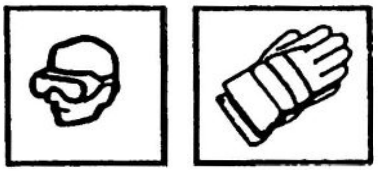
SEMI-AUTOMATIC POLYPROPYLENE!

STRAPPING MACHINE

OPERATION & MAINTENANCE MANUAL

SAFETY INSTRUCTIONS

Read these safety instructions before oper ating or servicing your strapping machine.



1. Read the operating instructions and all of the signs on machine carefully.
2. Wear eye or face, and hand protection.. Do not wear loose clothing.
3. Keep hands or other parts of the body out of the strap chute area during operation.
4. The temperature of the heater plate is high up to 320 °C. Do not touch!
5. Do not insert strap in the quide while there is not a package on the operation table.
6. Do not replace any. safety parts of different specifications.
7. Watch the springing force of spring when opening reels.
8. Shut off all electric power after machine operation or servicing machine.
9. Do not use water or steam to clean the machine.
10. Keep this operation manual at your strapping machine. Refer to it often.

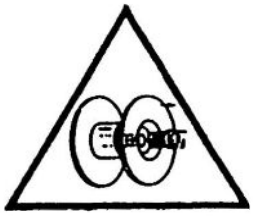


TABLE OF CONTENTS

MAJOR COMPONENTS

In figures 1 thru 4 the major components of the machine and the strapping head are shown in detail.
A detailed description of additional systems and specific components follows:

STRAP DISPENSER:
The dispenser supplies strapping material to the strapping head. It is located inside the cabinet on the lower left-hand side. A friction brake is provided to limit over-run of strap.

1. GRIP - The grip holds the lead end of the strap beneath the anvil while the remainder of the strap is being tensioned around the package.
2. STRAP FEED AND TENSION - Both feed
   and tension are achieved by two sets of gear rollers powered by an electric motor by means of a drive-belt and slip-clutch system. An operator controlled adjustable timer controls the duration of strap feed. When the set time for feeding is up the timer stops feeding strap. If additional feed is required beyond that determined by the timer setting, jog feed will be facilitated by pushing the "Jog" feed button on the operator's control panel.

3. WELDING AND CUT-OFF - Welding of the strap ends and cutting of the strap supply are facilitated in this process.
4. PACKAGE RELEASE - After a short weld-cool period (necessary to avoid welded ends from popping open) the package is released. (Note:) The afore mentioned functions: 1, 3 and 4 are driven by a cam shaft coupled to the drive system by means of an electromagnetic clutch which turns one full revolution per cycle.
5. HOT KNIFE. The "Hot Knife" is centrally located at the front of the strapping head. Movement of the knife is controlled by a cam.

6. ELECTRICAL SYSTEM. An all new electrical system using solid state technology supplies continual power supply to the electrical components within the machine. Using simple to insert circuit boards provides for safe and fast maintenance free operation.

7. OPERATOR CONTROLS. The Electrical Control Panel consists of the "Main Power ON-OFF Switch," "Feed Length Timer," "Reset Switch" and "Feed Length Switch" (Jog Feed).

INTRODUCTION

This manual contains safety, operating, and maintenance instructions for the SP-1 Semiautomatic Power Strapping Machine. This model is designed to strap packages with plastic strap 1/4" to 5/8" (6mm to 15mm) wide. The strap ends are joined by means of "hot-knife" welding process.

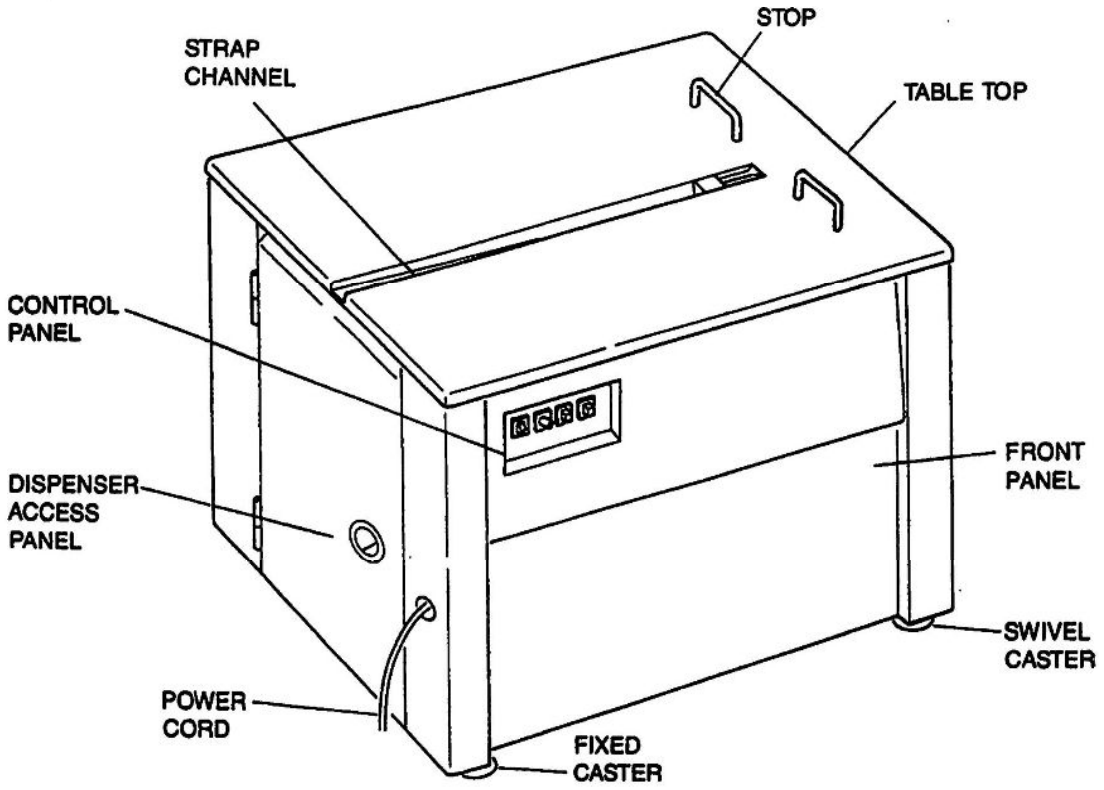


FIGURE 1. MAJOR COMPONENTS, EXTERIOR

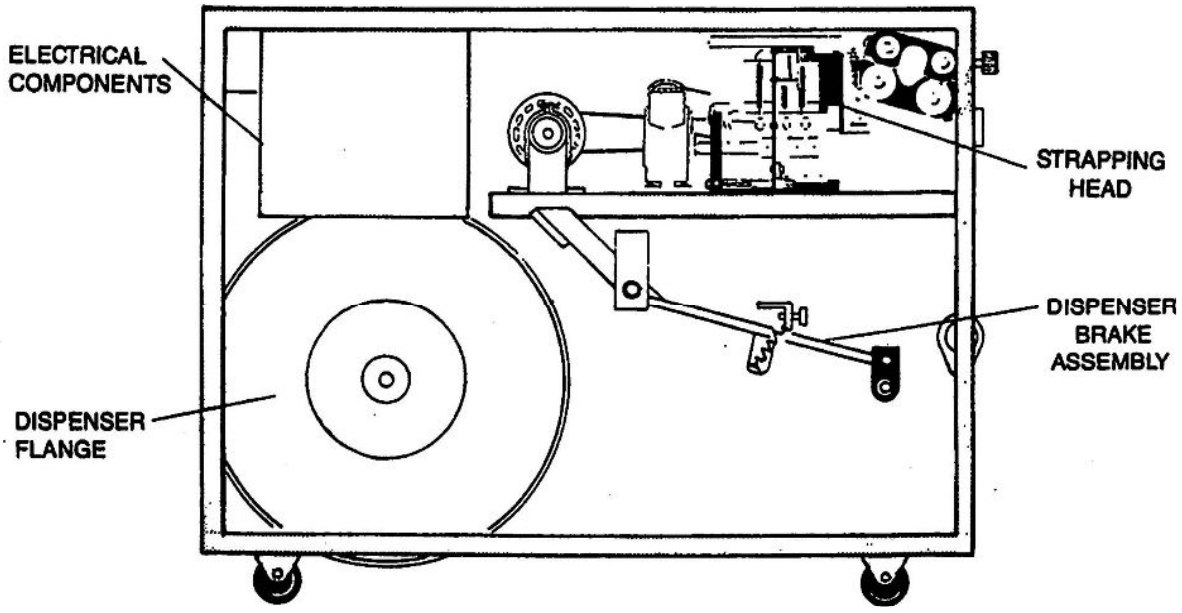
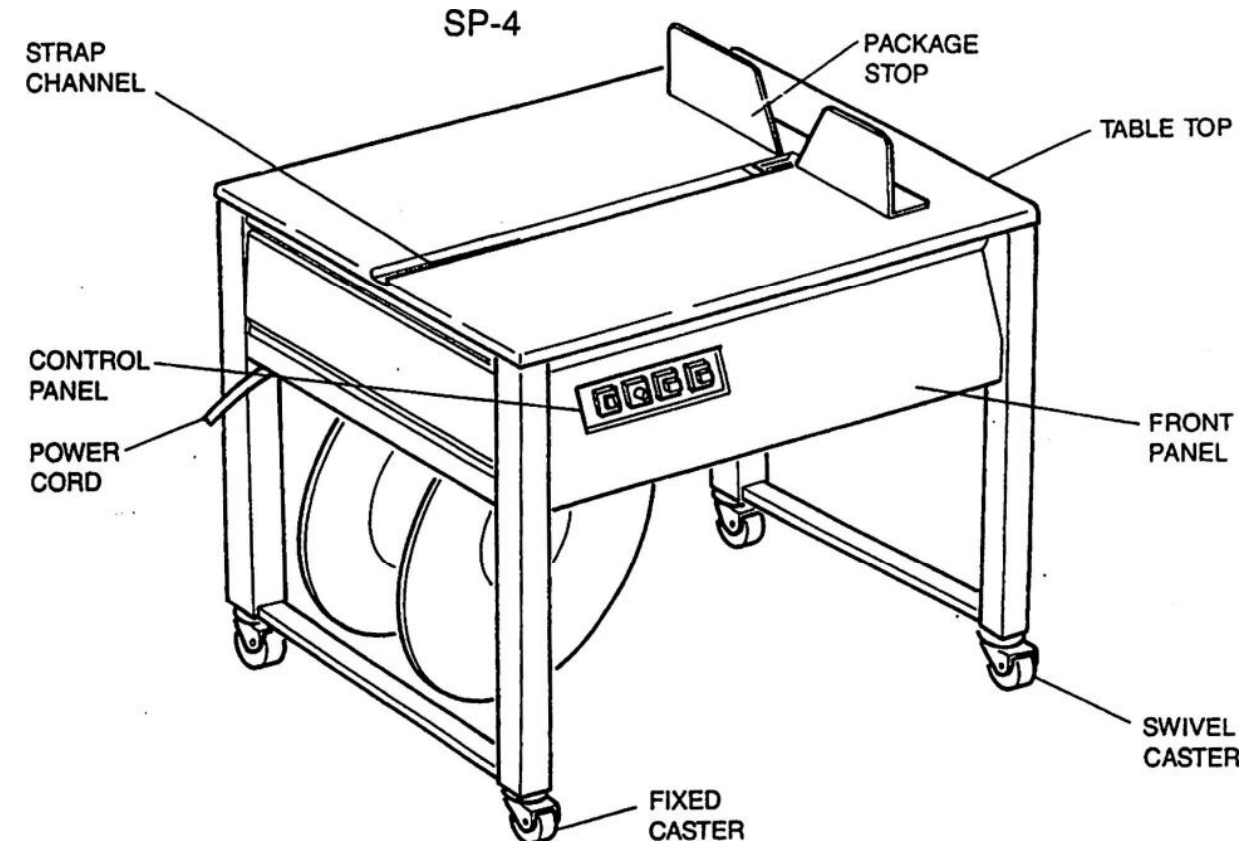
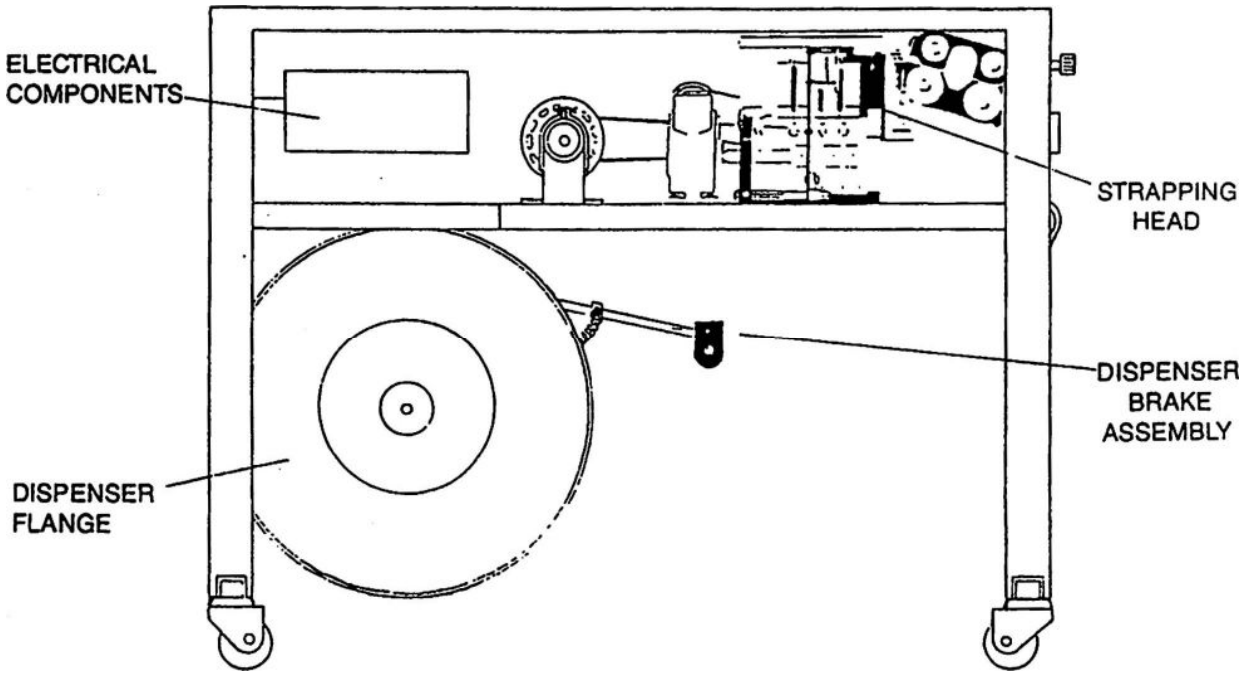


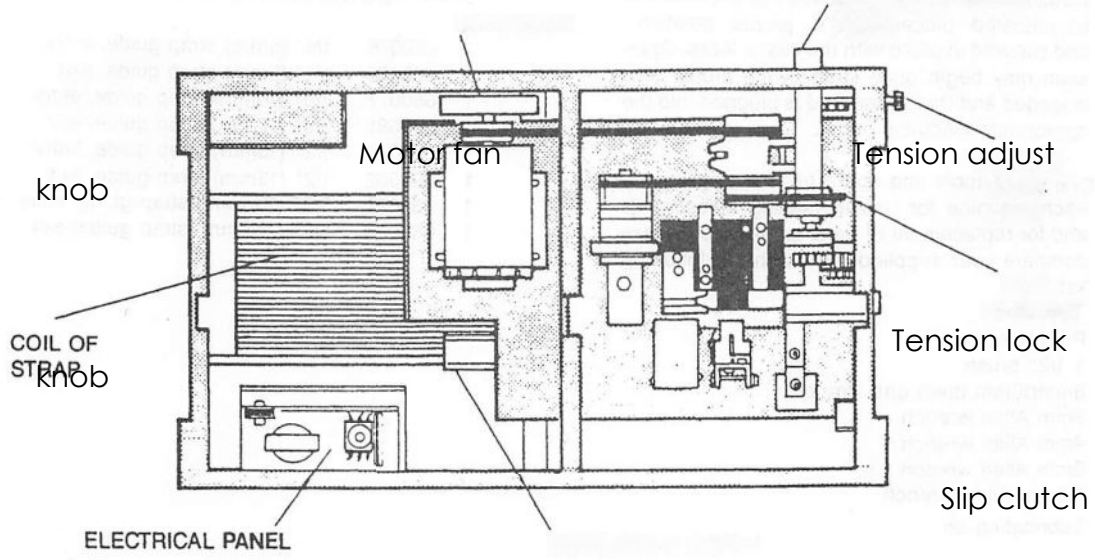
FIGURE 2. MAJOR COMPONENTS, FRONT VIEW

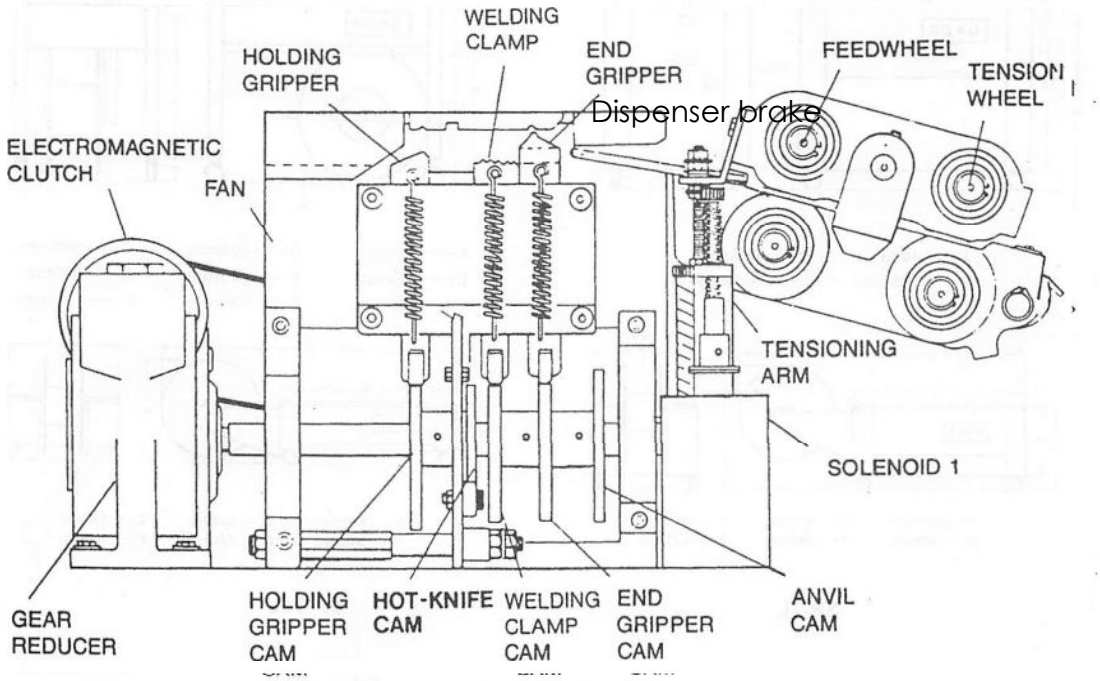


FIGUR 3. MAJOR COMPONENTS, EXTERIOR



FIGUR 4. MAJOR COMPONENTS, FRONT VIEW 4



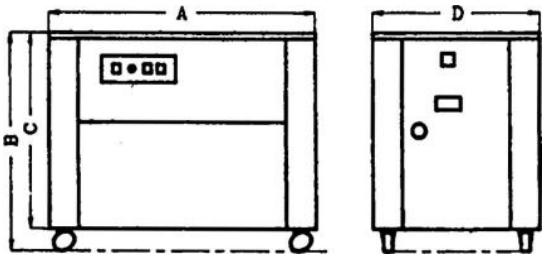


INSTALLATION

Installation of the SP-1 requires that the machine be uncrated, placed in it's proper position and secured in place with the caster locks. Operation may begin once strap of the proper size is loaded and the power cord is plugged into the appropriate electrical outlet.

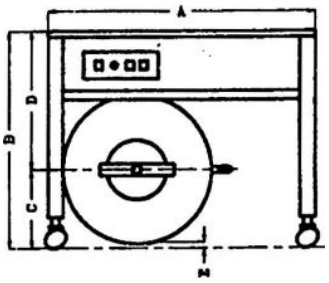
One set of tools and spare parts is packed with each machine for use in making adjustments and for replacement of parts as needed.

INSTALLATION DIMENSIONS AND CLEARANCES.



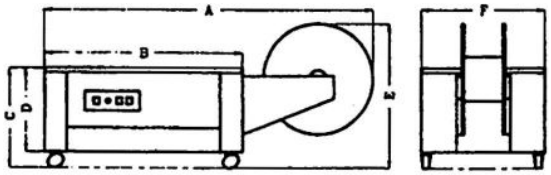
A-895mm B-735mm C-565mmD-655mm 465mm

SP-4

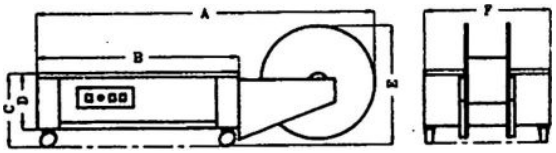


A-895mm B-735mm C-270mm D-

E-20mm F-565mm G-395mm H-230mm I-110mm



A--1510mm. C---470mm. E---855mm.
B---895mm. D---380mm. F---565mm.



A-1510mm B-895mm C-330mm D-220mm E-515mm F-565mm

OPERATING INSTRUCTIONS

OPERATOR'S CONTROLS

CONTROL PANEL. The control panel is located on the left-hand side of the front panel of the machine. Refer to Figure 9.

POWER SWITCH. A single pole, single set luminous push button glows when turned on. All electrical circuits and the electric motor are then energized. Pushing the "Power Switch" once more cuts off all power supply to the machine.

STRAP FEED LENGTH TIMER. Metered lengths of strap can be adjusted to automatically feed in a range of from 1" (25mm) to approximately 25 feet (7620mm).

RESET SWITCH. When pushed, the electromagnetic clutch is energized and the strapping head turns one complete revolution, stopping in the home position.

FEED LENGTH SWITCH. When pushed, additional strap is fed out into the strap channel. Strap feed will continue as long as the button is pushed.

LOADING STRAP IN MACHINE

Refer to Figure 10 and proceed as follows:

1. Withdraw the dispenser assembly. Place the assembly as shown. (Fig. 10, P. 8)
2. Push down on the lock and turn to disengage from the roll pin that protrudes from the shaft.
3. Remove the lock and lift the right flange from the dispenser shaft.

COOLING TIME DIP-SWITCH ADJUSTMENT

The cooling time adjustment on your machine allows the user to adjust the cooling time to meet his strapping requirements. Please follow the steps below to adjust the cooling time of the heater.

Attention: Before making any dip-switch changes Power MUST be OFF.

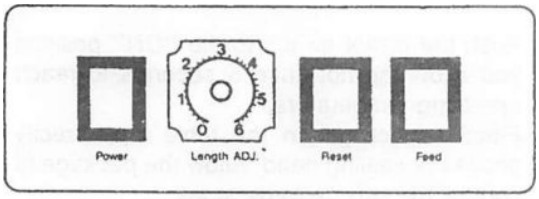
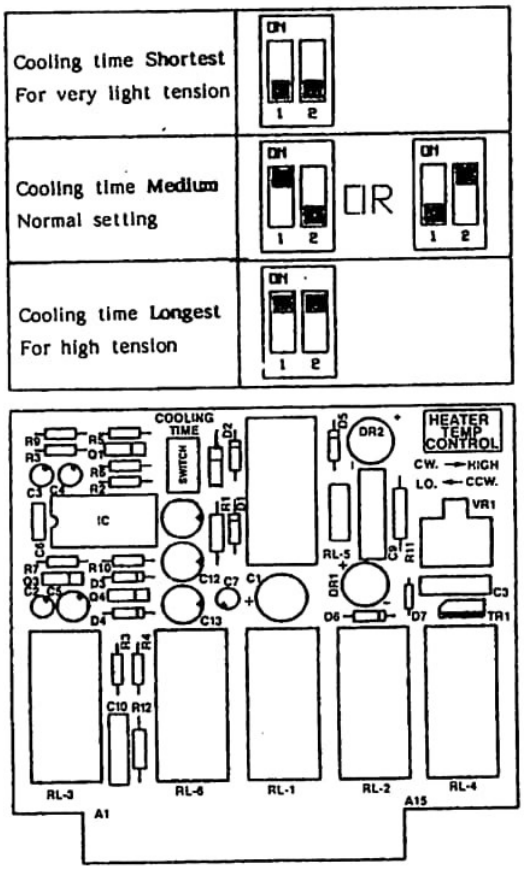


FIGURE 9. OPERATOR'S CONTROL PANEL



4. Place a coil of strap on the left flange allowing the shaft to poke through the plastic wrap. Pay-off must be from the top of the coil if the friction brake is to operate properly, as shown in Figure 11.
5. Replace the right flange and reinstall the lock.
6. At this time the securing straps can be removed from the coil of strap
7. Place the dispenser assembly back into the rear-end of the machine. Make sure the assembly is placed in properly. The lock should be positioned to the right. This can be verified by noting that the drag arm of the friction brake contacts the left dispenser flange.
   When installed, close the rear panel door.

Continue to push the strap through the head until it can be seen at point (E).

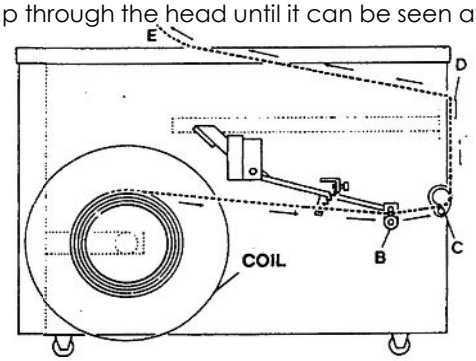


FIGURE 11. STRAP THREADING DIAGRAM

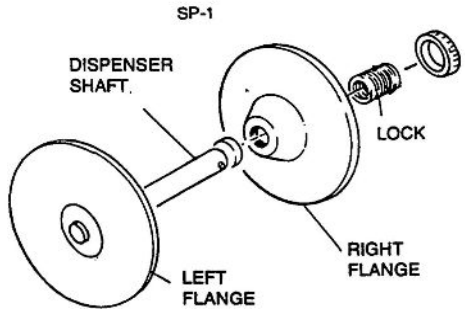


FIGURE 10. DISPENSER ASSEMBLY

THREADING STRAP THROUGH MACHINE

The threading procedure involves routing strap from the dispenser and up through the strapping head. Refer to Figure 11 and proceed as follows:

1. Open the right-hand door and pull about 3 feet (1M) of strap from the coil.
2. Thread the strap through the looper (B), pass it under roller (C) and allow it to exit the cabinet. Close the right-hand door.
3. Pull up on the strap, then insert the lead-end between the guide and roller (D).

STRAPPING CYCLE

The machine is now ready for strapping a pack- age. To operate the SP-1, proceed as follows:

1. Push the power switch to the "ON" position and allow the hot knife 5 seconds to reach operating temperature.
2. Place a package on the table top, directly above the sealing head. Allow the package to contact the two package stops.
3. Grasp the strap on the left side on the package, bring it over the package and insert the lead- end into the strap guide on the right side of the package. As the lead-end of the strap closes LS1, the strap will be tensioned, welded and then released, all automatically. "CAUTION!!" Be sure to keep fingers from beneath the strap.
4. Remove the strapped package and note the length of the strap fed out for the next cycle. Adjust the timer as needed.

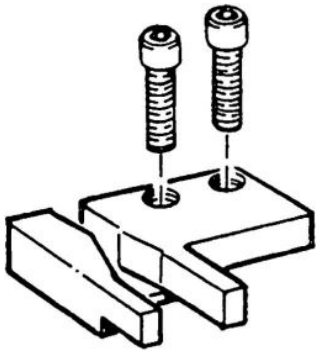
5. Note the condition of the weld and the tension of the tie on the package. If the condition of the weld or the level of tension is unsatisfactory, adjust the hot knife temperature or the tension level as needed. Ref: Operating Adjustments.

ADJUSTING TENSION

If tension adjustment is required, proceed as follows:

1.Loosen the locking knob at the righthand end of the machine.
2. Turn the knurled knob, located at the rear of
the machine, clockwise to increase tension, counterclockwise to decrease tension.
3.When set to the desired tension level, tighten the locking knob.

Figure 12
Exit guide



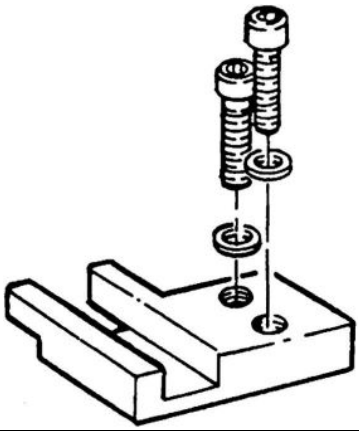
ADJUSTING HOT-KNIFE TEMPERATURE

If the weld appears to be only minimal, it may be that the temperature is improperly set. Make all corrections, in small increments, according to the following conditions:

RAISING HOT-KNIFE TEMPERATURE - If the weld appears to have insufficient heating, turn the hot-knife rheostat (Item 19 on the PC board), in a clockwise direction.

LOWERING HOT-KNIFE TEMPERATURE –
If the condition of the weld appears to have been over heated, turn the rheostat counter clockwise.

FIGURE 13. ENTRY GUIDE



REPLACING STRAP GUIDES

Each machine is shipped with 4 sets of strap guides. The strap guide sizes supplied are for strap of 1/4" (5-6mm), 3/8" (10mm) 1/2" (13mm) and 5/8" (16mm) respective.
Note: Each set consists of an exit and re-entry guide. Ref: Fig. 12 & 13 for identification.

Fig. 14, shows the correct location of each guide. Be sure not to inter-mix the sets as feeding reliability will be affected.
Note: When installing the guides be sure not to over-tighten the mounting screws.

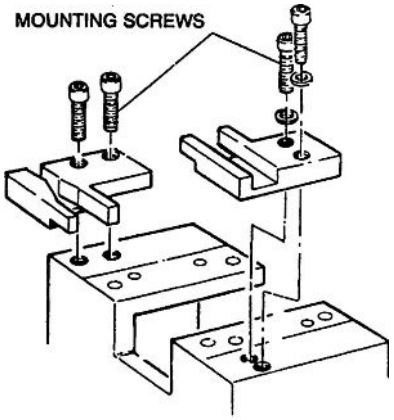


FIGURE 14. GUIDE LOCATION

PRINCIPLES OF OPERATION

GENERAL

The strapping cycle can be divided into three distinct operations:

a. Grip and tension
b. Weld, cut, and release
c. Feed

The following descriptions refer to Figures 15 through 20. Note that both the mechanical and the control functions of the micro switches are described.

1. NEUTRAL POSITION. When the strap is initially threaded through the machine, it enters the head under the strap guide and over roller D, between two sets of feed and tension rollers and on through a slot in the end gripper. It then passes beneath the anvil, over the welding clamp and holding gripper and out into the strap channel on the left-hand side of the table top where the operator has access to it.

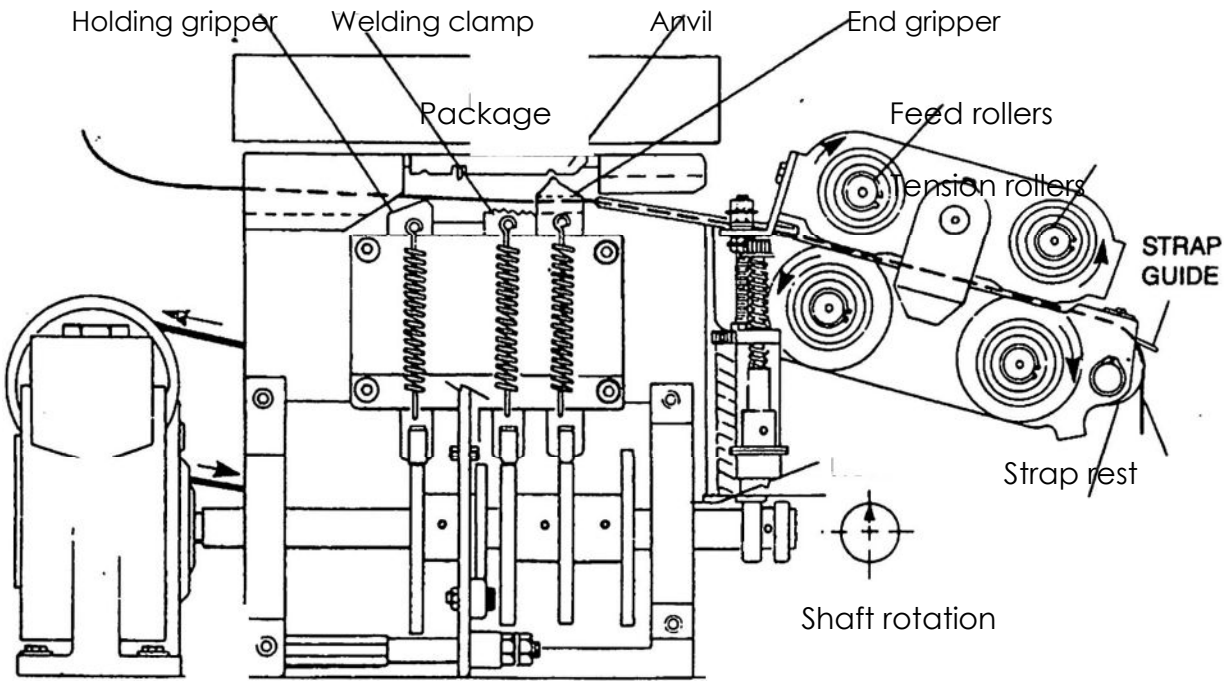
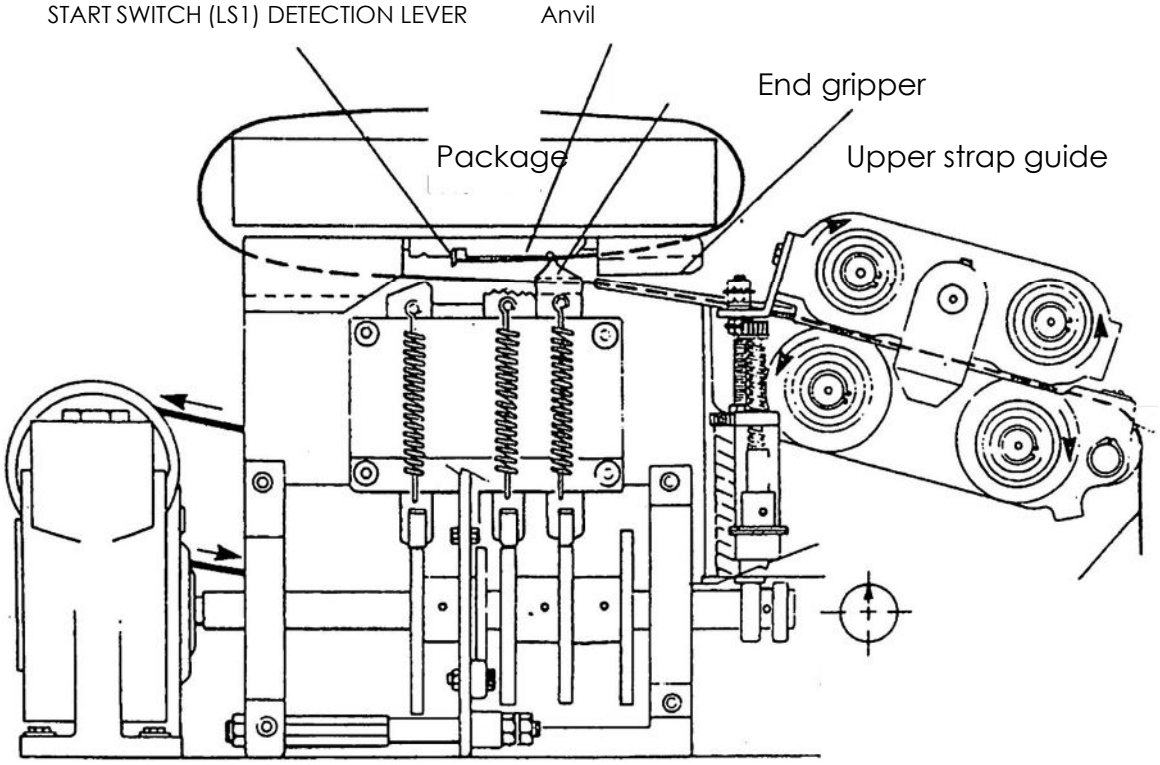


FIGURE 15. Neutral position

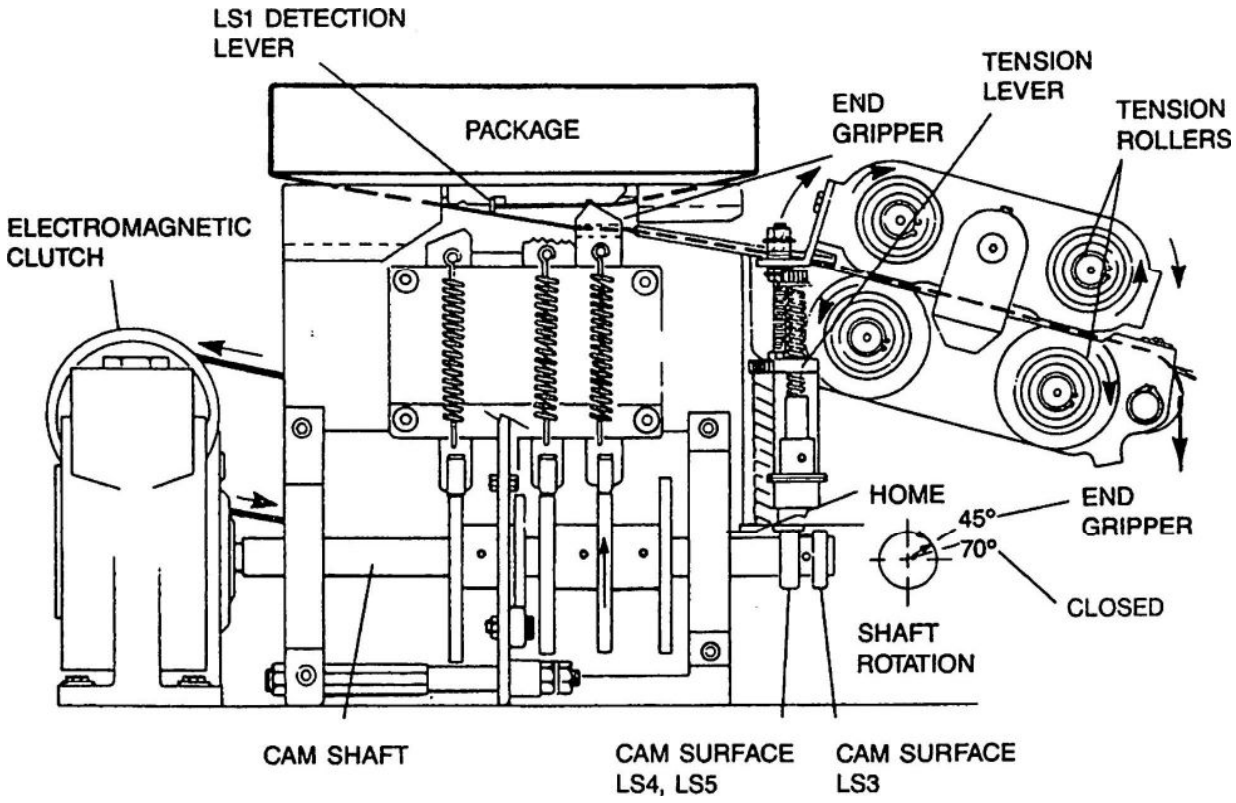
2. ENCIRCLING PACKAGE; TRIPPING LS1.
   Grip and tension is initiated by the operator who encircles the package with the strap and inserts the strap end into the slot of the upper strap guide on the right-hand end of the machine. In doing so, the strap is guided between the gripper portion of the end gripper and anvil then into a slot in the anvil where it contacts the start switch detector lever. As the lever moves to the left, it trips the cycle start switch, LS1.



3. TENSION.
When LS1 is closed, the electromagnetic clutch energizes and the cam shaft rotates approximately 45 degrees. This small amount of shaft rotation is controlled by LS3, mounted at the right-hand end of the cam shaft. When LS3 closes it de-energizes the electromagnetic clutch and the end gripper will have been moved upward to contain the upper strap beneath the anvil.

The 45 degrees of cam rotation brings the LS4 surface of the cam into play with the tension lever. The tension lever pivots and closes the tension rollers. The tension rollers close against the strap, drawing it back through the head, thus tensioning it around the package. When full tension has been drawn, the tension sensing assembly reacts and momentarily closes LS2. Refer to Parts List, Figure '4, for details of tension sensing assembly.

FIGURE 17. Tension

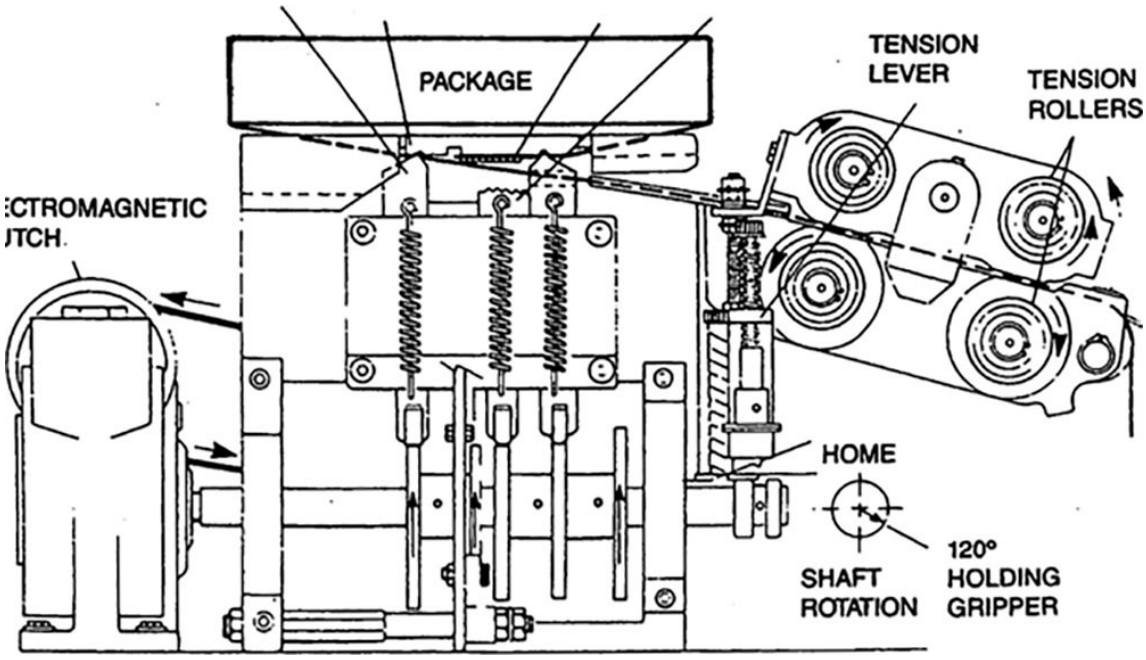


4. HOLDING GRIPPER RISES; HOT-KNIFE MOVES INWARD.
   Momentarily closing LS2 energizes the control circuit to energize the electromagnetic clutch and turn the cam shaft. As the cam shaft turns, the holding gripper rises to contain the other end of the strap beneath the anvil. The tension lever is lowered to release tension and the welding clamp begins to rise. (See Parts List, Figure 4 for location of LS2.)

   It's important to note that all tension to the strap must be released before the strap is cut, otherwise the strap-end could be damaged and feeding reliability will be affected.

   The hot-knife moves in between the two layers of strap.

FIGURE 18. HOLDING GRIPPER AND HOT-KNIFE



5. STRAP IS CUT; WELD IS MADE.
   The welding clamp cuts the strap during it's upward movement then pushes the upper surface of the lower strap against the lower surface of the hot-knife. It then pushes the hot-knife against the lower surface of the upper strap.

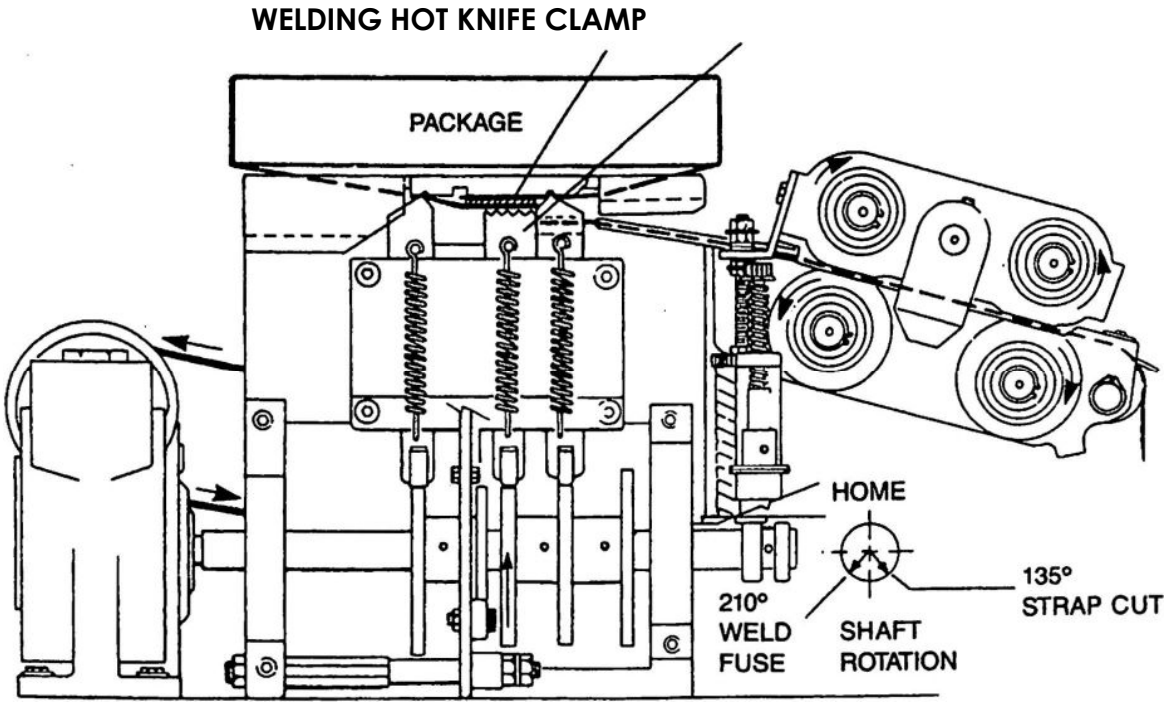


FIGURE 19. STRAP IS CUT & WELD IS MADE

6. WELD IS RELEASED, HEAD RETURNS TO HOME POSITION.
   The hot-knife retracts and the welding clamp pushes the two molten surfaces together, welding the strap.

   LS4 closes and stops the cam shaft for approximately 1/2 second. After this short delay, to ensure that the strap fuses properly, the cam shaft again turns and the holding gripper, the welding clamp and the end gripper retract to the neutral position.

   The anvil then retracts, and the welded strap is released to the lower side of the package.

   The cam shaft returns to the home position and closes LS3 and LS5. The electromagnetic clutch is de-energized by LS3 while LS5 energizes SOLI. As the solenoid pulls down on the tensioning lever, the feed rollers close against the strap, pushing it through the head and out into the strap channel. The feed timer de-energizes and SOL1 is released.

   Strap feed stops and the machine is ready for the next cycle.

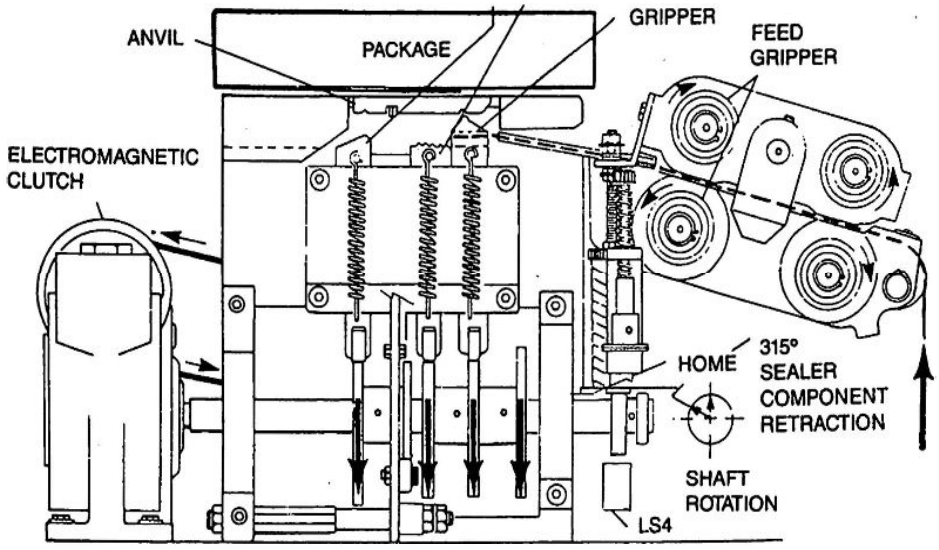


FIGURE 20. WELDED STRAP IS RELEASED; HEAD IS IN HOME POSITION; STRAP FEEDS

SERVICE ADJUSTMENTS AND CLEARANCES

ANVIL To ensure that the anvil operates smoothly, a minimum clearance between the anvil and the left and right guides must be maintained. To adjust, proceed as follows:

1.Make sure the right-hand guide is securely mounted.

2. Loosen the two left-hand guide mounting screws.

3. Insert a shim, .002"(.050mm) thick .118(3mm) wide by 5" (130mm) long between the shoulder of the anvil and the left guide.

4.Push the left guide against the anvil and tighten the left guide mounting screws.

5.Remove the shim and check to make sure the anvil moves smoothly

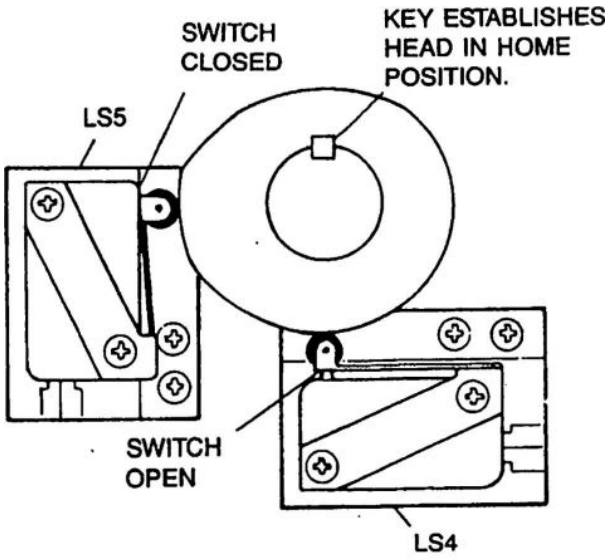


FIGURE 22. LS4 AND LS5

RIGHT-HAND GUIDE 3

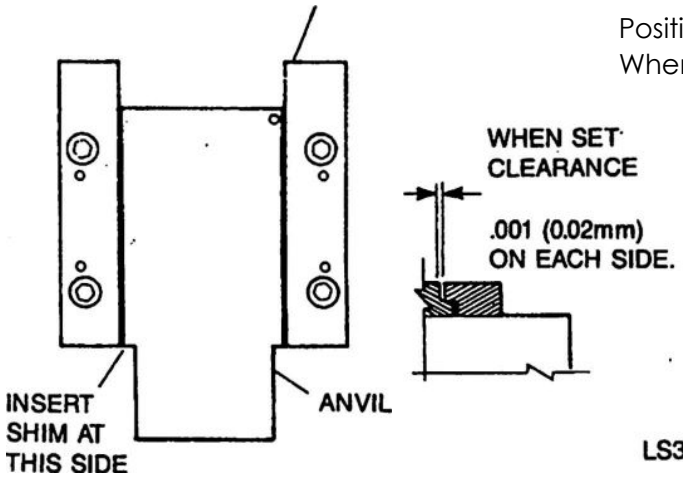


FIGURE 21. ANVIL CLEARANCE

Position LS3 as shown in Figure 20. When set, tighten the mounting

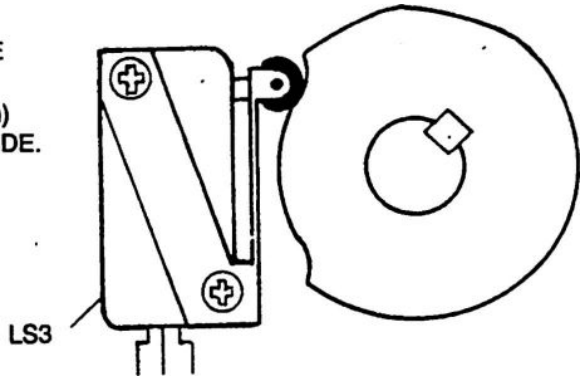


FIGURE 23 LS3

SWITCH CAM: The switch cam is a two level cam. The inner cam actuates LS4 and LS5. The outer cam actuates LS3. To make sure the cams are set properly, proceed as follows:

1. The switch cam is a two level cam. The inner cam actuates LS4 and LS5. The outer cam actuates LS3
2. If the micro-switches need adjusting, loosen the mounting screws and set LS4 and LS5 as seen in Figure 22. When properly set, tighten the mounting screws.

WELDING CLAMP AND END GRIPPER.

To adjust the clearance between the welding clamp and the end gripper, refer to Figure 23 and proceed as follows:

1. Remove the anvil.

2. Loosen the two socket head cap screws that secure the *'L" shaped adjustment bracket to the casting.

3. Push the block left or right to adjust the clearance. The clearance should not exceed .001" (0.02mm).

4. When set, securely tighten the two mounting screws.

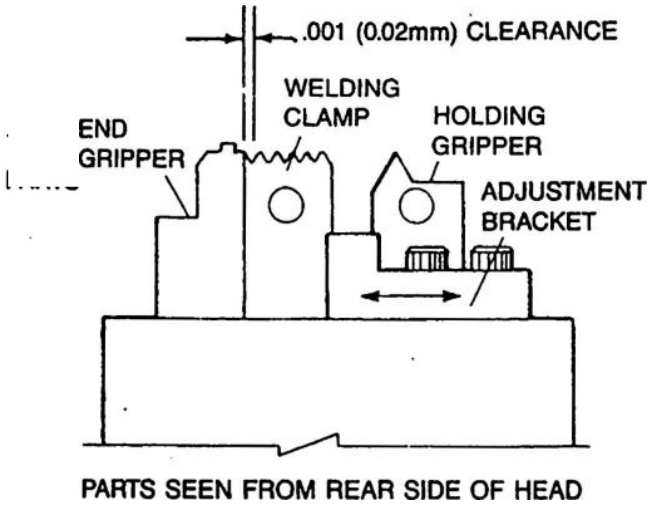


FIGURE 24 WELDING CLAMP AND END GRIPPER CLEARANCE

Note: If the cutting surface of the welding clamp has become dull, the welding clamp can be turned 180 degrees, thus doubling the life of the part.

TENSION LEVER. Before making any adjustments to the tension lever, check to see if the tension lever is in a level condition. To check and adjust if need be proceed as follows:

1. Manually turn the rotor of the electromagnetic . clutch until the key, seen at the end of the cam shaft, is positioned as shown in Figure 25.

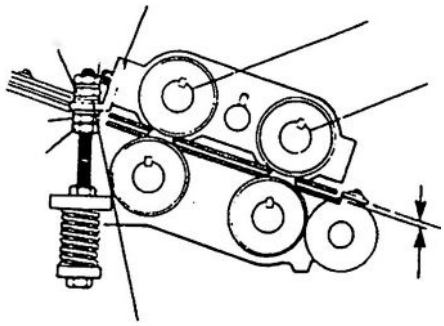


FIGURE 26: Adjusting feed and tension rollers

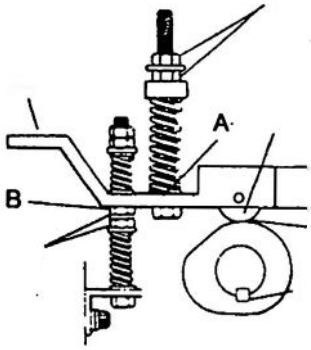


FIGURE 25. ADJUSTING TENSION LEVERTENSION ROLLERS

2. Make sure the tension lever bearing is in contact with the surface of the cam.
3. If there is no clearance at points A, B, and C then the tension lever is considered to be level.
4. If there is clearance at any point, loosen locknuts (1) and (2) and adjust all clearance out at points A, B, and C.
5. When set, tighten the locknuts.

GENERAL. Periodic checks of all drive belts for replacement should be made to prevent worn out or struched belts which will affect tensioning.

LUBRICATION. Make sure the machine is clean before applying lubricants to the points shown in the figure below. Note: Use a brush or compressed air to dispose of debris.

TENSION TRIP ARM ASSEMBLY SLEEVES.

Apply a few drops of light machine oil to the edge of the sleeve so that the oil can penetrate to the shoulder of the screw.

TOP SLIDE, GUIDE PLATES. WELDING CLA'MP, END GRIPPER, AND HOLDING GRIPPER.

Apply light machine oil to these parts at the points indicated in Figure 27.

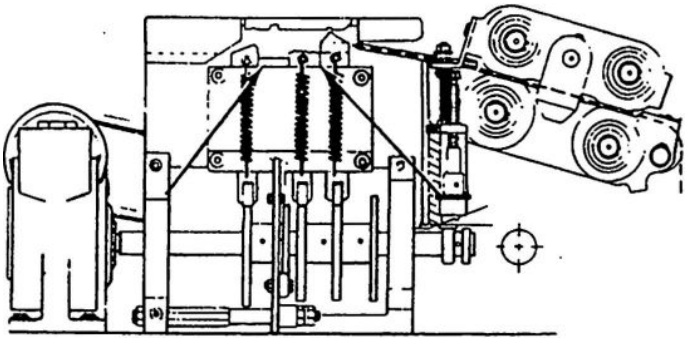


FIGURE 27. LUBRICATION POINTS

GEAR REDUCER. Replace the oil in the gear reducer once a year in the following manner:

1. Remove the oil filling plug at the top of the reducer.

2. Remove the lower plug and allow the oil to drain from the gearing.

3. Reinstall the lower plug and fill with gear oil.

4. Reinstall the upper plug.

Note: The following parts should NEVER be lubricated:

1. **Electromagnetic clutch**
2. **Roller assemblies**
3. **Belts and pulleys**
4. **Clutch disc**

TROUBLESHOOTING	
SYMPTOM / CAUSE	**REMEDY**
Strap jams in strapping head while feeding. Debris accumulation in feed/tension roller area.	Disassemble the roller assembly and remove debris. See Adjusment Section, Figure 23.
Strap pulls from head before seal and cut-off. Worn gripper.	Replace gripper
Strap will not feed. Solenoid 1 will not activate.	1. Adjust the clearance of LS5 in relation to the switch cam. Refer to Figure 22. 2. Replace LS5. 3. Adjust LS3 if needed to ensure the head stops in HOME position.
Strap is not being cut-off upon completion of strapping cycle. 1. LS3 inoperative. 2. LS3 improperly adjusted. 3. Clearance between welding clamp and end gripper too great. 4. Cutting surface on welding clamp is dull.	1. Replace and adjust LS3, refer to Fig. 23. 2. Adjust LS3 as required. 3. Adjust the clearance as detailed in Adjustments and Clearances Section. 4. Turn the welding clamp 180° to bring new cutting surface into play. Details in Adjustments and Clearances Section
Machine will not complete seal and cut-off. 1. The belt that activates the tension trip arm is broken or has come off the pulleys. 2. LS2 inoperative.	1. Replace the belt, if necessary. Remount the belt if it has come off the pulleys. Refer to Parts List, Figure 4. 2. Replace LS2. Refer to Parts List. Fig. 4
Poor strap weld 1. Hot-knife temperature is too high or too low. 2. The 5 amp fuse has blown	1. Adjust the hot-knife temperature, Details in Operating Instructions Section. 2. Before replacing the 5 amp fuse, attempt to identify the cause of why the fuse failed and make necessary repairs.