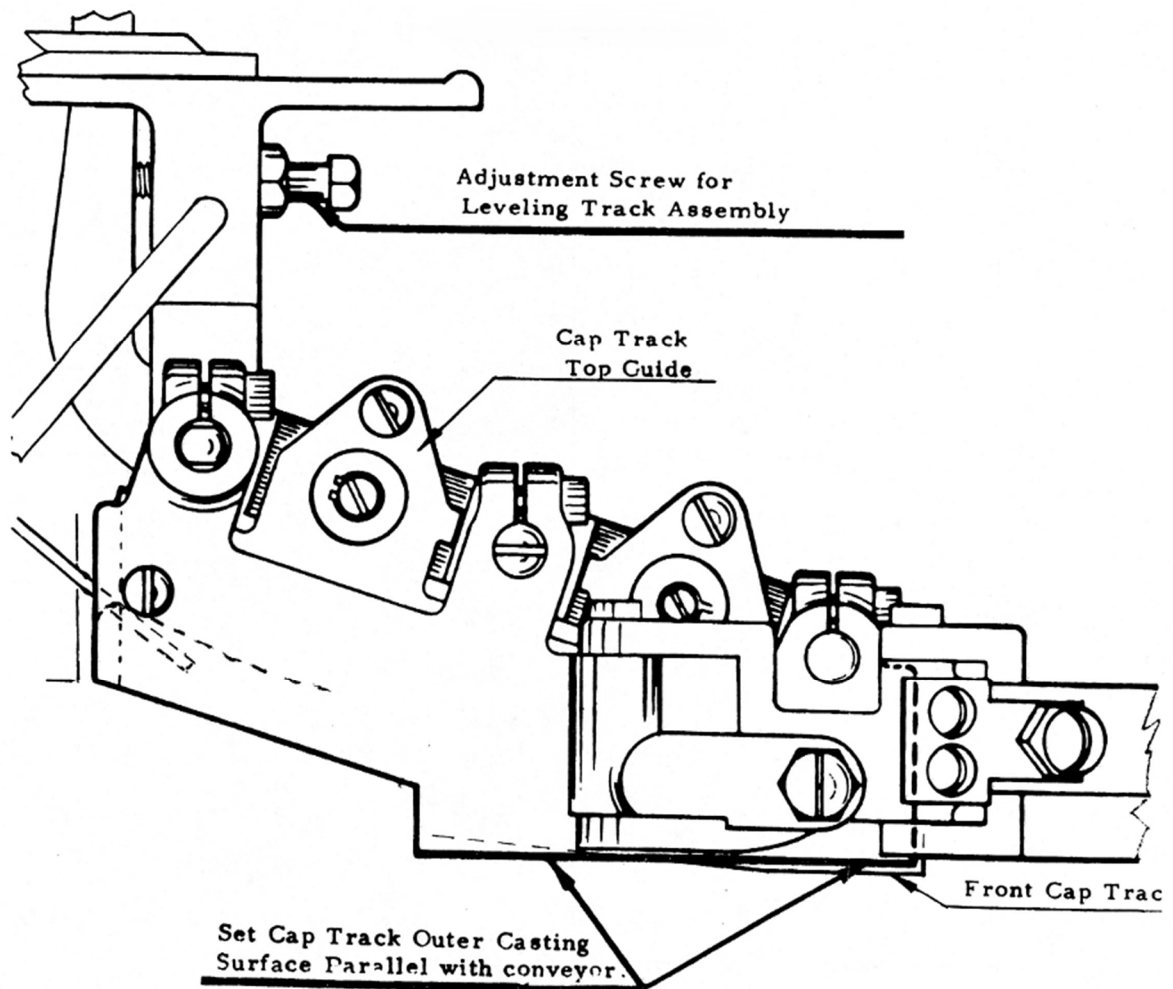


Figure 3-19: Track Assembly Diagram

3. INSTALLATION

3.6.4 Drag Arm, Duck Bill, Hold Down Assembly

If drag rubber (*Item 6*) is required, it should angle in $3/16'' \pm 1/16''$ when the leading edge is even with the inside of the front track (*Figure 3-20*). Remove the mold skin from the drag rubber. The beginning of the track assembly will clear the cap chute support by about $1/4''$, and the end of the brass drag arm will be about $1-1/8''$ from the center of the roller on the shoe (for wide mouth only).

The duck bill and hold down assembly (*Item 7*) should be parallel with the track ledges from front to back (*Figure 3-16*). The duck bill and hold down assembly should not interfere with each other nor contact the track assembly for extent of the operating movement. The duck bill and hold down assembly should move freely. The duck bill and hold down assembly should overlap the ends of the track by $3/8'' \pm 1/8''$.

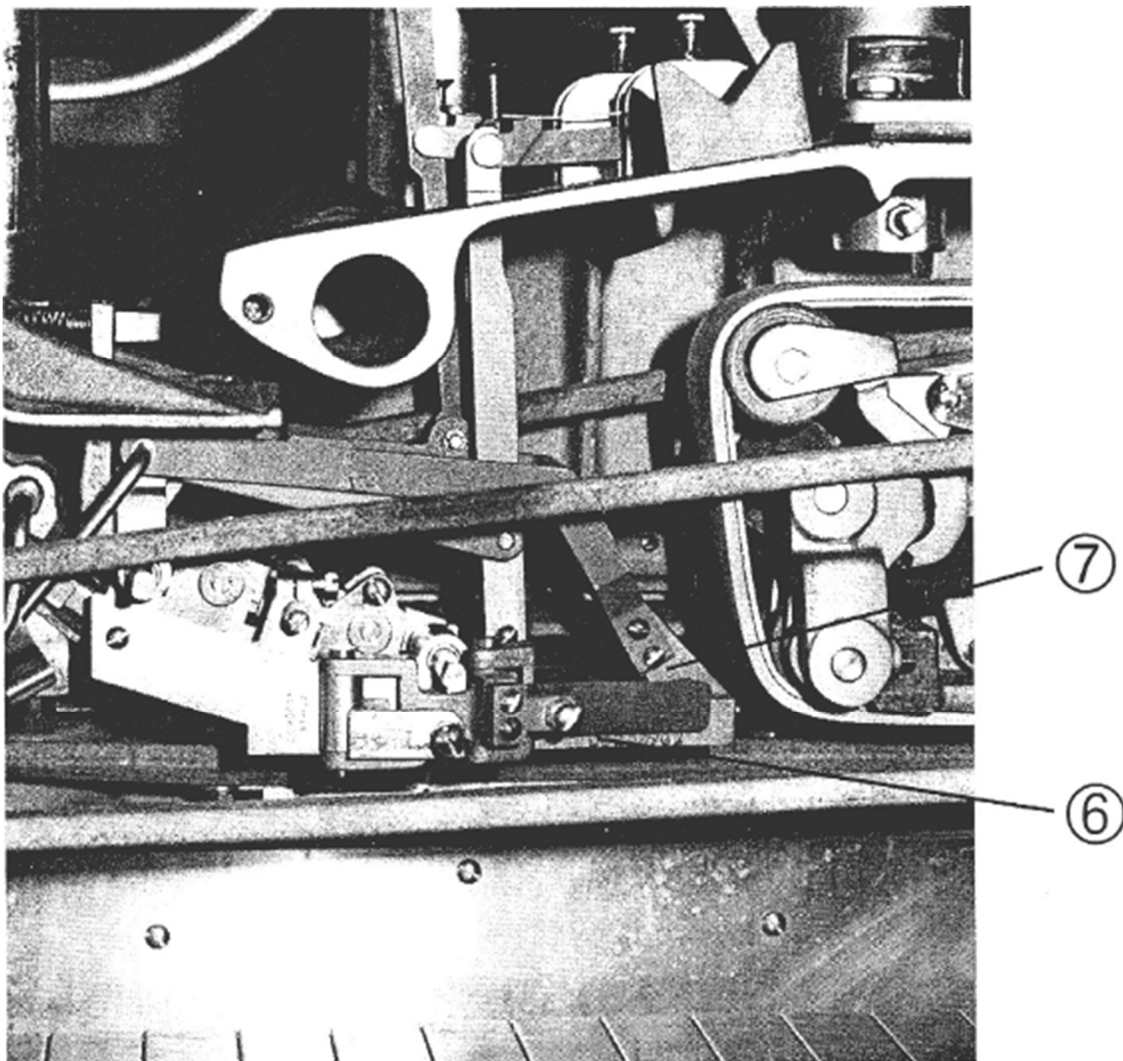


Figure 3-20: Drag Arm, Duck Bill, Hold Down Assembly

3. INSTALLATION

3.6.5 Sealing Shoes

The hanger rods (*Item 8*) should be centered with the sealing shoe (*Item 9*) set at operating height (*Figure 3-21*). The sealing shoe center can be verified by cranking a jar through with the sealing belts removed. For wide mouth jars, reference can be made to the V at the discharge end of the shoe. For 27 to 38mm caps, reference can be made to the deep groove in the shoe.

With spring pressure removed, the shoe should move freely up and down. The entrance hanger should clear the rib in the head. Check that all sealing shoe rollers (*Item 10*) are free. Check that the front tightener (*Item 11*) can be placed in the last notch. The tightener should not bottom after tightening the sealing belts. The sealing shoe should be level front to back within $1/64"$.

The rear belt (*Item 12*) speed should be $1-1/8" \pm 1-1/8"$ faster than the conveyor in 9" of travel. The front belt (*Item 13*) speed should be $1-1/8" \pm 1-1/8"$ slower than the conveyor in 9" of travel. The jar should clear the belt under the pulley by $3/16" \pm 1/16"$.

Mechanics should be instructed to eliminate false bump by keeping more spring pressure on the discharge hanger than on the entrance hanger.

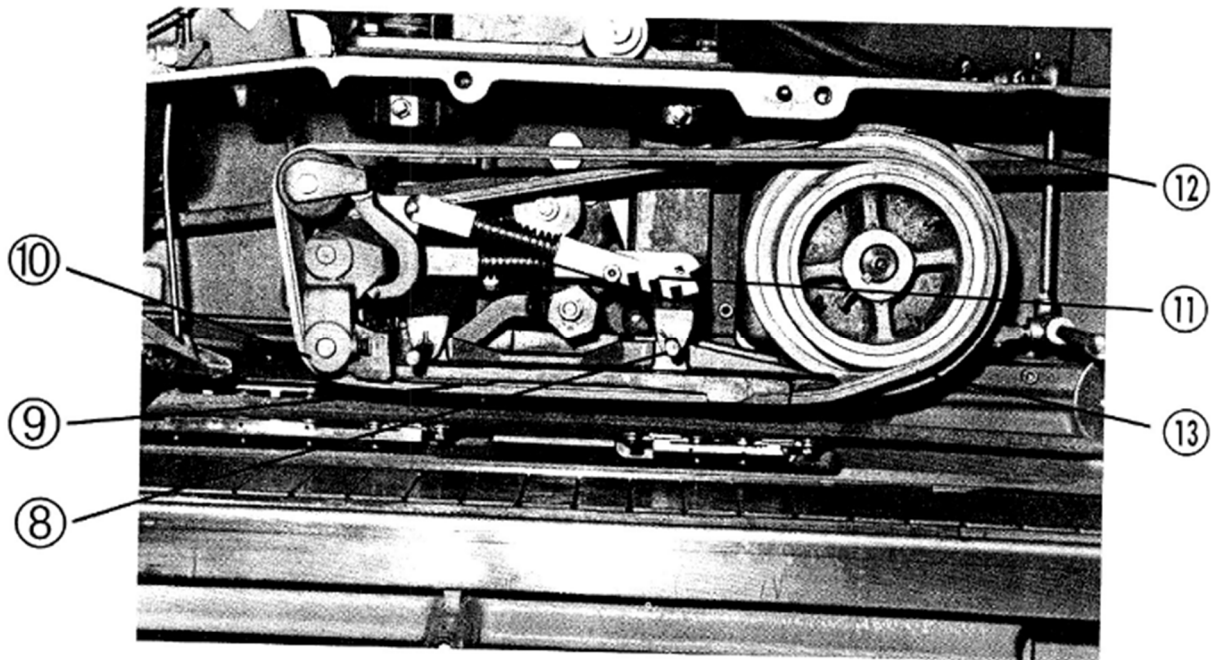


Figure 3-21: Sealing Shoe

3. INSTALLATION

3.6.6 Side Belts & Rollers

All rollers (*Items 14,15*) and idler pulleys (*Item 16*) should be free (*Figure 3-22*). Check for broken springs in the H casting and plungers. Check for frozen plungers. Verify the plunger thrust collar hasn't broken loose. Check that the discharge brackets (*Item 15*) have $1/32''$ more bump than the entrance side belt brackets.

Verify the side belts (*Item 17*) have enough tension so they will not slip. Ensure the belts are not so tight that the action is removed from the entrance H castings. The long entrance side belt brackets should be checked to determine if they have not been bent out of parallel. Check that the side belt roller brackets are opposite each other in height within $1/16''$. The side belts speed should be $3/8'' \pm 1/8''$ faster than the conveyor in 2' of travel. The belts should measure $21/32'' \pm 1/32''$ wide and $7/16'' \pm 1/32''$ thick.

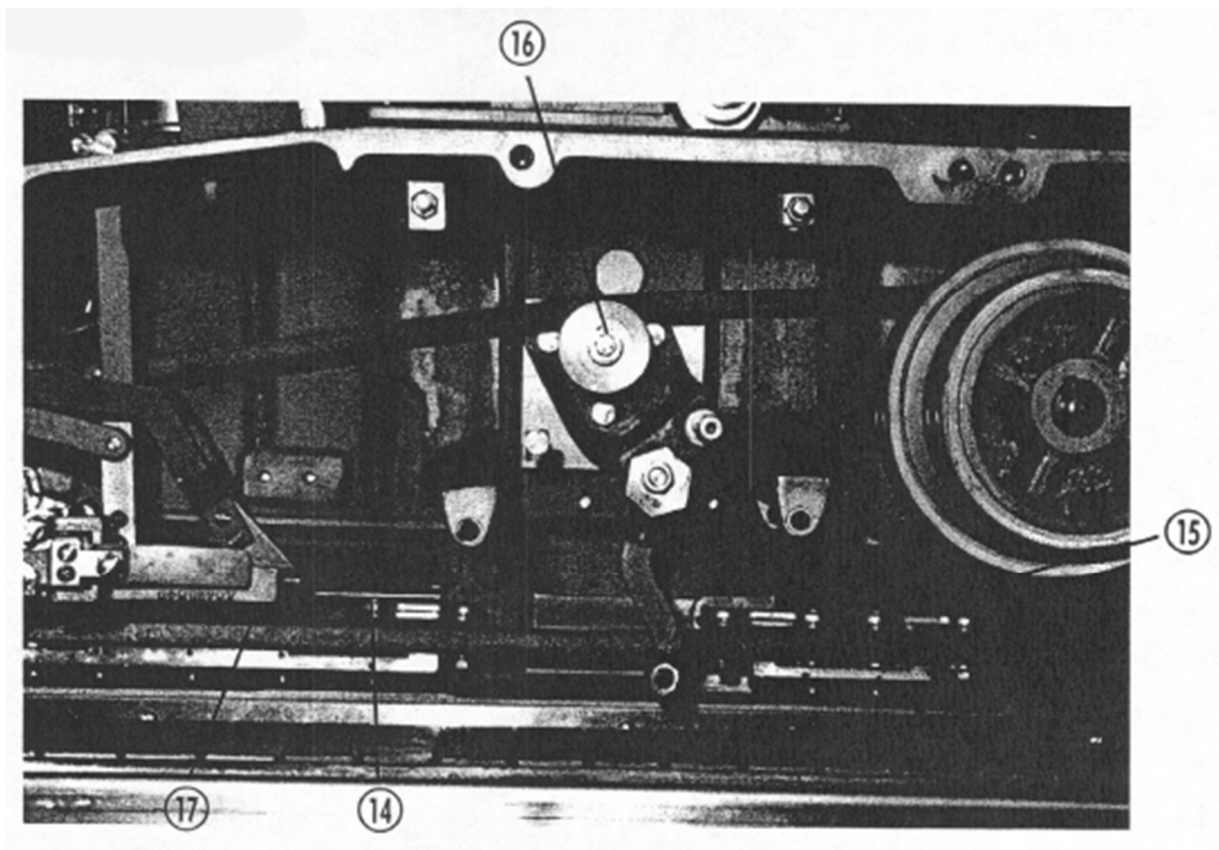


Figure 3-22: Side Belts and Rollers

4. SET UP PROCEDURES

4.1 Set-Up Preparations



Danger

The following steps should be taken before making the initial set up for any size cap or jar. Turn off steam and water supply. Turn off the power to the machine. Follow Lock out/Tag out procedures. Turn side belt adjustment wheel (*Item A*) to the widest position (*Figure 4-1*). This will prevent interference of roller brackets and belts while setting machine. Remove the stabilizer bolt (*Item B*). Remove the door (*Item C*).

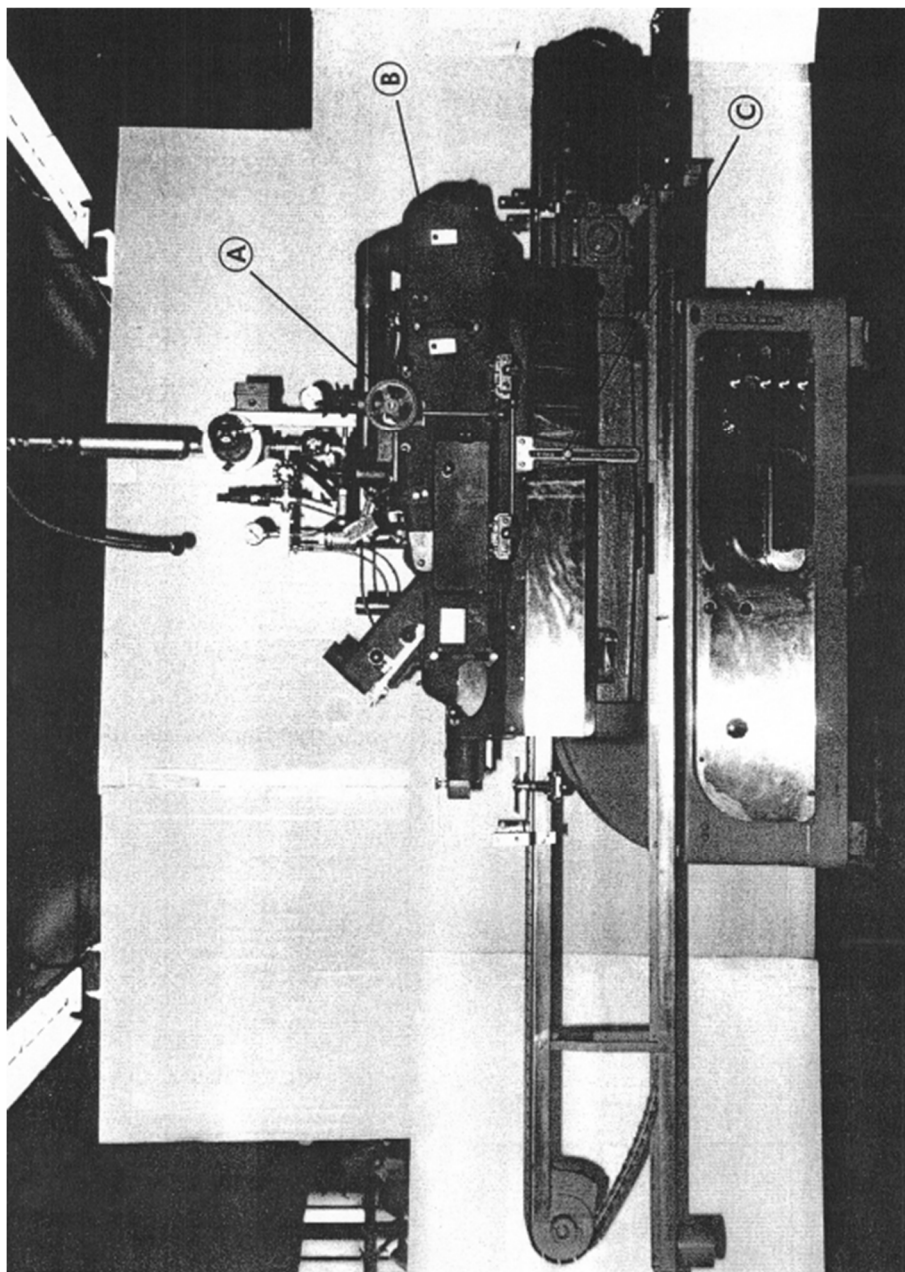


Figure 4-1: VG Capper

4. SET UP PROCEDURES

4.1.1 27-30mm DTO/DTF, MTO/MTB Cap Track Assembly

Width Adjustment Two Positions Only (Figure 4-2).

To set the cap track width to run 27mm caps, the socket head screws (*Item A*) must be in the position shown. Move the socket head screws to the holes marked (*Item B*) to set the cap track width to run 30mm caps. When changing from one size to another the screws in the slotted holes (*Item C*) must be loose. Check the cap track width by using the cap to be run as a gage. There should be approximately 1/32" clearance on each side of the cap throughout the length of the cap track assembly. The cap track assembly is available in two configurations for these sizes and cap styles, Standard and Dry Steam. Each is set up in the same manner.

Top Guide Setting Assembly using Notched Tracks (Figure 4-3).

Use the set screw (*Item A*) to adjust the height of the top hold back (*Item B*). With caps in the track, the top guide should be raised slowly until the cap falls into the notches. Lock in place. Pull a few caps through the notches to check the hold back setting. The hold back will raise up about 1/16" to 3/32". The hold back is spring loaded lightly but will have enough force to enable it to successfully hold back the line of caps awaiting the position in the notch. As the speed of the line increases the spring pressure will have to be increased.

Pick Up Height (Figure 4-3, 4-4).

In all cases when setting the pick up height, the setting is reached while raising the head. To start bring the head lower than necessary for the pickup and then raise it until the final position is reached. This is to be done regardless of type of stop, either stop pins or notched tracks, or the style of cap. Use the hand crank provided to unlock the head at (*Item H*). Turn the hand crank clockwise 1/2 turn to unlock the head. This will also uncover the screw (*Item G*) to be used to move the head up or down. Raise or lower the head to accommodate the bottle to be run. Use the hand crank on the shaft and turn clockwise to raise the head and counter clockwise to lower it. With caps in the cap track, raise or lower the head until the top of the bottle is 3/16" to 1/4" higher than the lowest part of the cap. Be sure that the glass lugs are below the track ledge (*Item 2*). The fixed chute should allow about 1/16" maximum total clearance of cap (*Item 3*). Be sure that the thimble of glass has a side play of about 1/16" between tracks (*Item 4*). Relock the head when the adjustment is completed. Retain the jar used for later height recheck.

4. SET UP PROCEDURES

Duckbill Setting (Figure 4-6, 4-7).

Using a bottle from the glass lot to be run, pull the cap out of the chute until the cap is just out on the bottle. Rotate the cap counter clockwise until the lugs of the cap are resting on the highest point on the thread of the glass. The duckbill (*Item J*) must be flat on the top of the cap when in this position. Use the two adjusting screws (*Item Z*). Apply a cap by hand, until the lugs on the cap are pulled up to the positive stops on the glass; fully sealed position on the angle flat finish. The duckbill should drop approximately 1/16" to 3/32" as the capped jar is moved toward the hold down (*Item K*). Set height using screw (*Item M*).

Hold Down Setting (Figure 4-7).

Using a fully applied "finger tight" cap, the hold down (*Item K*) must be set flat. To adjust, use the two screws (*Item L*). To set the height of the hold down use the adjusting screw (*Item M*). The hold down should not bump when running. The hold down is shown in the fast position. Loosen the screws and move the hold down to the left to run 30mm caps under speeds of 150 bottles minute and under 250 bottles per minute when using 27mm caps. Spring tension adjustments are made by using the screws at the top of the assembly (*Item N*). Start with a light amount of pressure. Increased spring pressure will be required as the line speeds become faster.

4. SET UP PROCEDURES

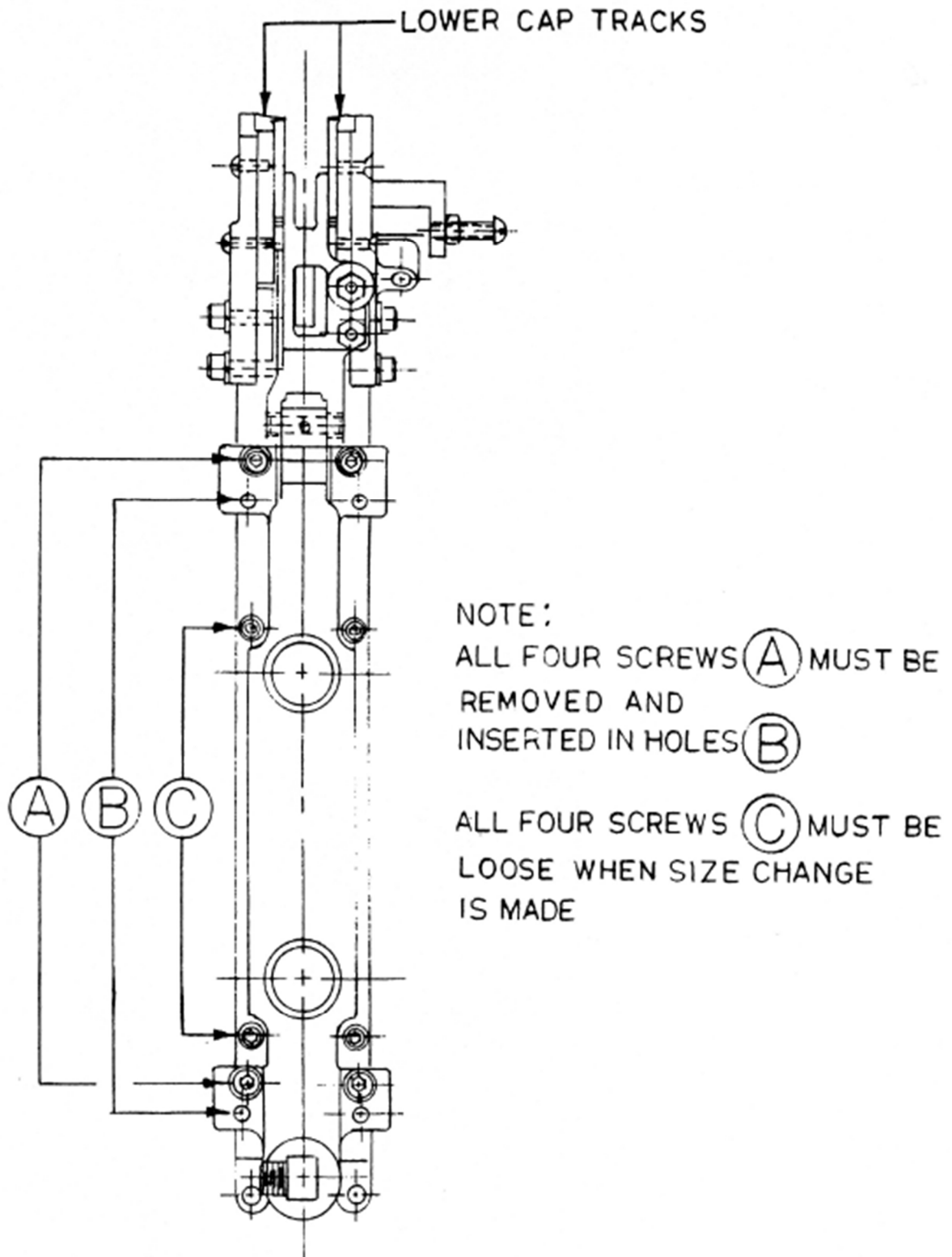


Figure 4-2: 27-30mm notched cap track assembly DTO/DTF - MTO/MTB

4. SET UP PROCEDURES

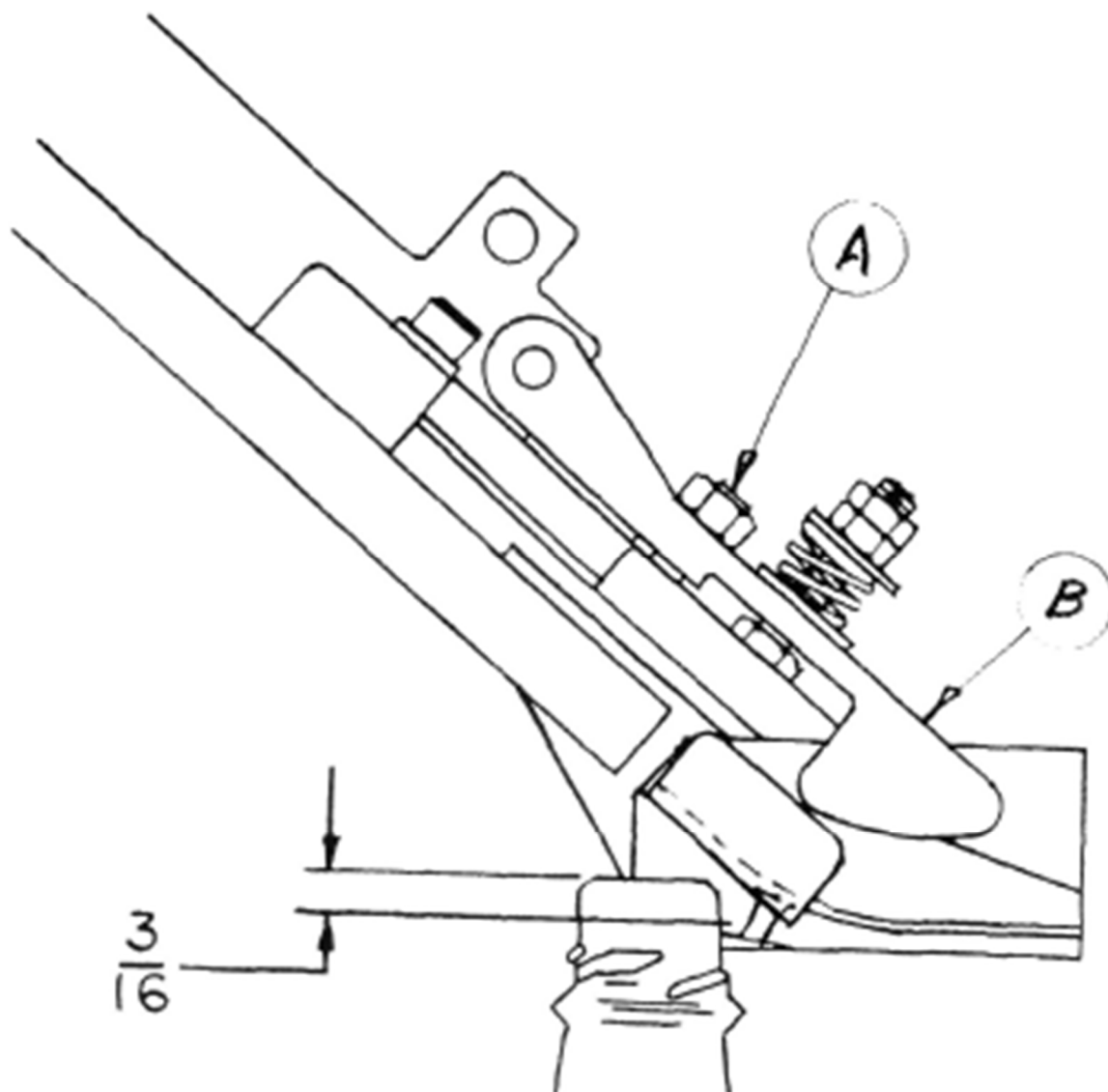


Figure 4-3: Top Guide Adjustment

4. SET UP PROCEDURES

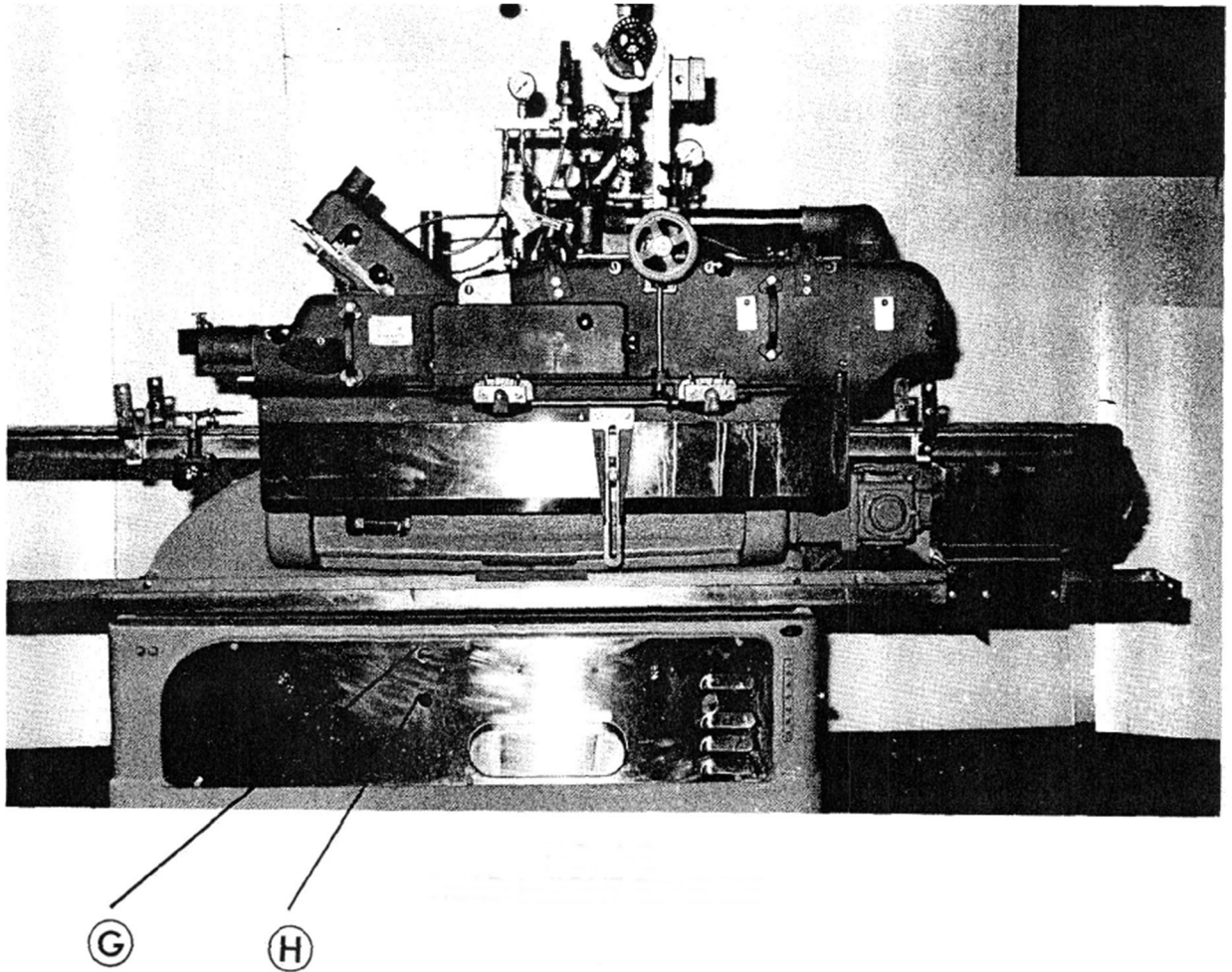


Figure 4-4: Head Height Settings

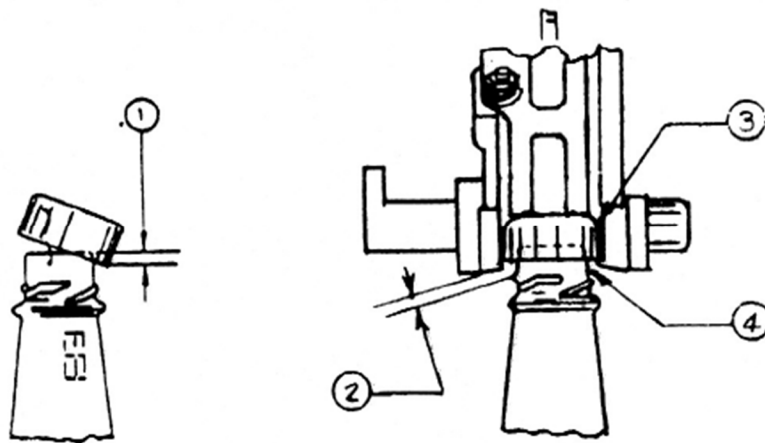


Figure 4-5: Cap Application Diagram

4. SET UP PROCEDURES

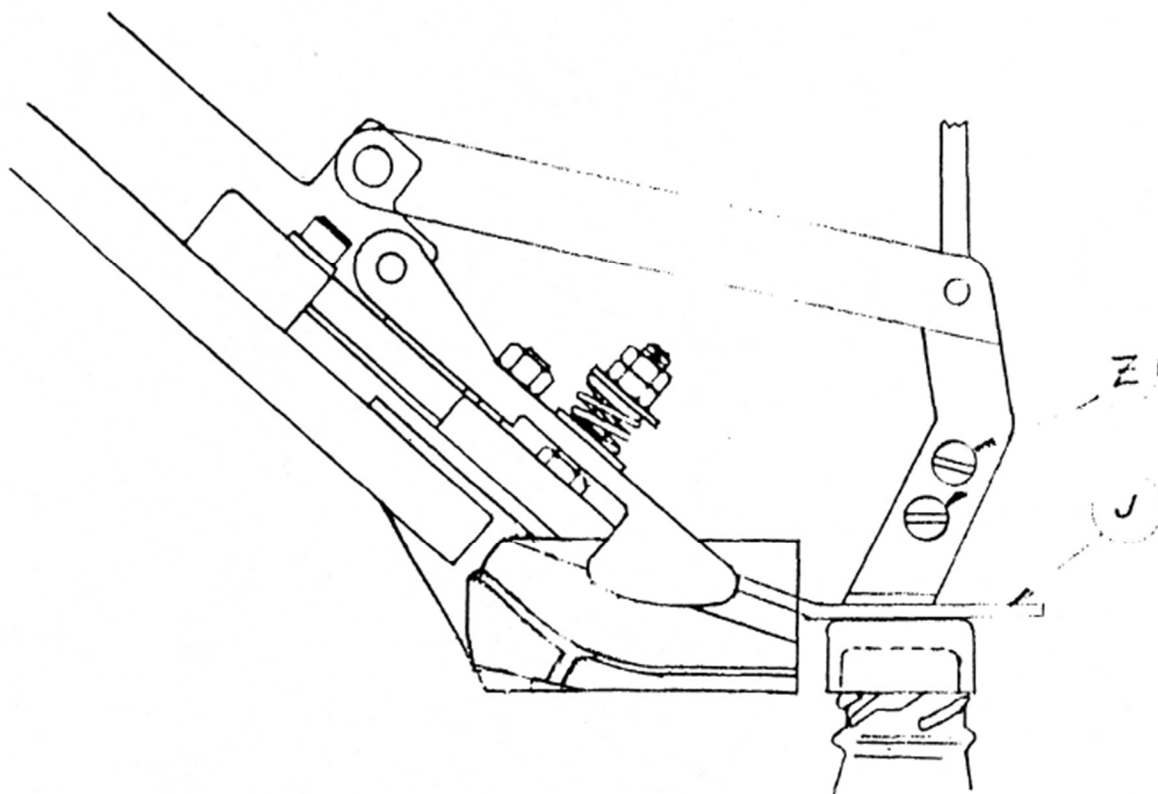


Figure 4-6: Duckbill Adjustments

4. SET UP PROCEDURES

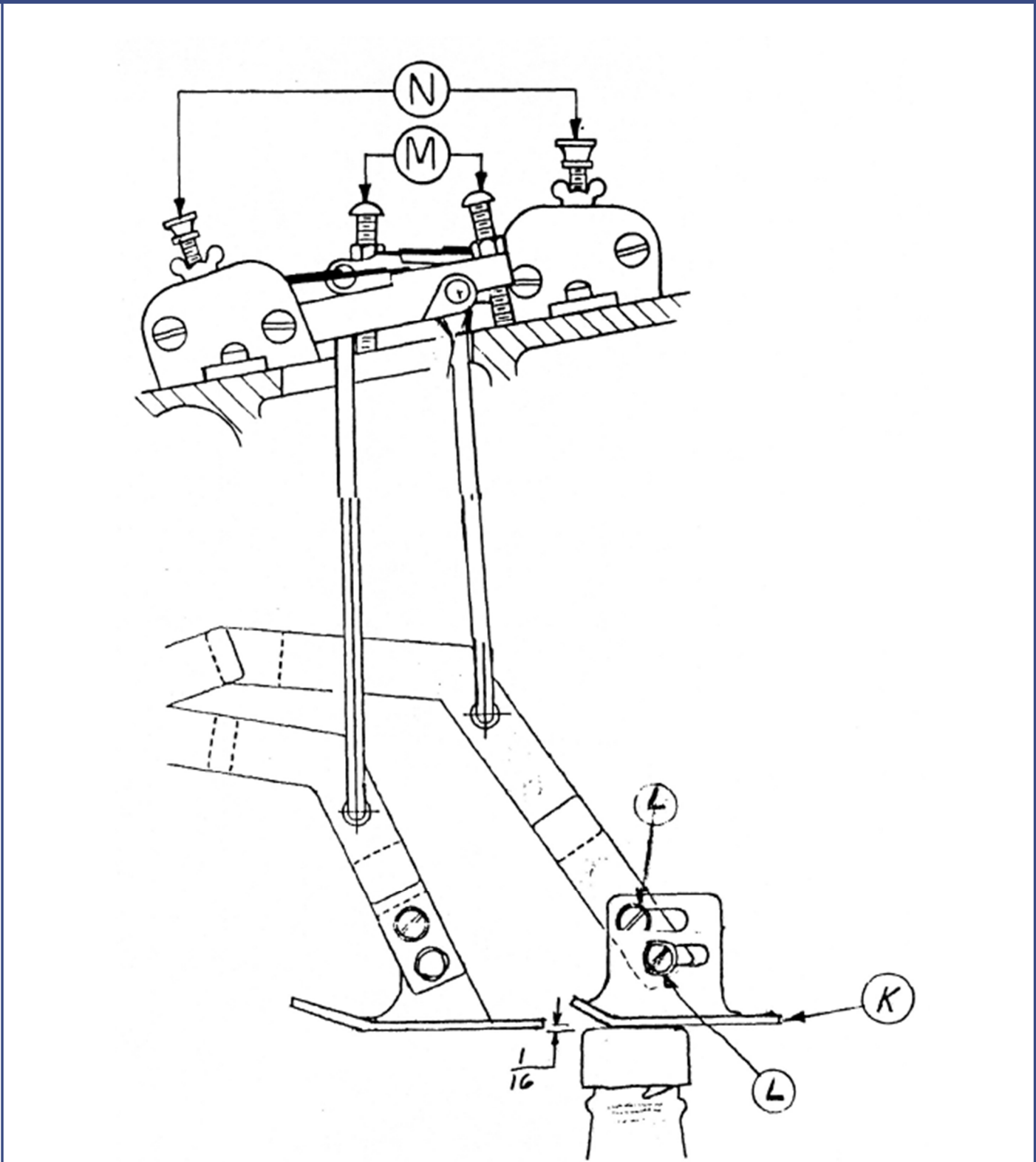


Figure 4-7: Duckbill & Hold Down for 27-38 MTO-MTB-RTO & DTO

4. SET UP PROCEDURES

4.1.2 33-38mm Cap Track Assembly (DTO/DTF, MTO/MTS)

Width adjustments are not made since all units are made for one size only and each has a rigid bridge at the pick up end. These assemblies exist in the standard notched track and the Dry Steam version which is also a Notched Track Assembly. All adjustments for Head Height, Cap Pick-up, Duck Bill, and Hold Down are similar to 27-30 DTO (*Figures 30, 31, 33, 34*).

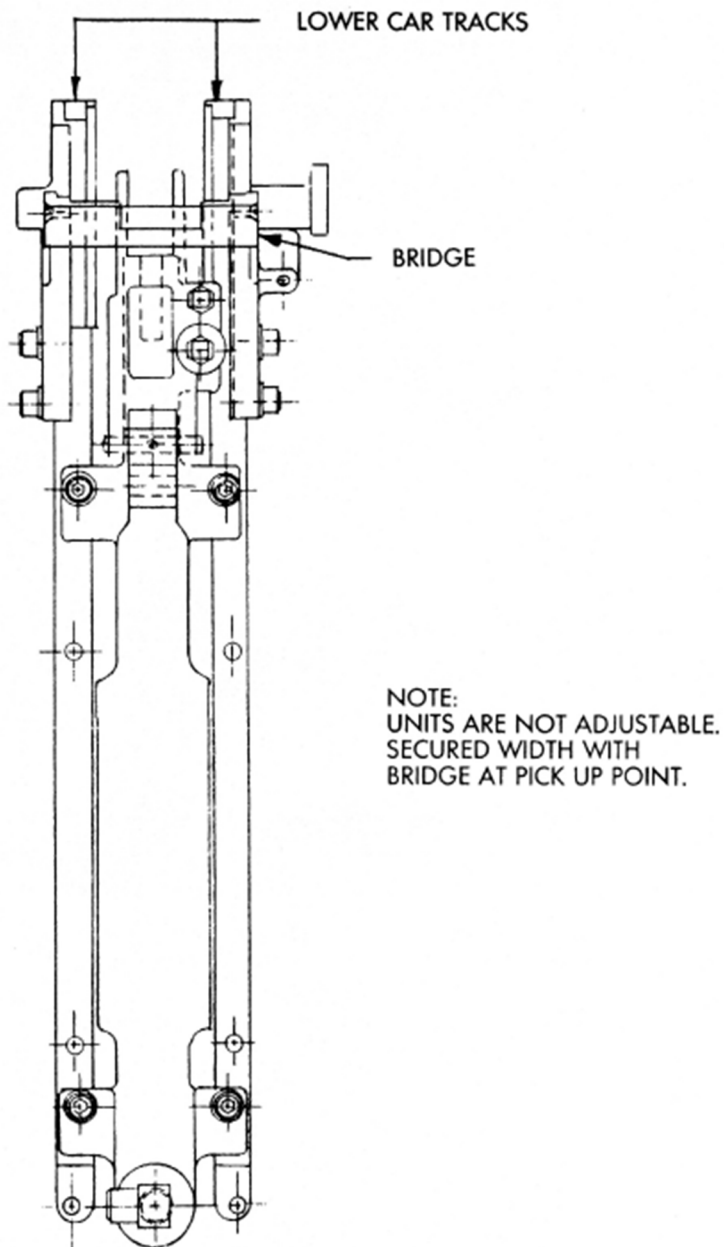


Figure 4-8: 33-38mm Cap Track Assembly

4. SET UP PROCEDURES

4.1.3 27-33mm Cap Track Assembly (RTO / RTB)

Width adjustment

27mm cap chutes are rigid assemblies and are not changeable (*Figure 4-9*). 38 RTO standard chute is also rigid and not a convertible unit. 33-38mm cap chute used for the Dry Steam Package is convertible to either size by means of optional bridges. Disassemble the top guide assembly from the front and back rail and reassemble according to cap size (*Figure 4-10*). Check the cap track width by using the cap to be run as a gauge. There should be approximately 1/32" clearance on each side of the cap throughout the length of the cap track assembly.

Top Guide Setting

Use the set screw (*Item D*) to adjust the height of the top guide wheel (*Item F*). The wheel should be set to clear the top of the cap by 1/64" when the cap is resting on the stop pins. This is the normal pick up position. Pull a few caps through the stop pins to check the wheel height setting. The wheel should spin slightly when a cap is pulled through, but no up and down motion of the top guide wheel should be observed. The Top Guide Wheel is spring loaded to compensate for height variations in the container and to allow for easy removal of an upside down cap. The spring pressure is regulated by using the Screw (*Item E*). A moderate amount of spring pressure should be used.

Top Guide Setting

The settings are the same as used for the DTO caps in the previous section (*Figures 4-3~4-5*).

Pick Up Height

Setting pick-up height is performed while raising the head to take up the play in gears, chain, etc. Use the hand crank provided to unlock the head at (*Item H*). Turn the hand crank clockwise 1/2 turn to unlock the head. This will also uncover the screw (*Item G*) to be used to move the head vertically (*Figure 4-12*). Raise or lower the head to accommodate the bottle. Use the hand crank on the shaft at (*Item G*). Turn clockwise to raise the head and counter clockwise to lower it (*Figure 4-12*). With caps in the cap track, set the pick up height with a lug lightly resting on the highest point of the glass thread (*Item 1*) (*Figures 4-13, 4-14*). Be sure that the glass lugs are below the track ledge as shown in (*Item 2*). The fixed chute should allow about 1/16 inch maximum total clearance of cap (*Item 3*). Be sure that the thimble of glass has a side play of about inch between tracks (*Item 4*). Relock the head when the adjustment is completed. Retain the jar used for later height recheck. For Duckbill and Hold Down Settings, sealing shoe Adjustments, and Spring Pressures follow all the instructions given in the DTO / DTF Section (*Figures 4-3~4-7*).

4. SET UP PROCEDURES

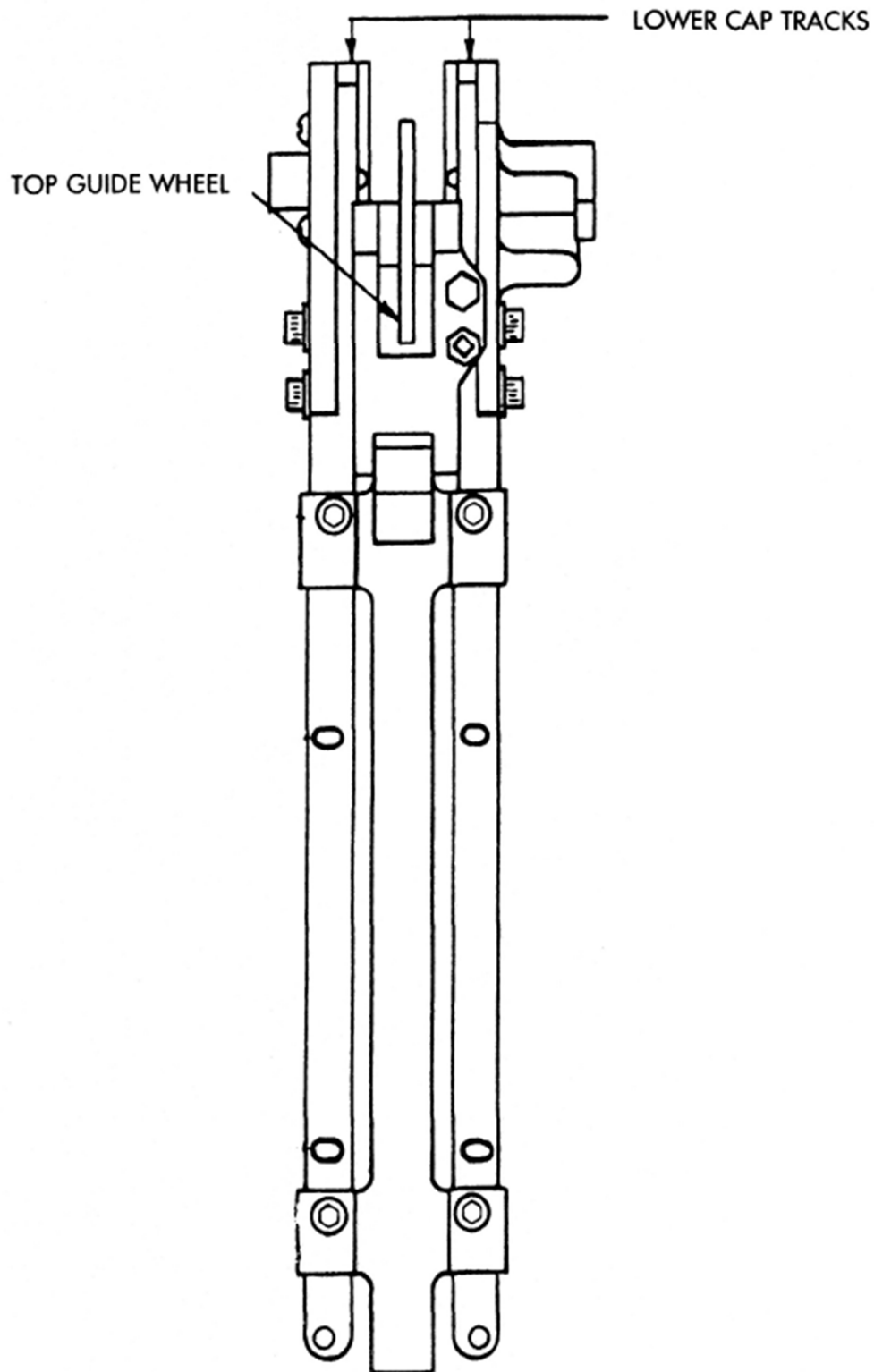


Figure 4-9: Cap Chute Assembly (27 RTO)

4. SET UP PROCEDURES

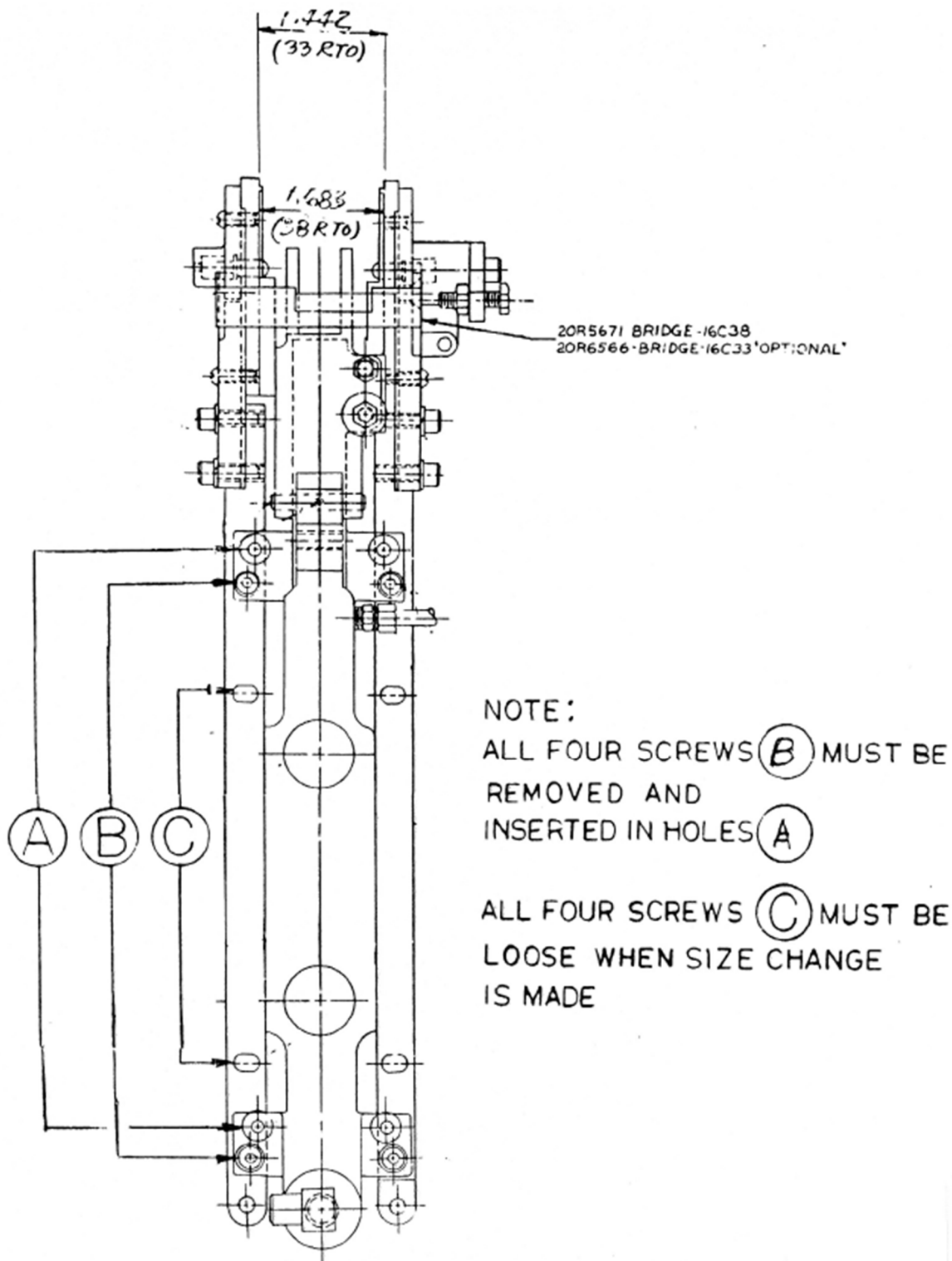


Figure 4-10: 33-38 RTO Cap Track Assembly

4. SET UP PROCEDURES

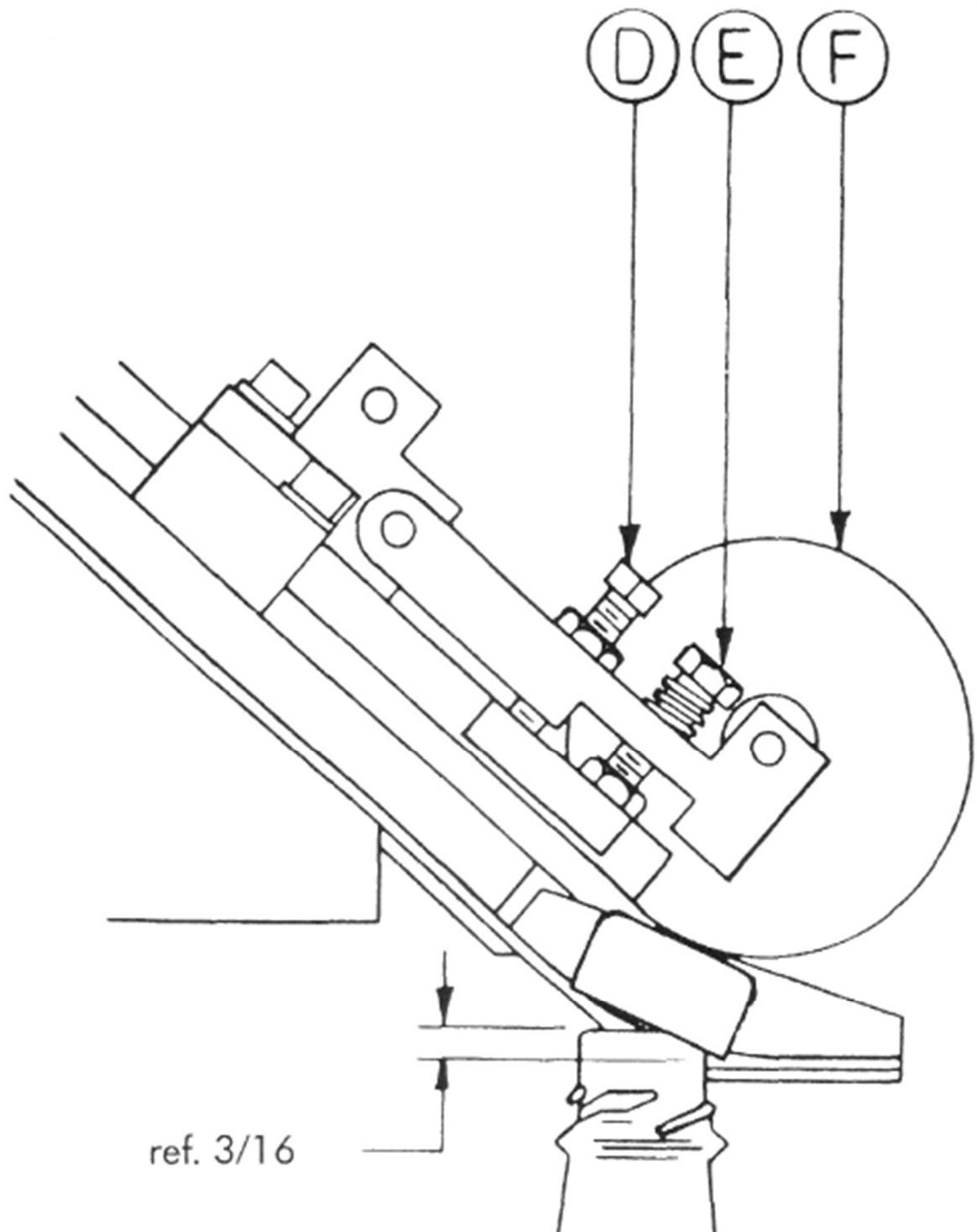


Figure 4-11: Top Guide Setting

4. SET UP PROCEDURES

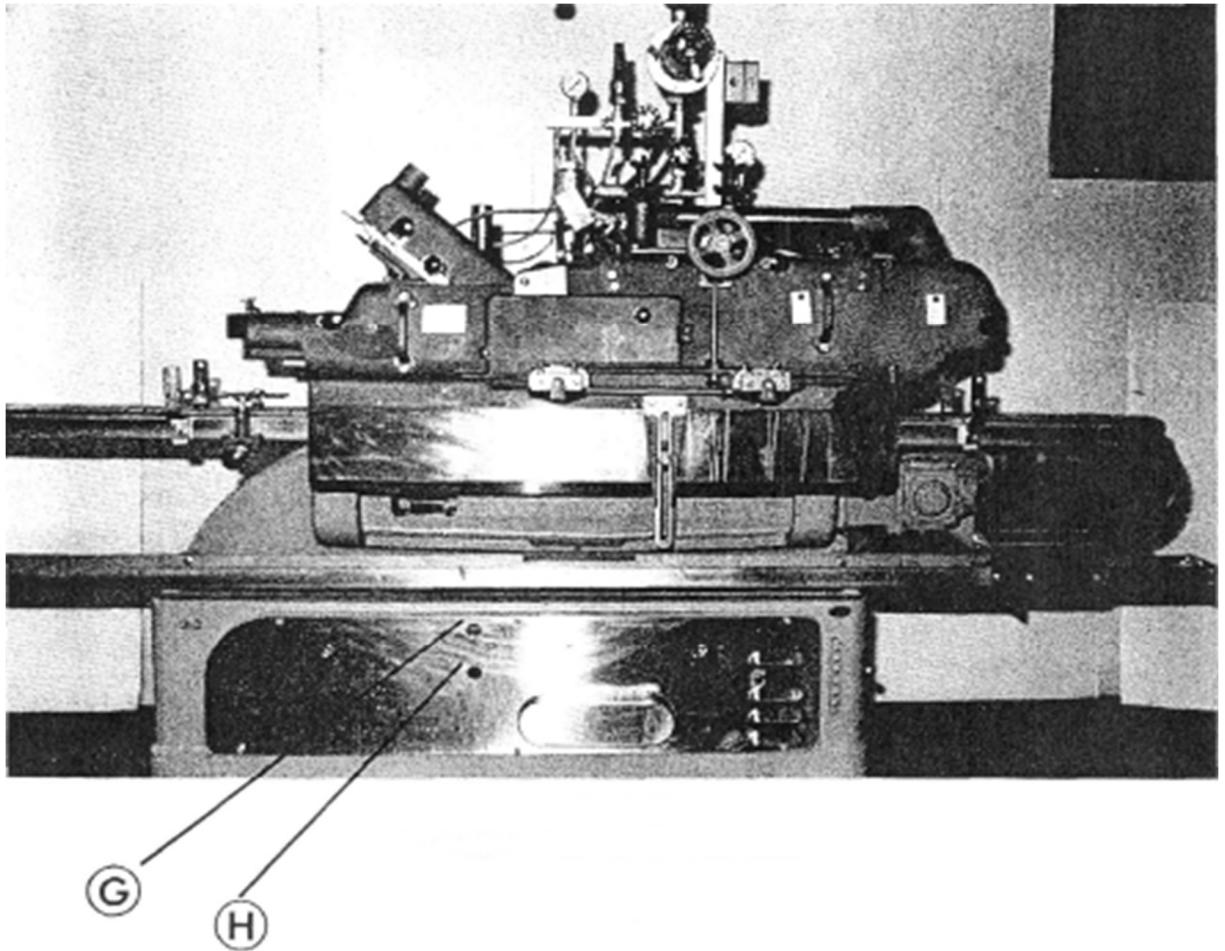


Figure 4-12: Head Height Setting

4. SET UP PROCEDURES

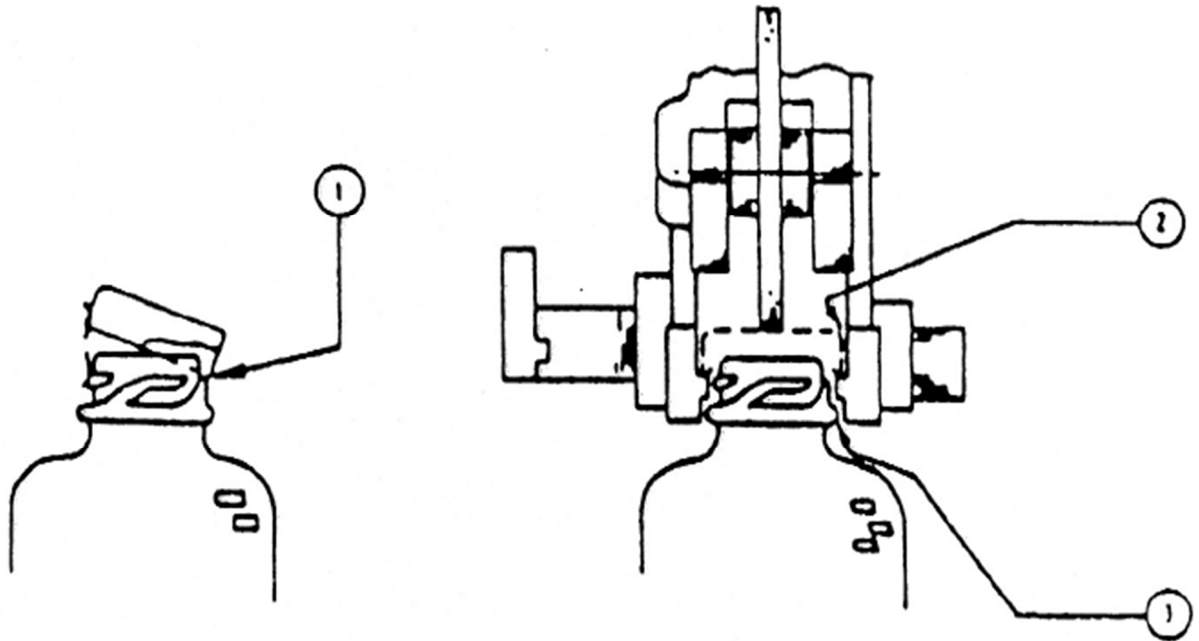


Figure 4-13: RTO/RTB, FAO/FAB Caps Pick Up Height Adjustments

4. SET UP PROCEDURES

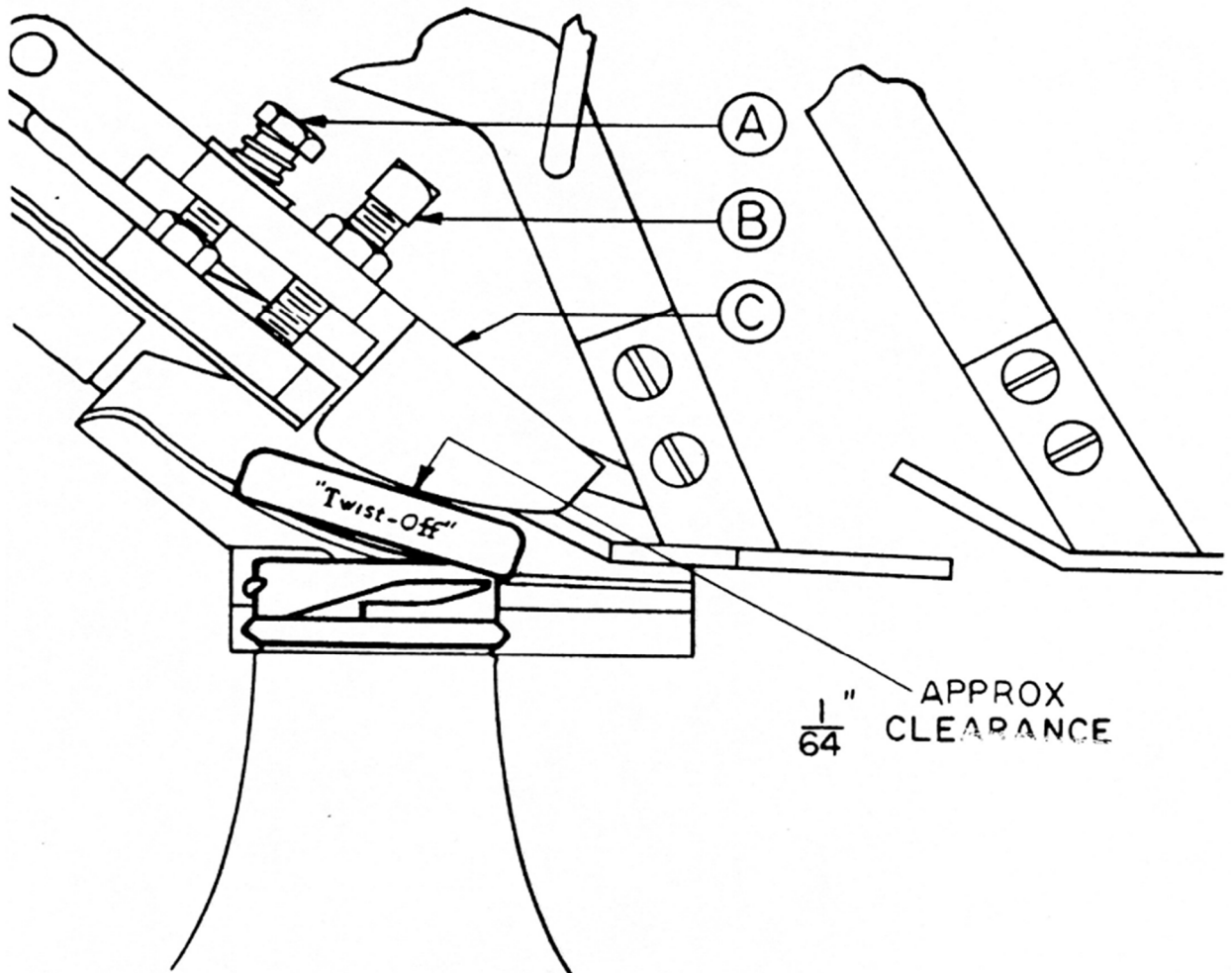


Figure 4-14: Head Height Setting 38mm

4. SET UP PROCEDURES

4.1.4 43-89mm RTO, 58-100mm DWB

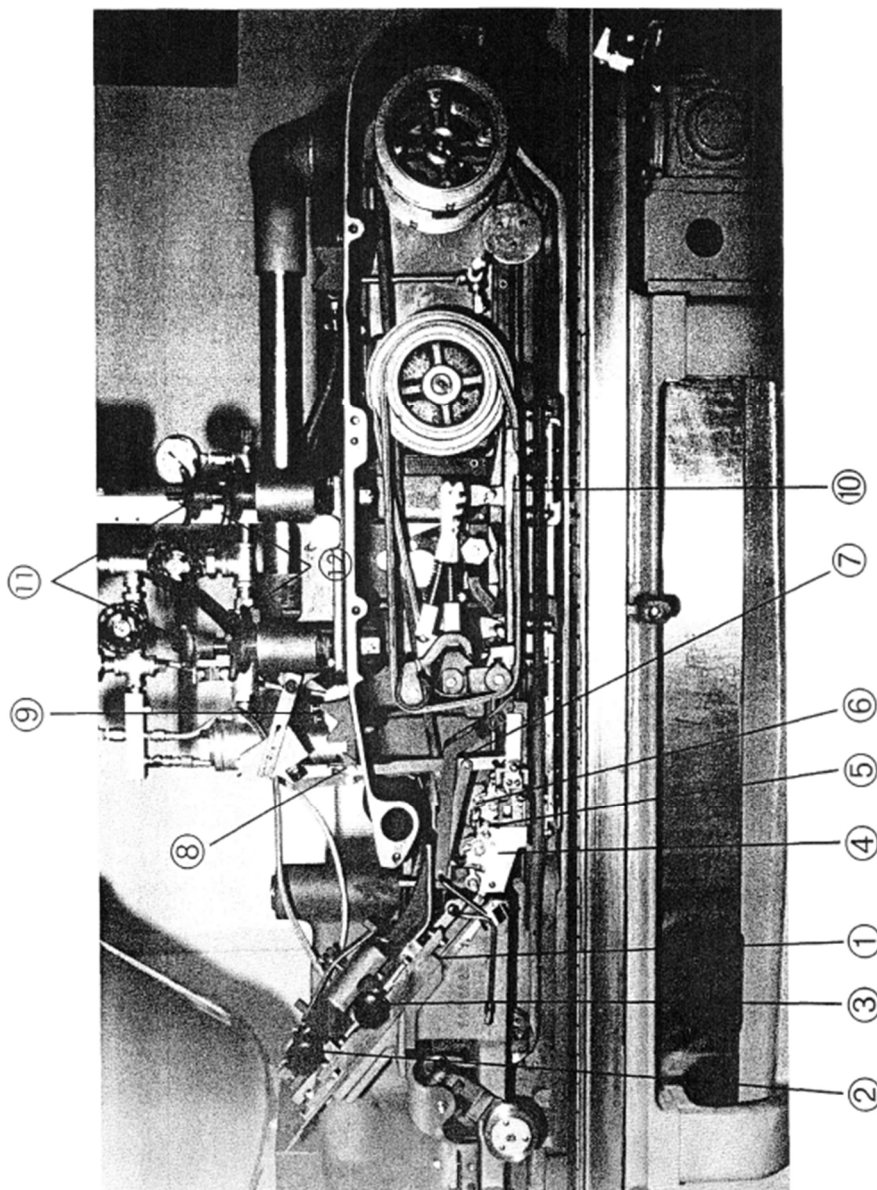


Figure 4-15: Capper Side View

Item	Description	Item	Description
1	Cap Track Assembly	7	Duck Bill Assembly
2	Top Heater Height Adjustment	8	Duck Bill Height Adjustment
3	Cap Track Width Adjustment	9	Duck Bill Spring Tension Adjustment
4	Lower Cap Track	10	Sealing Shoe
5	Lower Cap Track Width Adjustment	11	Sealing Shoe Height Adjustment
6	Top Guide Height Adjustment	12	Sealing Shoe Spring Tension Adjustment

4. SET UP PROCEDURES

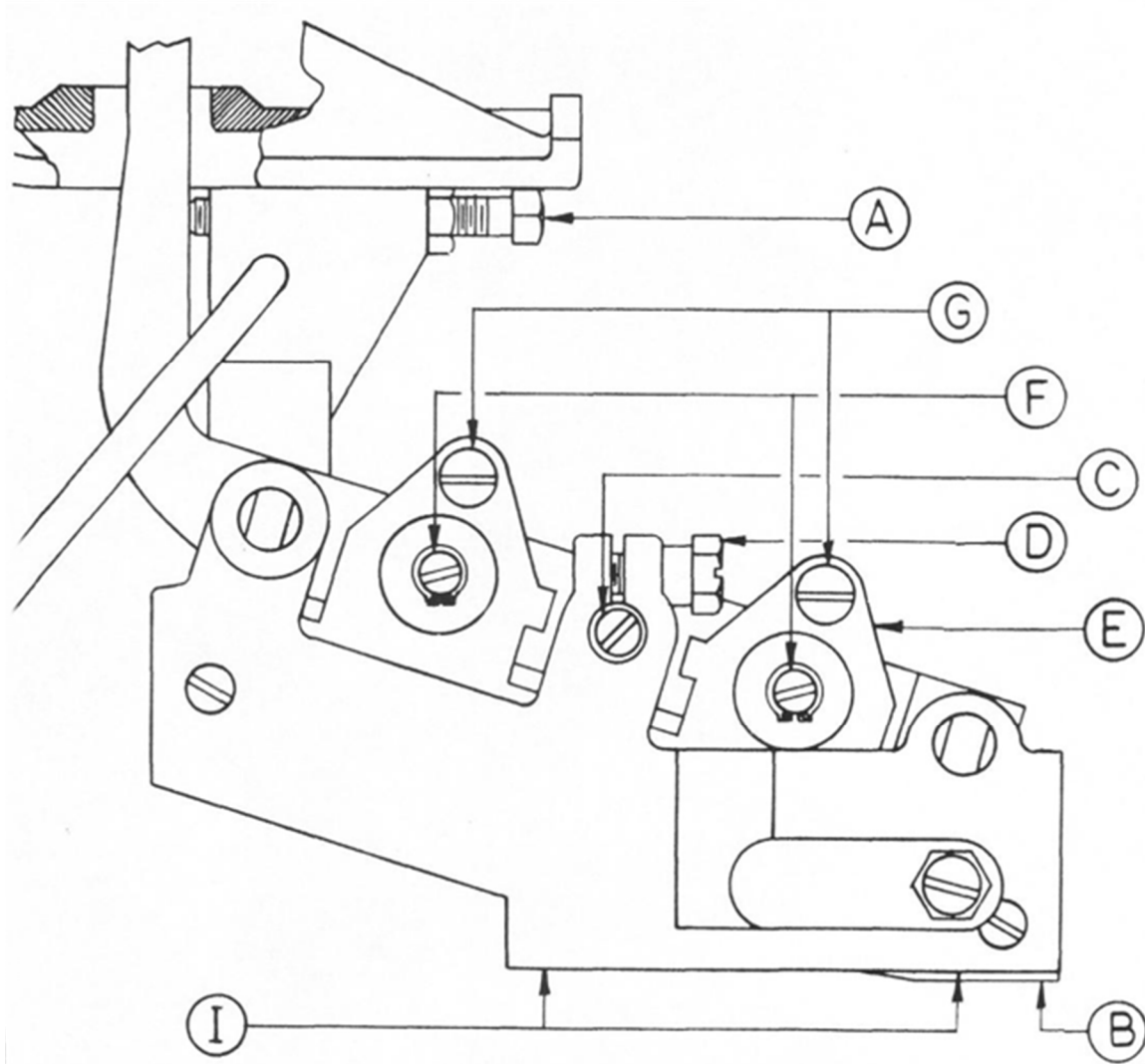


Figure 4-16: Cap Track Assembly

Item	Description
A	Cap Track Leveling Screw.
B	Lower Track.
C	Width Adjusting Screw.
D	Width Adjustment Lock Screw.
E	Top Guide.
F	Top Guide Adjustments (Eccentrics).
G	Top Guide Lock Screws.
H	Stop Pins.
I	Surface Used to Set Track Level with Conveyor.

4. SET UP PROCEDURES

4.1.5 43-89mm Cap Track Adjustments

Lower Track Leveling (*Figure 4-18*)

The bottom surface of the cap track must be parallel to the conveyor from left to right (*Item I*). Use leveling screw (*Item A*) when adjustment is required.

Width Adjustment

Loosen the lock screw (*Item D*) and use the adjusting screw (*Item C*) to obtain the desired width. Place the cap to be run between the lower cap tracks (*Item B*) and turn the screw clockwise until the cap is snug in the tracks. Turn the screw counter clockwise 5/8 of a turn maximum to provide proper side clearance, secure the lock screw.

Top Guide Adjustment (*Figure 4-18*)

To set the top guide (*Item E*) loosen the lock screw (*Item G*) and turn the eccentrics (*Item F*) until the cap clears the entrance end of the top guide by a minimum of 1/32". The discharge end of the top guide should be set to almost touch the cap when the cap is at rest on the stop pins (*Item H*). Pull the cap past the stop pins, but not out of the tracks. The cap should be able to turn freely without binding when in this position.

Note: When one eccentric is adjusted, the opposite end of the top guide will also move slightly. Always recheck settings. Caps will bind and be scratched if the top guide is set too low. Missed caps will result if the top guide is set too high. Secure the lock screw when the top guide adjustment is completed.

Cap Pick Up Height (*Figures 4-19, 4-20*)

Use the hand crank provided to unlock the head at point (*Item J*). Turn the hand crank clockwise 1/2 turn to unlock the head. Select a sample jar from the glass lot to be run. Raise or lower the head to accommodate this jar. Use the hand crank to turn the shaft (*Item K*), clockwise to raise the head and counter clockwise to lower it. Allow caps in the cap track resting on the stop pins. Raise or lower the head so that the lowest point on the cap comes in contact with the jar. This contact should be the point where the thread on the glass is the highest (*Item L*). When the height is set, lock the head in place by using the hand crank.

4. SET UP PROCEDURES

Duckbill Assembly with Top Drag (*Figures 4-22, 4-23*)

These assemblies are optional and are recommended in certain cases where standard side drags are ineffective. The Duck Bill (*Item D*) is set for the cap and jar. The Hold Down with drag (*Item K*) is set with the cap applied finger tight. The drag will lay on the cap with 1/16" drop-off. Spring pressure is moderate and must be determined on the line. The ejector bill (*Item E*) will be set with the cap finger tight with a space of 1/32" between the ejector bill and the top of the flat jar . The sensitivity of the ejector switch is adjusted in this position.

4. SET UP PROCEDURES

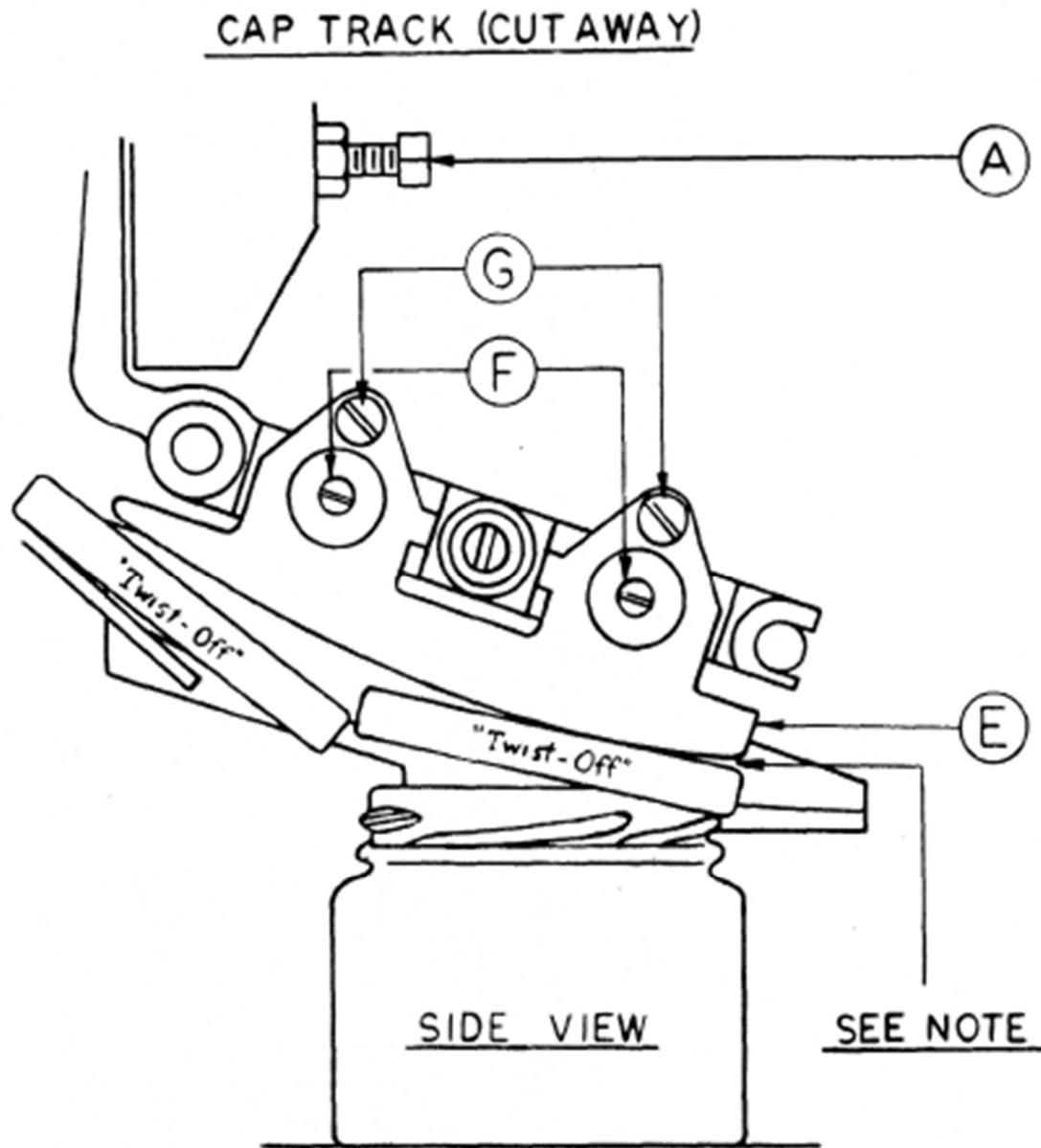


Figure 4-17: Cap Track Settings

4. SET UP PROCEDURES

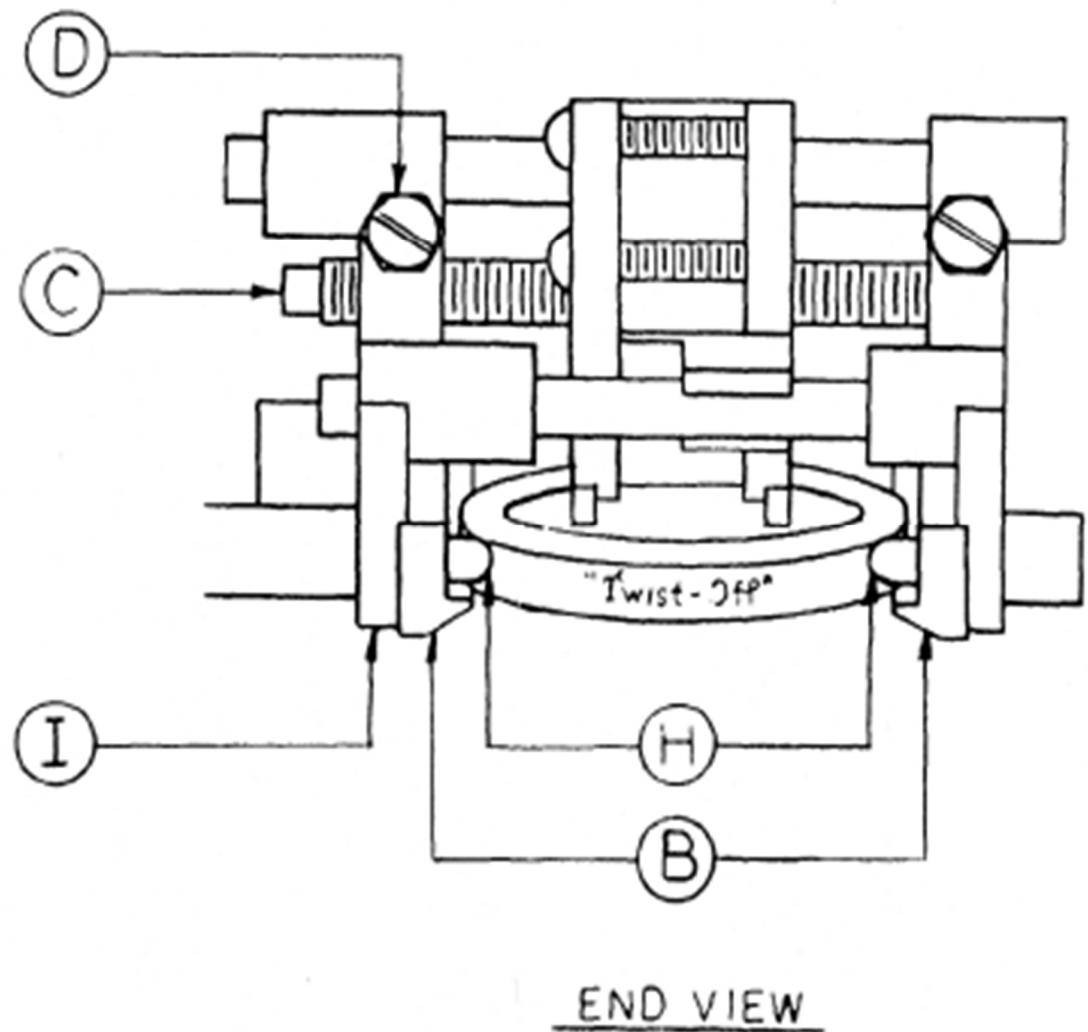


Figure 4-18: Cap Track Settings

4. SET UP PROCEDURES

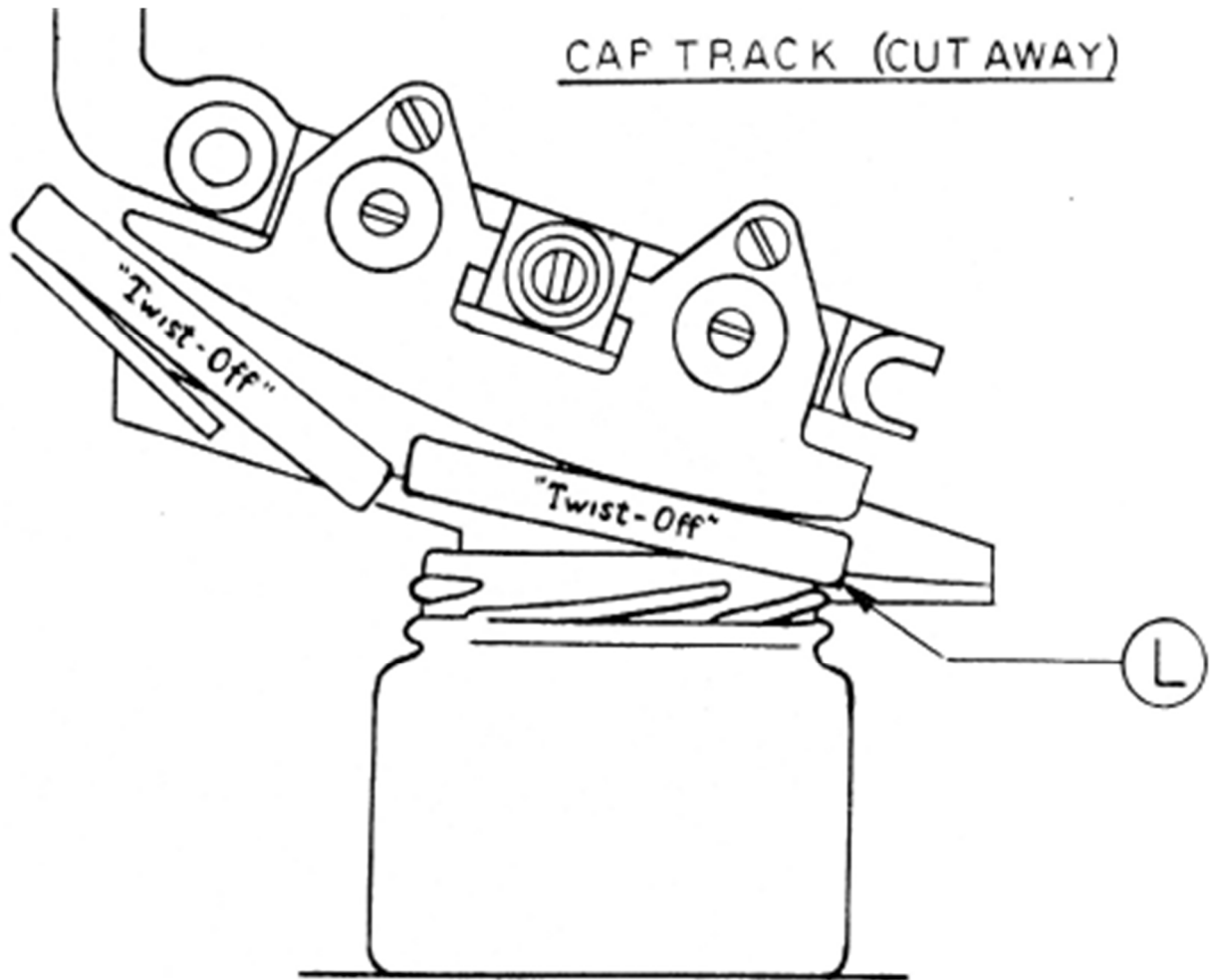


Figure 4-19: Head Height Settings

4. SET UP PROCEDURES

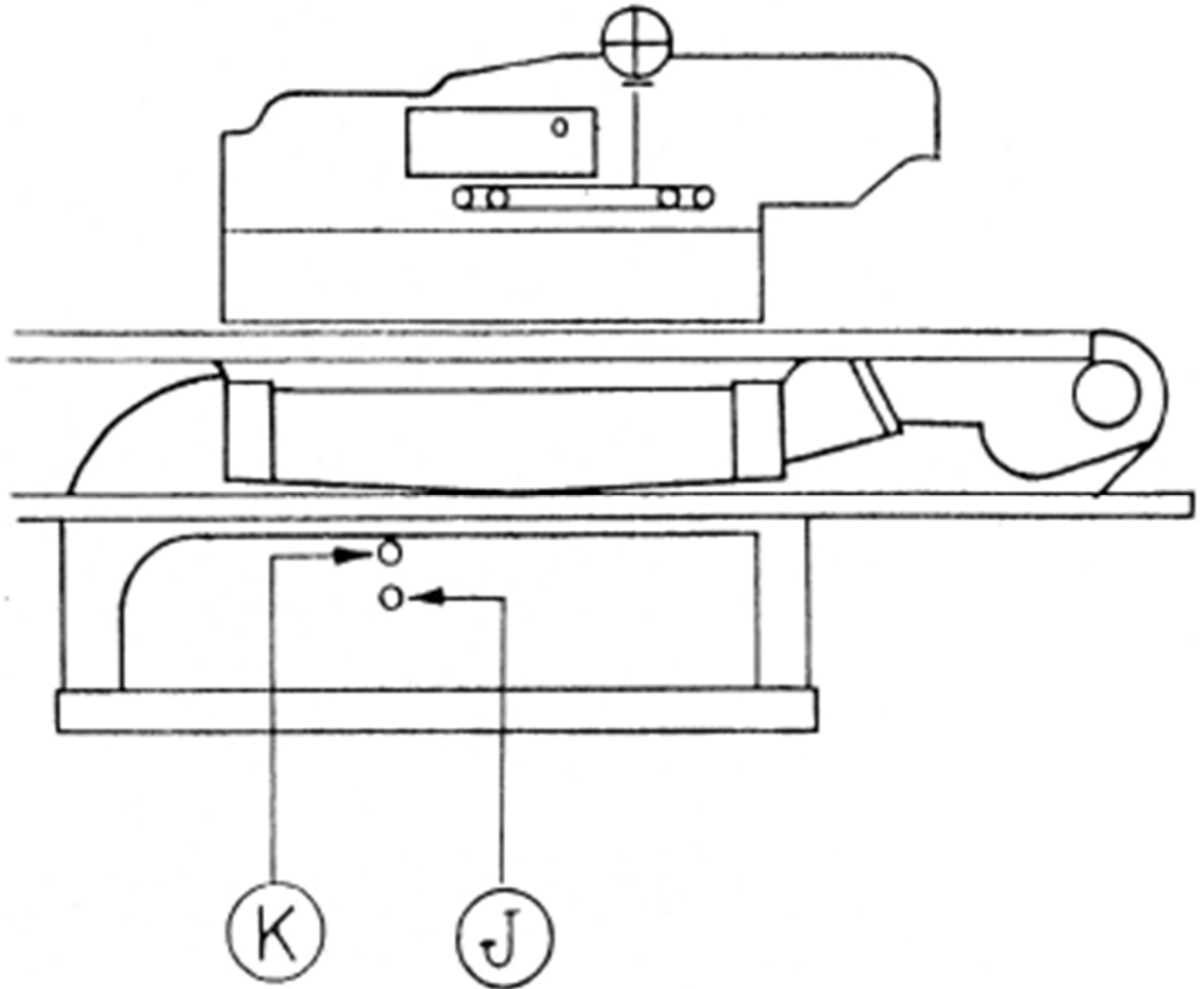


Figure 4-20: Head Height Settings

4. SET UP PROCEDURES

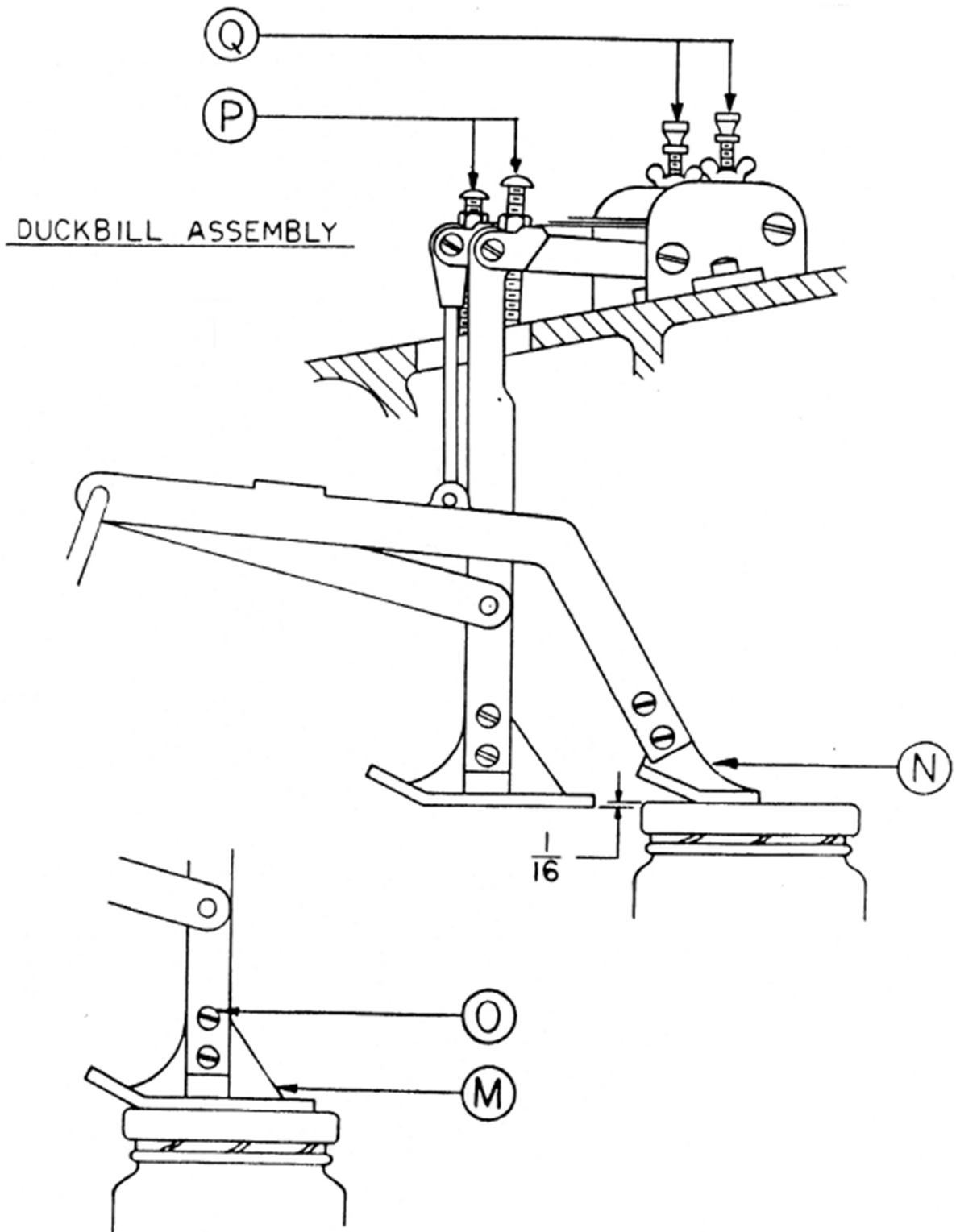


Figure 4-21: Duckbill Setting

4. SET UP PROCEDURES

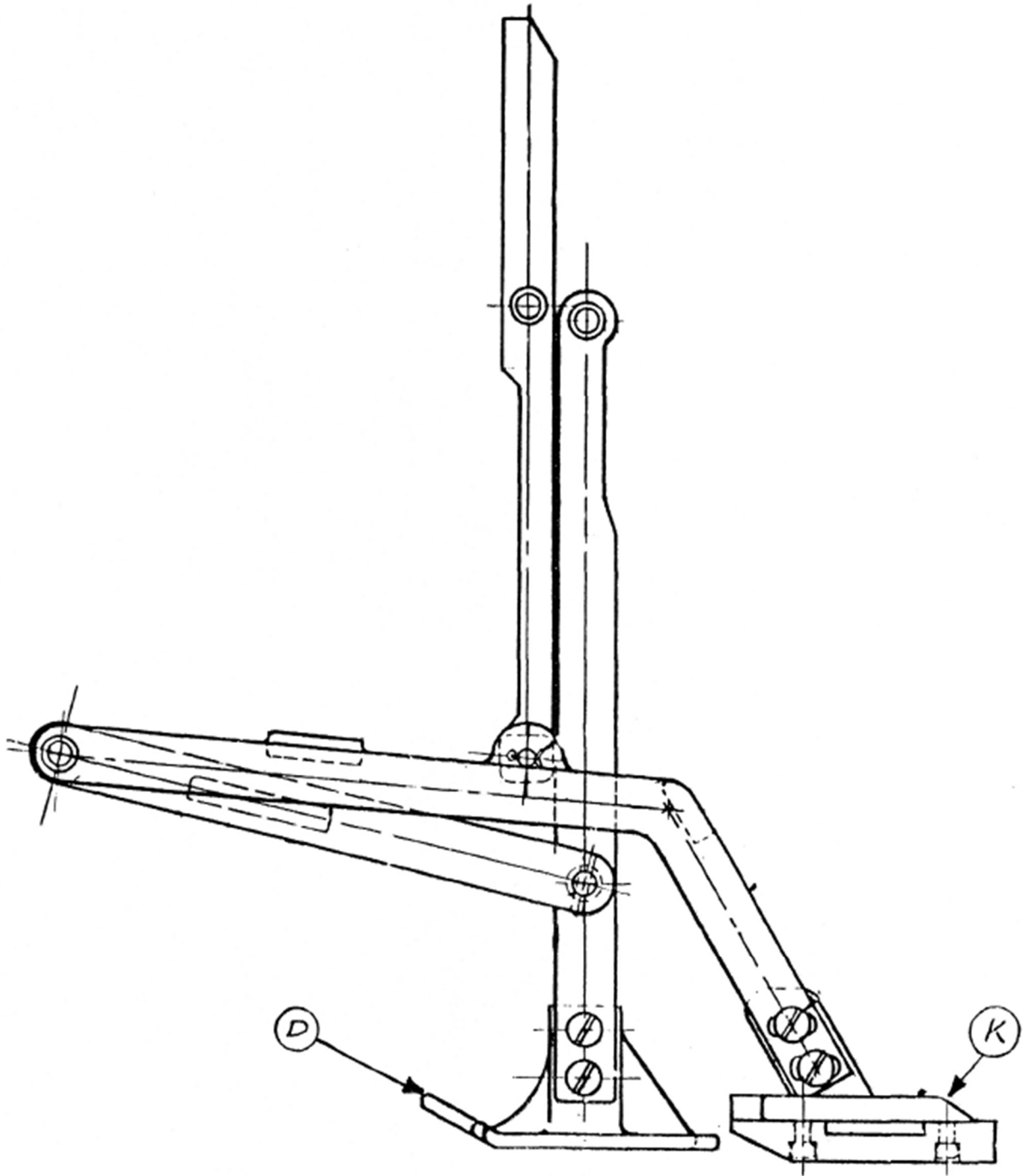


Figure 4-22: Assembly Duckbill with Drag

4. SET UP PROCEDURES

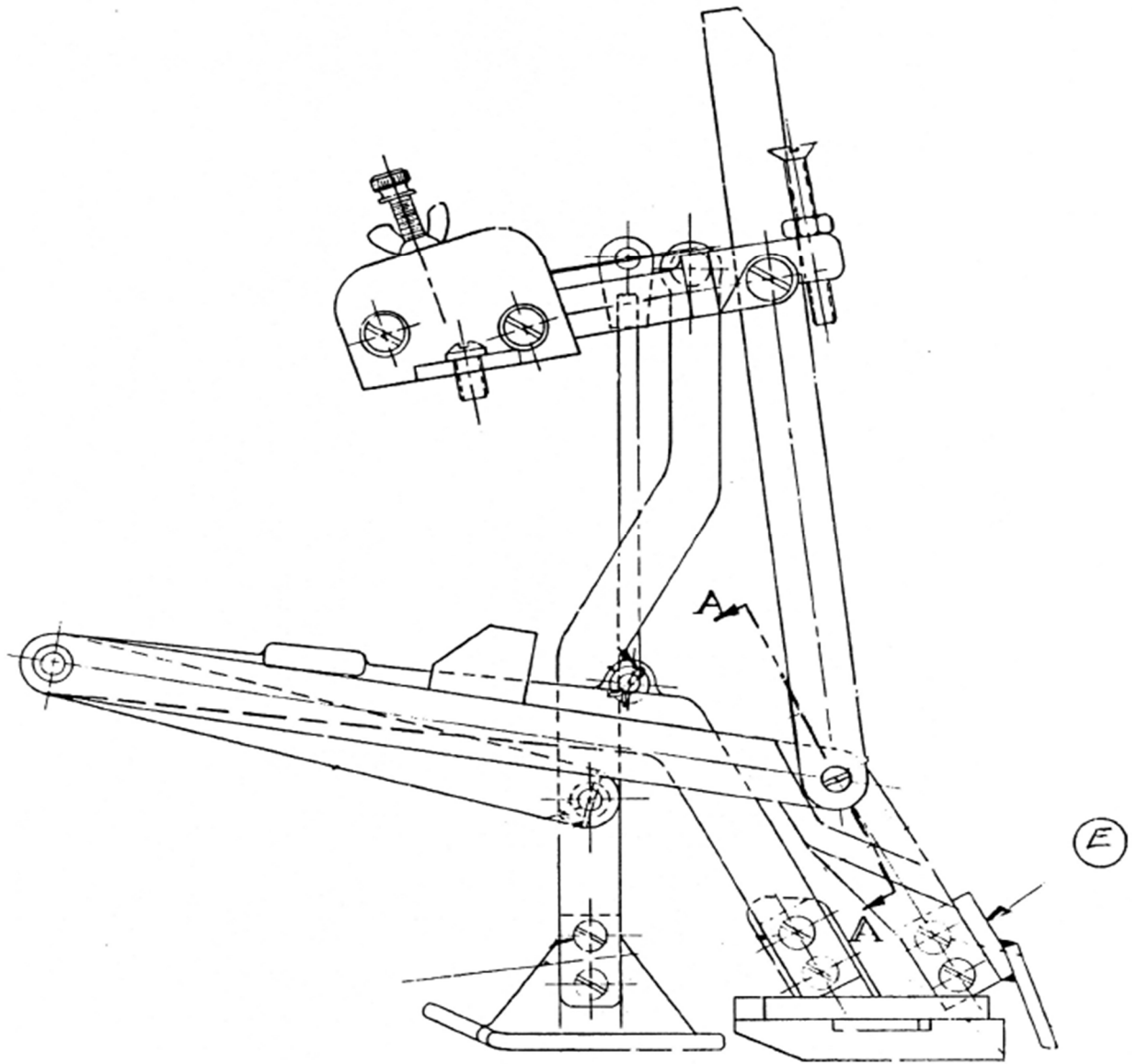


Figure 4-23: Assembly with Ejector & Drag

4. SET UP PROCEDURES

4.1.6 100-110mm RTS Set Up Procedure

Track Leveling (*Figure 4-25*)

To level the lower cap track assembly, make the adjustment using the bolt (*Item A*). To check the track level, pull a cap past the stop pins. Do not pull it out of the tracks. The bottom edge of the cap should be parallel to the top of the jar.

Top Guide (*Figure 4-25*)

Adjust the top guide (*Item D*) in the same manner as the regular twist off (RTO). Use lock screw (*Item B*) and eccentric (*Item C*) to make adjustments when required.

Head Height (*Figure 4-25*)

Set head height so that the lowest point on the cap contacts the jar approximately 3/16" from the top.

Duckbill and Hold Down Setting (no Ejector Bill) (*Figure 4-26*)

Apply a cap to the set up jar by hand. The cap should be finger tight on the jar. Do not over tighten. Place the capped jar under the duckbill (*Item M*). The duckbill should be set flat on the cap. Use the Adjusting screws (*Item O*) when adjustment is required. Move the jar to the right and position it under the hold down (*Item N*). The duckbill should drop 1/16" when the capped jar passes. Use the screw (*Item P*) to adjust the duckbill height.

Set the hold down flat in the same manner used to set the duckbill. Use the screw to set the hold down height. Adjust the height until the hold down almost touches the top of the cap. It should clear the cap by 1/64" when slack is removed from the hold down linkage.

Spring Pressure

Spring pressure adjustments for the duckbill and hold down are located at (*Item Q*) on the duckbill controls. Start with light to moderate spring pressure. The duckbills must rise and fall quickly and smoothly. Check all pivot points and linkage for binding.

Note: Line speeds and jar spacing must be considered when adjusting the spring pressures. The faster the line speed or closer the jar spacing the faster the duckbills must work, therefore, more spring pressure would be required.

4. SET UP PROCEDURES

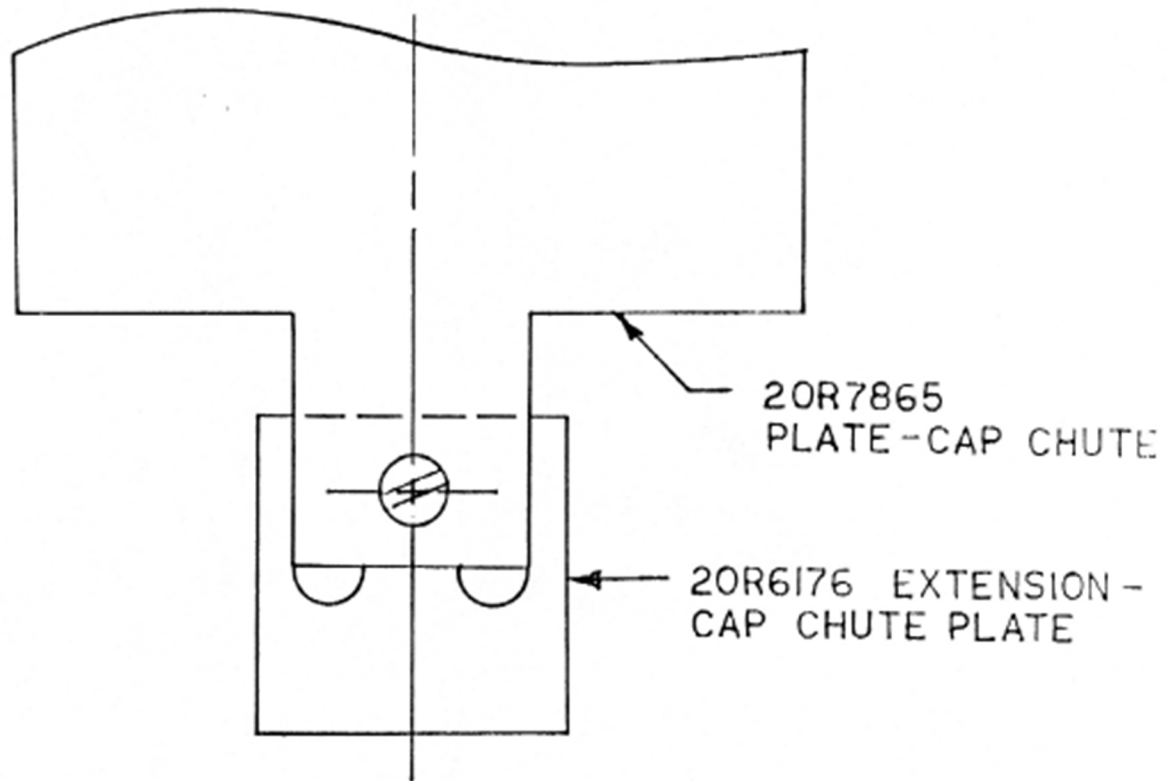


Figure 4-24: 110 Cap Plate Chute Extension

4. SET UP PROCEDURES

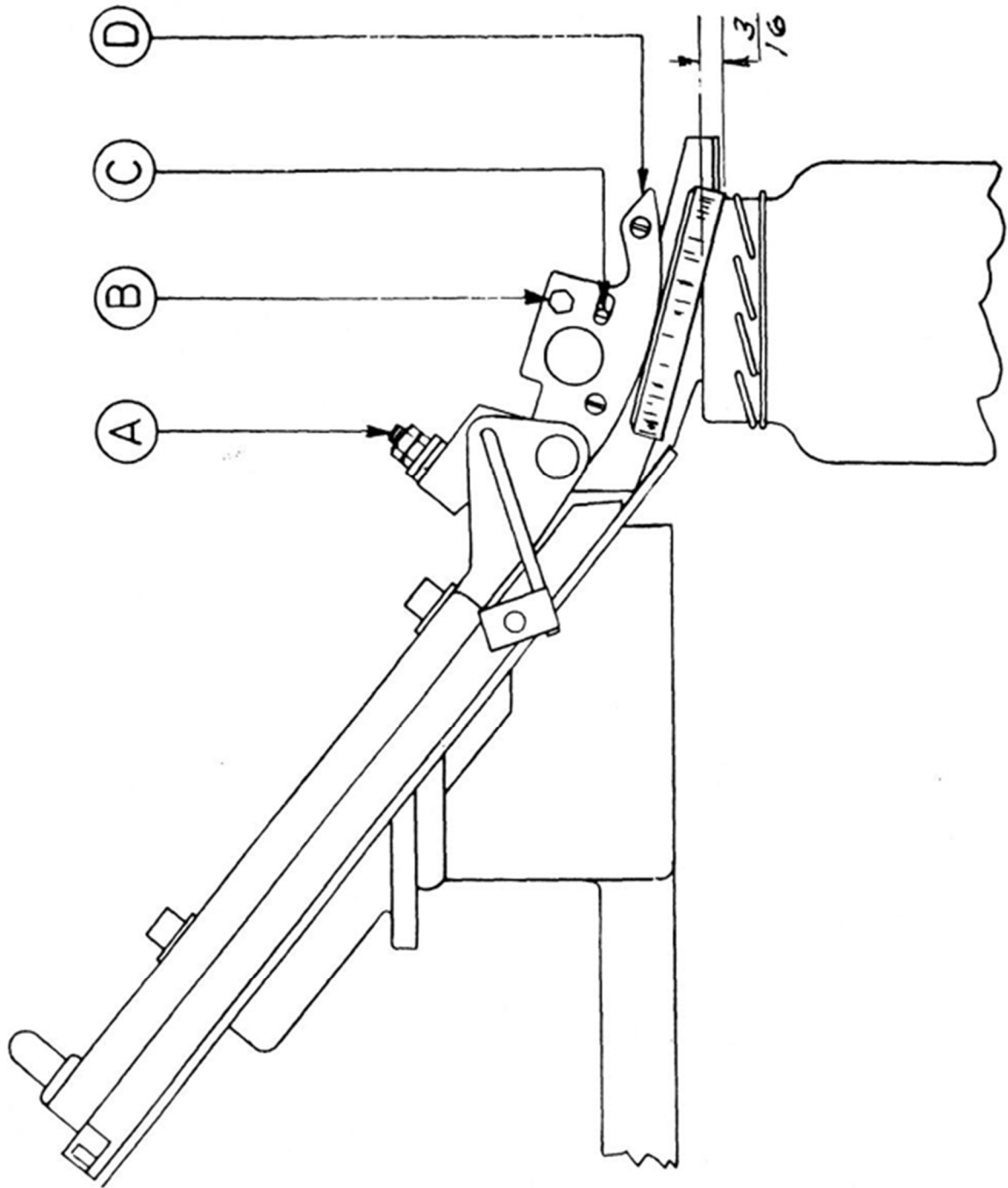


Figure 4-25: 100 - 110mm Cap Pick Up Height

4. SET UP PROCEDURES

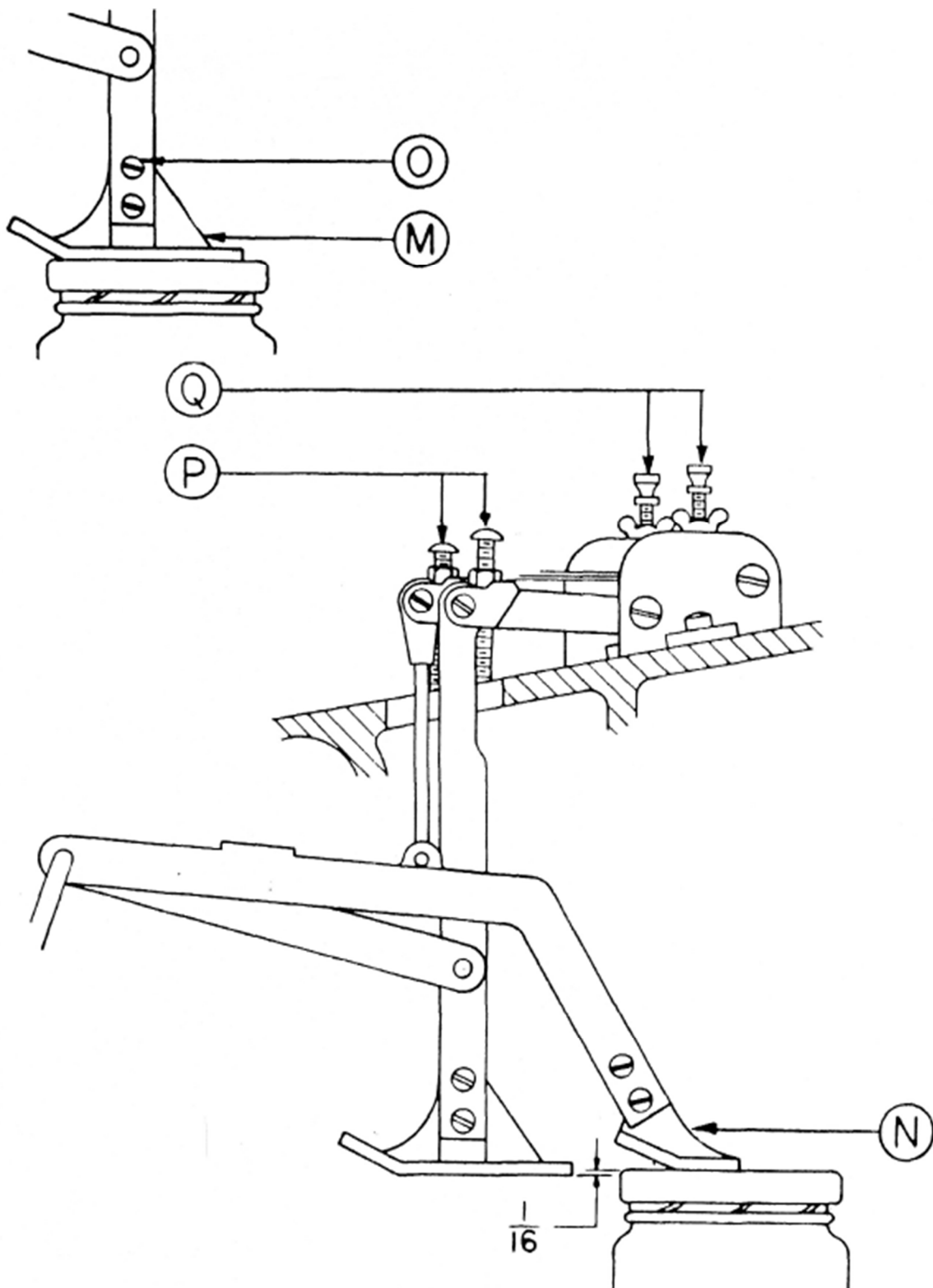


Figure 4-26: Duckbill Settings

4. SET UP PROCEDURES

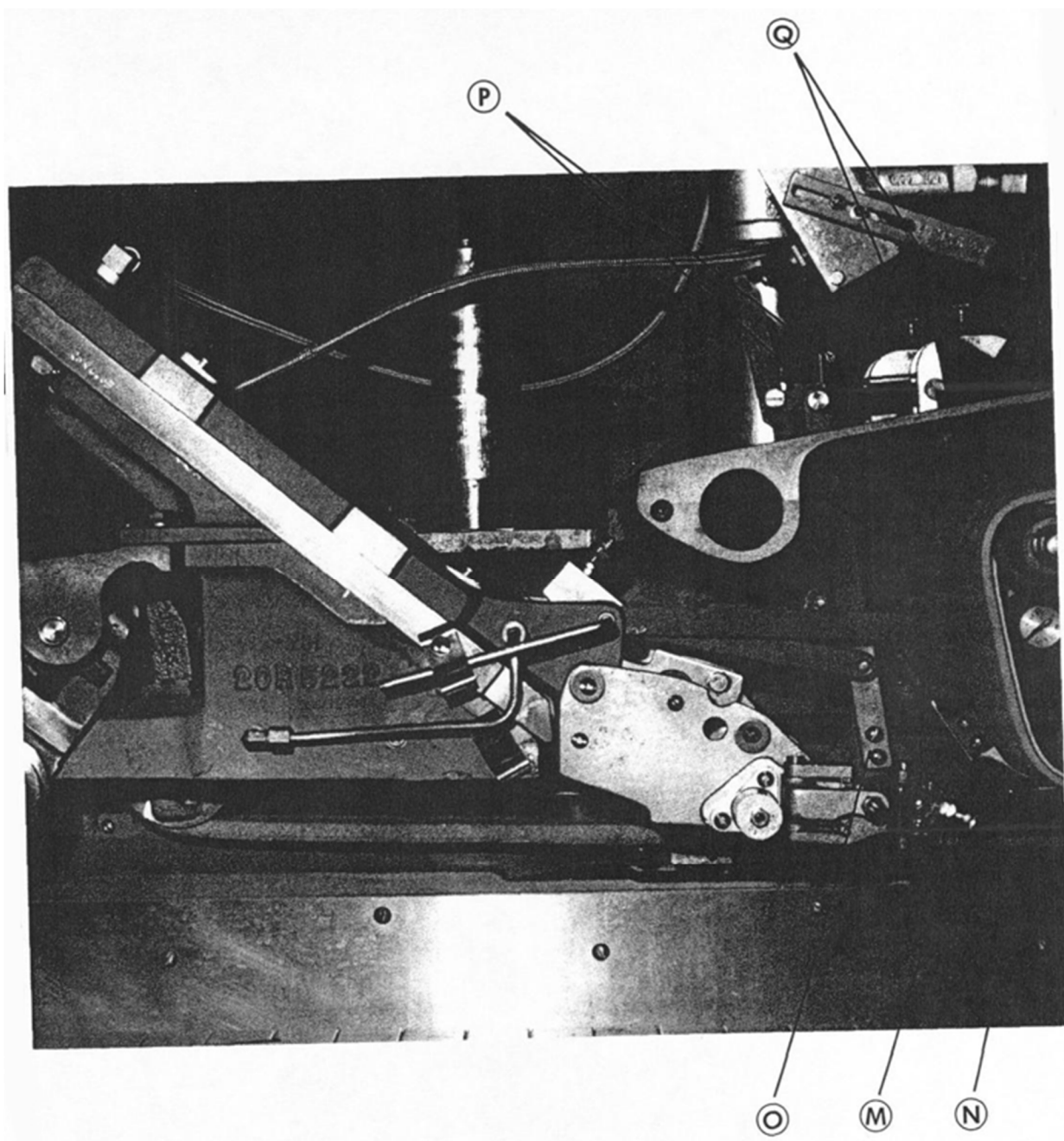


Figure 4-27: Duckbill Setting

4. SET UP PROCEDURES

4.2 Cocked Cap Signal Systems

Micro-Switch Adjustment (Figures 4-28, 4-29)

Place the setup jar under the ejector bill (Item T). Unlock the screw (Item R) and set the micro switch (Item S) 1/16" above the Hold Down Arm (Item H). Hold the cap in place under the ejector bill with one hand and rotate the jar clockwise. This will cause the cap to rise and push up on the ejector bill linkage. The horn should sound just before the cap is on the top or highest point on the glass thread.

Reset the micro switch closer to the Hold Down Arm if necessary and secure lock screws. Retain test jar for rechecking. If these procedures do not cause the horn to sound it may be necessary to lower the ejector bill slightly by adjusting the screw.



Attention

Important: This system is designed to give you an early warning in the event that the caps are being misapplied (cocked caps or crushed lugs). If immediate attention is given to the cause of the signal, losses of product and excessive handling can be averted.

Cocked Cap Signal System with Ejector Bill and Top Drag (Figure 4-30)

The Hold Down with Drag Bar (Item U) should be set by placing a jar under the drag with the cap turned down finger tight on the jar. The Hold Down Drag is positioned flat on the top of the cap. By means of screw (Item P) adjust the Hold Down Arm so as to have a maximum of V32 drop of Drag when jar is passed from under.

4. SET UP PROCEDURES

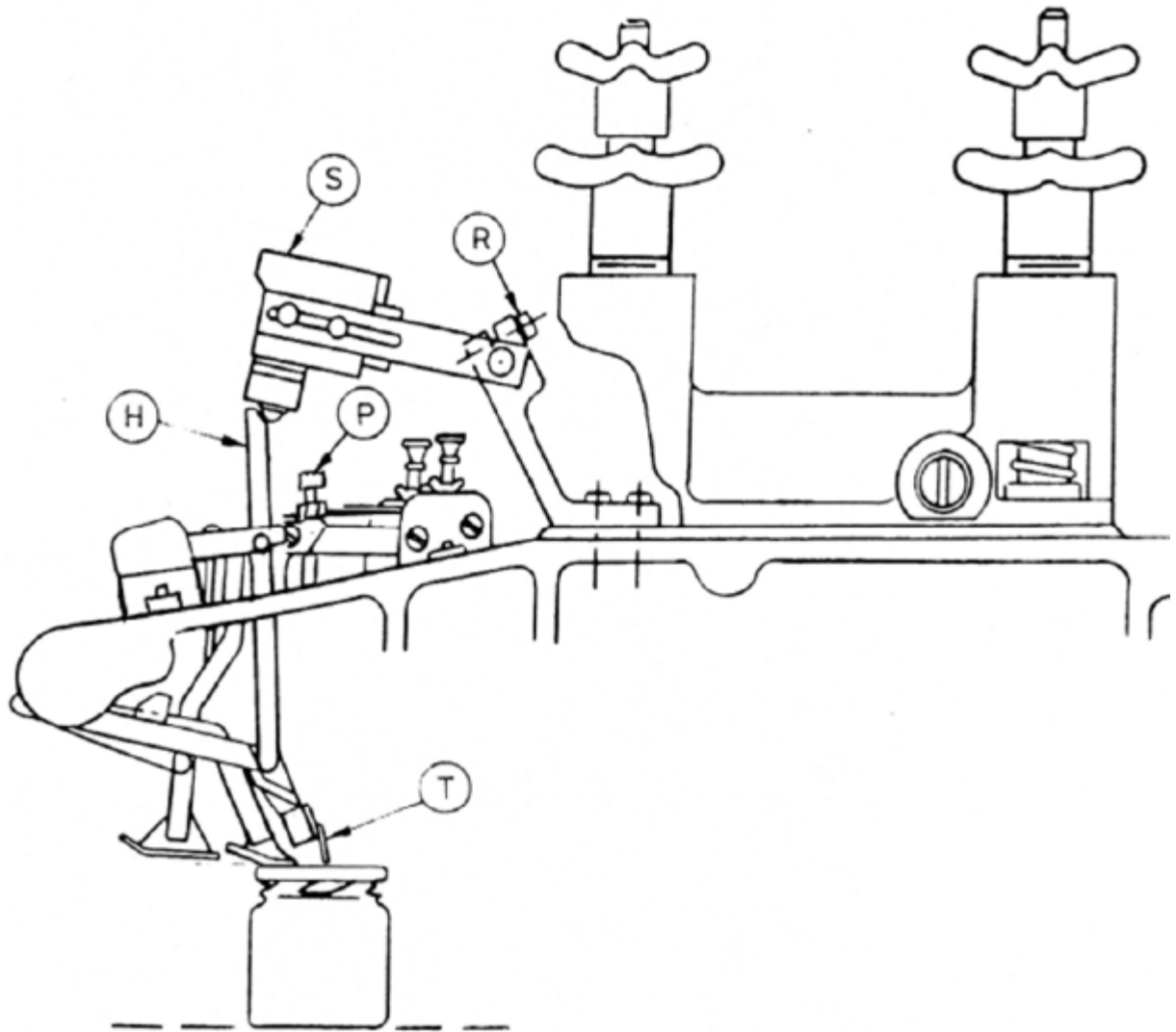


Figure 4-28: Cocked Cap Signal System with Ejector Bill

4. SET UP PROCEDURES

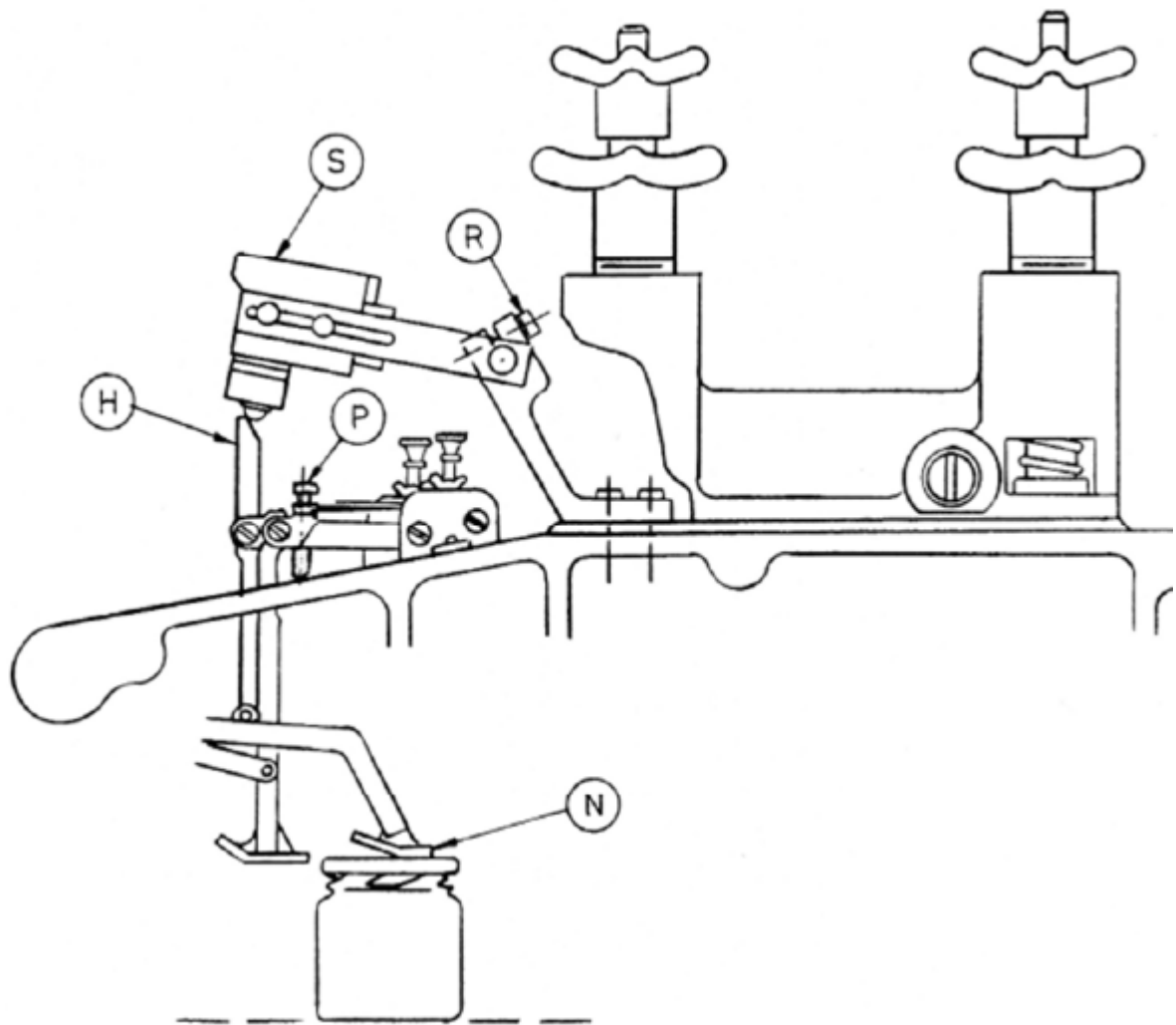


Figure 4-29: Cocked Cap Signal System with Ejector

4. SET UP PROCEDURES

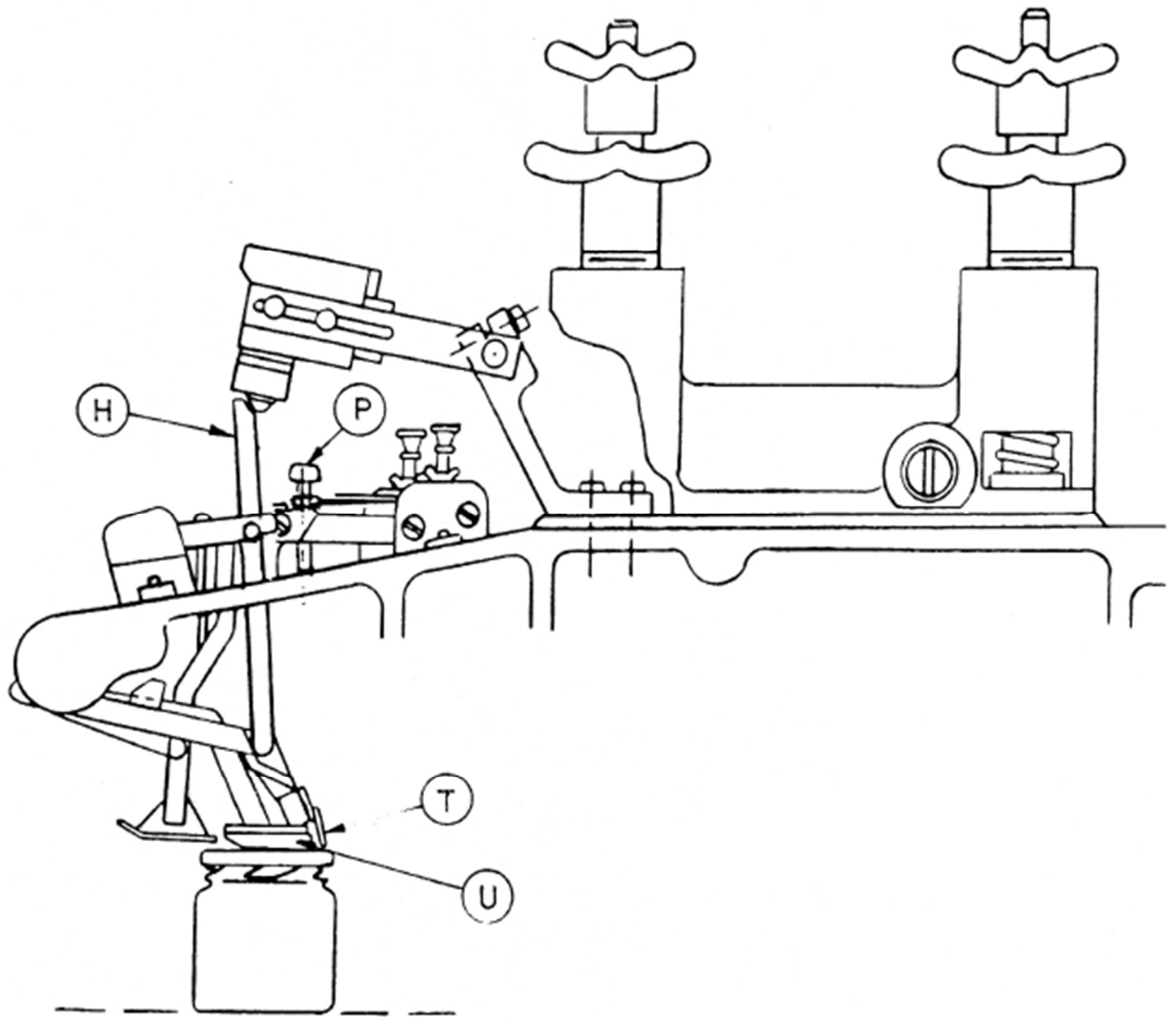


Figure 4-30: Cocked Cap Signal System with Ejector Bill

4. SET UP PROCEDURES

4.3 Jar Centering Device Adjustment

The centering device width is adjusted by using the hand knob marked *(Item T)* (Figure 4-31). Set the width to allow the jar to pass through the brass guides *(Item W)* with a minimum amount of clearance. Place the set up jar on the conveyor and crank the machine by hand. The center of the jar should meet the center of the cap. If the center of the jar does not meet the center of the cap, realign the centering device. Slotted holes in the mounting plate on the under side of the conveyor permits the assembly to be repositioned. Open the centering device to provide 7,6" clearance between the brass guides and the jar.

Note: The centering device is factory adjusted; however, periodic centering checks should be made.

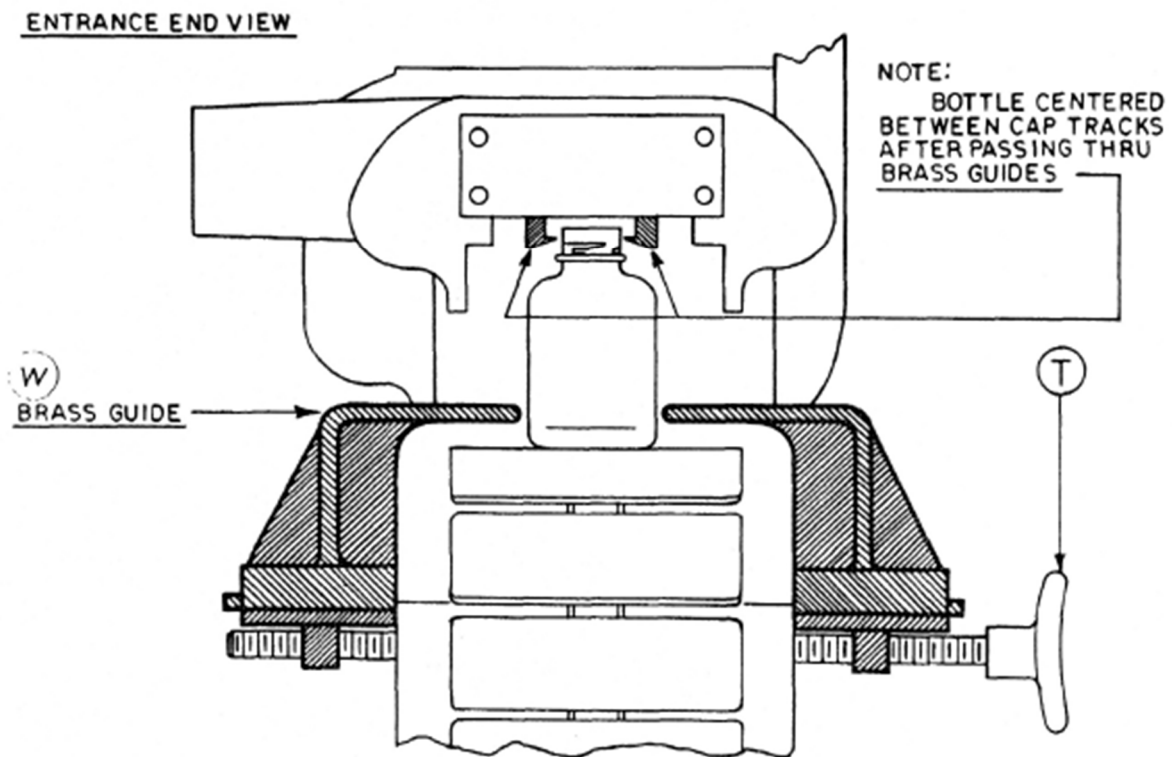


Figure 4-31: Centering Device

4. SET UP PROCEDURES

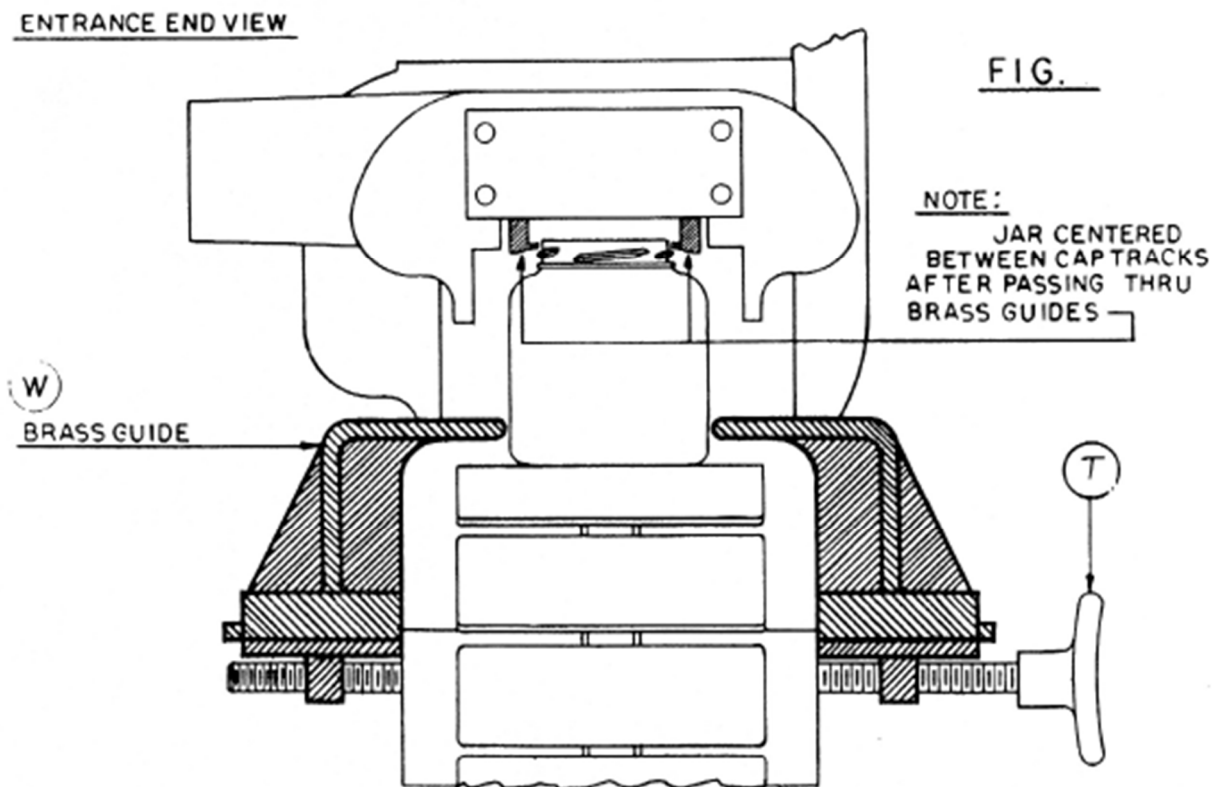


Figure 4-32: Centering Device

4. SET UP PROCEDURES

4.4 Side Belt Roller Bracket Adjustment

Because of the many different bottle configurations, the VG Model Capper can utilize many types of Side Belt Roller Brackets (*Table 4-33*). The function of the Roller Bracket is to position the belts to grip the jar surface while the cap is being applied. Since there is disturbance at the cap pickup and during the cap application, good side belt contact is required. Another requirement is that the brackets have a slight downward travel from the entrance to exit of the capper. This will force the jars down on the conveyor and help to stabilize them.

Silgan Equipment furnished a simplified tool which, when it is applied to the bottle, determines the optimum bracket for the capper. In the material that follows within this section, demonstration drawings will show the matching of the Bracket styles and the bottle types. It will enable you to pick out quickly the Roller Brackets best suited to the bottle.

Extended Bridged Side Belt Roller Brackets (*Table 4-33*)

Install Cap Chute Support 20R7996-D. Install Cap Chute required for cap to be run. Install Duck Bill, Hold Down & Ejector Bill. Refer to Assembly 51RA81 0 for Ejector Switch and Mounting Components. Install suitable Extended Bridged Side Belt Roller Brackets

Standard Low	Bridged Low	Extended Bridged Low
Rear Entrance 20XA1384G	Rear 20RA5645G	Rear 20RA7144G
Front Entrance 20XA1385G	Front 20RA5646G	Front 20RA7140G
Rear Discharge 20XA1392G		
Front Discharge 20XA1392G		
Standard Medium	Bridged Medium	Extended Bridged Medium
Rear Entrance 20XA1204G	Rear 20RA6155G	Rear 20RA6232G
Front Entrance 20XA1203G	Front 20RA6160G	Front 20RA6231G
Rear Discharge 20XA1328G		
Front Discharge 20XA1327G		
Standard High	Bridged High	Extended Bridged High
Rear Entrance 20XA1384G	Rear 20RA5584G	Rear 20RA7160G
Front Entrance 20XA1313G	Front 20RA5596G	Front 20RA7158G
Rear Discharge 20XA1334G		
Front Discharge 20XA1333G		
	Bridged Short Jar	Extended Bridged Short Jar
	Rear 20RA5719G	Rear 20RA7163G
	Front 20RA5718G	Front 20RA7161G

Table 4-33: Roller Brackets

4. SET UP PROCEDURES

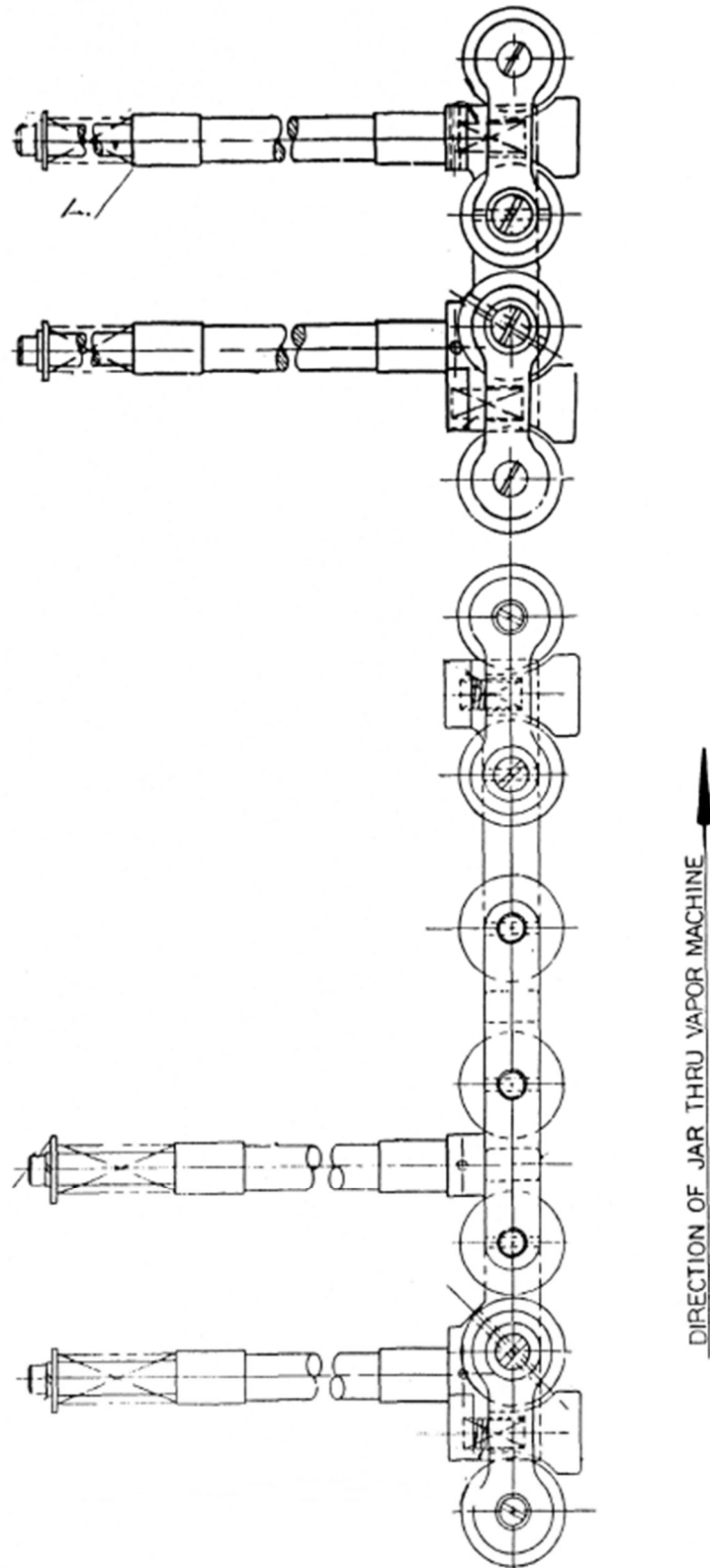


Figure 4-34: Standard Medium Bracket

4. SET UP PROCEDURES

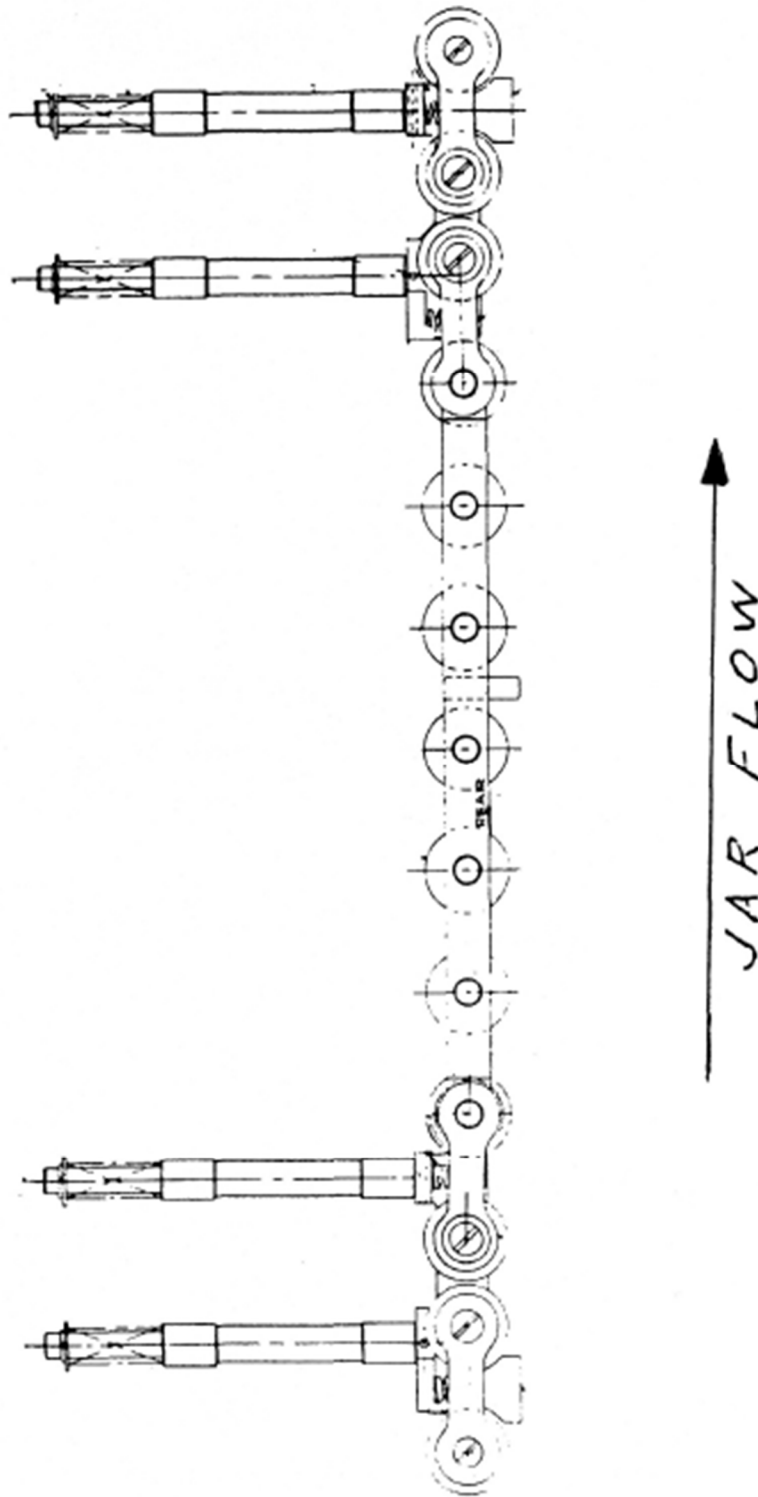


Figure 4-35: Bridged Roller Bracket

4. SET UP PROCEDURES

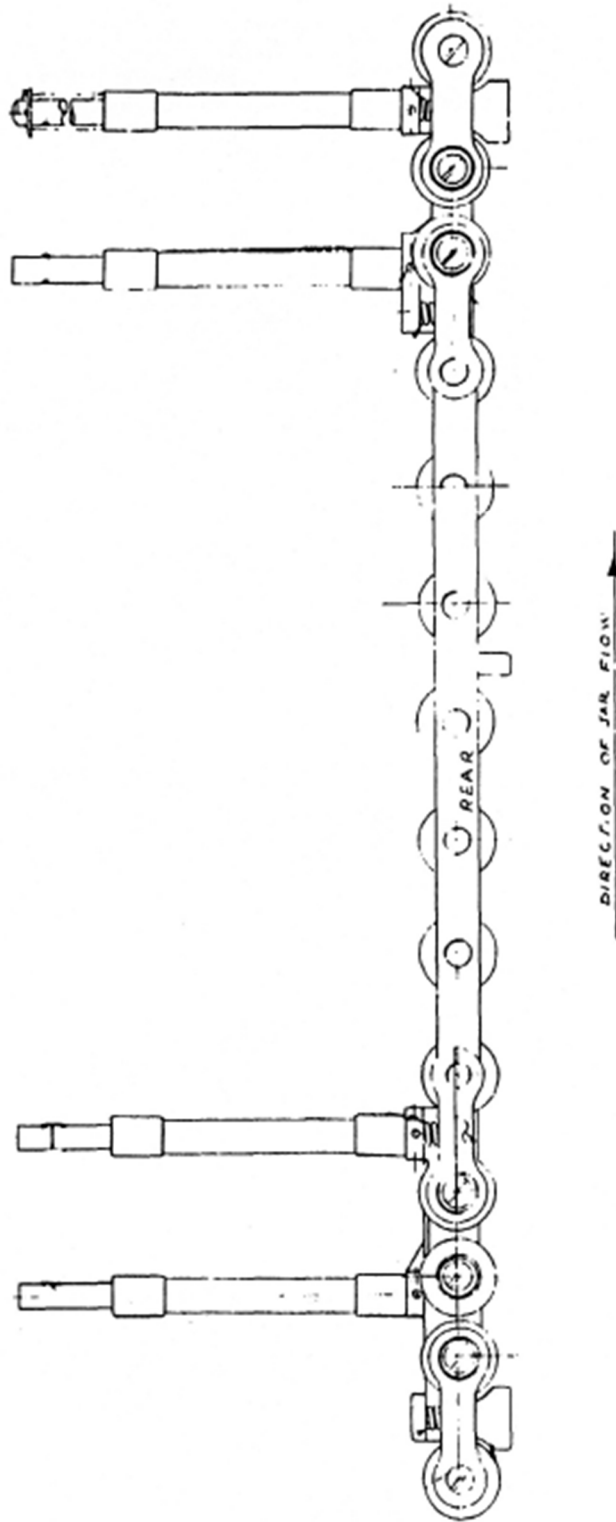


Figure 4-36: Bridged Extended Roller Bracket

4. SET UP PROCEDURES

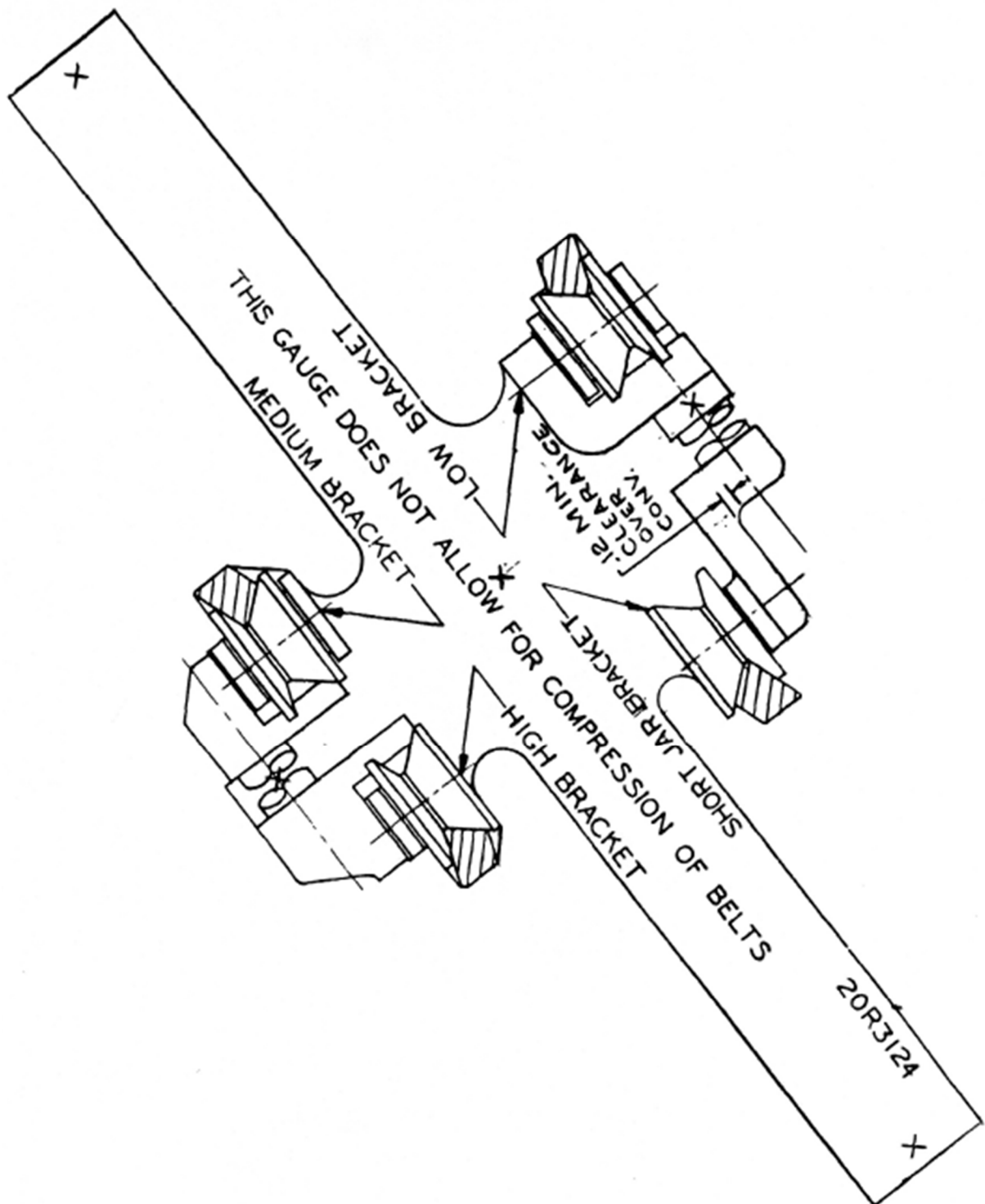


Figure 4-37: Side Belt Roller Bracket Gauge

4. SET UP PROCEDURES

NOTE:

BELTS SHOULD NOT
CONTACT ROUND OR
NEGATIVE TAPER
GLASS SURFACE.

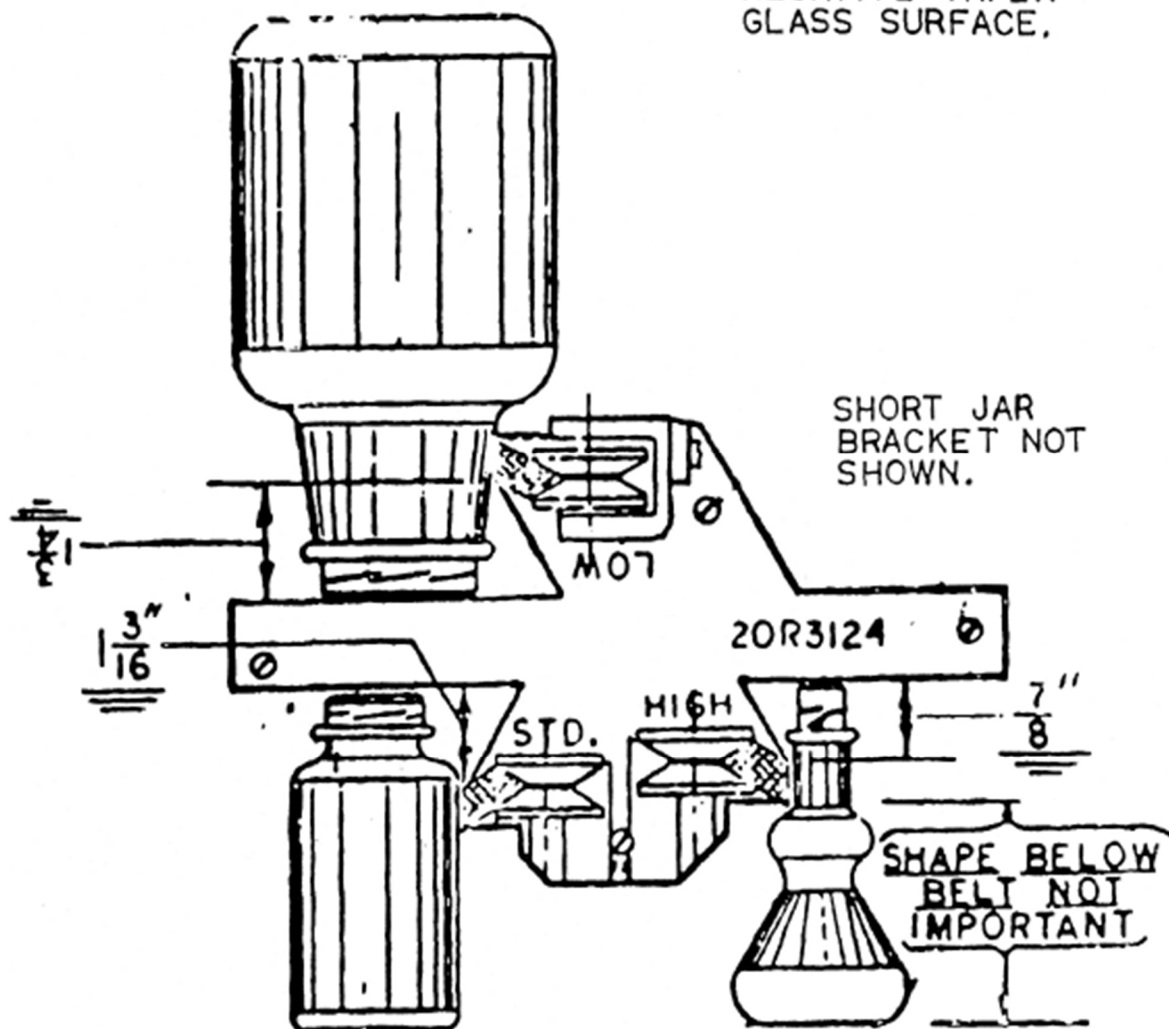


Figure 4-38: Use of Side Belt Roller Bracket Gauge

4. SET UP PROCEDURES

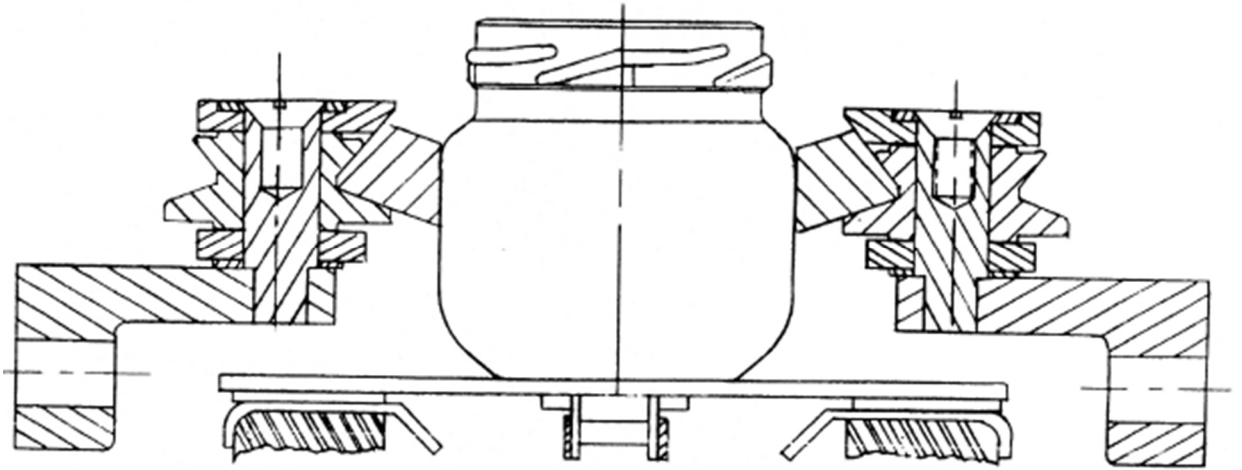


Figure 4-39: Short Jar Bracket Location

4. SET UP PROCEDURES

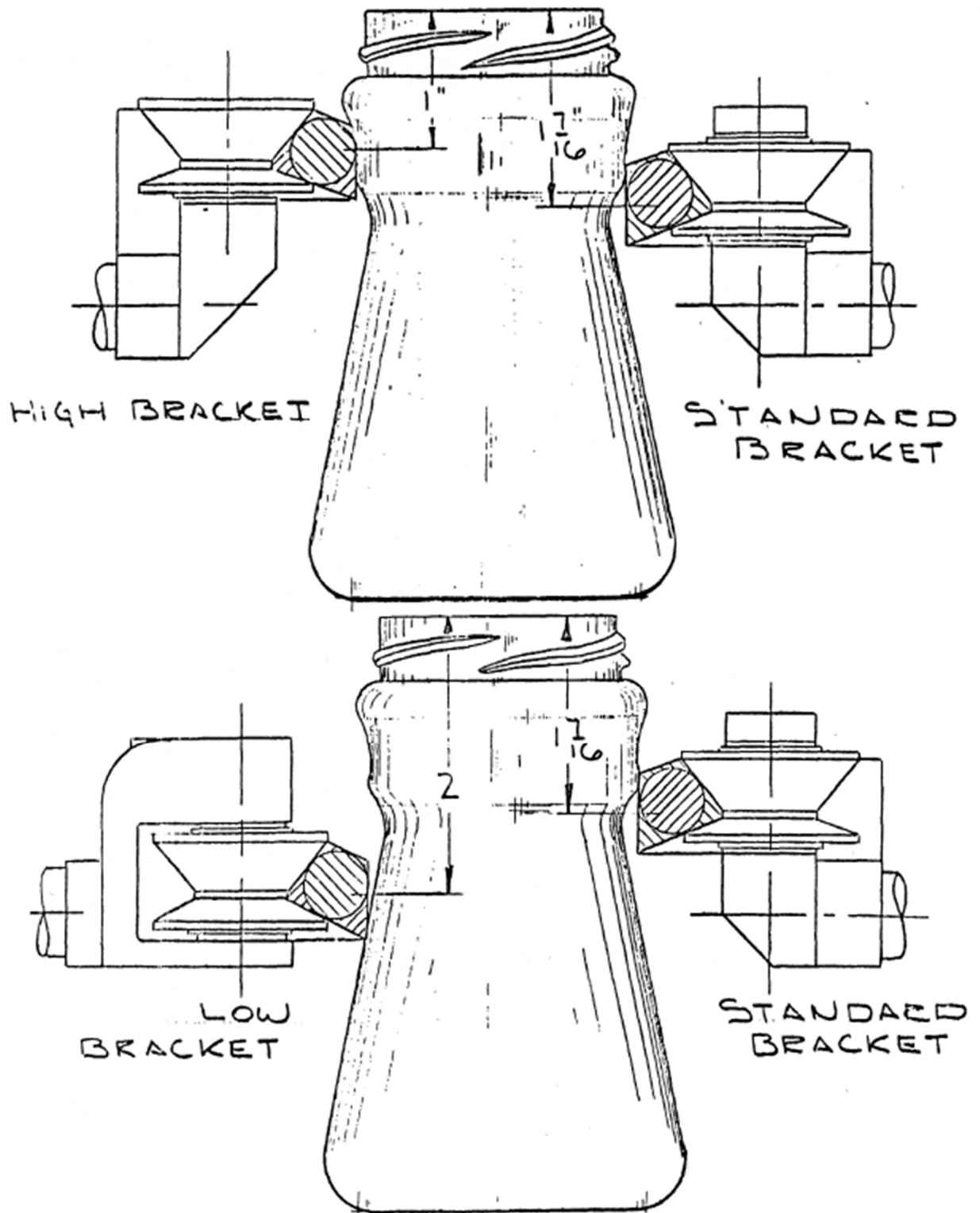


Figure 4-40: Demonstration Sketch

4. SET UP PROCEDURES

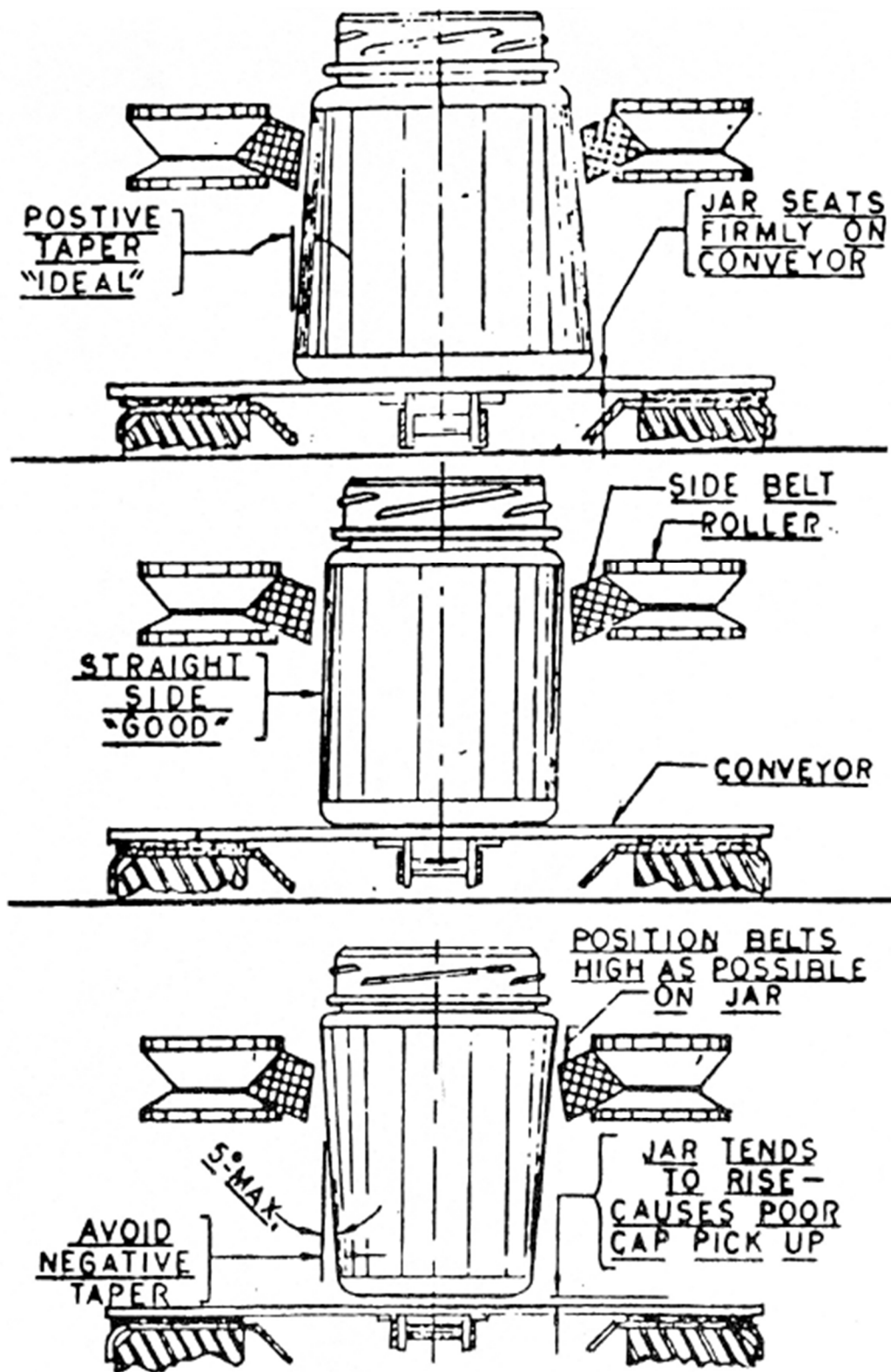


Figure 4-41: Demonstration Sketch

4. SET UP PROCEDURES

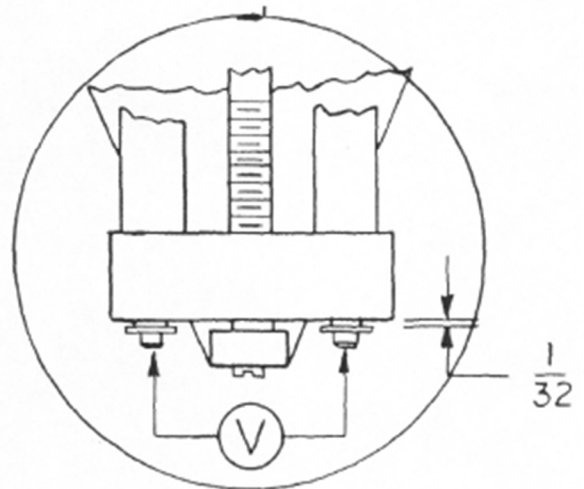
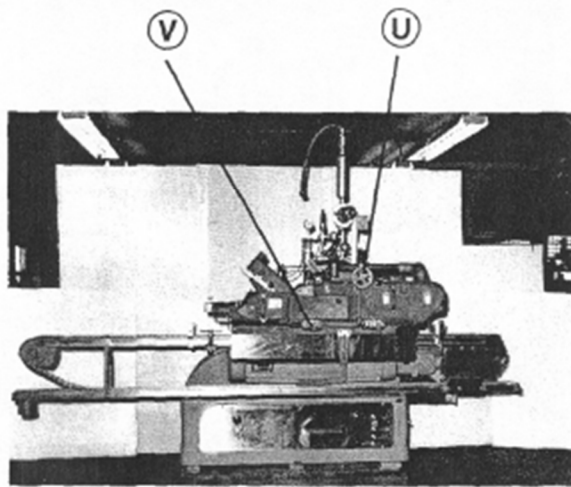
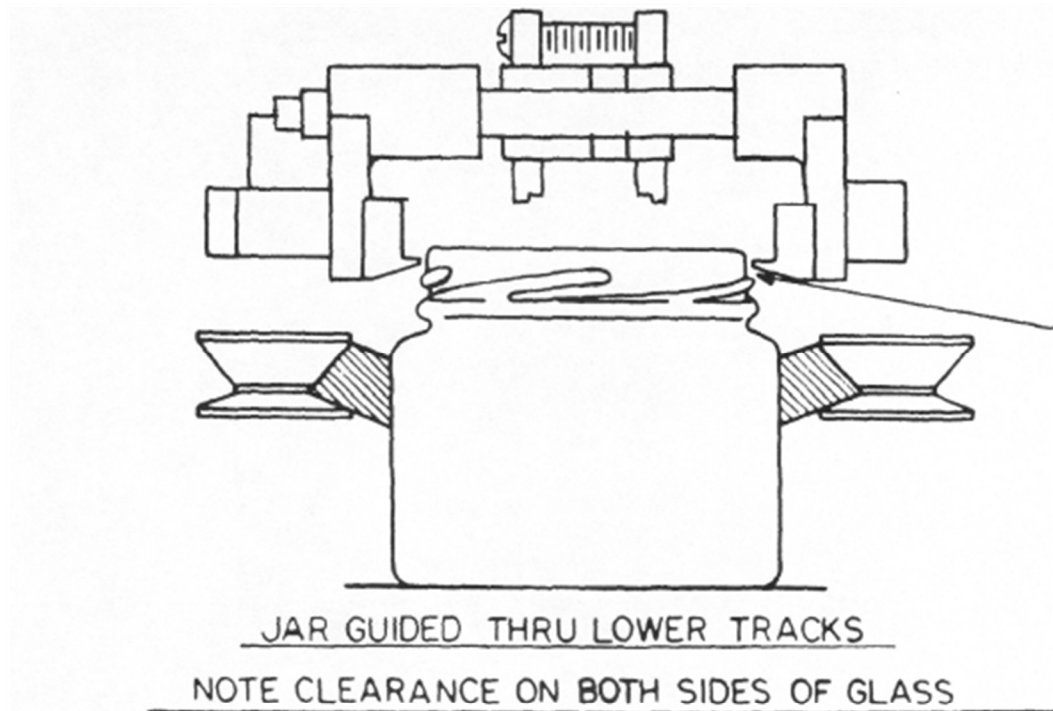


Figure 4-42: Container Clear-

4. SET UP PROCEDURES

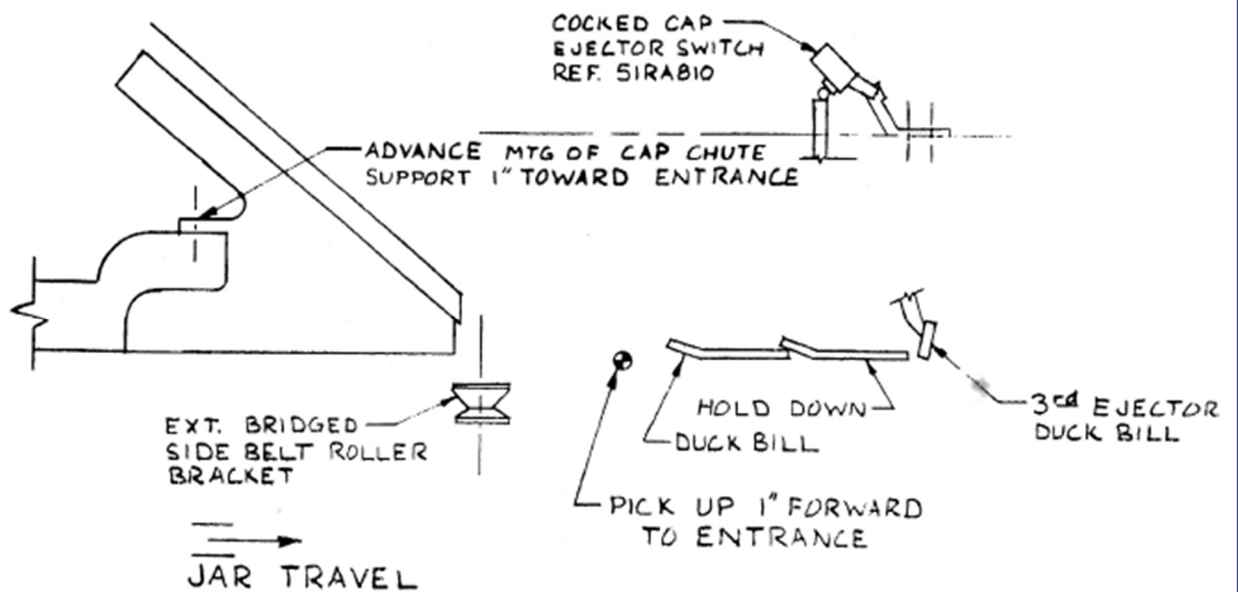


Figure 4-43: Optional Assembly (Cocked Cap Duckbill, Duckbill, Hold Down)

4. SET UP PROCEDURES

4.5 Drag Arm Adjustment

Drag Arm Assembly Settings (Figure 4-44)

The drag arm should be set so that the drag rubber (Item Y) is moved approximately $\frac{1}{8}$ " as a capped jar passes through the drag bar area. The adjusting screw (Item W) is used to adjust the drag arm in or out.

Drag Arm Tension (Figure 4-44)

Use the screw (Item X) to adjust the spring tension. Set the spring tension on the drag rubber approximately equal to the spring tension of the duckbill.

NOTE: When replacing drag rubbers, be sure the wide end of the bevel is at the top. Various drag rubbers are available of different materials to meet special sealing conditions. Consult with Silgan Equipment service personnel for recommendation. Drag Assembly for 100-110mm has altered parts. See the Parts Catalog for details.

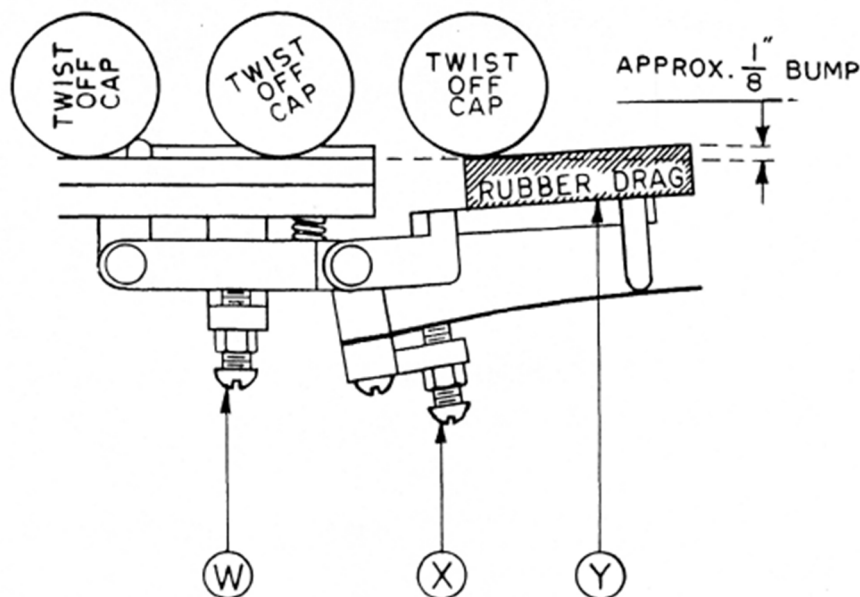


FIG. 4-46

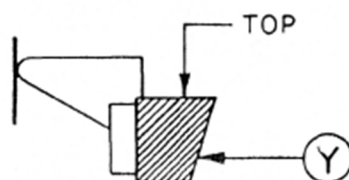


Figure 4-44: Drag Arm Assembly Top View

4. SET UP PROCEDURES

4.6 Sealing Shoe Adjustment

Post Centering (Figure 4-45)

Loosen nut (*Item N*) to free knob (*Item Z*). Knob is an eccentric to shift and center the shoe hanger posts through the head. These posts (*Items O, P*) must be centered at opening through the head so as not to cause binding of the sealing shoe when lifting occurs during an operation. Tighten nut after centering posts.

Height Setting (Figure 4-45)

Place the bottle with a fully applied cap under the entrance post (*Item O*) and use the hand knob (*Item Q*) to raise or lower the entrance post until both of the flat sealing belts contact the cap firmly. Post should have only the slightest movement. Move the bottle to a position under the discharge post (*Item P*) and use the knob marked to raise or lower the discharge post until the brass collar (*Item S*) is raised approximately 1/16". Be sure that the shoe is free and can be raised by hand pressure applied under the short pins (*Item T*).

Spring Pressure (Figure 4-45)

The spring pressure on the sealing shoe is regulated by using the hand knobs (*Item R*) on both posts. Light spring tension settings are recommended for the start of the production run. It is recommended that water be sprayed on the sealing shoe to keep it cool and to extend the life of the sealing belt. The sealing belts can be reversed in direction to extend the belt life.

Note: These are preliminary settings and may have to be altered slightly when production has begun. Gradual increases in spring pressure should be made if the cap lugs are not pulled up to the stops on the glass. Stripped caps could result if the spring tension is too great.

4. SET UP PROCEDURES

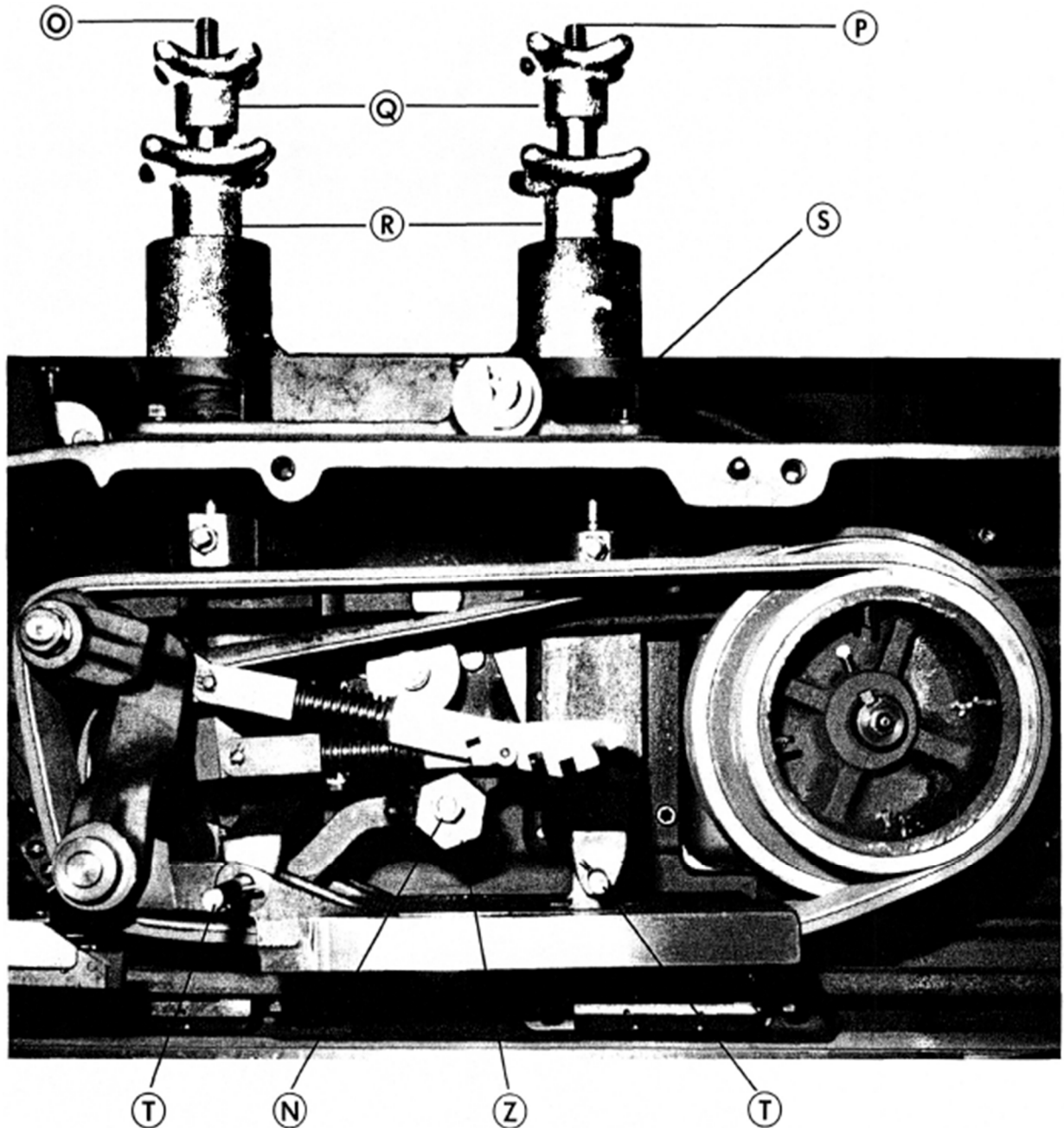


Figure 4-45: Sealing Shoe Adjustments

4. SET UP PROCEDURES

4.7 Push-On Caps

4.7.1 58-77mm DSR 27-70mm PT-DPT

Set Up Preparation for Deep Snap Re-Seal Caps

Before making the initial setup for any size cap and jar, the following steps should be taken (*Figure 4-46*). Turn the side belt adjustment wheel (*Item A*) counter clockwise until the side belt roller brackets are fully opened. This will prevent interference of the roller brackets and belts while setting the machine. Remove the stabilizer bolt (*Item B*). Remove the door (*Item C*).

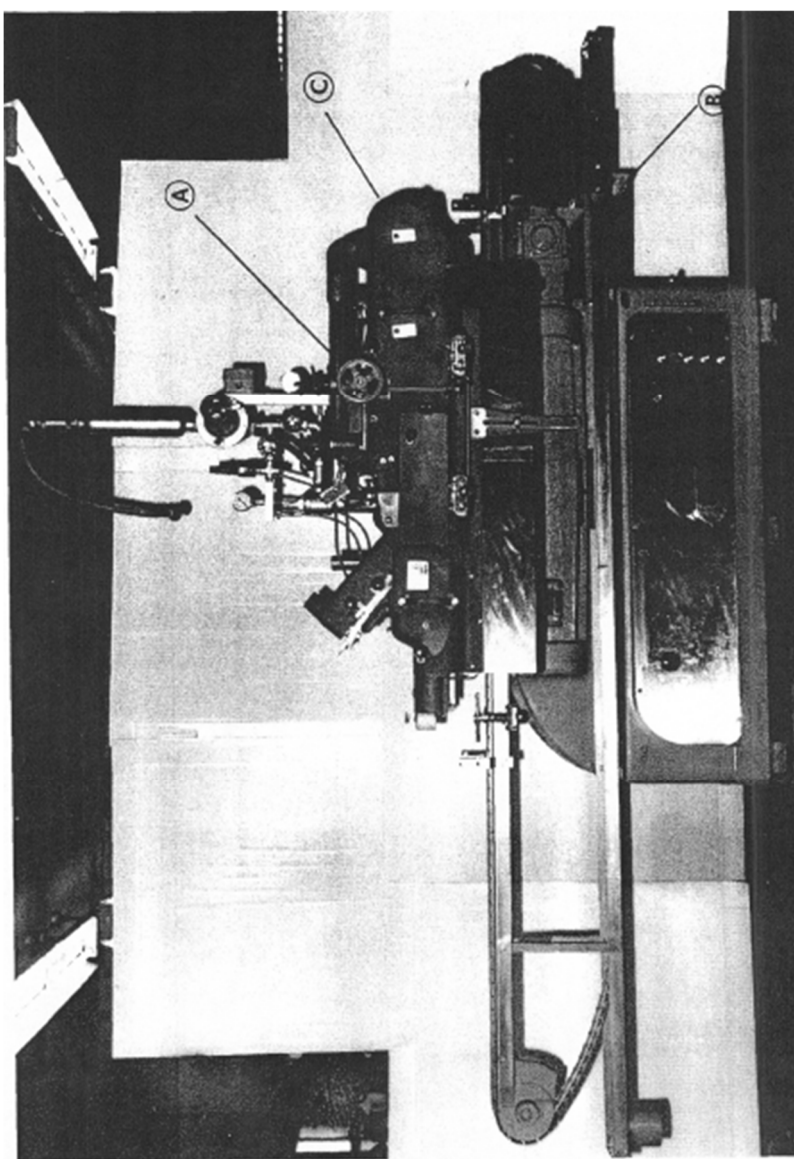


Figure 4-46: VG Capper

4. SET UP PROCEDURES

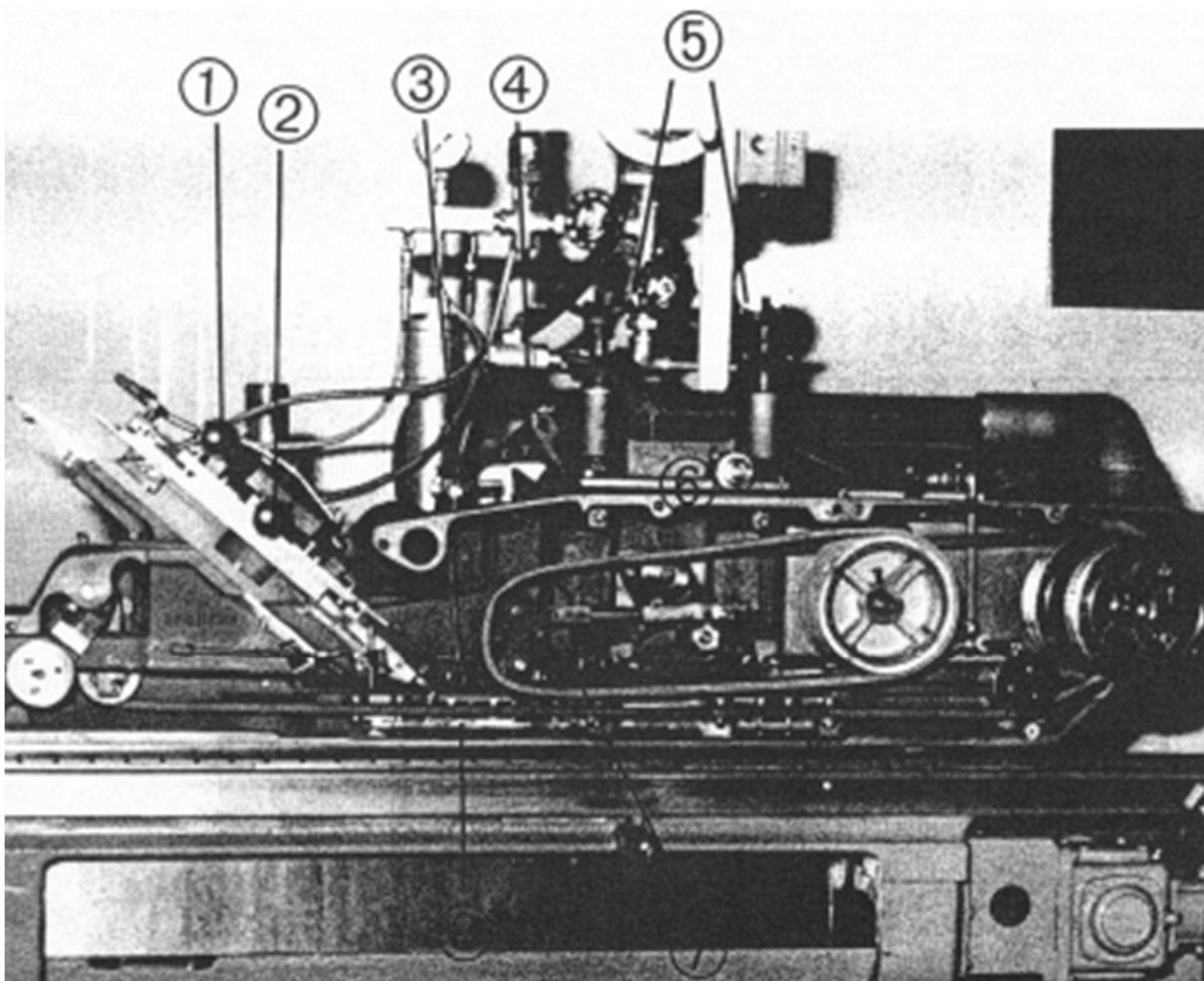


Figure 4-47: Vapor Vacuum Capper Door Removed (DSR-PT)

Item	Description
1	Cap Track Height Adjustment
2	Cap Track Width Adjustment
3	Hold Down Height Adjustment
4	Hold Down Spring Tension Adjustment
5	Sealing Shoe Height Adjustments (Both Posts)
6	Sealing Shoe Spring Tension Adjustments (Both Posts)
7	Sealing Shoe Assembly
8	Side Belt Rollers

4. SET UP PROCEDURES

Cap Track Adjustments (Figure 4-48)

Loosen height lock (Item A) and width lock (Item B). Use the height adjustment (Item C) to raise the top guide (Item G) to its highest position. Place a cap between the upper tracks (Item E). Close the width adjustment (Item D) until the cap is held in place. Open slowly until cap slides down to clips (Item F). For all large size caps, move the cap up one inch. Set the width so there is $\frac{1}{16}$ " clearance between the cap and clips. When using 27mm caps, the clearance should be $\frac{1}{8}$ ". Remove the cap from the clips and place it between the upper tracks. Lower the top guide to hold the cap in place. Raise the top guide until the cap slides down the track to the clips. The clearance between the hold down block (Item H) and the top of the cap should be $\frac{1}{32}$ " when running 27mm caps. The clearance should be $\frac{1}{16}$ " for all other sizes. Tighten height lock and width lock.

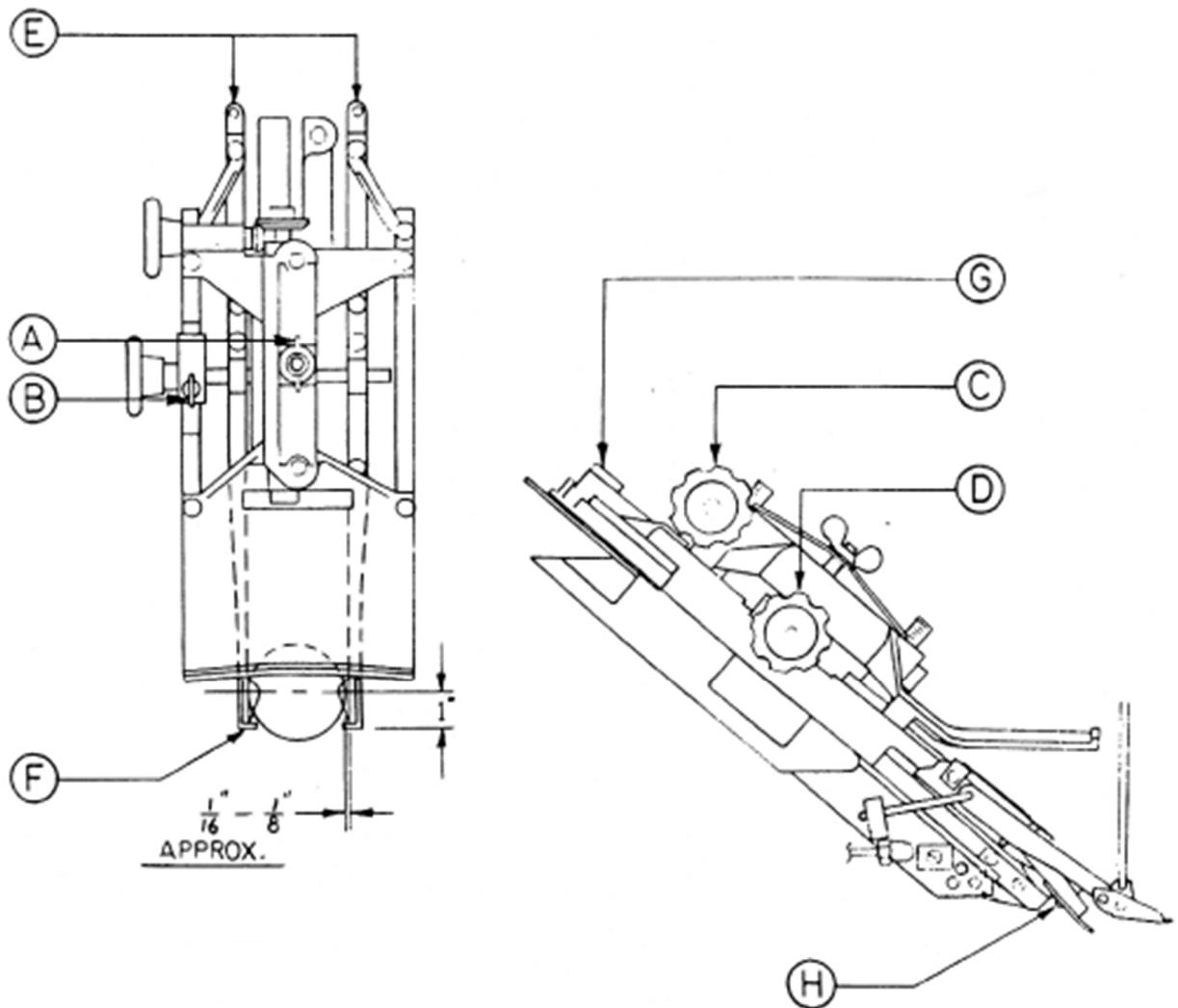


Figure 4-48: Cap Track Adjustments

4. SET UP PROCEDURES

Cap Pick Up and Leveling on the Container (Figure 4-49)

The area from the cap pick up to the sealing belts is critical and control of the cap on jar is achieved first with (Item O) the cap chute spur. This is pivoted into a parallel position with the adapter plate when running the 27 - 38 cap sizes. The Self-Locking Pin (Item P) is used to hold it in either position. The cap (Item K) is in position waiting to be picked up by the container. The first Duck Bill (Item R) holds the cap in a leveling attitude with the jar. It conveys it to the Hold Down (Item L). The Hold Down is adjustable with this screw (Item M). This delivers the cap to the sealing belt and sealing shoe. This screw (Item N) is used to regulate the amount of spring pressure exerted on the Hold Down. The head post lock (Item I) for the shaft (Item J) raises or lowers the capper head.

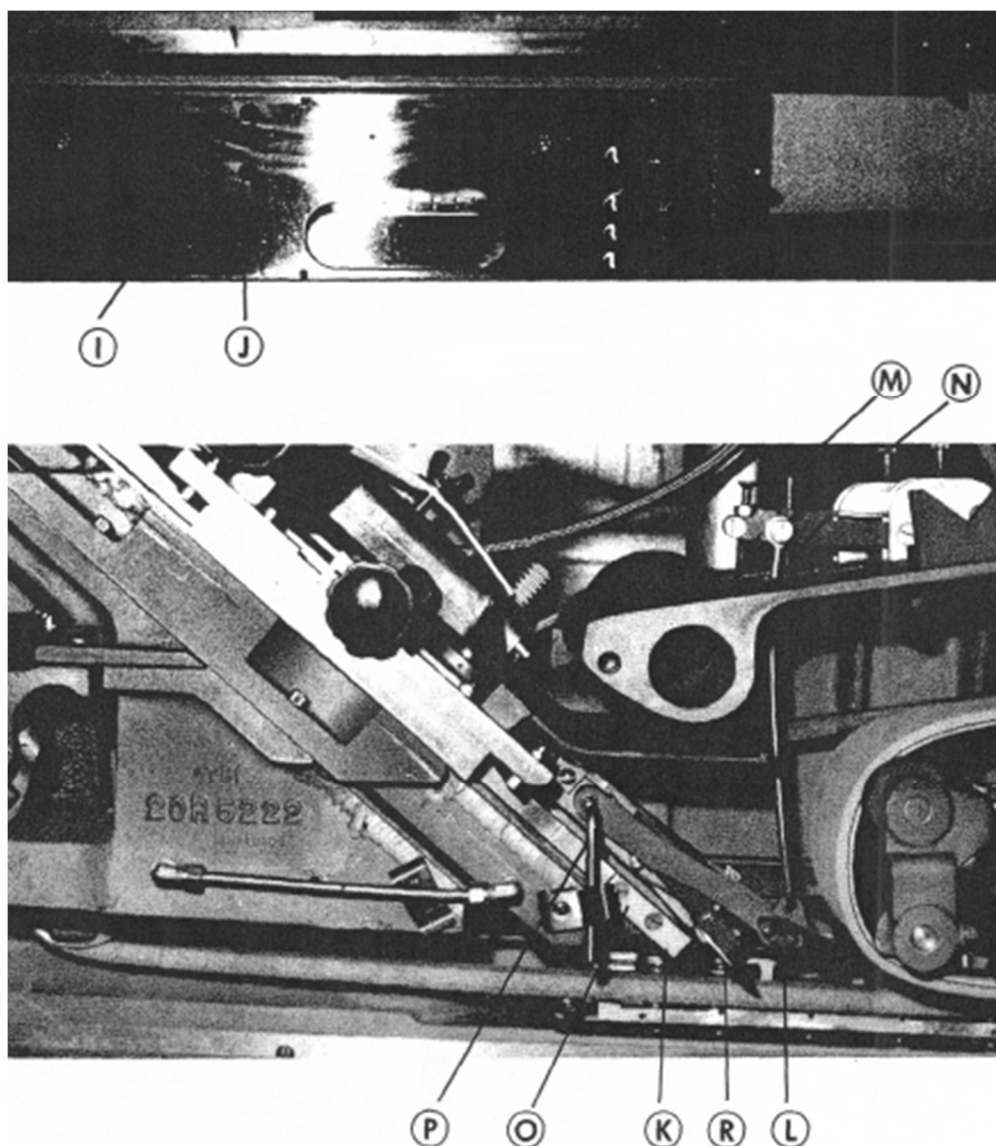


Figure 4-49: Cap Pickup and Leveling on Glass

4. SET UP PROCEDURES

Pick Up (Figure 4-50)

The Pick Up should be approximately $3/16''$ deep. This distance will vary a little according to cap size. Verify the container is centered in the pick up area. The bottom of the side rails must be straight. Ensure the side rails do not spring outward. The rail clips should have good contour for ejecting caps. The cap must be held firm during ejection. A positive cap position must be maintained for pick-up. Ensure the weight of caps in the chute has no influence on the position of the cap in the pick up area.

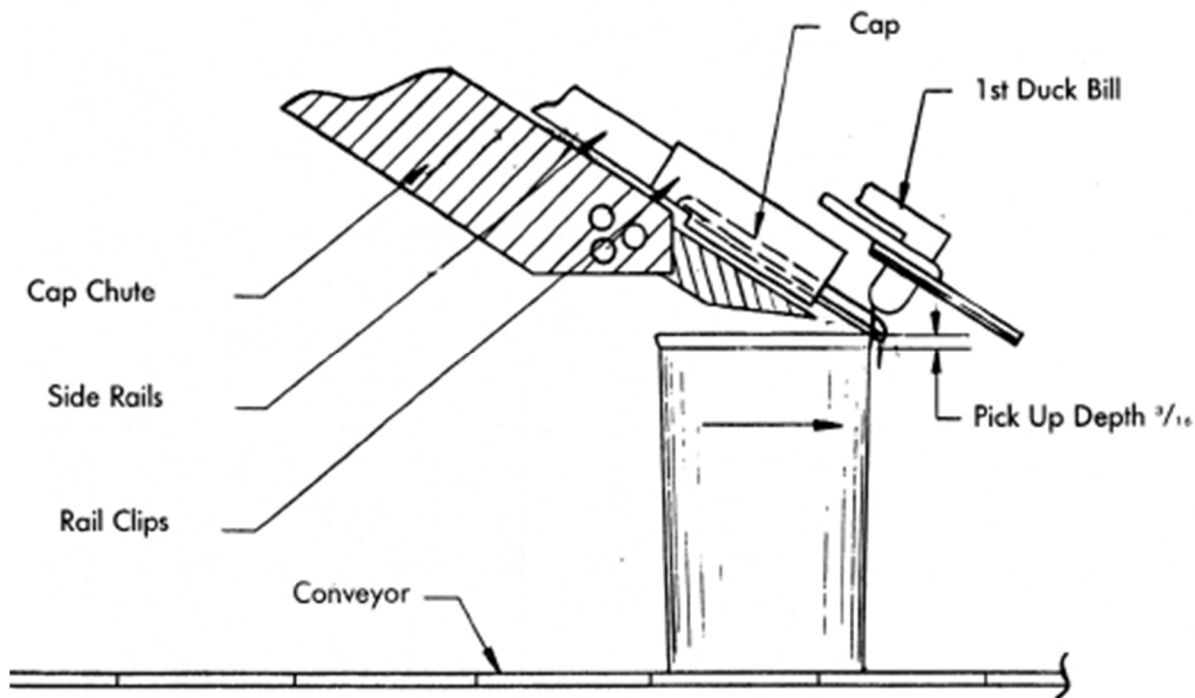


Figure 4-50: Pick Up

4. SET UP PROCEDURES

DSR Set Up Instructions (Figure 4-51)

The cap chute spur must be down to enable cap to slip down smoothly on the container. The slide block, first duck bill, and hold-down must be independently spring loaded. These three components must be arranged to keep cap on the container. This spring loading can be determined by trial and error. Spring pressure on hold-down is usually held on the heavy side. Cap position must be maintained on the container until it reaches sealing belt. Caps tend to be pulled back by the first duck bill when the container passes through. To prevent this, the hold-down must be contoured so that the front of it bears down at point "A". This point must lie somewhere in the front half of the cap. The cap chute spur must be fully extended when using 27mm caps. To extend the spur pull out pin (Item P) and rotate spur into position.

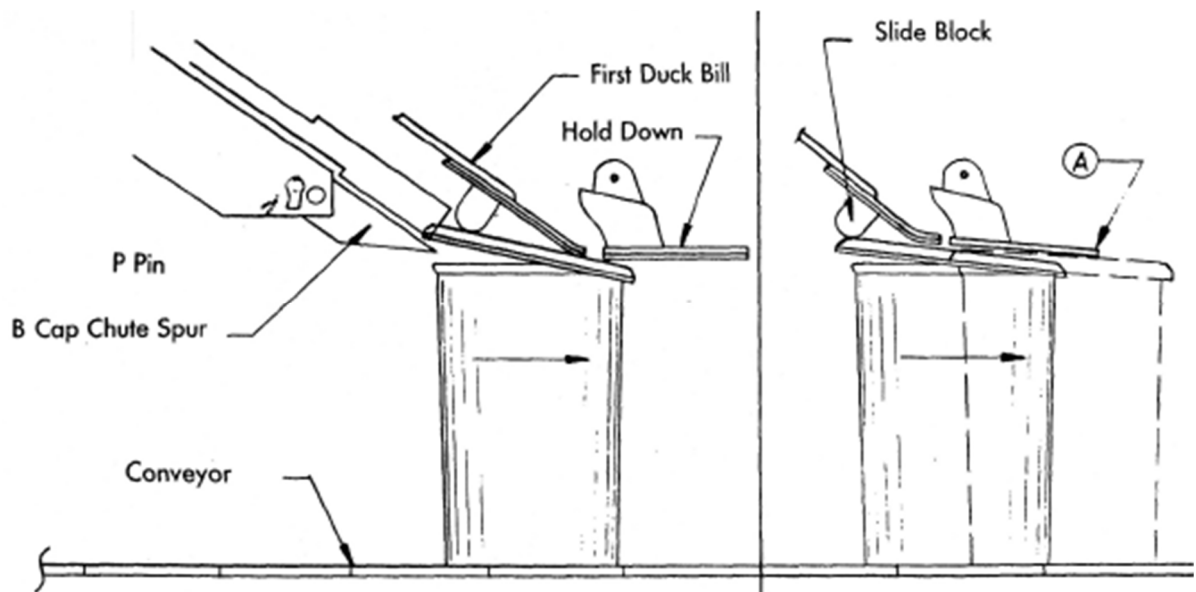


Figure 4-51: DSR Set Up Instructions

4. SET UP PROCEDURES

DSR Set Up Instructions (Figure 4-52, 4-53)

The caps tend to pull back off of the container. This happens when the hold down is to the rear of the container (*Item B*). By this time, the leading edge of the cap is under the sealing belt. The sealing belt is set by nuts (*Item Q*) with little depth just enough to show slight wiggle on first post (*R*). The second post is set at 1/2" bounce (*Item S*). The springs (*Item T*) are compressed about 50% on each post. Adjust using nuts (*Item U*).

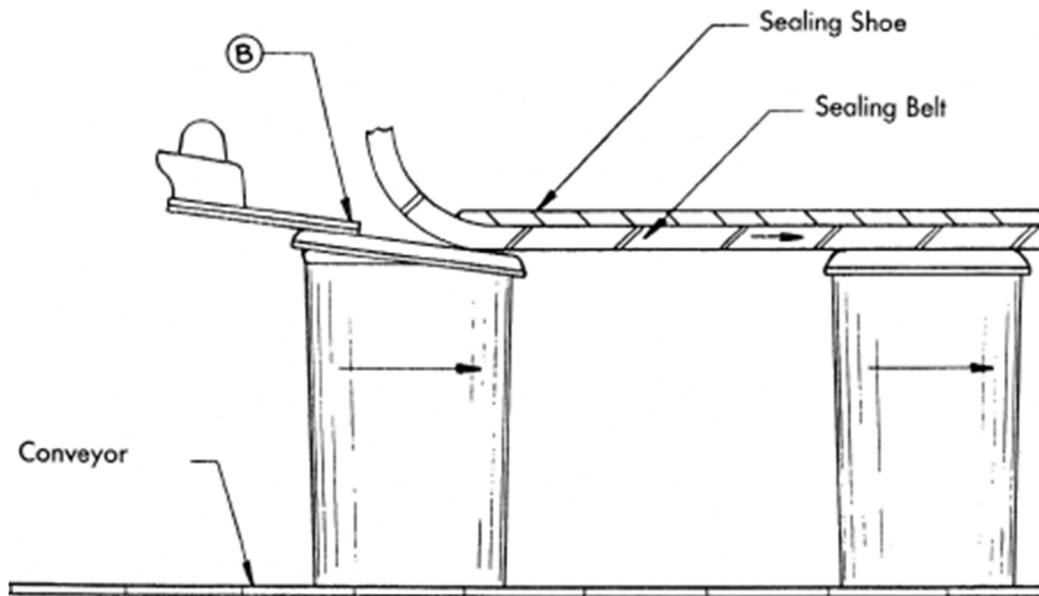


Figure 4-52: Sealing Belt and Sealing Shoe

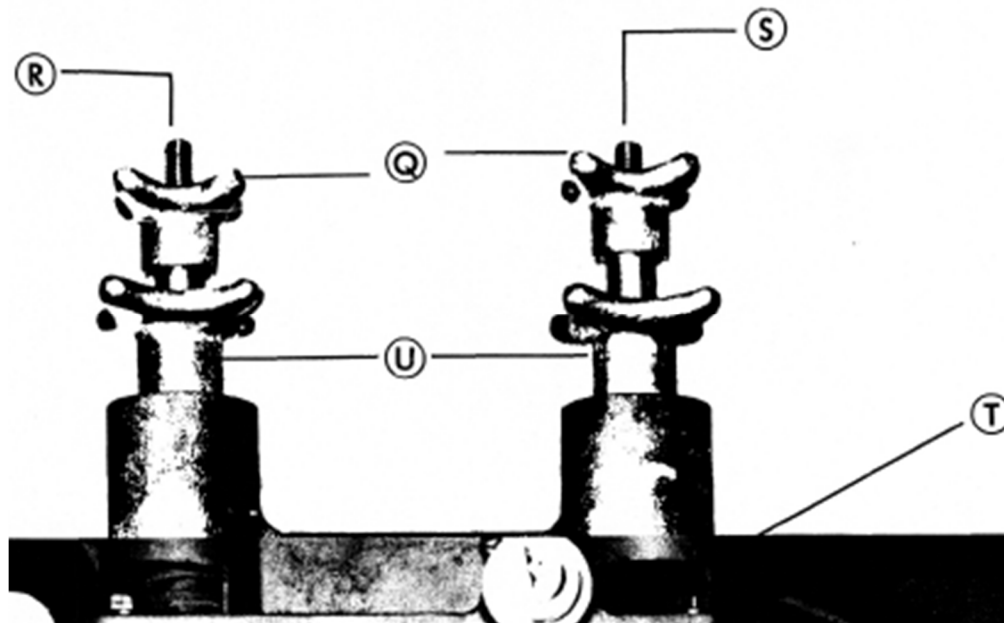


Figure 4-53: Adjustments

4. SET UP PROCEDURES

PT-DSR Set Up Instruction (*Figure 4-54*)

In this diagram, the sealing shoe/sealing belt is not level with the conveyor. The sealing belt and sealing shoe should not be out of level further than $1/32"$. This measurement is taken from side to side directly under the second post.

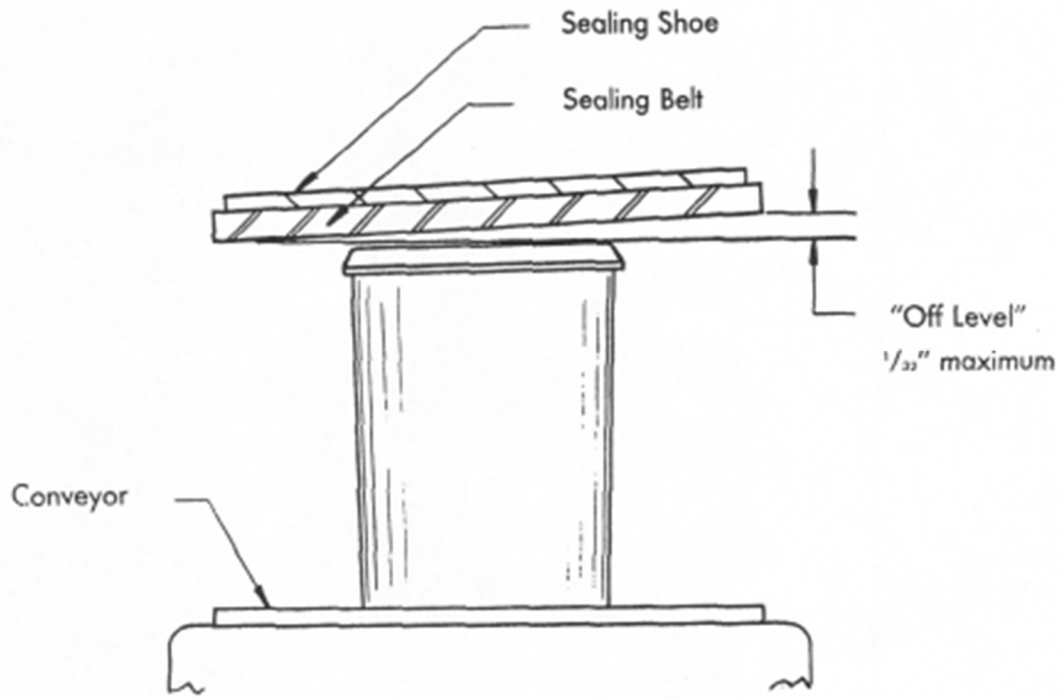


Figure 4-54: End View

5. CAP APPLICATION

5.1 Set-Up Procedures

5.1.1 Pre-Production Checkout For All Cap Styles

Maximum Cold Water Vacuum Checks

Purpose: To monitor vapor vacuum efficiency of capping machine. Refer to operating instructions for appropriate steam supply system for initial steam settings.

Procedure: Obtain six containers to be run through the capper. Fill the containers with 70°F water. Leave a headspace for each at approximately 1/4". Set the main steam valve in full open position. Set Hi-Lo valve to high side if used. Run the machine until it is in warm condition. Run the containers through the capper twice. After each run, puncture the closure with a vacuum gauge and take a reading. Do not release the gauge after the reading. Leave the gauge closed. From the second pass, record the highest, lowest, and average readings. Record the highest, lowest, and average readings obtained. Recommended range 23-27 in/hg. large mouth 18-21 in/hg. small mouth jars. Return to the operating instructions for appropriate steam system to determine proper steam valve settings. If min. vacuums are not achieved - check following:

- Check headspace and temp. of cold water.
- Incoming steam supply, strainer, silencer, steam traps.
- Hi-Lo valve position - should be on the "hi" side if on the line.
- If Low Pressure system be sure globe valve is fully open.
- Distributor ledge for blockage.

While running, open the cover door to check the sealing shoe. Check the side belt roller brackets. Verify the cap application on all containers. Each plant will set its own standards to compensate for steam conditions and headspace levels.

Frequency: Cold water vacuum checks should be performed at the start of each shift, after prolonged line stops (lunch, breakdowns, etc), after size changeovers, when there is a jam-up in the capper, and whenever a significant change in vacuums taken on product is detected.

Records: A permanent record of reading should be kept, including date, time, line, products, line speed, headspace, cold water temp., min. and max. vacuum, pullup, security, sealing temp., cooled temp., cap size and style, job number, glass size, glass finish and manufacturer.

5. CAP APPLICATION

5.2 Final Checkout Procedure

5.2.1 Twist-Off Caps

The cap chute is provided with steam jets above and below the caps to accelerate them to the pick up station and to soften the gasket prior to sealing. This machine has a sensitivity to a container height variation of ± 1 ". If caps are missed, it may not be the height setting. Try adding more steam to the upper and lower cap heaters to accelerate the caps down to the pick up station. If the pick up is set too deep, the cap chute will bump up and down.

When the run is started, it will be necessary to readjust the bump and spring pressure on the discharge end of the sealing shoe to put the lug of the cap under the flat of the thread on the bottle. A dot is provided on the bottle (DTO only) for a quick check. Cold caps will be harder to seal, so use sufficient steam to heat the caps.

When the run is started, it will be necessary to open the door and observe the caps as they start under the sealing belts. Looking at the caps as seen through the door:

1. If the caps are rocking around on top of the thread, increase the bump and spring pressure on the drag arm to spin the caps into the threads. If the drag arm does not spin the caps properly, the sealing belts may bend the lugs over the threads or container.
2. If the caps cock with the high edge towards the entrance end, the duck bill has too little bump or spring pressure, or the hold down has too much bump or spring pressure, or the pick up for RTO caps may be set too deep.
3. If the caps cock with the high edge towards the front of the machine, the drag arm has too much bump or spring pressure, or the duck bill has too little spring pressure.
4. If the caps cock with the high edge towards the discharge end, the hold down is set too high above the cap or has too little spring pressure, or the capper is set too high.

5.2.2 Press-On Caps

Check to see if spur of cap chute is out where required. Check rail-clips for wear or sprung side rails. Be sure spring pressure on duck bill is correct so that cap will not get ahead or pull back. Also check hold down spring pressure. Be sure proper pick up dimension is held. If pick up is too deep, there will be excessive action on cap chute and caps will be missed.

5. CAP APPLICATION

5.3 Operation

This section provides information on operating the capper. The procedure must be followed at the beginning of each shift. Obtain samples of the caps and containers for the current job.



Warning

Follow lock out tag out procedures before performing the following steps.

Open the roller brackets using the one point adjustment wheel. Remove the cover from the head. Check that the correct change parts are installed. Remove the cap track, duck bill, and hold down. Perform daily maintenance (*Section 7.1.1*). Reinstall the cap track and level it to the conveyor. Set the width and height of the cap track. Set the top guide to the correct setting.

Pull caps through the cap track. Check that they flow freely, and there are no scratches on the caps. Set the head to the proper height. Pull several caps and containers through to see that the caps drop onto the containers smoothly. Apply one cap to a container by hand. Position the container at the discharge end of the cap track. Push the cap and container into the cap track. Spin the container by hand. Remove the container and check that the marks on the cap indicate that the cap track is level front and back. Install the duck bill and hold down assembly.

Adjust the duck bill and hold down assembly. Pull the container and cap through by hand to check the proper settings. Install the drag arm assembly (if required). Adjust the drag arm assembly.

Check the roller brackets. Set the centering device for the container to be used. Using the hand crank, crank a container through the capper to the center of the cap track. Check for the proper clearance between the tracks.

Place capped containers under the sealing shoe. Adjust the sealing shoe. Crank the containers out of the capper. Check all belts and idlers. Replace the cover on the head.

Crank an uncapped container through the cap track. Adjust the roller brackets using the one point adjustment wheel. Set the roller brackets for the proper bump. Do the daily lubrication procedure. Turn the main power on. Place caps in the hopper. Fill several jars with cold water to within 1/4 inch of the top. Push the switches to turn on the capper motor, exhaust motor, hopper and hopper fan. Do a cold water check. Turn on the steam and cold water. Adjust the steam as required. Do a cold water check. If all is correct, run production. Retain containers used for rechecking if necessary.

5. CAP APPLICATION

Summary of observations to be made at various stages of production

Prior to Capping

Use proper filling machine levels for headspace and temperature. Obtain and use the correct container size. Verify the correct closures are loaded in the hopper. Ensure the settings on the capper are correct.

Startup

After the capper is set up, verify the settings. Keep a set up container available for reference. Observe the cap application through the inspection door. Use the same container manufacturer for the entire lot. It should also be the same as the set up container. Confirm the cap is sealed on the container.

After Capping

Test for proper vacuum by performing a cold water check. Test for good security and pull up on twist-off caps. For press-on caps, verify level and positive seating. Check for a good transfer of containers.

During Pasteurization

Check the package for proper process temperature (specified by the customer).

After Cooling

Check package for temperature and vacuum. Check package for proper sealing. Remove water from the container finish area. Set coder and dud detector.

After Production

Remove door, wash interior of head, check belts for wear, check stop pins. Stop pin springs and roller bracket springs replace if needed and all other wearable parts. Care fully store change parts; shelves and cabinets should be provided. Do not toss heavy parts on top of one another. Use Parts Catalog for ordering of replacement parts. Keep adequate supplies of spare parts on hand. Mechanics and operators should keep change parts in good repair, lubricating the equipment on a weekly basis.

5. CAP APPLICATION

5.4 Package Evaluation

Small Mouth "Twist-Off" Operating Instructions

These instructions cover White Cap closures, sizes 27 - 38mm, in both the conventional (RTO) and deep (DTO) profiles used on three lead angle flat glass finishes.

Closure Size & Style	No. of Lugs	Sealing Material	Glass Finish
27 — 38 DTO	3	TOA, 045, 078	GCMi 2060 (3 fillets - 2 stops)
27 — 38 RTO	3	045, 078, 238	GCMi 2000 (3 fillets - 2 stops)

Figure 5-1: Closure Detail

5.4.1 Security and Pull Up Check

Pull Up (Position of lug with respect to fillet)

This inspection is recommended at capping and after cooling. Periodic checks should be made and recorded as frequently as possible. Lug position should be directly over the "locating dot" on the transfer bead of the container finish for best cap application (*Figure 5-2*).

Occasionally closures may be found with the lug not up against the primary fillet or stop. It is imperative that the full lug be completely on the flat or horizontal portion of the thread to be acceptable.

Closure lugs not completely on the flat portion of the thread indicate that the closures are not sufficiently applied. Over application of the closure is identified by the lug position being significantly over the primary stop.

5. CAP APPLICATION

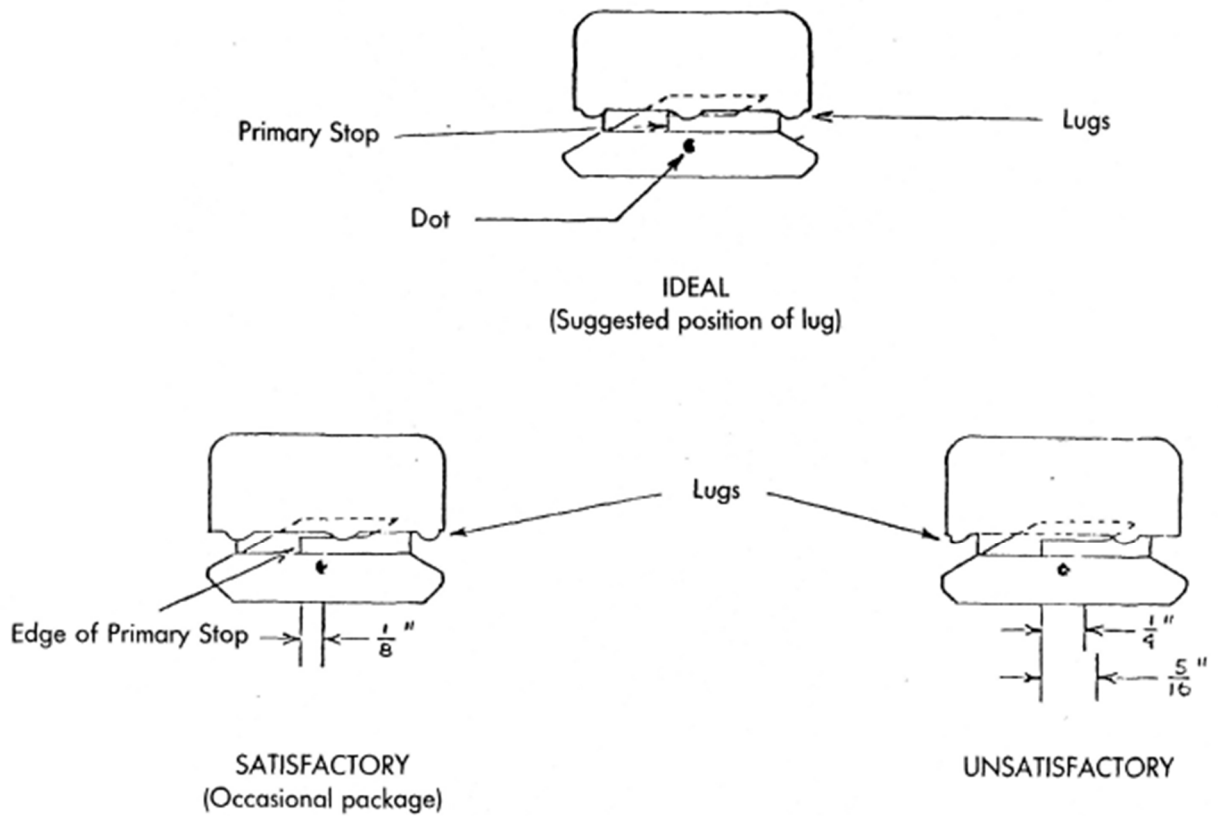


Figure 5-2: Lug Position

5. CAP APPLICATION

Remaining Compound Thickness(Related to sealing area impression)

The actual measured thickness is optional; however, a complete (360°) impression in the sealing area must be observed at the time of capping and after cooling.

The remaining compound thickness usually ranges from .004 - .020" (not including tinplate thickness) at the time of capping, and .003 - .018" after cooling. The sealing material used in "Twist-Off" closures requires heat obtained from the steam supply to the capper to form the desired impression in the sealing area.

Steam temperatures for proper operating conditions will vary with specific vacuum requirements for any particular product being capped. Ideally, the capper temperatures for these closures are as follows:

Steam Distributor Ledge (Capper Head) 212°F - 230°F

Cap Chute 190°F - 212°F

High volume steam conditions for maximum package vacuum may require less cap chute heat. Low volume steam conditions for lowest package vacuum may require maximum cap chute heat to obtain the desired sealing area impression.

Removal Torque

This is an optional check that may be performed for Quality Control records, but it is not recommended that it be used as a control for cap application.

Removal torque can vary significantly with sealing conditions, filling techniques, glass finish lubricant or treatment, package vacuum levels, and dimensional relations between the closure and glass finish. Differences in removal torque readings taken under identical sealing conditions can also be noted between personnel operating the torque meter on packages sealed under identical conditions. For this reason, we have not prescribed any specific torque limits. The minimum removal torque is approximately 1/7th of the millimeter size measured in in/lbs of torque, and reseal torque is approximately 1/2 of the original removal torque value. On fast continuous runs, a somewhat higher ledge temperature may be used

5. CAP APPLICATION

Large Mouth "Twist-Off" Operating Instructions

(Not for closed Retort Processes) These instructions cover White Cap "Twist-Off" closure sizes 53 through 110mm used on helix glass finishes. The various closure styles used are identified as follows:

- RTO signifies a Regular Twist-Off cap up to and including the 77mm size.
- RTS is the same as above with the addition of a step in the cap panel design. This style is generally confined to the largest three sizes.
- FAO indicates a "Twist-Off" cap with the addition of flutes or knurls to the skirt of the closure.
- RTB signifies a regular "Twist-Off" cap which incorporates a button or flip panel as a vacuum indicating device in the cap panel.

Closure Size	No. of Lugs	Glass Finish
53 & 58mm	4	GCM1 2020
63, 66, 70 & 77mm*	4	GCM1 2030
82mm	6	GCM1 2040
89mm	6	GCM1 2050
110mm	8	GCM1 2070

*77m — most caps of this size are 6 lug.

Figure 5-3: Closure Detail

5. CAP APPLICATION

Physical Measurements Taken at Capper & After Cooling

Pull-Up (Position of lug with respect to fillet)

This is a visual inspection noting the location of the lug in relation to one of the two vertical parting lines (mold match) on the container finish. Usually the leading edge of a cap lug will be 1/4" from the parting line on the glass finish. However, this distance can vary 1/4" in either direction on the helix. The difference is due to the dimensional variations and design of the finish. Closures should not be over applied. Over application is defined as having the closures applied to the extent that the lugs pass the parting line of the glass finish. Pull-up measurements clockwise from the parting line are negative (-), counter clockwise from the parting line are positive (+).



Attention

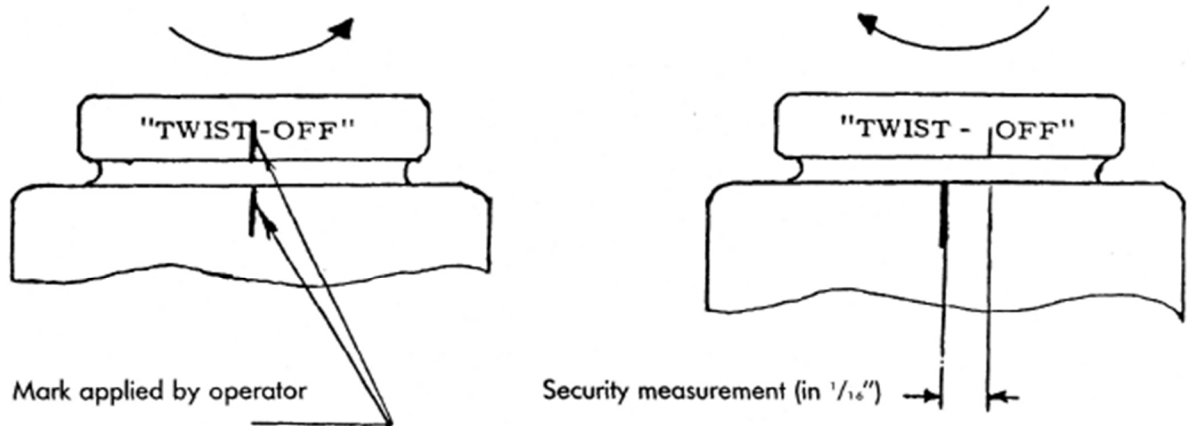
Caution: It is not recommended that this inspection replace the security check. It is intended as a secondary, external examination once the pull-up/security relationship of a specific lot of containers and closures has been established.

Security Value (Lug Tension of an Applied Closure)

This measurement should be taken by authorized personnel at periodic intervals during every production period. Security values are most important for judging "good" or "bad" cap application. The "security" measurements are taken right after capping as well as after cooling (Figure 5-4).

1. With a marking pen or pencil make a vertical line on the cap and a corresponding line on the container.
2. Turn closure counter clockwise until vacuum is broken. No need to completely remove the cap.
3. Reapply closure to container just until the gasket material touches the glass surface and the closure lug touches the glass thread or until the closure is just finger tight. Do not use force.
4. Measure the distance between the vertical line in 1/6" increments. This number is "security."
5. "Security" is considered positive if the line on the cap is to the right of the line on the container and negative if the line on the cap is to the left of the line on the container during the measurement.

5. CAP APPLICATION



The above is a destructive test, thus there are practical limits as to the number of packages that can be so evaluated.

RECOMMENDED SECURITY VALUES (Expressed in increments of 1/16".)

	At the Capper	After Cooling
4 lug caps	3 - 5	2 - 5
6 and 8 lug caps	2 - 4	1 - 3

Figure 5-4: Security Testing

5. CAP APPLICATION

It is suggested that security checks be made and recorded at the start of a shift and at periodic intervals thereafter. The frequency of which will be dictated by practical considerations such as line speed, etc. Security should be rechecked every time a packaging component (caps, glass) changes, or when a product change takes place. Three consecutive packages out of the capper should be checked by this procedure. To insure proper cap application after cooling, security checks should be made there as well as at the capper, and with equal frequency.

Note: While the method of obtaining security readings always applies, the "security numbers" given above are general in nature and intended only as suggestions. From time to time conditions may vary to the extent that a deviation from the suggested security numbers is necessary.

Variations may be coexistent with the type of plate or the compound used in the caps and/or glass lubricant used by the glass maker. One or a combination of these conditions may dictate a shift of the proper security range in either direction for the specific operation. In some cases lower security values may be entirely acceptable as long as some positive security is on packages going into the warehouse. Conversely, higher security values may be necessary if the user feels that the recommended range produces a percentage of unsatisfactory packages, and higher securities reduce them.

Remaining Compound Thickness (related to sealing area impression)

The actual measured thickness is an optional check; however, a complete 360° impression in the sealing area must be observed at the time of capping. Remaining compound thickness usually ranges from .008 - .022" (gauge reads zero on plate in center panel) at the time of capping and .005 - .019" after cooling. Most of the sealing materials used in "Twist-Off" closures require heat obtained from the steam supply to the capper to form the desired impression in the sealing area.

Steam temperatures for proper operating conditions will vary with specific vacuum requirements for any particular product being capped. Ideally, capper temperatures for these closures are as follows:

- Steam Distributor Ledge (capper head) 215° 240°F
- Cap Chute 190° 210°F
- Cap Pick-up Area 212° 230°F

Slow line speeds with large container spacing may require less cap chute heat, providing the steam in the steam distributor is supplying sufficient heat for the desired impression. On fast continuous runs, a somewhat higher ledge temperature may be used.

5. CAP APPLICATION

Removal Torque:

This is an optional check that may be performed for Quality Control records, but it is not recommended to be used as a control for cap application. Adjusting the capper to specific torque limits may promote loose cap problems. Removal torques vary significantly with glass lubricant or treatment, filling conditions, sealing conditions, package vacuum level and how tightly the cap is applied. Torque reading differences under identical conditions can also be noted between personnel operating the torque meter. For this reason, we have not prescribed any specific torque limits. As a guideline, the *minimum* torque at the time of capping should be 1/4 the millimeter size in inch-pounds at the minimum security level.

Note: For reasons outlined in the "Security" section, a deviation from the "rule of thumb" mentioned above may be necessary. Removal torques immediately after capping may be quite low and should not be used as a criteria for establishing quality control limits. Removal torques will be higher after processing or cooling of the product and will increase some in a relatively short time. It is because of this known increase that attempts to raise torque immediately after capping are discouraged.

We discourage the practice of checking the tightness of caps immediately after sealing. By having the Quality Control operator try to spin the cap off can only lead to loosening of closures.

5. CAP APPLICATION

5.4.2 Press On Caps Check From Machine

Description - DSR

It's a compound cap and strictly a top seal type. Six gripping lugs grip directly on the tumbler bead, making a metal to glass contact which gives (1) package security and (2) reseal quality. The cap is non-finished when shipped to the customer because the lugs do not permit the cap to fit the tumbler. The final sizing of the cap is performed during the capper operation by forming lugs on tumbler. To acquire good impressions (Top Seal) we use: (1) compounds which are softer than compounds normally used on Twist-Off caps, (2) special equipment to deliver adequate cap heating and (3) instructions that must be rigidly adhered to. Please note that cap removal requires leverage at two or more places around circumference.

Description - PT

This cap has compound along the cap sides and a ring in the top. The ring of compound in the top will cover the top of the container insuring a top seal. The side compound will form around the jar lugs creating a seal and barrier to bacteria infestation. The caps at the present time range from 27 through 70mm. This cap will be removed by twisting the same as our "Twist Off" and can be resealed by reverse action. To acquire good impressions for the top seal and thread forming the cap chute requires a heating capacity to soften the compound before application.

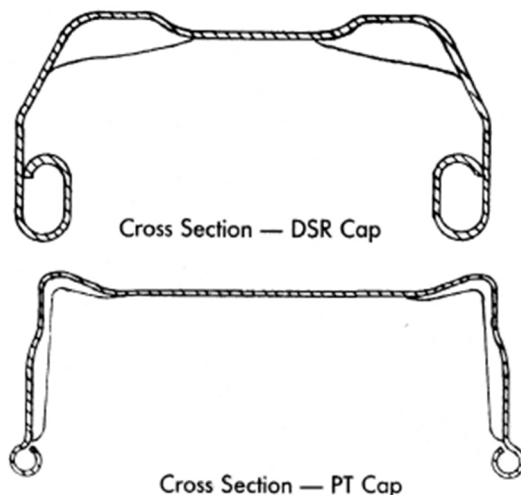


Figure 5-5: Cap Cross Sections

5. CAP APPLICATION

Operating Conditions

Packages should have some vacuum coming out of the capper. An occasional customer may run zero to 2 lbs. pressure. The customer, in this case, should be cautioned and advised that perfect machine settings and careful handling are necessary. Field experiences have shown that this cap will not operate correctly when internal pressures exceed 2 pounds.

A minimum of 8" vacuum is required on cooled jars for satisfactory casing and handling. A minimum of 10" vacuum is necessary for shipping. These are absolute minimums for 10-oz. to 20-oz. packages. Less vacuum may be proportionately used for smaller packages.

After sealing, DSR cap should have evenly collapsed lugs and deep even impressions in the compound.

As with Twist-Off capping operations, steam is used for two purposes in the capping machine: for vacuum, for cap preheating. Preheating softens the sealing material or compound.

Steam Requirements

Cap Chute Heat: The cap chute assembly is equipped to supply steam to the cap to sufficiently soften the compound for sealing. Controlled cap preheating is very important for proper sealing. The steam should be connected from the main steam distributor of the capper. The pressure gauge on the cap chute steam line should read between 15 and 20 p.s.i. This may have to be adjusted slightly depending on the depth of impression described in this section.

Vacuum: The steam requirements for vacuum will vary depending on the product being packed. It is recommended that standard "Twist-Off" settings be used.

6. GENERAL TROUBLESHOOTING GUIDE

6.1 General Troubleshooting Guide

6.1.1 Four Types of Misapplied Caps (Twist-Off)

For purposes of dud classification as well as for purposes of making the proper capper adjustments, it is important to be able to recognize the four major types of misapplied closures.

Cocked Cap: A closure which became cross-threaded during initial application and was snapped over the threads under the sealing shoe.

Inspection: Half the lugs are crushed, deformed; other half appears normal or slightly pulled. Compound impression is uneven.

Crushed Lugs: A closure which although not cross-threaded was not spun into threads during initial application (sometimes referred to as "late spinners") and was snapped over the threads under sealing shoe.

Inspection: All of the lugs are crushed or marred, but not as severely as a cocked cap. Compound impression is light but relatively even.

Stripped Cap: An over applied closure which has been twisted beyond the ends of the threads.

Inspection: All lugs are marred. Cap appears to be squared or pulled out of shape.

Loose Cap: An under applied closure never securely applied.

Inspection: Closure has the appearance of an unused cap, lugs are not marked.

6. GENERAL TROUBLESHOOTING GUIDE

6.2 Visual Cap Inspection

This section provides information for making adjustments that are required when caps are not correctly applied (*Figure 6-1*).

Cocked caps occur while the cap and container are in the pick up area. To correct a cocked cap problem, check the following:

- The cap track level
- The cap track width
- The top guide height
- The cap pick up height
- For sticky stop pins and broken stop pin springs
- For proper jar centering between the cap tracks
- The duck bill angle and height.
- The hold down angle and height
- The duck bill and hold down spring pressure
- The drag arm bump and spring pressure

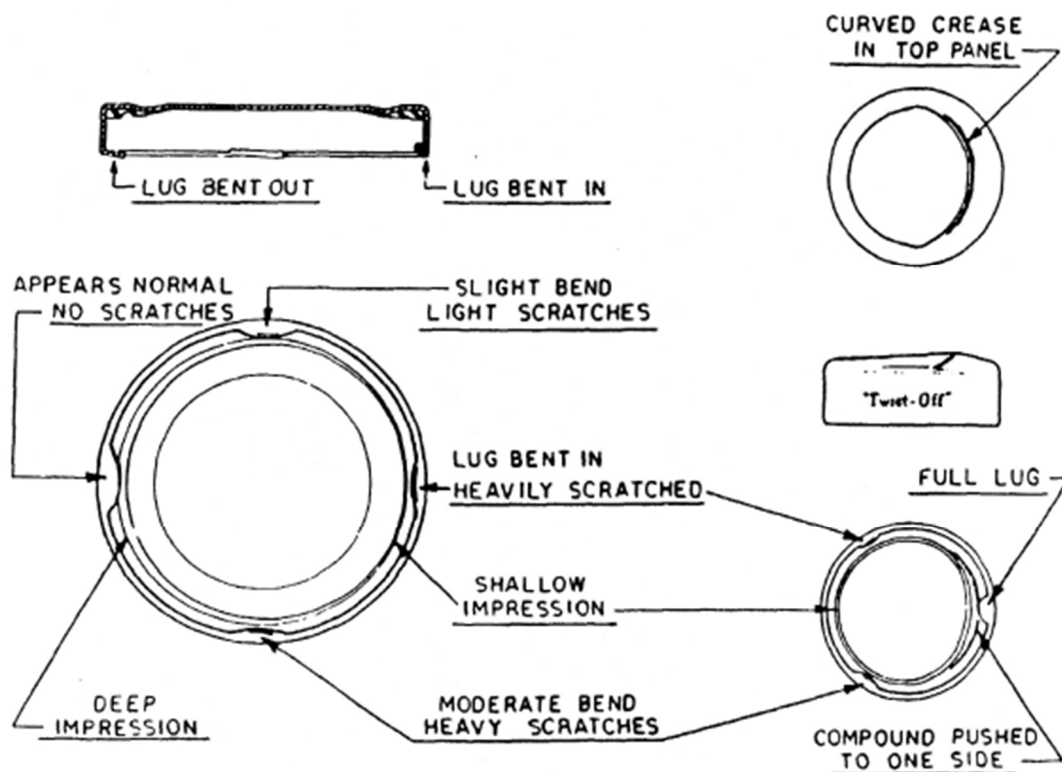


Figure 6-1: Identification of a Cocked Cap

6. GENERAL TROUBLESHOOTING GUIDE

To identify and correct possible causes for cocked caps, when viewed through the inspection door if you see:

Trailing edge high

Check: Cap track out of level.
Pick up too deep.
Broken stop pin springs.
Foreign material under the conveyor chain.

Door side high

Check: Cap track width set too wide.
Duckbill spring pressure too light.
Drag arm spring pressure too great or too much bump on drag.
Duck bill set too high.
Jars not centered between the cap tracks.

Leading edge high

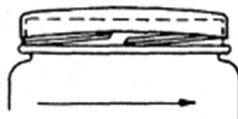
Check: Cap track out of level.
Top guide set too high.
Duck bill has too much spring pressure or is not set flat.



Trailing Edge High



Door Side High



Door Side High

Figure 6-2: Cocked Caps

6. GENERAL TROUBLESHOOTING GUIDE

6.3 Twist-Off Troubleshooting

The following describes adverse conditions and possible causes

Cocked Caps: (Section 6.4) Product protrudes above finish. Side belts are not centered with cap chute. Side play in track assembly is frozen. Duck bill is too high and/or is tilted improperly. Drag rubber has too much bump and too much pressure. Side belts slip and let glass tip back. Pick-up is too deep. Track assembly is off level. Conveyor bed is not flat in pickup area.

Drag Rubber Will Not Turn Cap: There is too much duck bill pressure. Drag has less than 1/8" bump and/or too little spring pressure. Cap cocks as it leaves the chute. Drag rubber is worn out. Drag has lost friction properties.

Caps Lost Off of Container: Duck bill is tilted improperly. Hold-down is too low. Top guide is too high at pickup station. Pickup is too shallow

Container Falls/Tips Over Backwards: Side belts slip. Track assembly is too tight on cap. There is too much bump and pressure on entrance of sealing shoe. Stop pins are frozen. Container is not centered in cap chute.

Side Belts Slip: Too little or too much bump is used on belts (use about 1/32"). The side belt assembly is too loose. The cleats in the side belt drive pulley are worn down. The side belts are worn out or stretched too much. The side belt brackets are not parallel to conveyor

Cap Chute/Track Assembly Bump: Pickup is too deep. Track assembly runs downhill too much (1/16" max.). Track assembly is too tight on glass finish. Side belts are too far off center

6. GENERAL TROUBLESHOOTING GUIDE

6.4 Cocked Cap Troubleshooting

The following describes adverse conditions and possible causes

Drive Motor: Check drive motor in base. Make sure that motor is operating efficiently and is large enough to do the job.

Variable Speed Pulley: Make sure pulley is not frozen ,and will open and close smoothly.
Check drive belt for worn or shiny spots.

Conveyor Chain: Make sure capper conveyor chain is level.

Container Spacing: Make sure container spacing is even and containers are not too close together, particularly at high speeds. If containers are too close, caps will not have time to drop to pickup point.

Caps Thru Stop Pins: This can best be observed in the cap chute above the capper. Caps should always stop in the same place, should not bounce back, and should keep up a steady flow pattern.

Side Belt Washers: Make sure side belt washers are turned on, particularly where fills are sloppy. Ensure product particles are not being imbedded in belts.

Cap Tracks: Make sure that cap track assembly does not bounce up and down or from side to side when jars are going through machine.

Side Belt Timing: Check side belt timing in relationship to conveyor chain. Belts should advance 3/8" to 1/2" in 24 inches of conveyor travel.

Head Level: Make sure the capper head is level with the conveyor.

Side Belt Brackets: Check roller brackets for, and also for clearances in tubes. Brackets should not bind. Check for broken springs in "H" castings.

Wear Strips: Check wear strips under cap track and sealing shoe. If they are worn they should be replaced.

Side Belts: Check to make sure that the side belts are not slipping in the capper. Make sure that there is enough tension on the take-up springs.

Container Centering: Check container under the sealing shoe to make sure that the cap is in the center in relationship to the two sealing belts. Stop the container under the discharge end of the sealing shoe and observe through the discharge end of the capper.

Clean Fill: Use the glass finish cleaner (if available) to make sure that the product is being washed off the finish and the sides of the containers.

Container: Check bad packages and see if there is a pattern of certain mold numbers.

6. GENERAL TROUBLESHOOTING GUIDE

6.5 Loose Cap Troubleshooting

The following describes adverse conditions and possible causes

Sealing Belts: Check the sealing belts to make sure that they have the proper tension and are replaced when worn.

Side Belts: Make sure that the side belts are not slipping on the side belt drive pulley.

Take-Up Springs: Make sure side belt take-up springs have proper tension.

Sealing Belt Tension: Make sure take-up bars are not bottomed out. First or second notch is usually sufficient.

Cap Heat: Check for too much or too little cap heat.

Sealing Shoe Binding: Make sure that the two sealing shoe hanger rods are centered in the holes in the head casting. Sealing shoe must be free to move up and down and should not bind.

Container Finish: Make sure that the proper container finish is being used.

Sealing Shoe Setting: Too much bump on the entrance sealing shoe hanger will not allow the cap to be turned up securely.

Conveyor Speed: In some cases, speeding up the conveyor will help remedy a loose cap situation. At times you may also want to try running the capper at a much slower speed than normal.

Container Spacing: Container should be properly spaced so that as few jars as possible are under the sealing shoe at any time.

Belt Washers: Make sure that both side belt and sealing belt washers are turned on to keep belts clean and lubricated.

Caps Backing Off: Observe packages coming out of the capper to make sure caps are not backing off.

Container Centering: Be sure that the container is in the center of the sealing shoe and that the two sealing belts are each contacting half of the cap.

Sealing Pulley: Check lagging on the sealing pulley. If it is worn it should be replaced.

A cap with crushed lugs could appear to be a loose cap (Figure 6-3). To identify a cap that has crushed lugs, inspect the lugs for distortion and scratches on the enamel. Also, check to see if the impression in the compound is even, but light. Crushed lugs occur when the lugs of the cap are on the top of the glass thread and the cap is pressed on instead of being twisted on. To correct a crushed lug problem check the duck bill and hold down spring pressure and the drag arm bump and spring pressure.

6. GENERAL TROUBLESHOOTING GUIDE

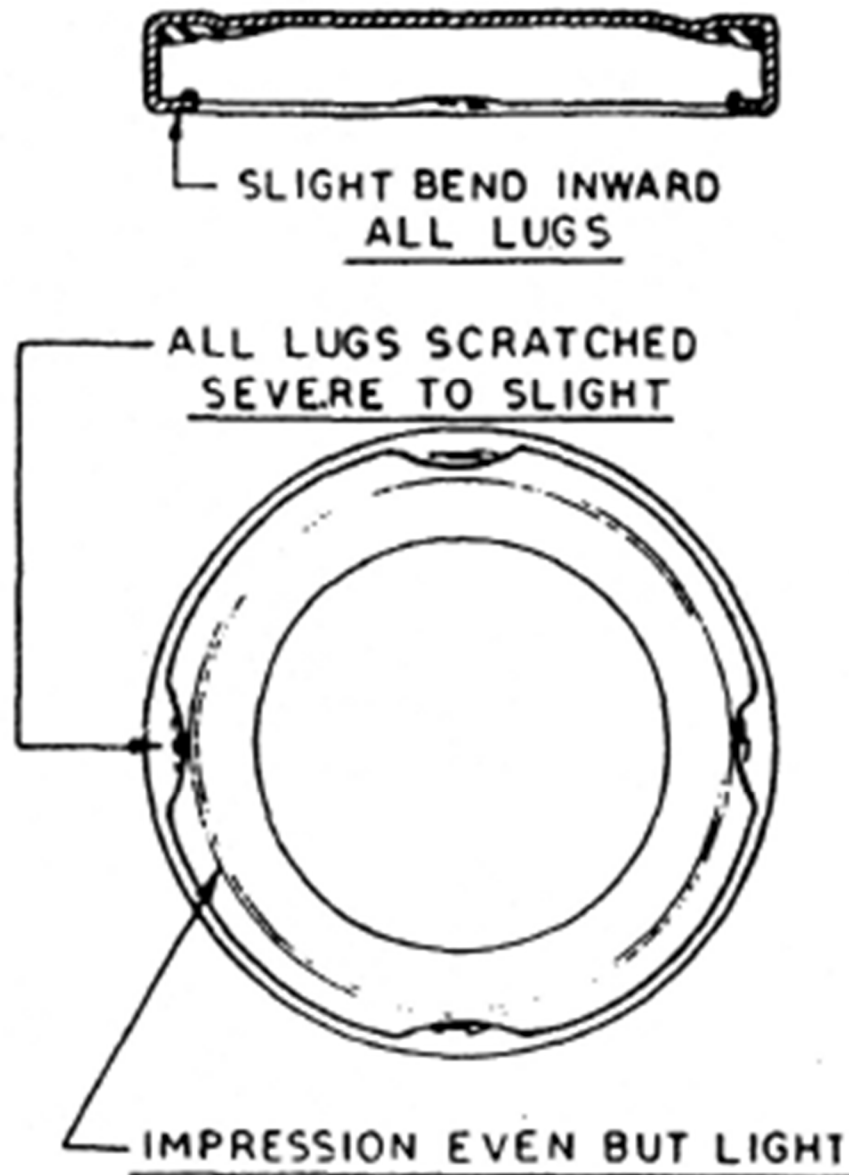


Figure 6-3: Crushed Lugs

6. GENERAL TROUBLESHOOTING GUIDE

Stripped Caps: The three lugged cap is an example of a cap that has been stripped when glass that has an angle flat finish is used (*Figure 6-4*). When a cap is applied to this finish, the cap should be tightened until one of the lugs comes to rest on the positive stop on the glass. The cap becomes stripped when the cap is over applied or rides over the positive stop on the glass.

Stripped caps occur as the capped jar passes under the sealing shoe. To correct a stripped cap problem check:

For improper cap heat

For excessive bump and pressure on the entrance sealing shoe post

For excessive bump and pressure on the discharge sealing shoe post

**NOTE OUT OF ROUND
CONDITION**

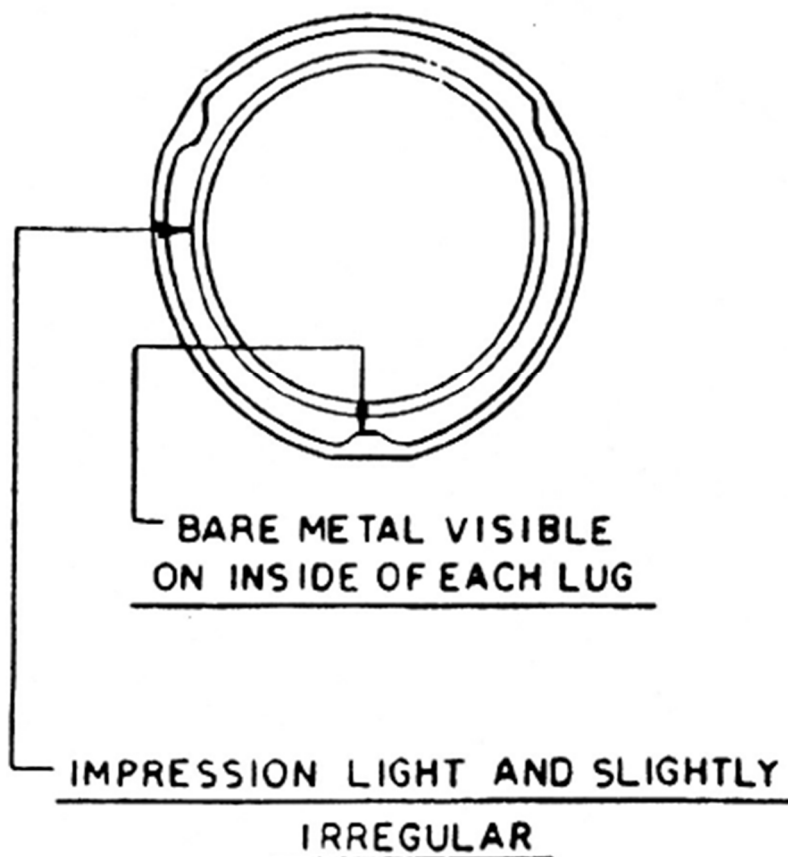


Figure 6-4: Example of a Stripped Cap

6. GENERAL TROUBLESHOOTING GUIDE

6.6 Hiked Cap Troubleshooting

Hiking is a result of over application, where the lugs of the cap tend to climb up ("hike") and over the glass threads. In many cases this problem can be reduced by using less sealing belt pressure and more cap heat. In some cases it may be a dimensional problem.

Hiking can be reduced by: Using more cap heat. Checking cap centering under sealing shoe. Using lighter sealing shoe settings. Reducing security, but not below acceptable limits. Using softer sealing belts. Tighten with discharge end of sealing shoe. Back off on bump on entrance hanger on sealing shoe

Other causes: Change in cooking or filling temperatures. Too much pressure in the package. Too much heat in the pasteurizer. Defective packages for certain molds. Check for customer rough handling of packages. Improper caps being used in customer's plant. Insufficient cap heat. Boiler line pressure at capper. Line running too fast for machine settings.

6.7 General Malfunctions

To date many difficulties have been encountered and overcome in the field. Listing incorrect machine adjustments may help clarify the instructions. Many problems crop up in holding cap on jar during pick-up and from pick-up point on until the cap is under the sealing belt. The following describes possible causes and the adverse effects of each situation.

Cause	Effect
Poor alignment or centering of jar at pick-up	Cap loss
Worn rail-clips or sprung side rails near rail-clip area	Variation in pick-up depth, cap not held firm. Cap may push the picked-up cap ahead of the jar. Caps fall from chute.
Too deep pick-up	Cap may be lost or lose correct position
Center spur of cap chute not out	Rear of cap not eased down on jar, cap losing position
Not enough spring pressure on duck bill	Permits cap to get ahead
Too much spring pressure on duck bill	Tends to pull cap back
Duck bill and hold-down mismatched (where butting is not aligned)	Cap loss
Hold-down not level	Cap loss
Hold-down incorrect angle for cap contact	Cap loss
Insufficient hold-down spring pressure	Cap loss
Hold-down too short	Cap loss
Interference of duck bill and hold-down supports with pin of top guide	Prevents proper function of duck bill and hold-down assembly resulting in cap loss
Hold-down slightly long. (Deep caps [DSR] can be handled by the standard duck bill.)	Damage to cap. It gets pinched between hold-down and sealing belt

6. GENERAL TROUBLESHOOTING GUIDE

Impressions

Aside from a cap that has been picked up and held onto the container properly, the following are possible reasons for light impressions:

- Too much bump on first post
- Insufficient steam pressure in cap heating area
- Slow cap delivery from hopper (cap doesn't get enough heating time)
- Inadequate heaters for high speeds
- Off-level sealing shoe
- Wrong pulley. (Must be pulley from change parts. It is specially identified.)
- Spring pressure too light
- Incorrect springs (Must be heavy springs)

PT and Deep Snap Reseal Troubleshooting

A cap that has been picked up and positioned properly on the container, but has not been firmly secured is considered a loose cap.

The following are possible reasons for a loose cap:

- For overfilled jars
- For little or no vacuum
- The sealing shoe height settings
- The sealing shoe spring pressure settings

To troubleshoot misapplied caps, verify the following settings:

- The cap track width
- The top guide height
- The hold down height
- The hold down spring pressure
- For proper jar centering
- For improper jar spacing

7. GENERAL MAINTENANCE

7.1 General Maintenance

7.1.1 Daily Checklist

The following items should be checked on a daily basis and whenever the door of the capper is removed. Establish a routine:

Side Belts

- Wear
- Friction (Grip vs. Slip)
- Twisting
- Belt alignment to pulley groove(s)
- Slippage against the drive pulley
- Belt tightness, check the spring tension & take-up idlers
- Entrance and discharge idlers are free to turn
- Entrance and discharge idlers are set properly (width).
- Roller brackets are free to turn & springs aren't broken
- Brackets are free to move in and out under spring pressure

Sealing Shoe Assembly

- Check the condition of the sealing belts.
- Check the sealing belt drive pulley.
- Check if the sealing belts are slipping on the pulley.
- Check the general condition of the sealing shoe assembly
- Check roller wear. They should turn freely
- Sealing shoe can move up and down
- Sealing shoe doesn't hang up or become sluggish

Cap Track Assembly

- Freedom of movement both up and down and front to back
- The cap track should center itself when released.
- Check stop pins spring pressure. This should be done by running your finger down the length of the cap tracks and against the pins from entrance to discharge.
- on each track or pin.

Observe these items

- Top guide setting (make certain it is secure).
- Cap tracks should be level with the conveyor
- Signs of product build up, lime, or other foreign material
- Movement of the hold downs, (not sticky or sluggish)

Conveyor bed & chain

- Conveyor chain links should lie flat on the conveyor bed.
- The wear strips and wear inserts should be level and replaced before 1/8" of wear.
- Glass or other material is not under the conveyor chain or between the wear strips.

7. GENERAL MAINTENANCE

7.1.2 Weekly Checklist

In addition to the daily checklist, perform the following checks:

Timing Belt

- Check in base of capper for wear and tension.

Drive Belt

- Check in base of capper for wear and tension.

Variable Speed Drive Pulley

- Verify the springs are not broken & pulley is not frozen or locked.

Conveyor Chain:

- Check for sticky or frozen links and for flatness.

Sealing Belt Drive Pulley

- Check for wear and slippage of belts.

Belt Washer Sprays

- Sealing/Side belt sprays are not broken or clogged.

Cap Track Ledges

- Check for wear or build up of debris.

Bearings

- Check in side belt idler pulleys & tightener pulleys.

Springs & Rollers

- Check in side belt roller brackets for wear, stickiness and breakage.

Centering of Machine

- Check centering device through sealing shoe areas. A jar should be run through the centering device and should pass through the cap tracks. No cap should be present. The jar should travel into the cap tracks centered as close as possible. When the side belts are adjusted, they should maintain a center. The center of the jar should be directly under the center of the sealing pulley and the space between the sealing belts.

Cap Tracks

- Check that these are level with the conveyor, and that they are parallel.

Springs

- Feel and observe all springs. Make certain that they return the attached parts. This should be free and without binding.

7. GENERAL MAINTENANCE

7.2 Lubrication Schedule

The principal function of the capper is to correctly apply the cap for a positive tight seal on the container. This relies wholly upon the gripping ability or friction of the belts against the cap and container. The efficiency of the drag rubber is reduced if there is no friction. This friction is necessary to give the cap the initial turn to seat the cap lugs under the thread of the container. Caution should be exercised in using any type of spray lubricant in or around the head of the capper. A good soap lubricant on the conveyor chain is recommended. It reduces chain wear, keeps the chain clean, and alleviates glass tumbling.



Attention

Caution: If soap is used on the conveyor chain, it may add to a sealing problem. This could be due to adverse conditions such as: a greasy product, height & style of container, overfills, etc.

Lubrication Schedule					
Equipment	Grease and/or Oil	10 Hrs.	50 Hrs.	100 Hrs.	Overhaul
Capper	Grease	X	X	X	X
	Oil	X	X	X	X
Hopper	Grease	-	X	-	X
	Oil	-	X	-	X

Table 7-1: Lubrication Schedule

Capping Machine Lubrication

It is important to have a good cleaning program. A lubrication program is equally important. It should be followed by competent, trained personnel who service the machines in the plant. These instructions will add to the life of your equipment. The lubrication recommendations are meant as a guide for our cappers that run at speeds up to 300 jars per minute. As the line speed increases up to 700 jpm, the frequency of lubrication should be increased. Washing away of grease caused by various cleaning agents, product, water, etc., may also require a more frequent lubrication of the capper.

A light application of oil and grease is most desirable and any excess should be wiped off. Too much grease applied to fittings servicing the head, if not immediately wiped off can produce problems in the sealing performance. Grease on the sealing belts, side belts and drag rubber will reduce friction causing a bad application of the caps.

This routine cleaning and lubrication program will further familiarize the capper operator or mechanic with the machine. This may enable the personnel to make more precise and faster machine setups improving the production output.

7. GENERAL MAINTENANCE

VG Machine Lubrication

Lubrication for the Vapor Vacuum Machine has been broken down into three specific lubrication periods: 10; 50, and 100 hour intervals (*Table 7-2*).

Silgan Equipment recommends Lubriplate lubricants. These products are white in color, and are manufactured from a material that is non-toxic. Use the recommended lubricant or an equivalent. A high quality, high pressure lubricant that meets the local governmental requirements will be satisfactory for this machine. Lubricants for Items #6, 10 and 14 are similar to the heavy oil type lubricants used in automotive transmissions (approximately S.A.E. 90 weight oil), or any A.G.M.A. rating No. 8 oil.

Note: Head Gear Box (4) should be packed, with Sinclair I grease. Gear Cases (6,10,14) should be filled to proper levels with Lubriplate 8. All grease fittings should be injected with Sinclair 1 grease. If the above is not available, an equivalent type of lubricant can be used.

Lubrication Schedule (*Alemite)					
Item#	10 Hrs.	Item#	50 Hrs.	Item#	100 Hrs.
1	Idler Shaft (2 Places)	5	Rt. Angle Drive Gear Box	2	Oil Post Cups
4	Head Gear Box Shafts* (2 Places)	6	Oil Cup Conveyor Drive Fill Plug	3	Post Base Bearings*
8	Side Belt Adj.* (16 Places)	7	Side Belt Tightener*	15	Head Drive Shaft Coupling*
12	Side Belt Pulleys* (2 Places)	9	One Point Adj. Crank	18	Sealing & Side Belt Pulley Shafts*
13	Worm Gear Drive & Idler Pulley* (2 Places)	10	Oil Speed Reducer Fill Plug	19	Exhaust Motor* (2 Places)
16	Side Belt Pulleys*	11	Centering Device* (2 Places)	20	Exhaust Motor* (2 Places)
		14	Oil Cup Worm Gear Drive Fill Cup	21	Pulley*
		17	Internal Base* (6 Places)	22	Oil Sealing Shoe Post*

Table 7-2: Lubrication Schedule

7. GENERAL MAINTENANCE

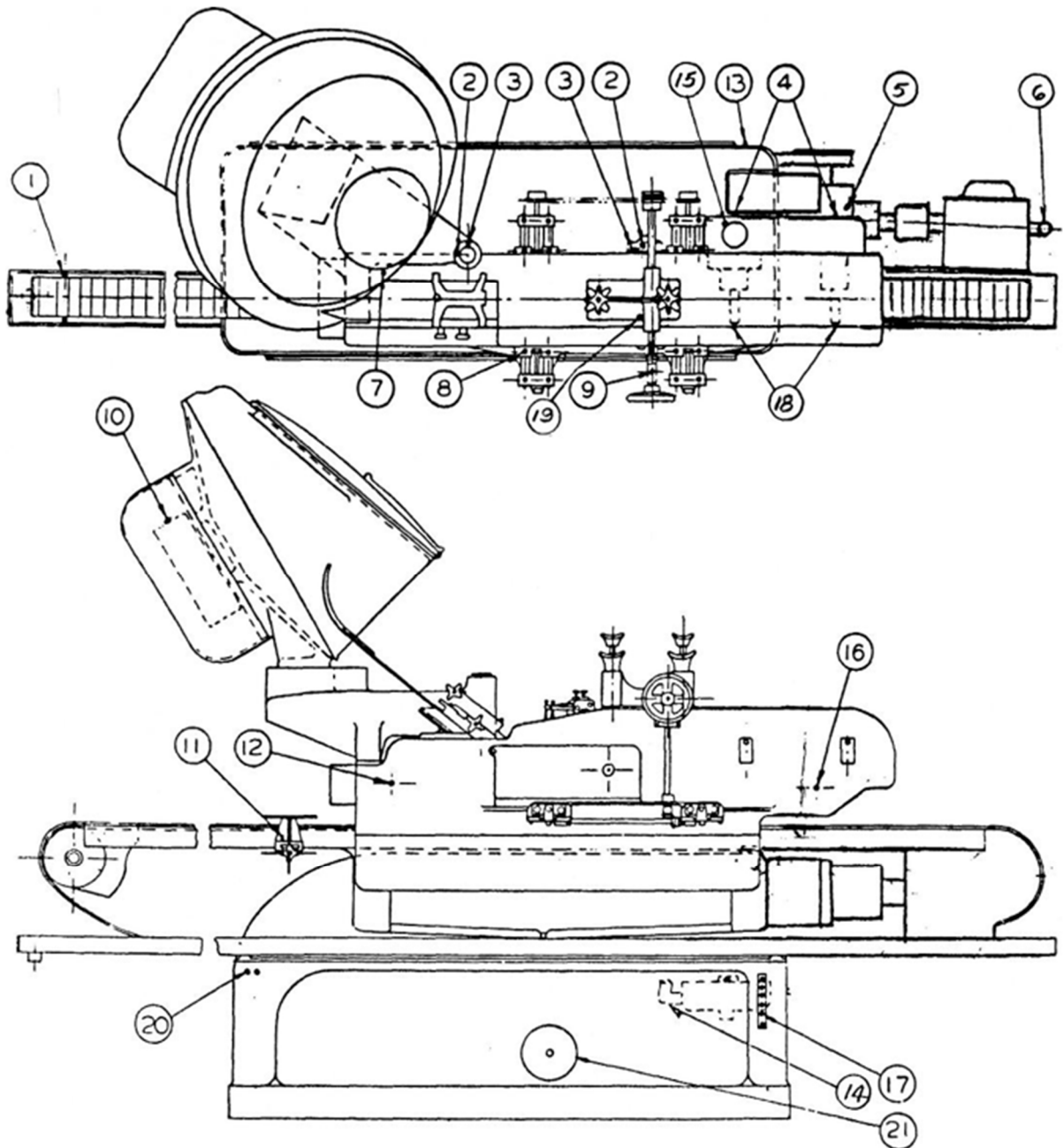


Figure 7-3: Lubrication Points

7. GENERAL MAINTENANCE

VF Machine Lubrication

Lubrication for the Vapor Vacuum Machine has been broken down into three specific lubrication periods: 10; 50, and 100 hour intervals (*Table 7-4*).

Silgan Equipment recommends Lubriplate lubricants. These products are white in color, and are manufactured from a material that is non-toxic. Use the recommended lubricant or an equivalent. A high quality, high pressure lubricant that meets the local governmental requirements will be satisfactory for this machine. Lubricants for Items #6, 10 and 14 are similar to the heavy oil type lubricants used in automotive transmissions (approximately S.A.E. 90 weight oil), or any A.G.M.A. rating No. 8 oil.

Note: Head Gear Box (4) should be packed, with Sinclair I grease. Gear Cases (6,10,14) should be filled to proper levels with Lubriplate 8. All grease fittings should be injected with Sinclair 1 grease. If the above is not available, an equivalent type of lubricant can be used.

Lubrication Schedule (*Alemite)					
Item#	10 Hrs.	Item#	50 Hrs.	Item#	100 Hrs.
1	Idler Shaft (2 Places)	5	Rt. Angle Drive Gear Box	2	Oil Post Cups
4	Head Gear Box Shafts* (2 Places)	6	Oil Cup Conveyor Drive Fill Plug	3	Post Base Bearings*
8	Side Belt Adj.* (16 Places)	7	Side Belt Tightener*	20	Exhaust Motor* (2 Places)
12	Side Belt Pulleys* (2 Places)	9	One Point Adj. Crank	21	Pulley*
13	Worm Gear Drive & Idler Pulley* (2 Places)	10	Oil Speed Reducer Fill Plug	22	Oil Sealing Shoe Post*
16	Side Belt Pulleys*	11	Centering Device* (2 Places)	23	Bearing Right Angle Gear Box
19	Bearing Side Belt Adjustment Shaft	14	Oil Cup Worm Gear Drive Fill Cup		
		17	Internal Base* (6 Places)		

Table 7-4: Lubrication Schedule

7. GENERAL MAINTENANCE

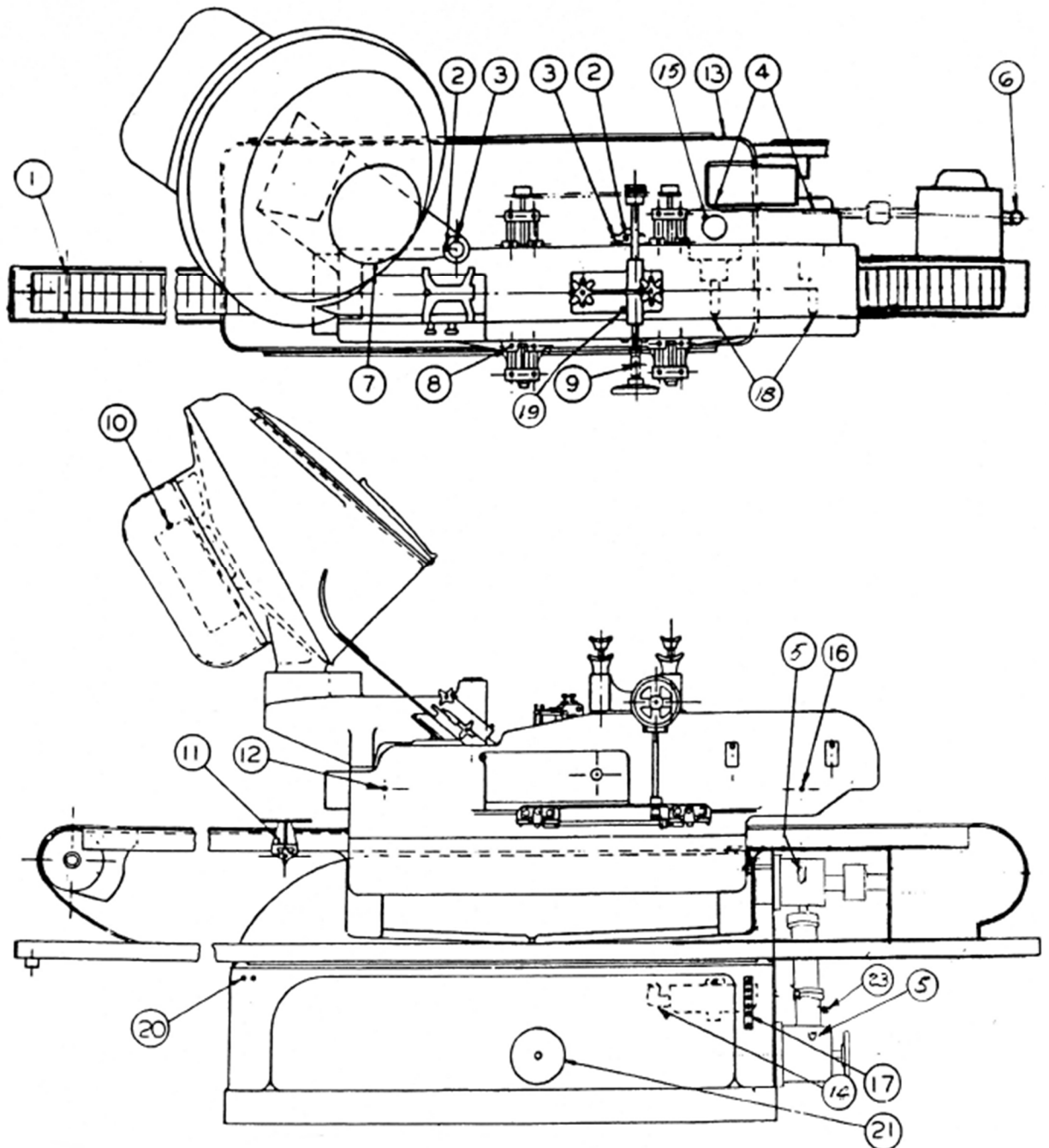


Figure 7-5: Lubrication Points

7. GENERAL MAINTENANCE

6R17, 6R25 Hopper Lubrication (Figure 7-5)

The only lubrication required of the 6R17 and the 6R25 hoppers is a periodic check once a week of the gear box. A visual check of the oil level glass will tell if oil is needed. Use S.A.E. #90 weight oil if low. Following the pack or equipment overhaul time, drain and refill with fresh oil. Check parts for wear and replace any oil seals that show signs of leaking.

6R16, 6R24 Hopper Lubrication (Figure 7-6)

These two hoppers of basic design and construction have the same lubrication features and should be serviced once a week following the weekly clean-up program. Check all oil seals for leakage and replace those that are leaking before lubricating the hopper. Both hoppers (6R16 not shown) grease fittings are serviced from the right side of the hopper.

The picture of the 6R24 hopper on the opposite page is shown with the hopper housing guard off to illustrate two grease fitting locations. Upon removal of the guard, greasing the fitting on the right serves the cap agitating shaft and bearings (*Item P*). The fitting on the left serves the idler sprocket bearing (*Item O*).

Two grease fittings, not shown, one on the rear of the hopper bin and the other located in line and next to the hopper housing, service the hopper housing shaft and bearings.

Note: The relief valve fittings shown in the picture. One is located at the rear of the hopper housing (Item N) the other in the middle of the hopper (Item M). They serve two purposes. One is to visually indicate a sufficient amount of lubricant by observing the escaping grease from the fitting. The other, to eliminate grease pressure that would build up in the bearings and force grease through the bearings on the shaft, thereby contaminating the caps in the hopper bin.

After greasing, all grease fittings and exposed parts treated should be wiped clean of any excess grease, paying particular attention that no grease remains exposed to the caps on the hopper housing shaft.

Check the oil level in the speed reducer by removing the oil level plug (*Item R*). If low, remove the cap on the top oil level plug and cap. Once a year, drain the oil from the speed reducers (*Item S*) and replace with fresh 90 weight oil. Change oil at least twice a year if the hopper is used year round.

A very light coat of grease applied on the chains and sprockets will keep them in top running condition and help prohibit corrosion.

7. GENERAL MAINTENANCE

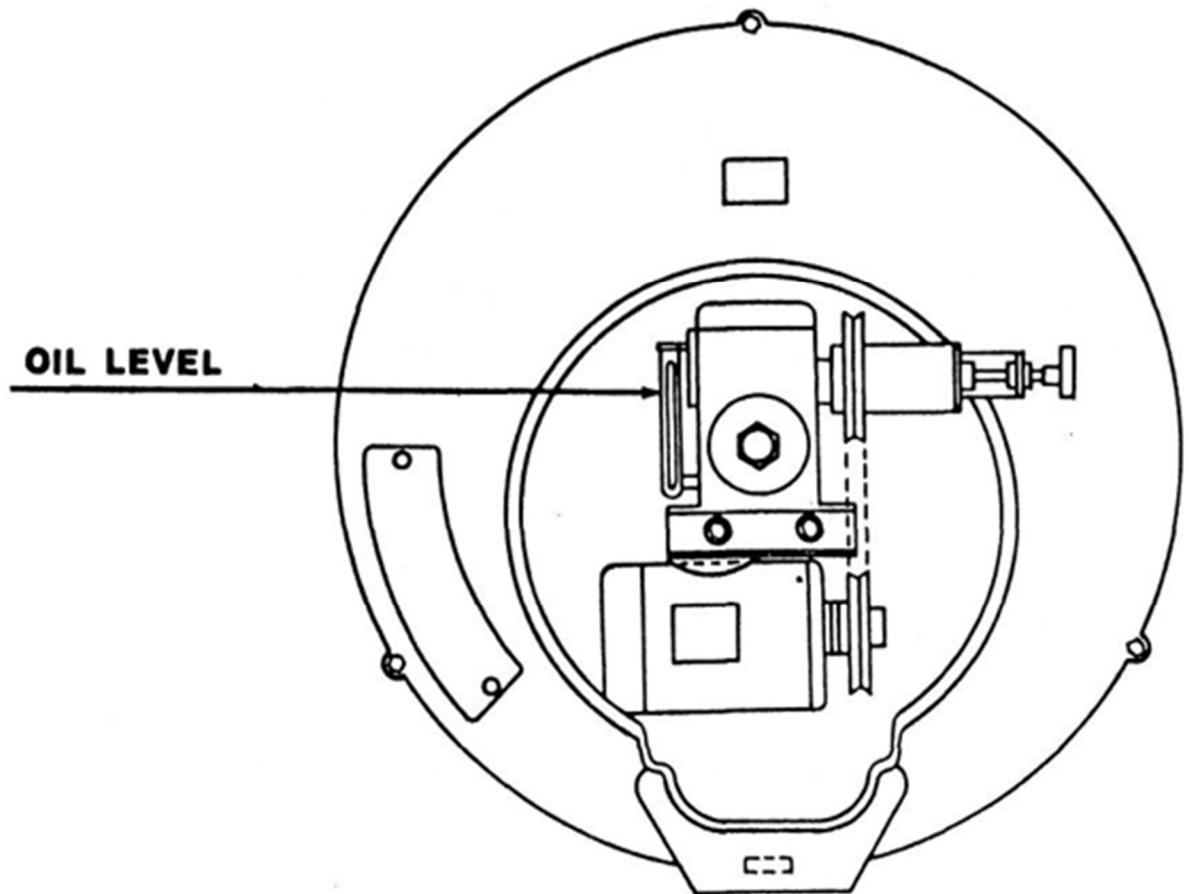


Figure 7-5: 6R17, 6R25 Hopper

7. GENERAL MAINTENANCE

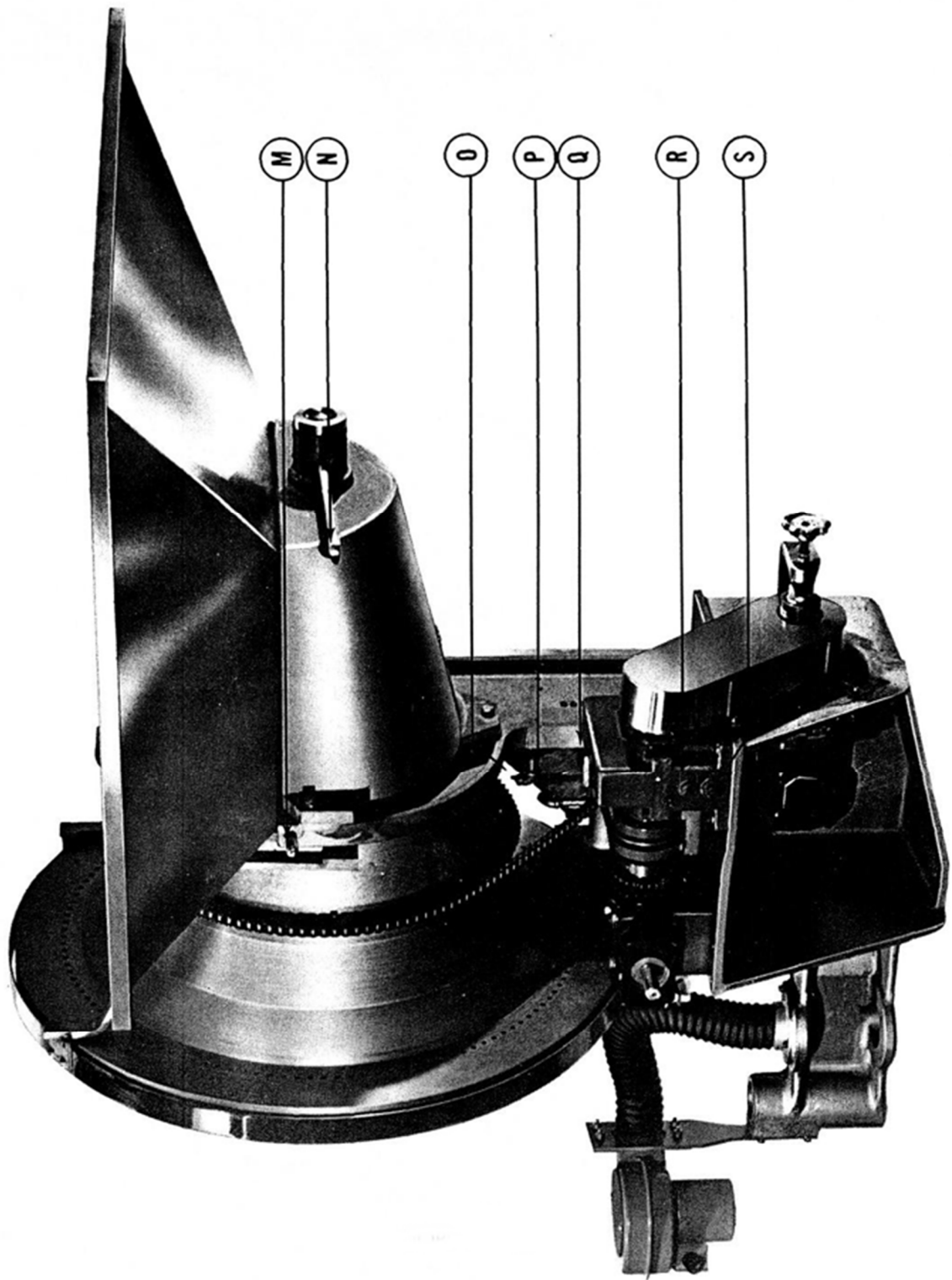


Figure 7-6: 6R24 Hopper

7. GENERAL MAINTENANCE

7.3 Cleaning Program

The Silgan Equipment capping machine is an important and integral part of the food packaging line. The cleaning of the capper and hopper should become as much a part of the cleanup operation as the filler, conveyors and other related equipment. It is our desire to promote and establish a sanitary, systematic cleaning operation of our equipment as practiced on the other food packaging machinery.

For years, it has proven costly that many parts prematurely worn out from lack of cleaning could have been prevented had a conscientious cleaning program been followed. There are many parts, such as the sealing shoe, sealing shoe belts, sealing shoe rollers, roller brackets, that are lubricated just by water alone. The capper has a built in feature to wash side belts and sealing belts, as well as to lubricate these moving parts. It important that the water valves located on the machine are turned on to serve this purpose at the beginning of and during the capping of the packages.

This section of the manual exists to educate those people closely associated with the capper with a simplified step by step cleanup procedure.

Post Seasonal Packing Machine Care Guidelines

Thoroughly clean and lubricate the capper after each seasonal pack. Cover the machine and conveyor with a large plastic sheet. Bind it securely to the machine so that it won't fall off. Let it drape loose for air circulation. After the annual overhaul of the capper, replace the sheet and it will then be ready for your next start up. We recommend that our other equipment such as the coder, head spacer, dud detector, etc. be covered also until such time as they need to be used again.

Cleaning Schedule					
Equipment	Daily	Weekly	Monthly	Semi-Annual	Annual
Capper	X			X	X
Hopper			X		X

Table 7-7: Cleaning Schedule

7. GENERAL MAINTENANCE

7.3.1 Daily Cleaning (*Figure 7-8*)

Remove caps from the cap track and cap chute (*Item C*).

Clean the steam distributor of any foreign material and lime deposits (*Item D*).

Scrape the roller brackets and brass rollers (*Item H*) of lime build up.

Remove the sealing belts and clean the sealing shoe and sealing shoe rollers (*Item F*).

Loosen foreign material and lime deposits inside the capper head (*Item J*).

Scrape or wire brush the side belt idlers (*Item B*), sealing hangers (*Item G*), step pulley (*Item I*), side belt pulley (*Item K*), hold down (*Item E*), etc.

Raise the conveyor chain (*Item L*) and loosen debris in the channel that may have collected, for later flushing.

Prepare the conveyor return channel for flushing by loosening any build up of debris.

Free foreign material and lime deposits from inside the door.

Flush thoroughly the inside and outside of the capper head, cap chute, conveyor chain, return channel, and capper door with hot water and steam.

Flush base and covers, front and rear, removing all grease and grime.

Make certain to thoroughly lubricate all necessary parts immediately after cleaning and prior to production start up.

7. GENERAL MAINTENANCE

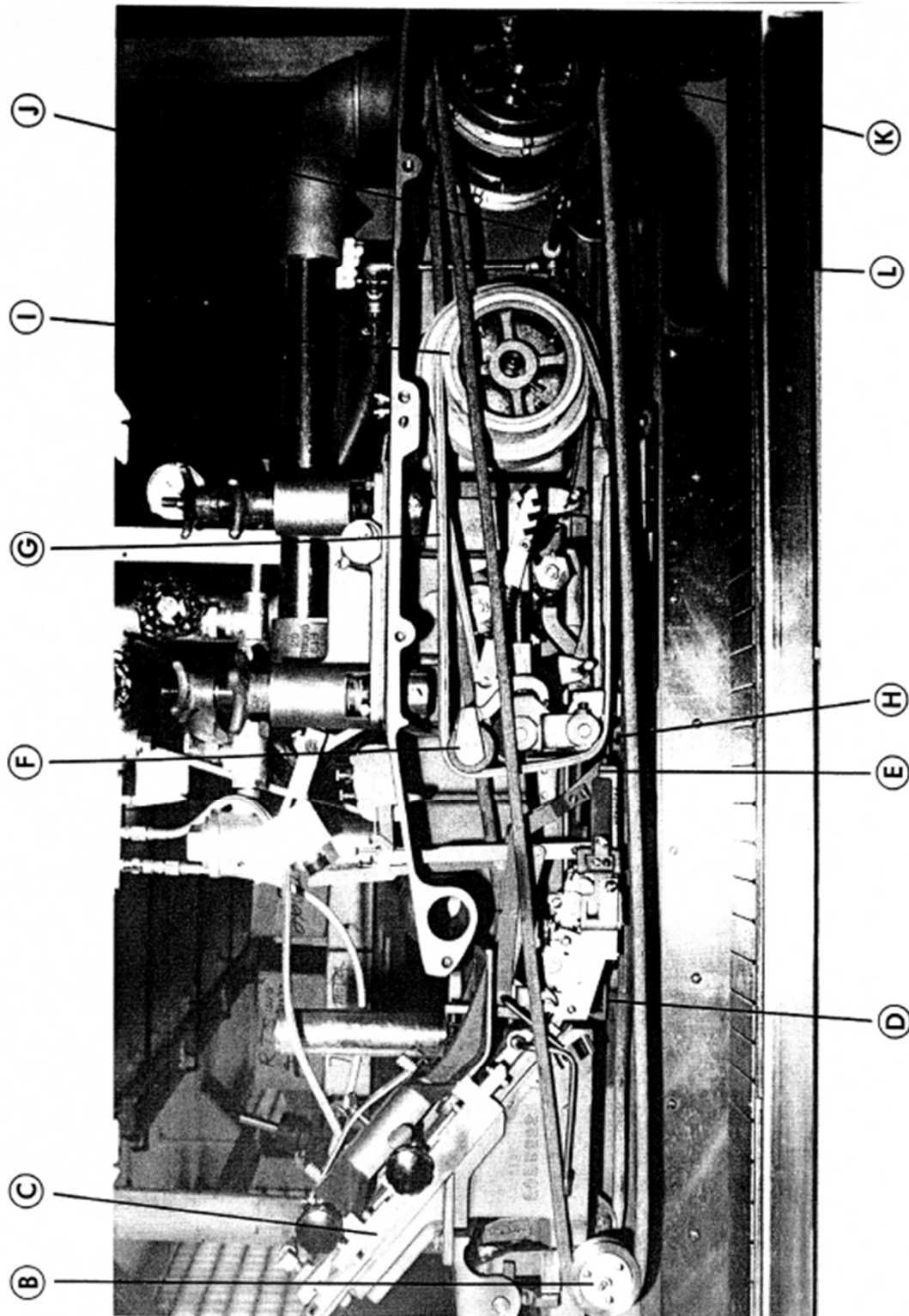


Figure 7-8: Vapor Vacuum Machine (RTO Setup)

7. GENERAL MAINTENANCE

7.3.2 Semi-Annual Cleaning

Semi-annual cleaning pertains to: once per overhaul, once per seasonal packing, twice per year round operation. During a semi-annual cleaning:

- Remove the base stainless steel covers and conveyor chain.
- Lay these out and wash thoroughly.
- Wash the hopper, capper base, and head with a commercial cleaning agent.

Although the head, hopper and all component parts are made of stainless steel, brass or anodized aluminum, the base is cast iron and should be painted. A suitable enamel can be ordered from our Parts and Equipment Department. Care should be taken that any machined or moving parts, such as the head elevating posts, etc. are not painted over.

Clean motor, post, chain, etc. inside base, using a strong mixture of detergent and water to wash away accumulation of grease, dirt and product. Rinse and coat moving parts with a light coat of heavy oil or grease. After washing, immediately run capper for five minutes to air dry motor or moisture.

Note: This would be a good time to lubricate the capper and hopper before resuming production. Through experience we have found the capper and its component parts must be kept as clean as possible at all times to keep its performance at peak efficiency and to meet the sanitary standards required in handling food products.

7. GENERAL MAINTENANCE

7.3.3 Hopper Cleaning

6R17, 6R25 Cleaning Instructions (*Figure 7-9*)

Remove all caps from the hopper.

Ensure the clean out opening in the base of the hopper is not clogged.

Remove the small cover located on the left side of the hopper drum. This will expose the opening and the back side of the hopper disc for cleaning (*Item N*).

Scrub the disc (*Item S*) and the inside of the drum (*Item R*) with a good cleanser recommended for the food packaging industry, that is compatible for aluminum.

Scrub the outside of the hopper and cover.

Flush debris from behind the hopper disc, using a water hose; move the nozzle in a circular motion around the disc, forcing water between the disc and hopper drum (*Item Q*).

Spray water through small opening in rear of hopper.

Flushing alternately from front and rear several times permits the scrap to wash down and out through the opening in the base of the hopper (*Item P*).

Wipe hopper disc and drum dry.

Switch on hopper and hopper fan. Run a few minutes, then wipe dry again before adding caps.

Remove hopper motor cover.

Wipe motor (*Item O*), speed reducer (*Item M*), pulley, belt and cover clean of grease, dirt and water accumulation.

Replace cover.

7. GENERAL MAINTENANCE

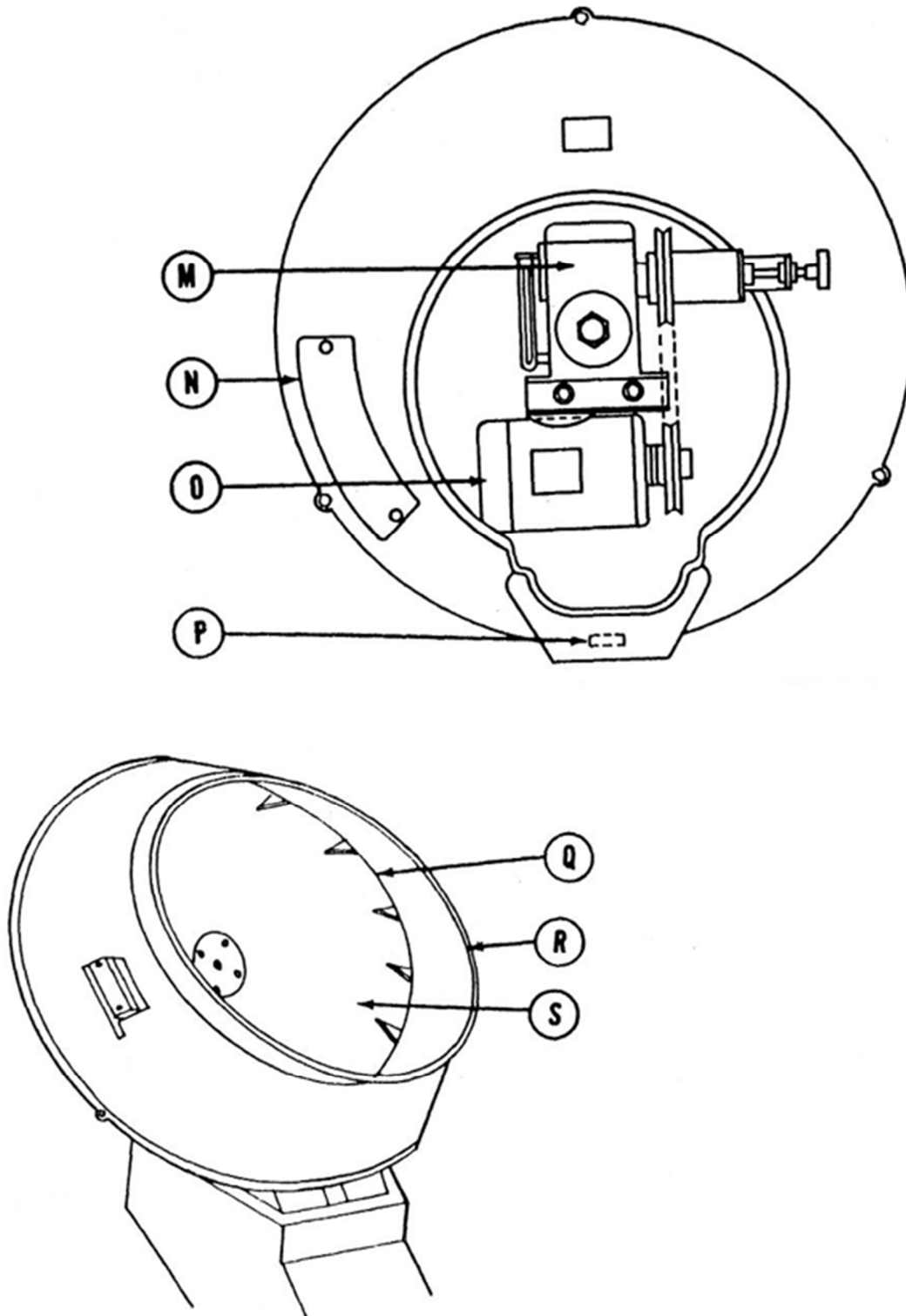


Figure 7-9: 6R17, 6R25 Cleaning

7. GENERAL MAINTENANCE

6R16, 6R24 Cleaning Instructions (Figure 7-10)

Remove the front upper cap chute guide.

Drain hopper of caps into an empty box.

Position bin hopper cover door to stay open (*Item V*).

Remove the bracket side cover (*Item U*).

Spray the inside of the hopper housing with hot water to flush out any loose debris (*Item W*).

Spray hot water through the opening between the hopper housing cover and hopper housing (*Item T*).

Flush debris from the inside of the hopper housing bin (*Item X*).

Scrub the inside and outside of the bin, hopper housing, housing cover, etc., with a cleanser compatible for aluminum, recommended by the food packaging industry.

Wash off all the cleanser and loosened foreign material with hot water and steam.

Remove the drive guard and motor guard.

Using a good cleaning agent, wipe clean the motor, reducer, pulleys, sprockets and shafts.

Wipe dry the whole hopper assembly.

Before replacing the guards, lubricate all moving parts, wiping off excess oil and grease.

Replace guards.

Turn on the hopper and fan and let them run a few minutes to help dry out the hopper.

Replace the upper cap chute guide and lock the bin hopper door.

When the hopper is completely dry, replace the caps for the next production run.

7. GENERAL MAINTENANCE

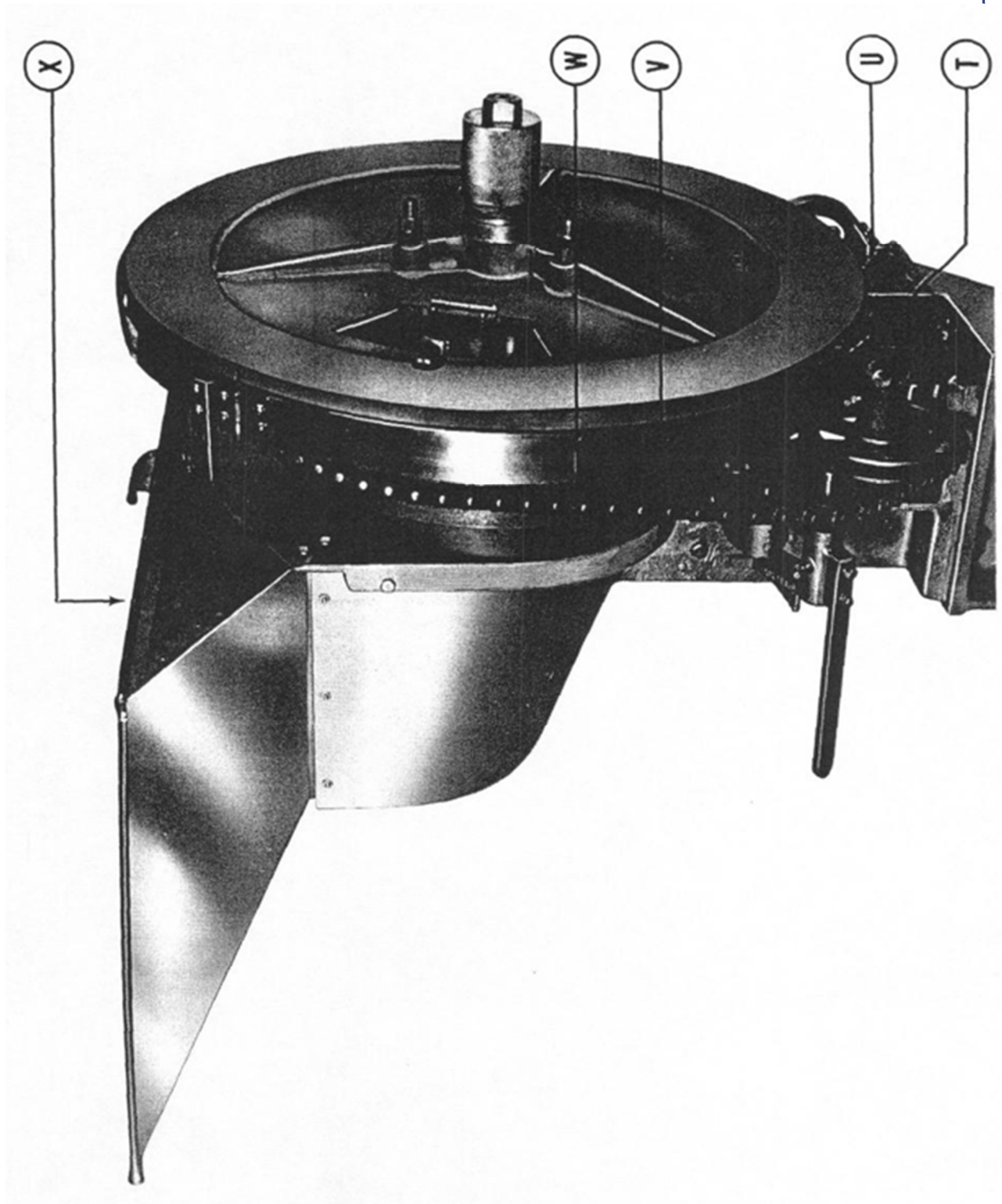


Figure 7-10: 6R16, 6R24 Cleaning