

BUNN®

SINCE 1907 THE ORIGINAL
PACKAGE TYING MACHINE

Series 14000 TYING MACHINES



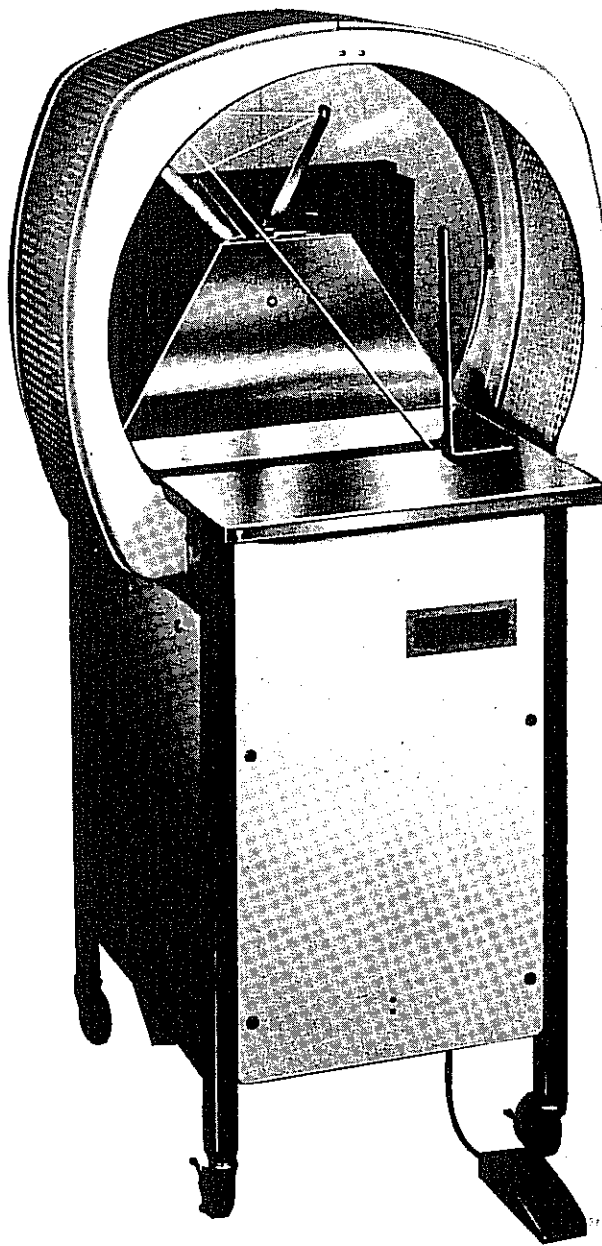
Service Manual

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Operation/Maintenance/Parts List

BUNN®

Series 14000

Service Manual

CONTENTS

I / INTRODUCTION	1		
SCOPE OF MANUAL	1		
PURPOSE OF TYING MACHINE	1		
GENERAL DESCRIPTION	1		
TABLE OF LEADING PARTICULARS	3		
PRINCIPLES OF OPERATION	4		
Single Wrap Models 14108 and 14114	4		
Double Wrap One-Way Models 14208, 14214, and 14220 and Triple Wrap One-Way Models 14408, 14414, and 14420	4		
Double Wrap Cross-Tie Model 14308	4		
Triple Wrap Cross-Tie Model 14508	4		
II / INSTALLATION	5		
UNPACKING TYING MACHINE MODELS 14108, 14208, 14308, 14408, and 14508	5		
UNPACKING TYING MACHINE MODELS 14108, 14214, 14220, 14414, and 14220	5		
POWER REQUIREMENTS			
ASSEMBLY			
Twine Arm Guard	7		
Electric Motor Assembly	7		
4-Prong Plug	7		
PLACEMENT OF TYING MACHINE	7		
Functional Checkout of Tying Machine	9		
III / OPERATION	10		
USE OF TWINE OR TAPE	10		
TWINE CONE PILOT ASSEMBLY AND TWINE CONTAINER SHIELD	10		
POLY TAPE ADAPTERS	10		
THREADING	10		
LIMITATIONS ON SIZES OF BUNDLES AND PACKAGES	14		
Models 14108, 14208, 14114, 14414, 14220, and 14420	15		
Models 14308 and 14508	17		
IV / PREVENTIVE MAINTENANCE	18		
PREVENTIVE MAINTENANCE RESPONSIBILITY	18		
TOOLS REQUIRED	18		
TABLE OF MAINTENANCE TOOLS	18		
PREVENTIVE MAINTENANCE PROGRAM AND SCHEDULES	19		
		TABLE OF PREVENTIVE MAINTENANCE CHECKS AND SERVICES	19
		TABLE OF CLEANING AND LUBRICATION REQUIREMENTS	20
		V / TROUBLE SHOOTING	22
		TABLE OF TROUBLE SHOOTING INFORMATION	22
		VI / CORRECTIVE MAINTENANCE	24
		TYING MACHINE ADJUSTMENTS	24
		Twine or Tape Running Tension	24
		Stringholder Button Pressure	25
		Knotter Release	25
		V-Belt Tension	25
		Chain Tension	26
		Stripper Shearing Action	26
		Micro Switch Motor Timing Cams Models 14108, 14208, 14408, 14114, 14214, 14414, 14220, and 14420	26
		Micro Switch Motor Timing Cams Models 14308 and 14508	26
		TYING MACHINE ALIGNMENTS	26
		Stripper Point and Knotter Alignment	26
		Knotter Timing	28
		DEFECTIVE PARTS REPLACEMENT	28
		Knife	28
		Knotter Body Assembly	28
		Knotter Flat Springs	28
		Motor Timing Cam (or Cams)	29
		Switch Heater	29
		Power Switch	29
		Relay Assembly	29
		Electric Motor Assembly	30
		V-Belt	30
		VII / PARTS LIST	31
		BASE PARTS AND ELECTRICAL SYSTEM INSTALLATION	31
		DRIVE ASSEMBLY	32
		TWINE ARM AND DRAWBACK LEVER ASSEMBLY	33
		MAIN TABLE ASSEMBLY	34
		KNOTTER HEAD ASSEMBLY	35
		STRINGHOLDER ASSEMBLY	36
		TWINE ARM GUARD	37

LIST OF ILLUSTRATIONS

1. Bunn Model 14000 Series Tying Machine	1	25. Tying Machine Throat Depth	16
2. Tying Capabilities	1	26. Positioning Package for Tying	16
3. Major Components of Tying Machine	2	27. Depressing Foot Pedal to Start Tying Cycle	16
4. Basic Types of Different Wraps Between Models	4	28. Twine Arm Making One Wrap	16
5. Twine Arm Guard Installation	6	29. Position Package for Cross-Tie Wraps	17
6. 110 Volt Alternating Current, Single-Phase, 60 Cycle, 1/4 Horsepower Electric Motor Electrical Wiring Diagram	8	30. Twine Arm Completing Cross-Tie	17
7. 220 Volt Alternating Current, Single-Phase, 50 Cycle, 1/4 Horsepower Electrical Motor Electrical Wiring Diagram	8	31. Maintenance Tools	18
8. Twine Cone Pilot Assembly	10	32. Twine or Tape Running Tension Adjustment	24
9. Poly Tape Adapters Installation	10	33. Stringholder Button Pressure Adjustment	25
10. Positioning Twine Arm for Threading	10	34. Knotter Release Adjustment	25
11. Removing Rear Cover	11	35. V-Belt Tension Adjustment	25
12. Opening Twine Tension Plate Assembly	11	36. Chain Tension Adjustment	26
13. Twine or Tape Cone Installation	12	37. Stripper Shearing Action Adjustment	27
14. Threading Tension Plate Assembly	12	38. Aligning Drawslide with Stringholder Button	27
15. Aligning Twine and Tension Spring	12	39. Micro Switch Roller and Motor Timing Cam for Alignment	27
16. Tension Springs	12	40. Aligning Twine Arm with Main Shaft	27
17. Threading Twine Bracket and Quill Shaft	13	41. Micro Switch Roller and Motor Timing Cams for Alignment	27
18. Threading Twine Arm Hub	13	42. Stripper Point and Knotter Alignment	27
19. Threading Twine Arm Ring Guides, Drawback Lever, and Tips	13	43. Knotter Timing	28
20. Threading Stringholder Shaft	14	44. Housing Assembly	28
21. Cutting Off Excess Twine	14	45. Base Parts and Electrical System Installation	31
22. Installing Rear Cover	14	46. Drive Assembly - Exploded View	32
23. Positioning Test Package	15	47. Twine Arm and Drawback Lever Assembly	33
24. Bundle and Package Capacity Graph	15	48. Main Table Assembly - Regular Light Stripper	34
		49. Knotter Head Assembly	35
		50. Stringholder Assembly	36
		51. Twine Arm Guard	37

Section I / INTRODUCTION

SCOPE OF MANUAL

This technical manual contains combined instructions for the installation, operation, preventive maintenance, troubleshooting, repair and overhaul, and repair parts identification for the Model 14000 Series Tying Machine (figure 1) manufactured by the B. H. Bunn Company, Alsip, Illinois. The technical manual also provides descriptions of the main assemblies, their function, and their relationship to other components of the tying machine. The knowledge and application of instructions contained in this technical manual will ensure safe and efficient operation and maintenance of the tying machine. The information and procedures contained in this technical manual can be used to assist in classroom and on-the-job training of operators and maintenance personnel.

PURPOSE OF TYING MACHINE

The primary purpose of the tying machine is to automatically tie mail, packages, cartons, piece-parts, printed matter, newspapers, laundry, produce, meat, corrugated cardboard, and miscellaneous materials and products requiring a secure wrap (figure 2). The tying machine ties almost everything that was previously wired, banded, taped, strapped, or previously tied by hand in offices, factories, and commercial establishments. The tying machine reduces tying time, employee effort and fatigue, reduces twine lint and twine waste, enables trained operators to make secure ties quickly, ties larger bundles with greater ease and efficiency, and discourages tampering because the tied knot cannot be duplicated by hand tying.

GENERAL DESCRIPTION

The tying machine (figure 3) consists of a main table assembly, knotter head assembly, stringholder assembly, drive assembly, twine arm, and base parts. The tying machine is of extruded steel and cast iron construction. Caster wheels are provided for fast, easy mobility. All moving parts are enclosed except for the twine arm which is shielded by a twine arm guard to prevent accidental contact from the sides or rear of the tying machine. Controls are located in the front of the tying machine within easy and comfortable reach of the operator. A pilot light is located in the normal viewing pattern of the operator. An operator's foot pedal provides toe-tap pressure to activate the tying cycle. The foot pedal can be positioned at the discretion of the operator. Operator maintenance points are easily reached without the use of tools. Refer to the Table of Leading Particulars for additional information and differences between various Model 14000 series tying machines.

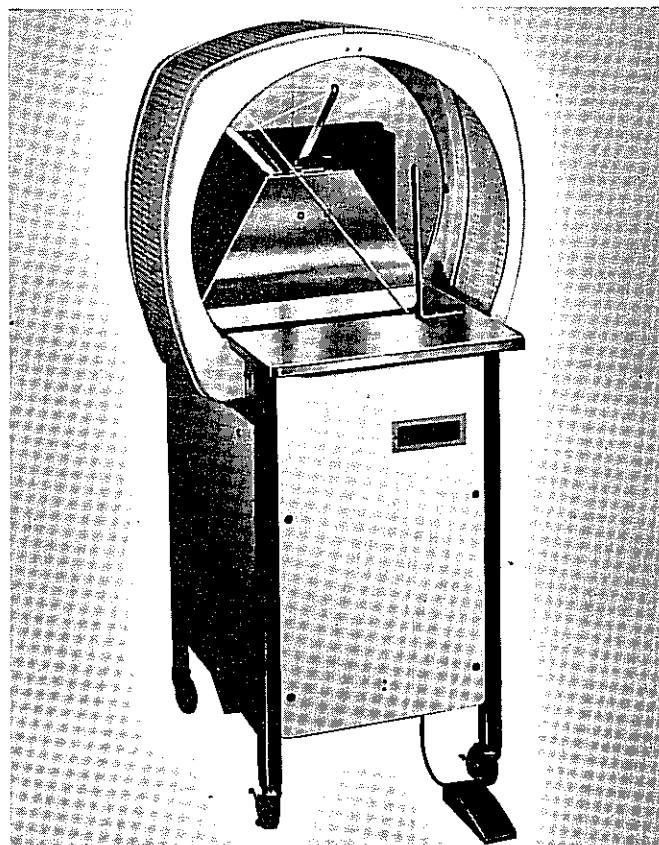


Figure 1. Bunn Model 14000 Series Tying Machine

<p>Ties packages quickly, and automatically adjusts to any shape, any size for</p> 	<p>small parts,</p> 	<p>irregular shapes,</p> 
<p>soft packages and parcels,</p> 	<p>mail, cartons, and parcel post, and</p> 	<p>printed materials and publications</p> 

Figure 2. Tying Capabilities

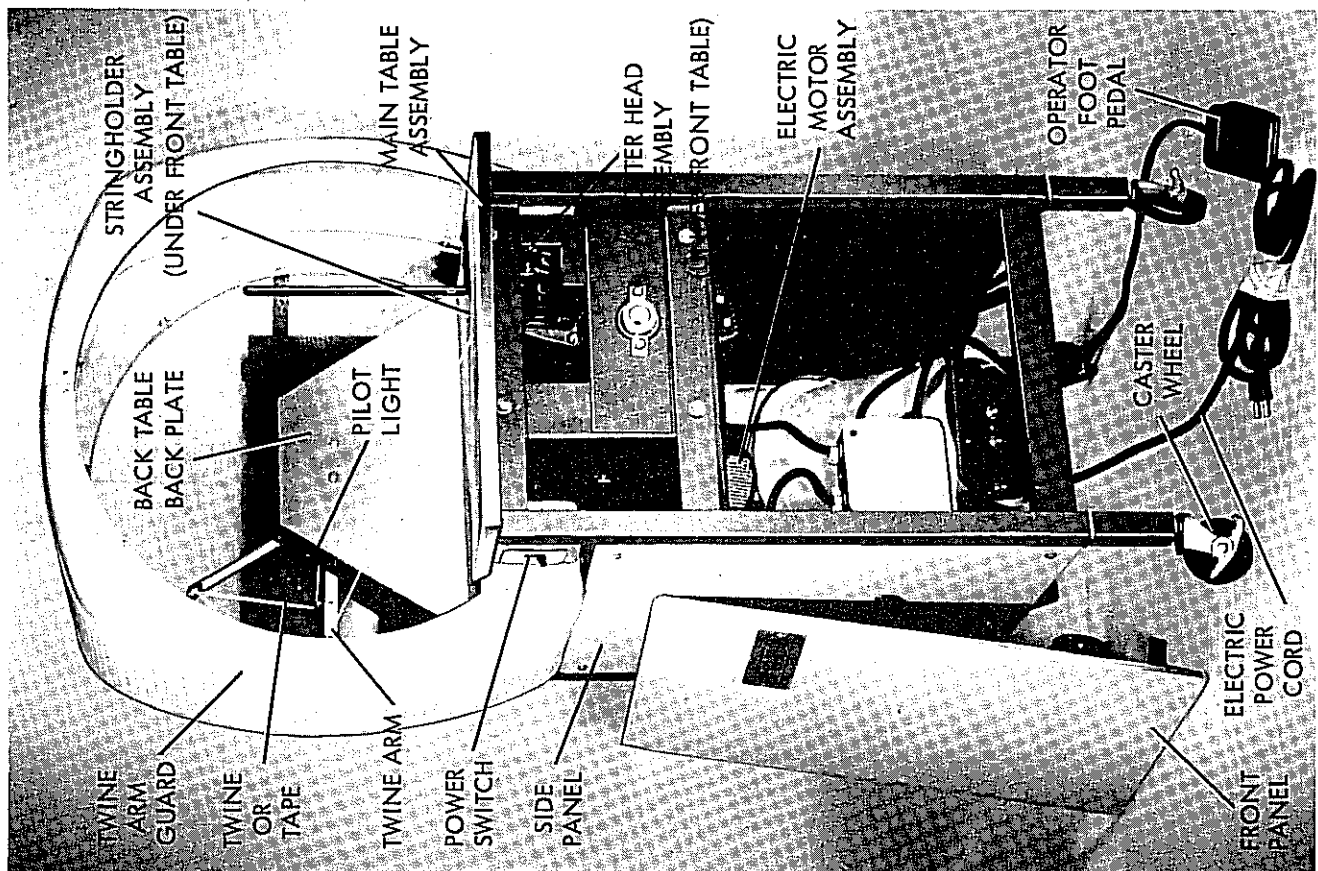
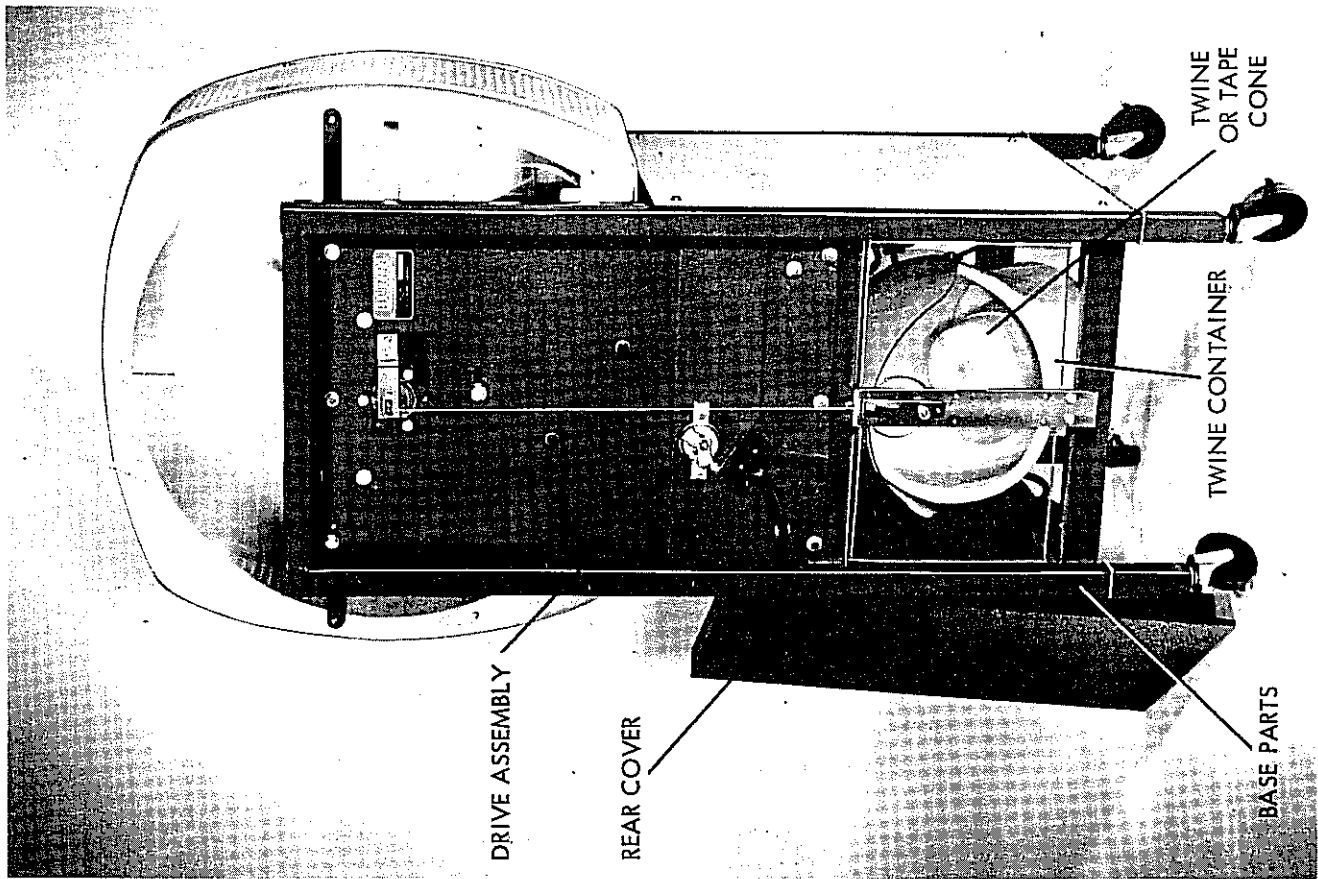


Figure 3. Major Components of Tying Machine

TABLE OF LEADING PARTICULARS

BASIC MODEL 14000 SERIES

Tying table height above floor	35-1/2 inches (31-1/2 inches optional)
Total overall height above floor	56-3/8 inches
Electric motor assembly	110 volts alternating current, single-phase, 60 cycles, 1/4 hp, 1725 rpm or 220 volts alternating current, single-phase, 50 cycles, 1/4 hp, 1425 rpm as required
Twine arm guard	Embossed vinyl plastic front and back, perforated steel center section, and clear heavy duty vinyl plastic back shield
Colors	Honey beige with brown trim
Type of wrap	See figure 4
Tying material	Cotton, sisal, rayon, and nylon twine or poly twine and tape

MODELS 14108, 14208, 14308, 14408, AND 14508

Floor space occupied	29 inches wide by 29 inches deep
* Throat depth	8 inches
Largest package capacity	14 inches high by 14 inches wide by 16 inches deep (permits wraps and tie 8 inches in from end of package)
Shipping weight	270 lbs (domestic packed)
Twine arm	Needle bearing type (back geared type optional)
Back table	Loose (fixed type provided only when used with back geared type twine arm)

MODELS 14114, 14214, AND 14414

Floor space occupied	29 inches wide by 35 inches deep
* Throat depth	14 inches
Largest package capacity	14 inches high by 14 inches wide by 28 inches deep (permits wraps and tie 14 inches in from end of package)
Shipping weight	320 lbs (domestic packed)
Twine arm	Back geared type
Back table	Fixed

MODELS 14220 AND 14420

Floor space occupied	29 inches wide by 41 inches deep
* Throat depth	20 inches
Largest package capacity	14 inches high by 14 inches wide by 40 inches deep (permits wraps and tie 20 inches in from end of package)
Shipping weight	370 lbs (domestic packed)
Twine arm	Back geared type
Back table	Fixed

* Throat depth is the distance from the twine to the face of the back table back plate (figure 3).

PRINCIPLES OF OPERATION

SINGLE WRAP MODELS 14108 AND 14114

With the tying machine power cord connected to an appropriate power source, the power switch set to the "on" position, the bundle to be tied properly positioned on the front table and back table, and the pilot light lit, the single wrap tying cycle is started by the operator applying toe pressure to the foot pedal. Power from the electric motor assembly is transferred to the drive assembly through the drive-belt. Through a series of gears, the drive assembly rotates the twine arm around the bundle. As the twine travels through the twine arm and passes the drawslide, the drawslide snaps back allowing the twine to fall into position behind the stringholder button. The drawslide then pushes the twine across the main table assembly to the other side of the knotter body assembly. The knotter body assembly moves forward catching the twine and turns counter-clockwise opening its jaws for the two strands of twine which are wrapped around the knotter body assembly. The strands of twine are brought through the jaws and the jaws firmly lock. The knotter body assembly then moves toward its finished position and the stripper forces the twine strands off of the knotter body assembly jaws into the tight part of the knot. As the two strands of twine are pulled into loops from the knotter body assembly jaws, the knife trap moves forward, cuts a fresh end of twine and pulls the previously cut end of the twine from behind the stringholder button. The knotter body assembly completes its movement to the finished position and the knotter body assembly jaws open to release the loops, completing the tying process. The tied bundle is then removed from the tying machine.

DOUBLE WRAP ONE-WAY MODELS 14208, 14214, AND 14220; AND TRIPLE WRAP ONE-WAY MODELS 14408, 14414, AND 14420.

The double wrap one-way and triple wrap one-way tying machine operates in exactly the same manner as the single wrap one-way tying machine described above except that the automatic knot-tying and twine-cutting processes are not performed until the twine arm rotates twice (or three times, as applicable) around the bundle being tied.

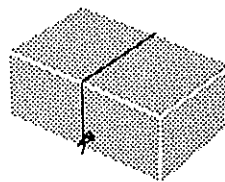
DOUBLE WRAP CROSS-TIE MODEL 14308.

The double wrap cross-tie tying machine operates in exactly the same manner as the single wrap machine described above except that the twine arm rotates once around the bundle being tied then automatically stops. The operator properly repositions the bundle 90 degrees in a clockwise direction, again applies toe pressure to the foot pedal, and the twine arm rotates around the bundle once more automatically completing the knot tying and twine cutting process-

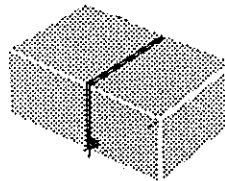
es. The bundle is cross-tied once in each direction with one strand of twine and is tied with one knot.

TRIPLE WRAP CROSS-TIE MODEL 14508.

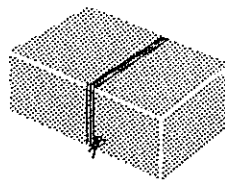
The triple wrap cross-tie tying machine operates in exactly the same manner as the double wrap cross-tie tying machine described above except that the twine arm rotates once around the bundle being tied then automatically stops. The operator properly repositions the bundle 90 degrees in a clockwise direction, again applies toe pressure to the foot pedal, and the twine arm rotates around the bundle two more times automatically completing the knot tying and twine cutting processes. The bundle is cross-tied once in one direction and twice in the other direction with one strand of twine and is tied with one knot.



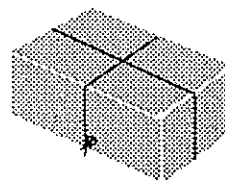
Single Wrap
The arm carries the twine around once and the knot is formed.
Models 14108 and 14114



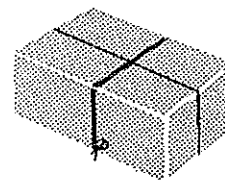
Double Wrap
ONE WAY
Two wraps in one direction with one knot.
Models 14208, 14214, and 14220



Triple Wrap
ONE WAY
Three wraps in one direction with one knot.
Models 14408, 14414, and 14420



Double Wrap*
CROSS TIE
One wrap in each direction with only one knot.
Model 14308



Triple Wrap**
CROSS TIE
One wrap in one direction; two wraps in other direction — with only one knot.
Model 14508

*Double wrap cross tie also provides: (1) two wraps in one direction if package is not turned between wrap cycles; (2) one way by tripping out the first wrap.

** Triple wrap cross tie additionally provides: (1) three wraps in one direction if package is not turned between wrap cycles; (2) two wraps one way by tripping out the first wrap.

Figure 4. Basic Types of Different Wraps Between Models

Section II / INSTALLATION

UNPACKING TYING MACHINE - MODELS 14108, 14208, 14308, 14408, AND 14508.

The tying machine is shipped in a wood reinforced corrugated cardboard carton. Unpack the tying machine as follows:

1. Observe TO OPEN CUT HERE marking and dash lines horizontally printed completely around sides near bottom of carton. Cut carton along this line using a 3-inch blade knife.

CAUTION

Do not use a knife with a blade larger than 3 inches. A larger blade may damage the tying machine.

2. Carefully raise top portion of carton off of bottom portion of carton, removing carton from tying machine.

3. Carefully open and remove plastic bag protecting tying machine. Remove cartoned twine arm guard (figure 3) from front of tying machine pack.

NOTE

The plastic bag can be used as an effective cover for the tying machine when not in use.

4. Cut remaining portion of carton away from skid using a 3-inch blade knife. Observe two 1 x 4 inch boards running across bottom of skid. Knock both 1 x 4 inch boards out of skid using a hammer.

5. Carefully pull tying machine out of skid. Observe metal bar wedged through front and rear caster wheels on left hand side of tying machine. Carefully knock metal bar out of caster wheels using a hammer.

6. If required, install twine arm guard, electric motor assembly, and 4-prong plug and receptacle in accordance with appropriate assembly instructions in this section of the manual.

7. Provide electric power to tying machine and position tying machine in accordance with appropriate paragraphs in this section of the manual.

8. Verify that tying machine operates properly using instructions as outlined in "checkout" paragraph in this section of the manual.

UNPACKING TYING MACHINE - MODELS 14114, 14214, 14220, 14414, AND 14420.

The tying machine is shipped in a wood slat reinforced skid crate. Unpack the tying machine as follows:

1. Carefully pry or knock top and side wood slats off of skid using a pry-bar or hammer.

2. Observe two 1 x 4 inch boards running across bottom of skid. Knock both 1 x 4 inch boards out of skid using a hammer.

3. Carefully open plastic bag that is protecting tying machine and remove plastic bag.

NOTE

The plastic bag can be used as an effective cover for the tying machine when not in use.

4. Carefully pull tying machine out of skid. Observe metal bar wedged through front and rear caster wheels on left hand side of tying machine. Carefully knock metal bar out of caster wheels using a hammer.

POWER REQUIREMENTS

The electric motor assembly, normally provided with the tying machine, is a 110 volt alternating current, single-phase, 60 cycle, 1/4 hp, 1725 rpm electric motor. This electric motor assembly is provided with an electric power cord which has a 3-prong standard parallel blade with "U" ground. To reduce the hazard of tripping over the electric power cord, an outlet of the proper type will have to be provided at the working locations selected. An optional 220 volt alternating current, single-phase, 50 cycle, 1/4 hp, 1425 rpm electric motor is provided on tying machines as necessary to meet customer power requirements. This electric motor is provided with electric power cord which has a 4-prong plug. Refer to the "4-prong plug installation" paragraph in this section of the manual for installation and wiring instructions.

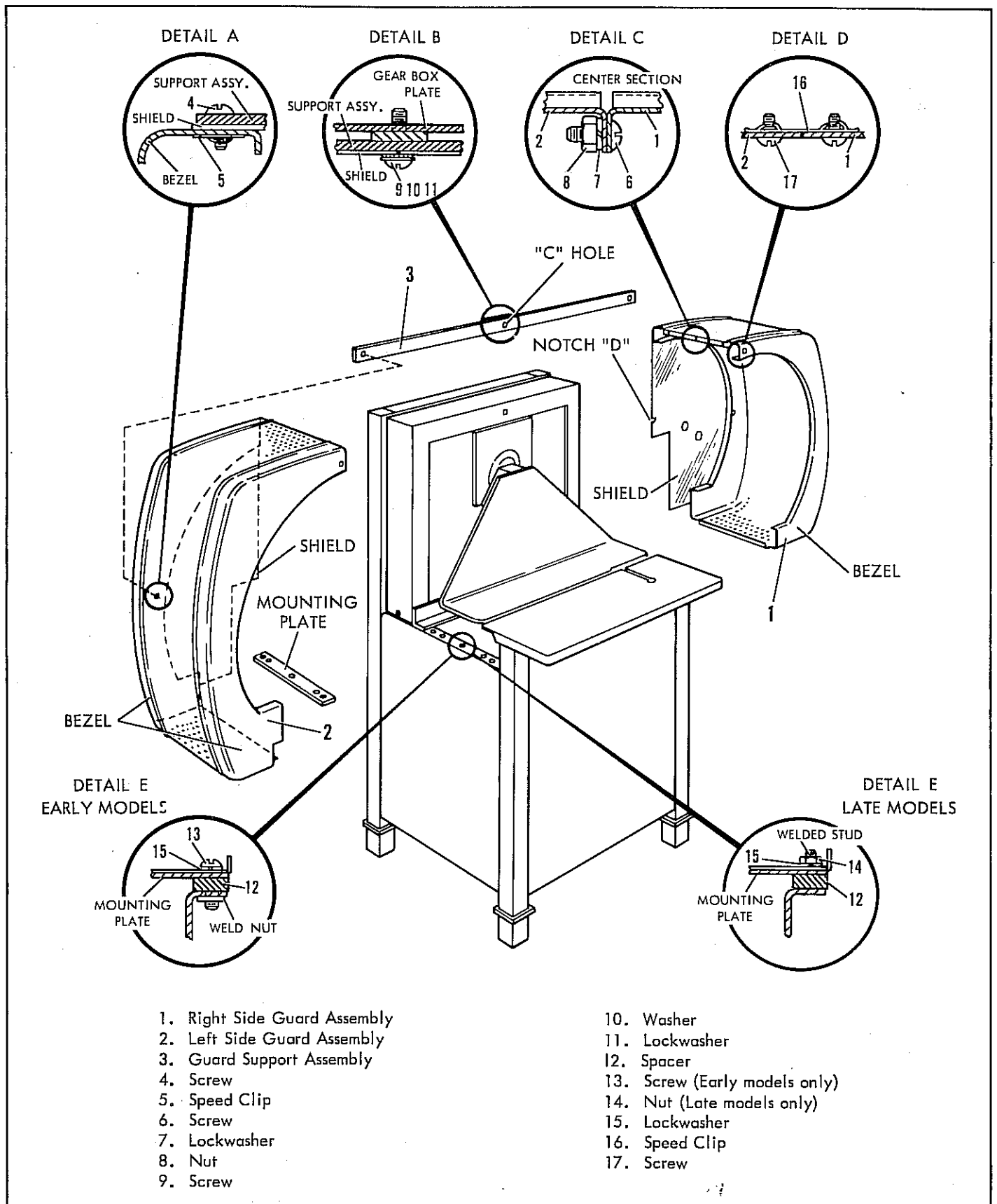


Figure 5. Twine Arm Guard Installation

ASSEMBLY

TWINE ARM GUARD. Install the twine arm guard (figure 5) on the tying machine as follows:

1. Position right side guard (1) and left side guard (2) assemblies face down and side by side on a clean flat surface.

2. Remove all loose parts (3 thru 16) from packet.

3. Position support assembly (3) across right and left side guards taking care to face spacer welded to support assembly away from right and left side guards. Secure support assembly to right and left side guards using screws (4) and speed clips (5) as shown in detail "A".

4. Secure center section of right side guard to center section of left side guard at top using screws (6), lockwashers (7) and nuts (8) as shown in detail "C".

5. If tying machine is a needle-bearing twine arm model, proceed to Step 6. If tying machine is a back geared twine arm model, loosen 2 screws securing back table to base. Slide back table up in slot and raise back table out of base. Set back table off to one side.

6. Carefully position assembled twine arm guard and two mounting plates on tying machine, taking care to align twine arm guard shield notch "D" with tying machine hole "C". Secure twine arm guard to tying machine gear box plate using screw (9), washer (10), and lockwasher (11) as shown in detail "B".

NOTE

Mounting plates are used on Models 14108, 14208, 14308, 14408, AND 14508 only.

7. On early Model 14000 series tying machines, slide spacer (12) between corresponding twine arm guard, mounting plates, and tying machine side angle mounting holes. Secure twine arm guard and mounting plates to side angle using screws (13) on early models or nuts (14) on late models and lockwashers (15) as shown in detail "E".

NOTE

Models 14108, 14208, 14308, and 14508 use 10 spacers (12), 2 mounting plates (10) screws (13) or nuts (14), 10 lockwashers (15). Models 14114, 14214, and 14414 use 14 spacers (12), 14 screws (13) or nuts (14), and 14 lockwashers (15). Models 14220 and 14420 use 16 spacers (12), 16 screws (13 or nuts (14), and 16 lockwashers (15).

8. Observe mounting holes at front and rear top of right and left side guard bezels. Position speed clip (16) at inside of right and left side guard bezel face. Align speed clip holes with right and left side guard bezel holes and secure using screws (17) as shown in detail "D". Repeat procedure at rear top of right and left side guard bezels.

ELECTRIC MOTOR ASSEMBLY. Due to tariff and shipping rules and regulations to some foreign countries, the electric motor assembly may be shipped in a separate package. If the electric motor assembly has not been installed, follow the procedures outlined in the electric motor assembly replacement paragraph in this manual. Check the specifications on the motor data plate and wire the 110 volt, a.c., single-phase, 60 cycle, 1/4 hp, 1725 rpm electric motor assembly as shown in figure 6 or the 220 volt, a.c., single-phase, 50 cycle, 1/4 hp, 1425 rpm electric motor assembly as shown in figure 7.

4-PRONG PLUG. Tying machines provided with the 220 volt alternating current, single-phase, 50 cycle, 1/4 hp, 1425 rpm electric motor are also provided with an optional 4-prong plug and receptacle. Check the specifications on the motor data plate and wire the 4-prong plug to the electric motor cable as in figure 7. Mount the receptacle near the tying machine work area and wire the available power source to the receptacle using standard electrical installation practices and procedures.

PLACEMENT OF THE TYING MACHINE

The tying rate of the tying machine may exceed the volume of any single location, therefore, effective placement varies with each office, factory, and commercial institution and the type of materials or packages to be tied. To determine the space required

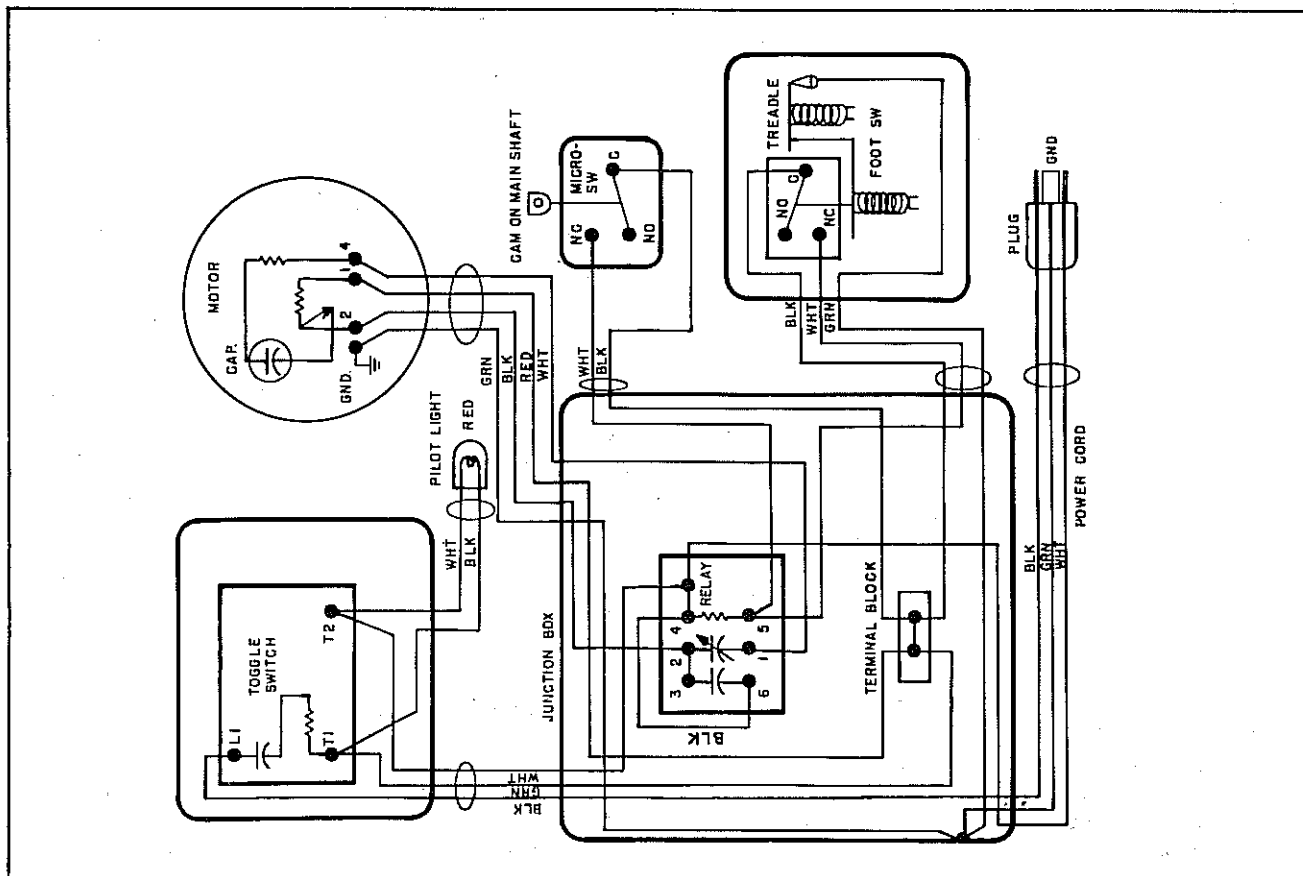


Figure 6. 110 Volt Alternating Current, Single-Phase, 60 Cycle, 1/4 Horsepower Electric Motor Electrical Wiring Diagram

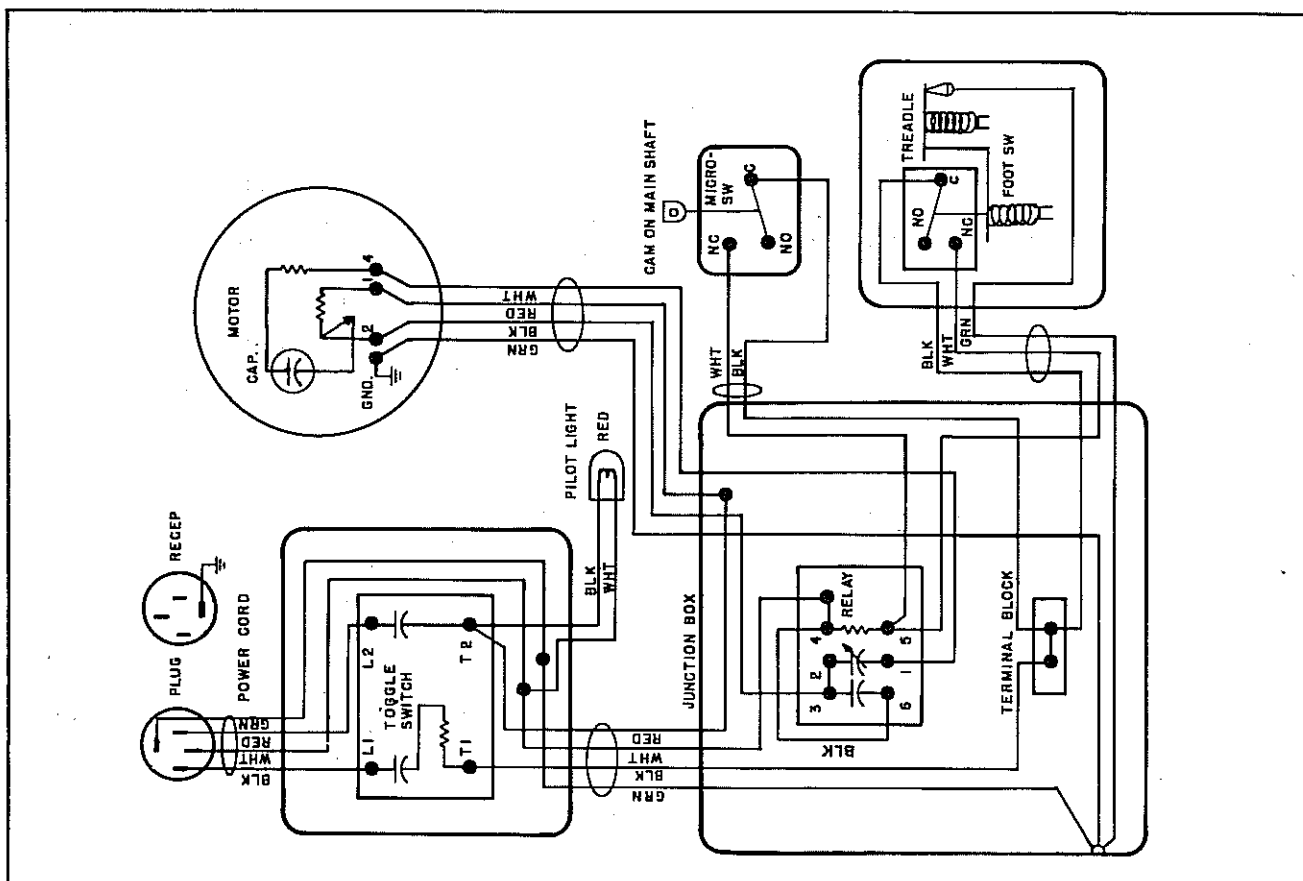


Figure 7. 220 Volt Alternating Current, Single-Phase, 50 Cycle, 1/4 Horsepower Electric Motor Electrical Wiring Diagram

for the tying machine, refer to the Table of Leading Particulars for the dimensions of the tying machine and add 2 feet of work space in front of the tying machine for the operator. The following locations should be considered for maximum utilization of the tying machine, if space permits:

1. At end of a receiving conveyor
2. At end of a row of cases
3. Between two rows of cases
4. Within a "U" shaped arrangement of cases
5. Close to racks or hampers
6. Close to a take-away conveyor

CAUTION

Set caster wheel lock levers to horizontal position to prevent tying machine from moving when in operation.

FUNCTIONAL CHECKOUT OF TYING MACHINE

1. Observe that twine has been threaded from stringholder button (figure 20), through twine arm assembly tip, drawback lever, and guide rings (figure 19), twine arm hub (figure 18), tension spring (figure 15), and is lying loose in twine container (figure 13).

2. Perform steps 1, 2, and 5 through 7 of "threading" paragraph in operation section of this manual.

3. Tie end of twine from twine cone and loose end of threaded twine into a tight firm knot.

4. Position rear cover on tying machine, taking care to align cover holes with frame pins.

5. Position test package over back and front tables taking care to hold firmly in place against standard (figure 23).

6. Set power switch to "on" position.

NOTE

Perform step 7 for Models 14108, 14208, 14114, 14214, 14220, 14408, 14414, and 14420 only. Perform step 8 for Models 14308 and 14508 only.

7. Momentarily depress foot pedal and observe that tying machine makes a complete tie.

8. Momentarily depress foot pedal and observe that tying machine makes an initial wrap (one wrap for Model 14308 and one wrap for Model 14508). Momentarily depress foot pedal and observe that tying machine completes its tying cycle.

NOTE

Additional test ties can be made on the test package to verify that the tying machine is tying properly. Depress the foot pedal once for 1, 2, and 3 wrap one-way tying machines Models 14108, 14208, 14114, 14214, 14220, 14408, 14414, and 14420. Depress the foot pedal twice for 2 and 3 wrap cross-tie tying machines Models 14308 and 14508.

Section III / OPERATION

USE OF TWINE OR TAPE

The tying machine is adaptable to a wide range of tying materials ranging from natural fibre twines to synthetics which can replace wire and strapping in a great many applications. Be sure that the twine or tape being used is of the proper type for the tying application. The twine container (figure 3) holds up to a 10-pound cone of twine. The base diameter of the cone must not exceed 9 inches. Conversion kits to change twines to tapes, tapes to twines, and types and sizes of twines and tapes are available through your B. H. Bunn Company factory representative.

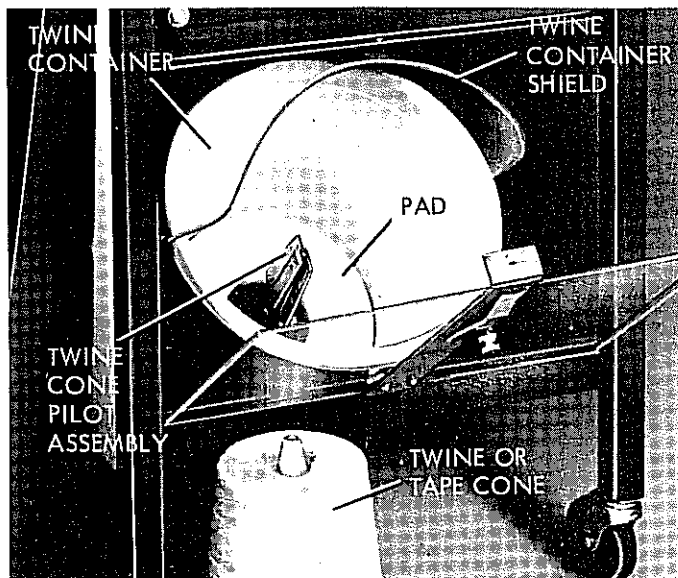


Figure 8. Twine Cone Pilot Assembly

TWINE CONE PILOT ASSY. & TWINE CONTAINER SHIELD

The positive spring-loaded twine cone pilot assembly (figure 8) automatically adapts to a wide range of cones and cylinders, holds the cone securely, and permits easy interchange of twines. The twine container shield, prevents the twine from becoming tangled as it is withdrawn from the twine container.

POLY TAPE ADAPTERS

Nylon or cotton twine is supplied on tapered cones and poly tape is supplied on cylinders. The poly tape adapters (provided with the tying machine) are to be used only when using poly tape. Install the poly tape adapters as follows:

1. Position one poly tape adapter (figure 9) on either side of twine cone pilot assembly and secure with the two screws, lockwashers, and nuts supplied.
2. Repeat step 1, above, to install second poly tape adapter on opposite side.

THREADING

Read these instructions thoroughly before attempting to thread the tying machine. The instructions outlined below apply to all models except as noted. It is important to observe the various openings through which the twine (or tape) is to be threaded. Thread the tying machine as specified below.

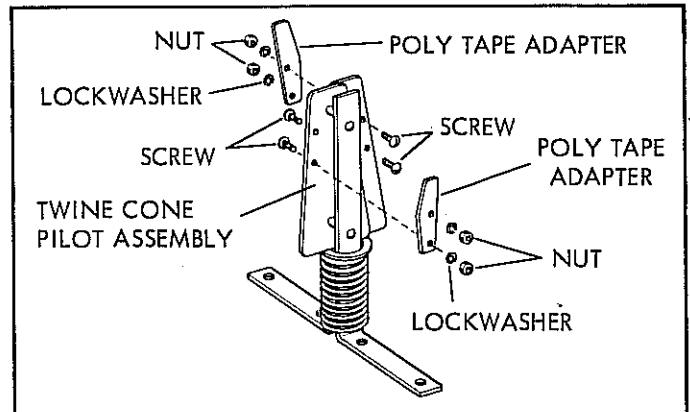


Figure 9. Poly Tape Adapters Installation

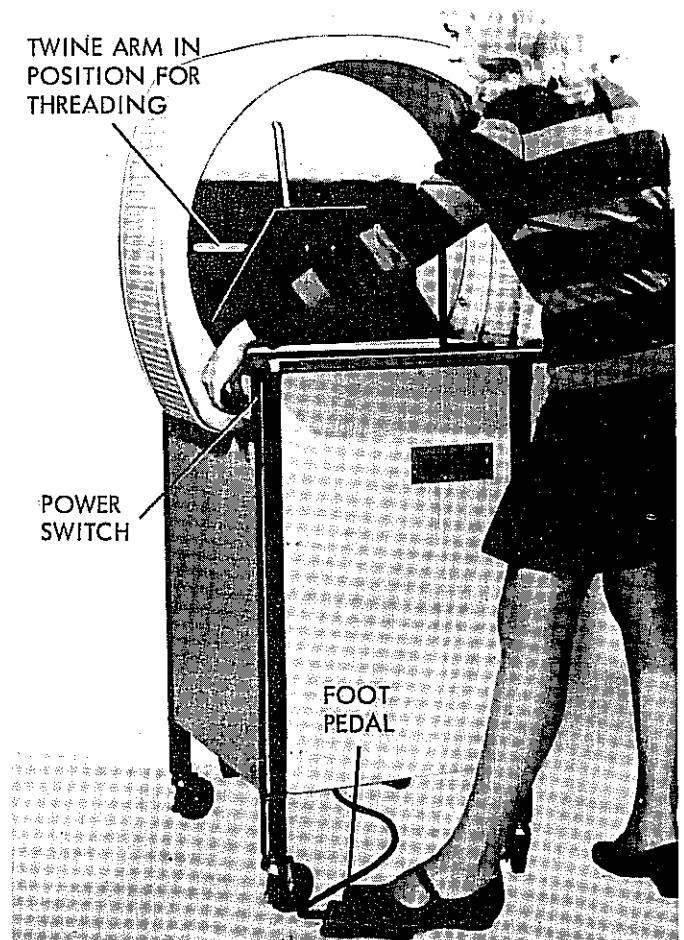


Figure 10. Positioning Twine Arm For Threading

NOTE

If the end of twine on the old cone is caught before it runs out of the twine container, perform steps 6 and 7 below, then tie the end from the new cone and the loose end from the old cone into a tight firm knot. Close twine tension plate assembly as described in step 9 below and perform step 12. If the end of the old twine is not caught, follow the steps described below.

WARNING

Be sure to keep head, arms and hands out from under the twine arm guard assembly area.

1. Set power switch to "off" position.
2. Insert electric power cord plug into appropriate power receptacle.
3. Depress and hold foot pedal and continuously jog power switch "on" and "off" until twine arm is approximately in a horizontal position on left hand side of tying machine as viewed from front (figure 10). Release foot pedal and set power switch to "off" position.
4. Remove electric power cable plug from power receptacle.
5. Grasp sides of rear cover. Simultaneously raise and pull back removing rear cover from tying machine. Set cover to one side (figure 11).
6. Grasp twine tension plate assembly at hole in plastic shield. Pull back the assembly to release spring catch and allow it to swing back to its stop position (figure 12).
7. Position cone of twine over the cone pilot assembly and press firmly until seated on foam pad at bottom of twine container (figure 13).

NOTE

When using twine or tape cones that are less than 5 pounds, it will be necessary to install a second foam pad in the bottom of the twine container.

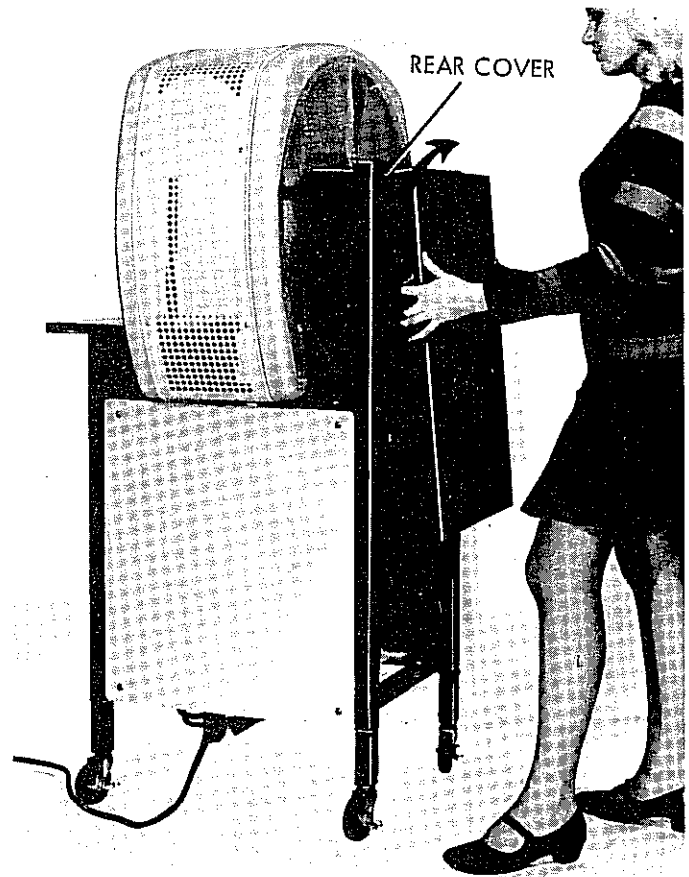


Figure 11. Removing Rear Cover

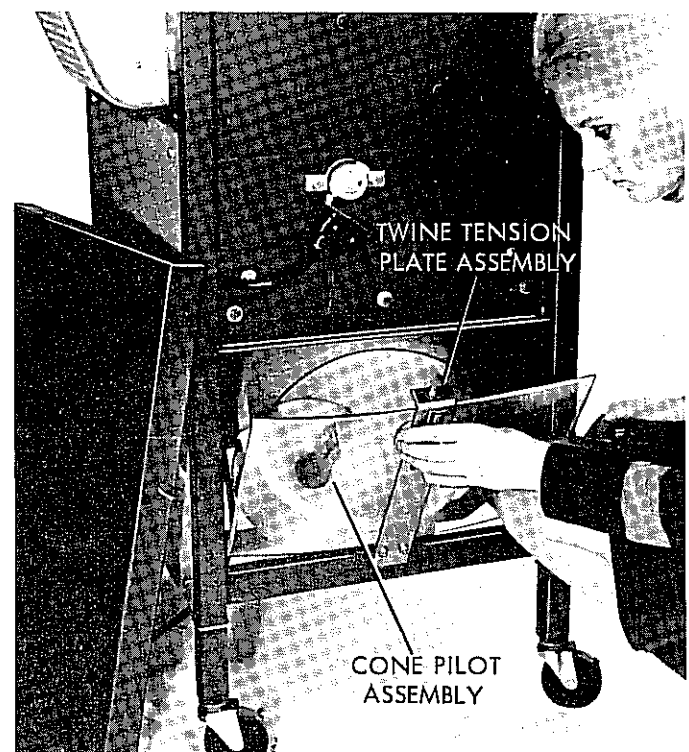


Figure 12. Opening Twine Tension Plate Assembly



Figure 13. Twine Tape Cone Installation

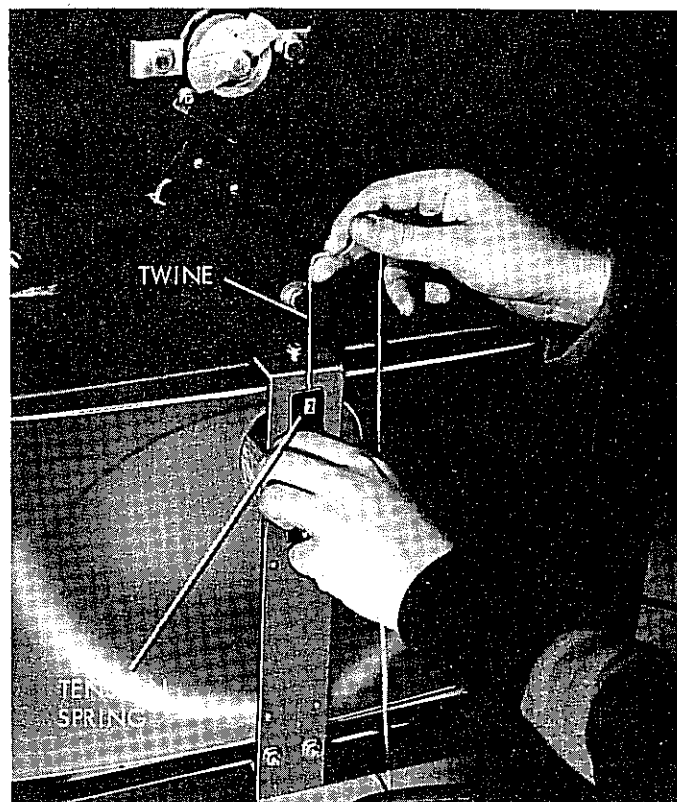


Figure 15. Aligning Twine and Tension Spring

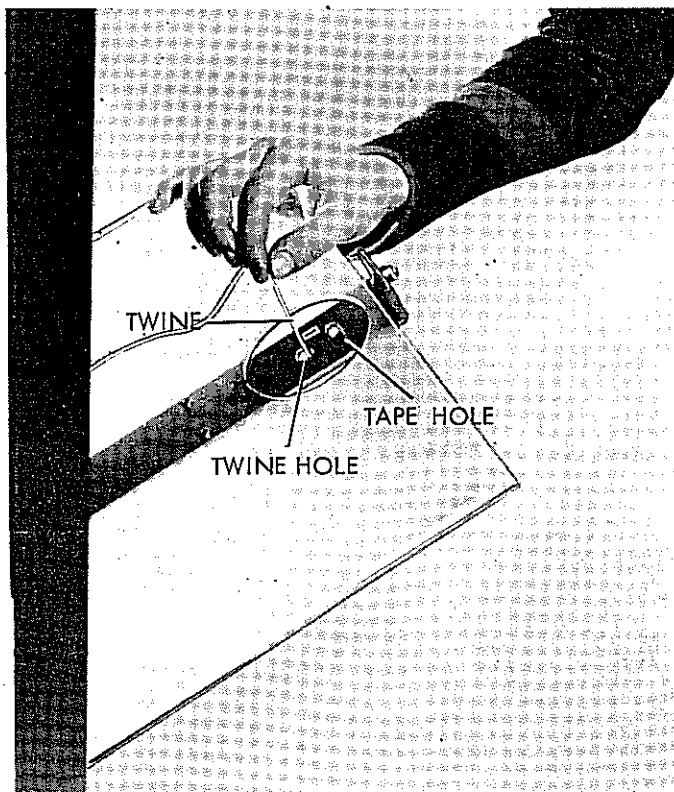


Figure 14. Threading Tension Plate Assembly

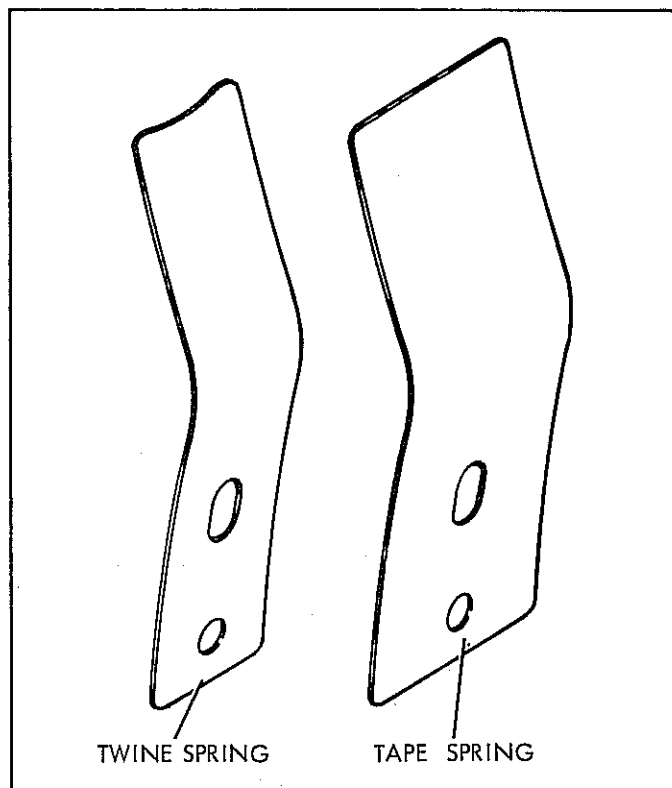


Figure 16. Tension Springs

8. Grasp end of twine and thread through tension plate assembly hole labeled no. 1 (figure 14).

NOTE

Thread twine through round hole in tension plate assembly. Thread tape through oblong hole in tension plate assembly.

9. Pull out approximately 5 to 6 feet of twine and close twine tension plate assembly. Gently pull tension spring (labeled no. 2) back, and position twine under center of tension spring. Release tension spring (figure 15).

NOTE

Two tension springs (figure 16) are provided with the tying machine. The narrow tension spring is used with twine and the wide tension spring is used with poly tape. Be sure that the appropriate tension spring is installed.

10. Position twine in crotch of twine threading tool with approximately 1 foot of loose twine folded back. Insert twine threading tool through twine bracket (labeled no. 3) and completely through quill shaft labeled no. 4 (figure 17). Remove twine threading tool.

11. Using twine threading tool (or similar object), fish twine out of twine arm hub slot labeled no. 5 (figure 18). Thread twine through ring guide labeled no. 6, up through backside of drawback lever slot labeled no. 7, down through ring guide labeled no. 8 at bend in twine arm, and through twine arm tip labeled no. 9 (figure 19).

12. Using left hand, pull twine over to right side of tying machine and press back stringholder release lever. Place twine under stringholder button shaft labeled no. 10, pull up and over shaft and release stringholder release lever (figure 20). Pull twine taut and press knife trap toward front of tying machine (figure 21) to cut off excess twine.

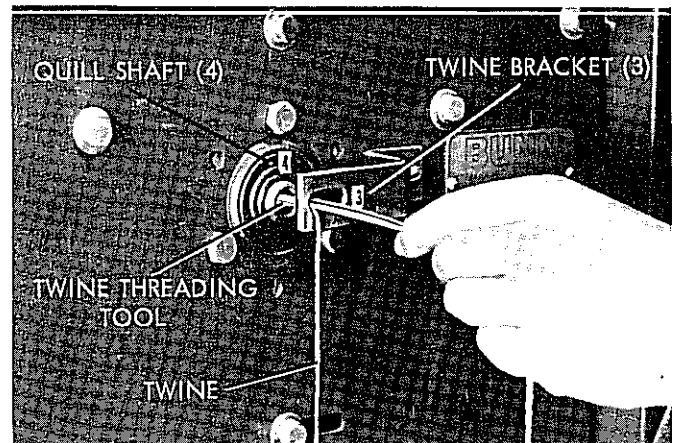


Figure 17. Threading Twine Bracket and Quill Shaft

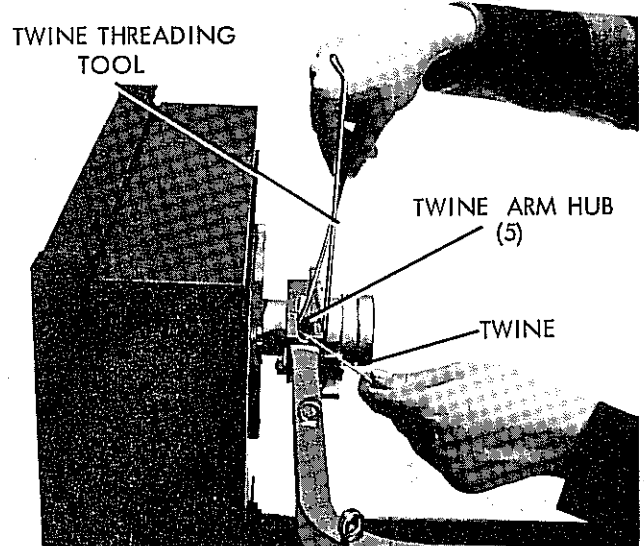


Figure 18. Threading Twine Arm Hub

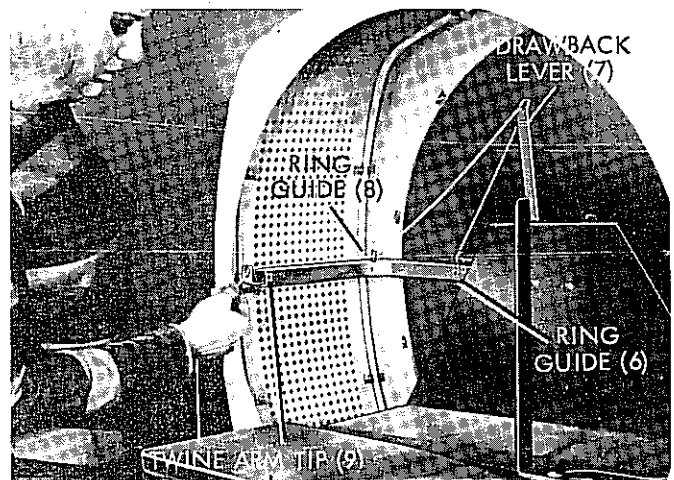


Figure 19. Threading Twine Arm Ring Guides, Drawback Lever, and Tip

13. Position rear cover on tying machine taking care to align rear cover pin holes with tying machine frame pins. Press rear cover forward to fully seat in position (figure 22).

14. Repeat steps 1 and 2 of this paragraph.

15. Position a test package over front and back tables taking care to hold firmly in place against standard (figure 23).

NOTE

Perform step 16 for Models 14108, 14208, 14114, 14214, 14220, 14408, 14414, and 14420 only. Perform step 17 for Models 14308 and 14508 only.

16. Set power switch to "on" position and observe that tying machine makes a complete tie.

17. Set power switch to "on" position, momentarily depress foot pedal, and observe that tying machine completes its tying cycle.

NOTE

Additional test ties can be made on the test package to verify that the tying machine is tying properly. Depress the foot pedal once for 1, 2, and 3 wrap one-way tying machines Models 14108, 14208, 14114, 14214, 14220, 14408, 14414, and 14420. Depress the foot pedal twice for 2 and 3 wrap cross-tie tying machines Models 14308 and 14508.

LIMITATIONS ON SIZES OF BUNDLES AND PACKAGES

The Model 14000 series tying machines, as the first two digits indicate, tie a 14-inch cube. This is the maximum dimension for a package where the width and height are equal.

As can be seen, by plotting the package dimensions on the capacity graph (figure 24) boxes 15 inches wide and 13 inches high can be tied as well as boxes 12 inches wide and 16 inches high. Packages of lesser dimensions can, of course, also be tied.

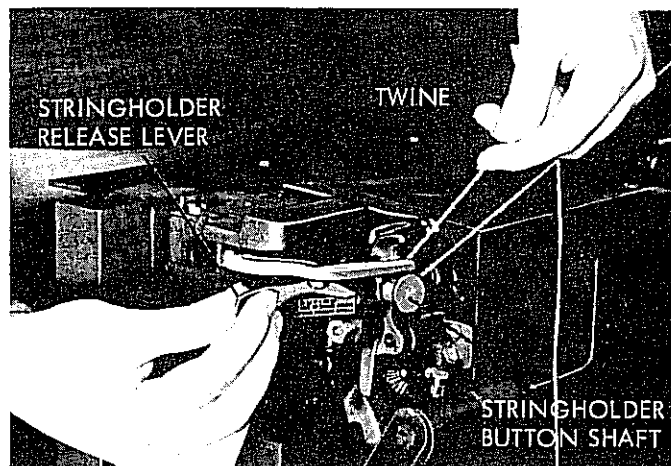


Figure 20. Threading Stringholder Shaft

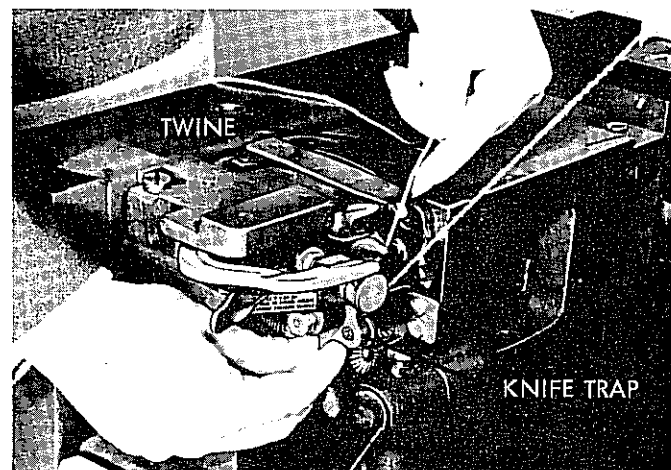


Figure 21. Cutting Off Excess Twine

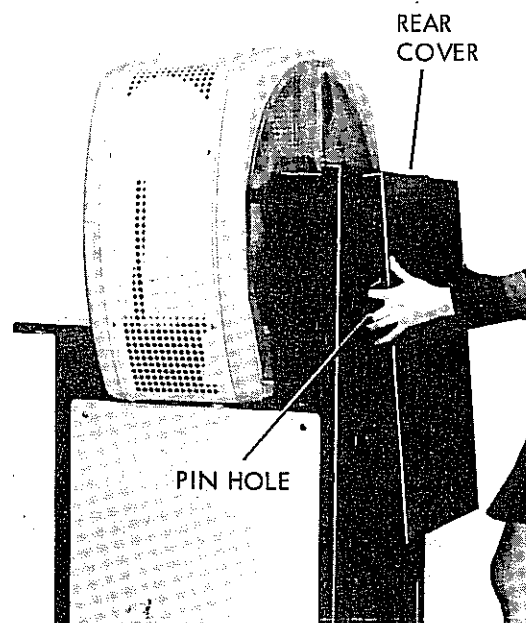


Figure 22. Installing Rear Cover

The only other dimension which controls the tying capacity is the "throat" depth of the tying table. This is the distance between where the tying twine (or tape) goes around the package to the backstop, or the maximum distance you can slide the package into the tying machine. The "throat" depths (figure 25) are 8 inches, 14 inches and 20 inches. Refer to the Table of Leading Particulars for the throat depth of each model of tying machine.

The tying machine adjusts automatically to handle packages of varying sizes and shapes that are smaller than its maximum capacity as specified above. The first package may be a small bundle of piece-parts. The second may be a package of odd-shaped pieces. The third may be a soft package. The fourth could be a large box or carton.

The tying machine automatically compensates for the size and shape and the different lengths of twine required. The tying machine also automatically applies the correct amount of tension, ties the patented slipproof and tamperproof knot and then cuts the twine.

HOW TO TIE BUNDLES AND PACKAGES

MODELS 14108, 14208, 14114, 14214, 14414, 14220, AND 14420. To operate the tying machine to its best advantage, proceed as follows:

1. Verify that electric power cord is connected to an appropriate power source.
2. Set power switch to "on" position and observe that pilot light is lit.
3. Hold ends of package between thumbs and forefingers of both hands and position package on tying machine table so that right side of package is butted against standard (figure 26) and positioned over gap between front and back tables.
4. Momentarily depress foot pedal holding package firmly until tying cycle is completed (figure 27).

NOTE

The tying cycle is complete after the twine arm makes one wrap on Models 14108 and 14114. The tying cycle is complete after the twine arm makes two wraps on Models 14208, 14214, and 14220. The tying cycle is complete after the twine arm makes three wraps on Models 14408, 14414, and 14420.

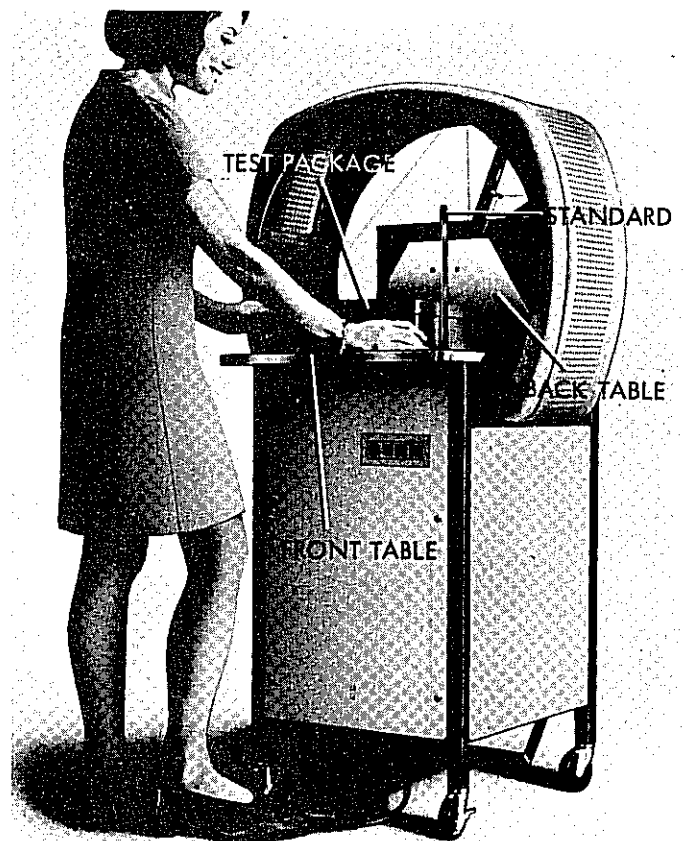


Figure 23. Positioning Test Package

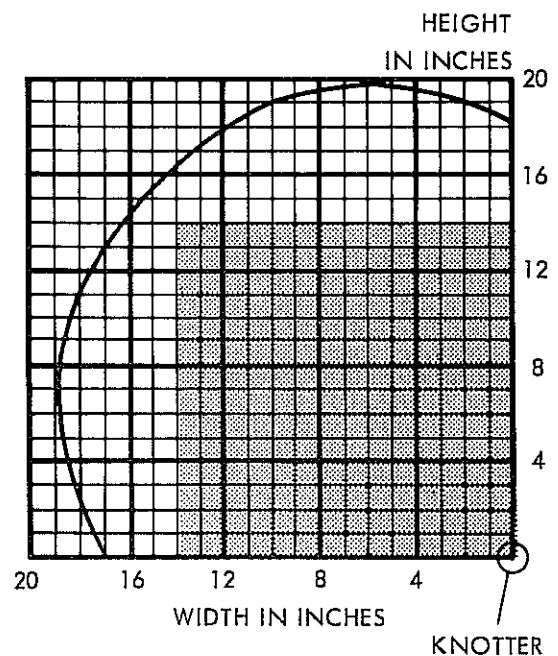


Figure 24. Bundle and Package Capacity Graph

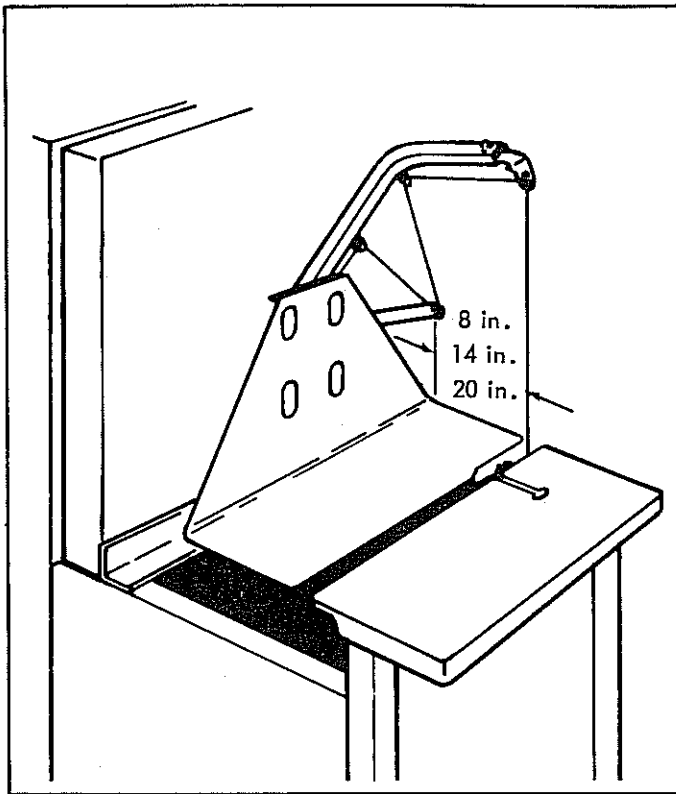


Figure 25. Tying Machine Throat Depth

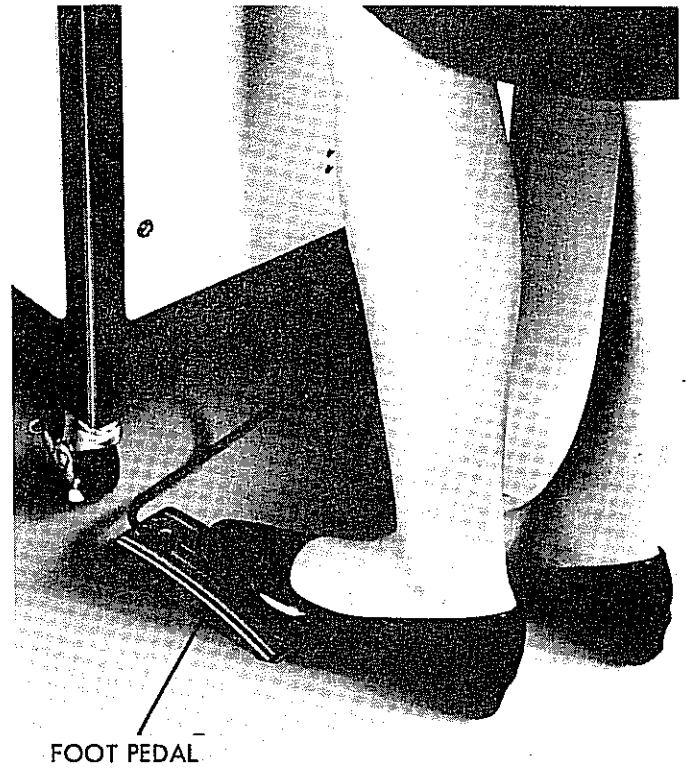


Figure 27. Depressing Foot Pedal to Start Tying Cycle

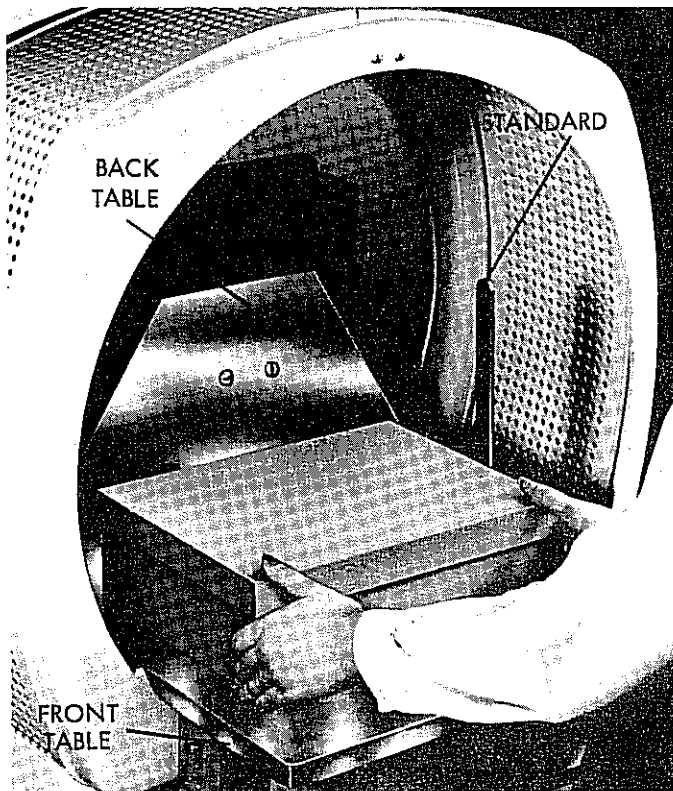


Figure 26. Positioning Package for Tying

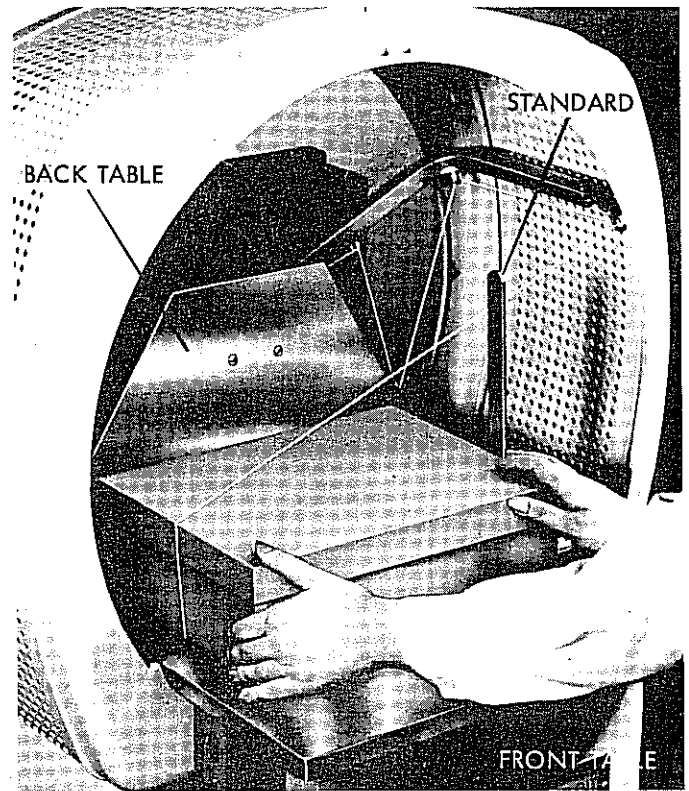


Figure 28. Twine Arm Making One Wrap

5. Remove package from tying machine.
6. Repeat steps 3 through 5 above for each package to be tied.
7. After all packages have been tied, set power switch to "off" position and observe that pilot light is not lit.
8. Cover tying machine with plastic bag.

MODELS 14308 and 14508. To operate the tying machine to its best advantage, proceed as follows:

1. Verify that electric power cord is connected to appropriate power source.
2. Set power switch to "on" position and observe that pilot light is lit.
3. Hold ends of package between thumbs and forefingers of both hands and position package on tying machine table so that right side of package is butted against standard (figure 26) and positioned over gap between front and back tables.
4. Momentarily depress foot pedal (figure 27) holding package firmly until twine arm makes one wrap (figure 28).
5. Reposition package IN CLOCKWISE DIRECTION (figure 29) in tying machine.
6. Momentarily depress foot pedal (second time) holding package firmly until tying cycle is completed (figure 30).

NOTE

The tying cycle is complete after the twine arm makes one wrap in each direction on Model 14308. The tying cycle is complete after the twine arm makes one wrap in one direction and two wraps in the second direction on Model 14508.

7. Remove package from tying machine.
8. Repeat steps 3 through 6 above for each package to be tied.
9. After all packages have been tied, set power switch to "off" position and observe that pilot light is not lit.
10. Cover tying machine with plastic bag.

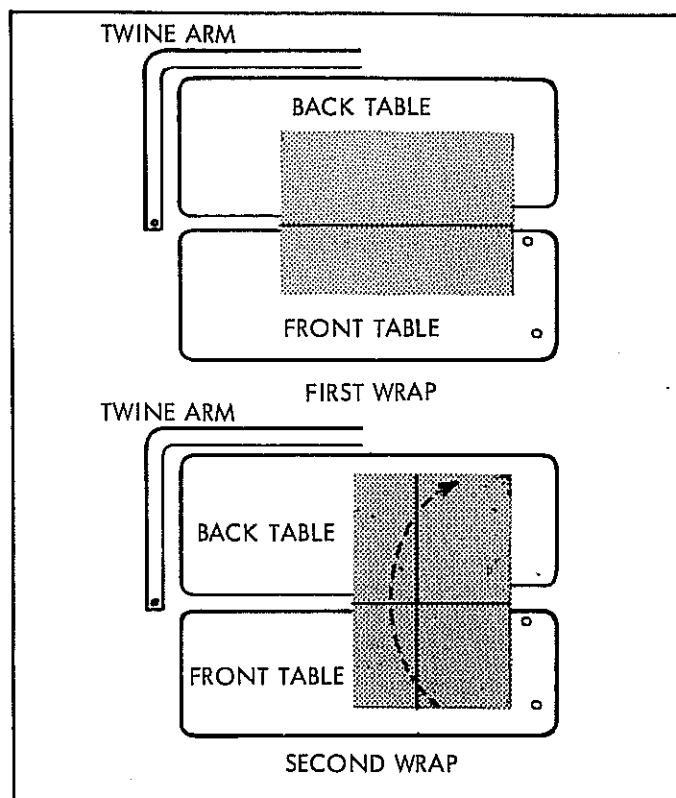


Figure 29. Positioning Package for Cross-Tie Wraps

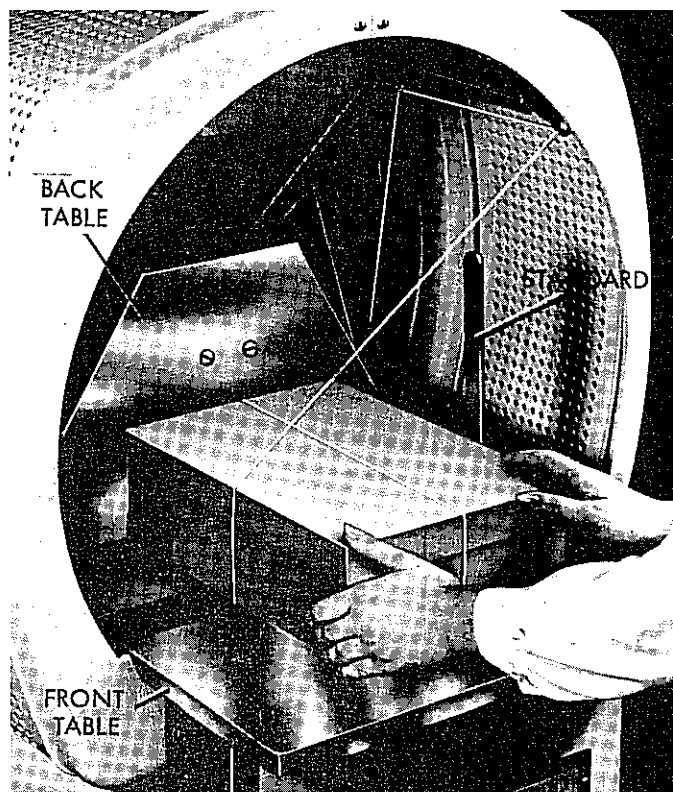


Figure 30. Twine Arm Completing Cross-Tie

Section IV / PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE RESPONSIBILITY

The tying machine has been designed and manufactured to perform satisfactorily over an extended period of time with a minimum of maintenance. With the exception of threading the tying machine, preventive maintenance responsibility should be assigned to the maintenance mechanic or other authorized personnel. This section of the manual provides maintenance instructions and maintenance function schedules.

TOOLS REQUIRED

Preventive maintenance, as well as corrective maintenance, requires only conventional tools (figure 31) with the exception of the twine threading tool which is provided with the tying machine. The following table is a list of tools (obtainable at any local hardware supply store) required to service the tying machine.

TABLE OF MAINTENANCE TOOLS

QUANTITY	DESCRIPTION OF TOOL
1	(1) Small machinist hammer, 8 oz.
1	(4) Screwdriver, 1/8 inch flat blade
1	(2) Screwdriver, 1/4 inch flat blade
1	(3) Screwdriver, 3/16 in. flat blade
1	(5) Pliers, slip joint
1	(6) Adjustable wrench, 6 inches
1	(7) Box-end wrench set, 1/4 inch, 5/16 inch, 3/8 inch, 7/16 inch, 1/2 inch, and 9/16 inch
1	(8) 12 inch long open-end wrench, 1/2 inch
1	(9) 12 inch long open-end wrench, 9/16 inch
1	(10) Allen wrench set, 3/32 inch, 5/32 inch, 5/64 inch, 1/8 inch, and 3/16 inch
1	(11) Pin punch set, 1/8 inch and 3/16 inch
2	(12) Thin open-end offset wrench, 3/8 inch
1	(13) Heavy duty No. 54 Truarc pliers
1	(14) Small tweezers

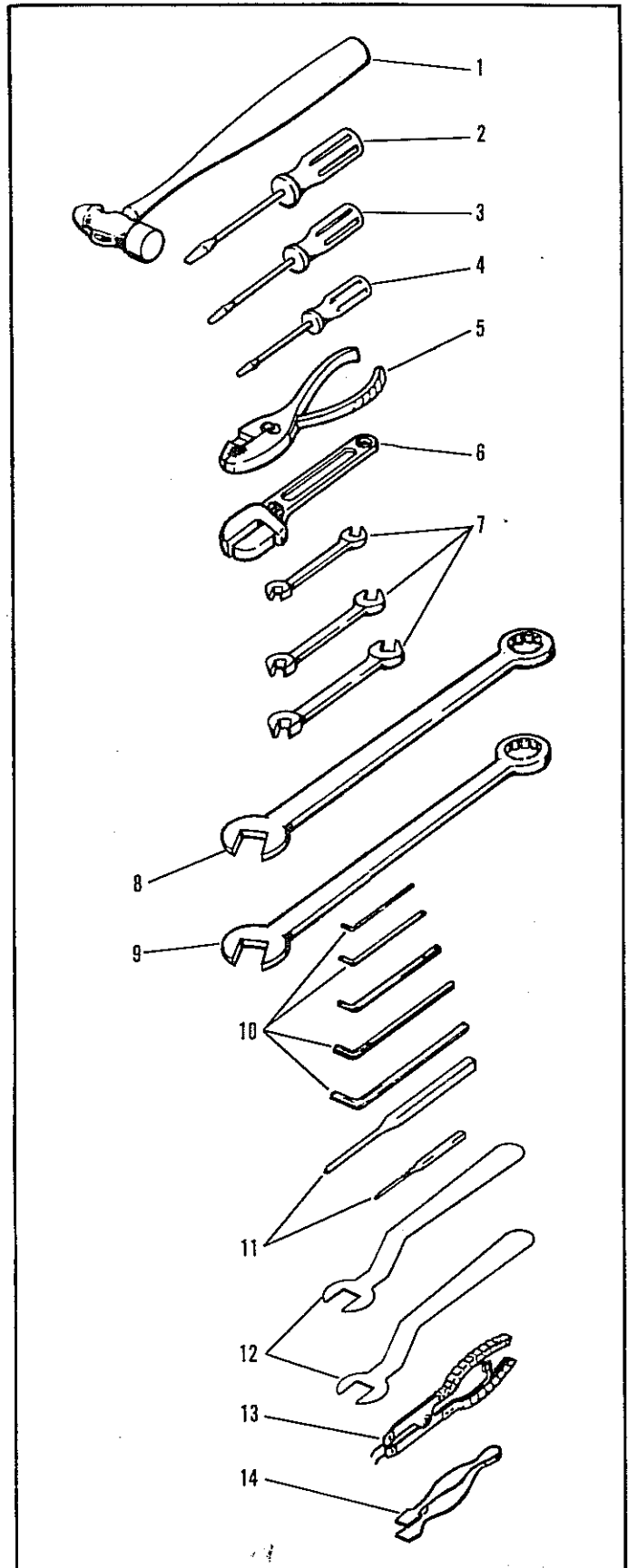


Figure 31. Maintenance Tools

PREVENTIVE MAINTENANCE PROGRAM AND SCHEDULES

A good preventive maintenance program is a major step forward to assure trouble-free tying machine operation. In order to be effective, routing inspection, lubrication, and adjustment schedules must be established and followed. The following Table of Preventive Maintenance Checks and Services and Table of Cleaning and Lubrication Requirements is provided for tying machines subjected to normal usage which is considered to be approximately 1,500

hours of operation annually. Substantial deviations from normal usage should require an adjustment in the indicated frequencies. Frequencies established in the tables are: daily (D), Monthly (M), twice monthly (SM), every third month (Q), and every two years (2A). The tables should be copied for use by maintenance personnel, to facilitate checking off each item as it is performed. These lists can then be signed and dated to serve as an accurate record of preventive maintenance work performed. Deviations from normal tying machine usage should become a part of the records for the tying machine.

TABLE OF PREVENTIVE MAINTENANCE CHECKS AND SERVICES

CHECK OR SERVICE ITEM	FREQUENCY			
	D	M	Q	2A
ELECTRICAL COMPONENTS				
1. Check electric power cord (58, figure 45) and plug. Cord should not be frayed and should be securely fastened. Plug should not be faulty.		X		
2. Check electric motor assembly (69), especially breather vents, which should be free of dirt and foreign particles.		X		
3. Operate electric motor assembly and listen for abnormal noises.	X			
4. Check condition of power switch (66) to verify that it is securely mounted and operating properly.	X			
5. Check pilot light (75) to verify that it is lit when power switch is set to "on" position.	X			
MECHANICAL COMPONENTS				
1. Operate tying machine and observe that it ties a bundle or package correctly.	X			
2. Check pressure on stringholder button (11, figure 50). Readjust if necessary. Remove lint and loose twine from stringholder button holes using a small pair of tweezers.	X			
3. Check twine (or tape) running tension. Readjust twine tension spring (24, figure 45) if necessary.		X		
4. Check condition of knife (6, figure 50). Knife should be sharp and free of knicks. Replace if necessary.	X			
5. Check for proper position of star wheel and shaft assembly (9, figure 49) gear and observe gear for excessive wear. Realign if necessary or replace as required.		X		
6. Check for general condition and excessive wear on the following and replace as required:				
a. Knotter head assembly (figure 49) parts.			X	
b. Main table assembly (figure 48) stripper parts.			X	
c. Main table assembly drawslide parts.			X	

CHECK OR SERVICE ITEM	FREQUENCY			
	D	M	Q	2A
MECHANICAL COMPONENTS (continued)				
d. Drive assembly (figure 46) chain and sprockets.			X	
e. Stringholder assembly (figure 50) parts.			X	
7. Check brake assembly (4, figure 46) for slippage. Readjust if necessary.			X	
8. Check for cracked or broken teeth on gears and sprockets (13, 17, and 20) and main gear (36). Replace as required.			X	
9. Check condition of main shaft bearings (35). Replace as required.			X	
10. Check condition of V-belt (47), V-belt tension, and evidence of slipping. Correct tension is 1/8 inch deflection. Readjust if necessary or replace as required.		X		
11. Check for correct chain (21) tension. Correct chain tension is 1/16 inch deflection. Readjust if necessary. NOTE: excessive slack in chain tension causes wear.			X	
12. Check for loose pins and set screws in gears.			X	
13. Check for wear on contact point of riser lever (24, figure 48). Replace if required.			X	
14. Check entire tying machine for loose hardware. Tighten loose hardware as required.		X		
15. Check for broken knotter flat springs (14, figure 49) and weak tension. Replace as required.		X		
16. Remove and disassemble major components of tying machine (figure 1) and examine all parts for wear. Replace parts as required.				X

TABLE OF CLEANING AND LUBRICATION REQUIREMENTS

CLEANING AND LUBRICATION ITEM	FREQUENCY	
	SM	2A
KNOTTER HEAD ASSEMBLY		
1. Apply several drops of oil (SAE 30 or equivalent) to knotter jaw (6, figure 49) roller.	X	
2. Add oil (SAE 30 or equivalent) to oil cup (16), in knotter head sub-assembly (15).	X	
3. Apply several drops of oil (SAE 30 or equivalent) to two oil holes (encircled in red) in knotter head subassembly (15).	X	
4. Apply several drops of oil (SAE 30 or equivalent) between knotter lever (8), and knotter head subassembly (15).	X	
5. Apply several drops of oil (SAE 30 or equivalent) around diameter of roller in knotter head subassembly (15).	X	

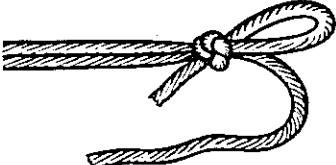
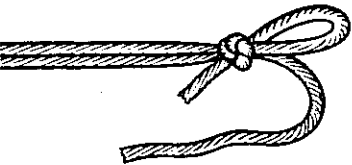
CLEANING AND LUBRICATION ITEM	FREQUENCY	
	SM	2A
STRINGHOLDER ASSEMBLY		
1. Apply several drops of oil (SAE 30 or equivalent) between knife trap rivet (8, figure 50) and knife trap lever assembly (9).	X	
2. Apply several drops of oil (SAE 30 or equivalent) between knife trap (7) and knife trap lever assembly (9).	X	
3. Apply several drops of oil (SAE 30 or equivalent) between trap screw (2) and knife trap lever assembly (9).	X	
4. Apply several drops of oil (SAE 30 or equivalent) between knife trap pivot screw (3) and knife trap (7).	X	
MAIN TABLE ASSEMBLY		
1. Apply several drops of oil (SAE 30 or equivalent) around diameter of roller in drawslide lever assembly (20, figure 48).	X	
2. Apply several drops of oil (SAE 30 or equivalent) between washer (22) and drawslide lever assembly (20).	X	
3. Apply several drops of oil (SAE 30 or equivalent) between drawslide lever assembly (20) and main table subassembly (27).	X	
4. Apply several drops of oil (SAE 30 or equivalent) to three oil holes (encircled in red) in main table subassembly (27).	X	
5. Apply several drops of oil (SAE 30 or equivalent) between stripper (3) and main table subassembly (27) so that stripper pivot pin (2) is lubricated.	X	
6. Apply several drops of oil (SAE 30 or equivalent) in two places between riser pin guide (8) and riser pin (14).	X	
7. Apply several drops of oil (SAE 30 or equivalent) between pivot screw and lever on tip-up assembly (7).	X	
DRIVE ASSEMBLY		
1. Apply a liberal coat of light weight grease to main gear (36, figure 46) flywheel land surface.	X	
2. Apply a liberal coat of light weight grease to cam brake (39) cam surface.	X	
3. Apply a liberal coat of light weight grease to knotter rack assembly (54) cam surface and teeth.	X	
4. Apply a liberal coat of light weight grease to cam riser (56) cam surface.	X	
5. Apply a liberal coat of light weight grease to cam switch (60) cam surfaces.	X	
6. Apply several drops of oil (SAE 30 or equivalent) to chain (21) rollers.	X	
BASE PARTS		
Add oil (SAE 10 or equivalent) to electric motor assembly (69, figure 45) oil cup. Do not over oil.		X

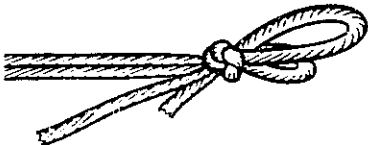
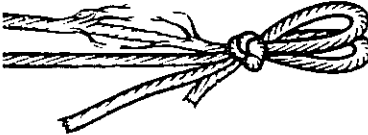
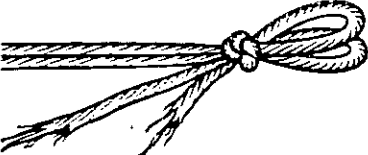


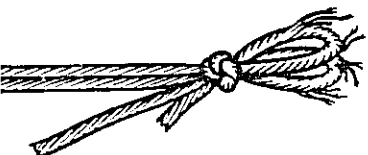
Section V / TROUBLE SHOOTING


This section of the manual contains a Table of Trouble Shooting Information for locating and correcting most of the troubles which may develop in the tying machine. The tying machine is generally trouble free. However, the tying machine suffers the usual wear and misadjustment from normal use. Careful inspection and accurate analysis of the symptoms

listed in the Table of Trouble Shooting Information will localize the trouble more quickly than any other method. This manual cannot cover all possible troubles and deficiencies that may occur, therefore, if a specific trouble is not covered herein, proceed to isolate the major component in which the trouble occurs and then isolate and correct the trouble.

TABLE OF TROUBLE SHOOTING INFORMATION

TROUBLE	POSSIBLE CAUSE	CORRECTIVE ACTION
a. Tying machine will not operate with power switch set to "on" position.	Electric power cord not plugged into receptacle. Circuit breaker tripped. Broken or disconnected circuit wire. Faulty power switch heater element. Faulty power switch.	Plug electric power cord into receptacle. Reset circuit breaker. If circuit breaker trips again, inspect and test for short in tying machine circuit or electric power cord. Correct defect as required. Repair or replace broken wire. Replace defective power switch heater element. Replace defective power switch.
b. Twine (or tape) breaks frequently in stringholder button.	Improper twine (or tape). Excessive stringholder button tension.	Use proper size of twine (or tape). Readjust stringholder button pressure.
c. Half or single loop on knot. 	Piece of twine (or tape) wrapped around stringholder button shaft, relieving tension on twine (or tape).	Depress and hold button release lever (12, figure 50) and remove bits of twine (or tape) using a small pair of tweezers. Then release button release lever.
d. One loop knot that slipt out. 	Excessive twine running tension.	Readjust to decrease twine running tension.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE ACTION
<p>e. One long and one short loop.</p> 	<p>Improper twine (or tape).</p> <p>One loop catching in back of knotter throat, improper knotter release adjustment.</p>	<p>Use proper size of twine (or tape).</p> <p>Readjust knotter release.</p>
<p>f. Break in twine in front of knot.</p> 	<p>Friction along twine (or tape) path.</p>	<p>Remove sharp edges from twine path in twine tension plate assembly, twine bracket, quill shaft, twine arm hub, twine arm assembly ring guides, drawback lever, and twine arm tip.</p>
<p>g. Ragged ends of twine at knot.</p> 	<p>Dull or knicked knife.</p>	<p>If knife is excessively knicked, replace. If knives continue being knicked, lubricate knife trap pivot points to assure that knife trap does not stick, allowing knife to remain in path of drawslide.</p>
<p>h. Loose knot and loops slightly shorter than normal.</p> 	<p>Loops release from knotter too soon, improper knotter release adjustment.</p> <p>Stripper too short.</p>	<p>Readjust knotter release.</p> <p>Replace stripper.</p>
<p>i. Short loops and tight knot.</p> 	<p>Improper balance between twine running tension and stringholder button pressure.</p>	<p>Check stringholder button pressure. Readjust twine running tension.</p>
<p>j. Cut loop ends.</p> 	<p>Stripper points shearing against side of knotter jaws when stripping.</p>	<p>Readjust stripper shear-action, bend top front end of stripper down tapping with a light hammer.</p>

TROUBLE	POSSIBLE CAUSE	CORRECTIVE ACTION
k. Very short loops and long ends. 	Knot slipping by stripper. Improper gap between stripper point and knotter. Knotter flat springs broken or weak.	Realign stripper point and knotter. Replace knotter flat springs.
l. Twine (or tape) catches in stripper.	Stripper spring broken or weak.	Replace stripper spring.
m. Twine (or tape) pulls out of stringholder button.	Twine (or tape) improperly threaded.	Check stringholder button threading and rethread if necessary.

Section VI / CORRECTIVE MAINTENANCE

This section of the manual contains instructions for adjusting, aligning, and the replacement of parts most likely to wear over an extended period of time. Should the replacement of a part be required that is not covered by instruction, it is strongly recommended that maintenance personnel carefully study the exploded views in the parts list section of this manual, then disassemble the tying machine only to the extent necessary to replace the part.

TYING MACHINE ADJUSTMENTS

TWINE OR TAPE RUNNING TENSION. Test twine by pulling a bit of twine from end of twine arm. Tension should be neither too tight nor too loose. The adjustment for twine running tension is the tension spring (figure 32) held in place by two knurled brass nuts at the back of the tying machine. To adjust, proceed as follows:

1. If tension is too tight, loosen tension spring by turning brass nuts approximately one-half turn at a time until proper tension is set.
2. If tension is too loose, tighten tension spring in same manner as above.

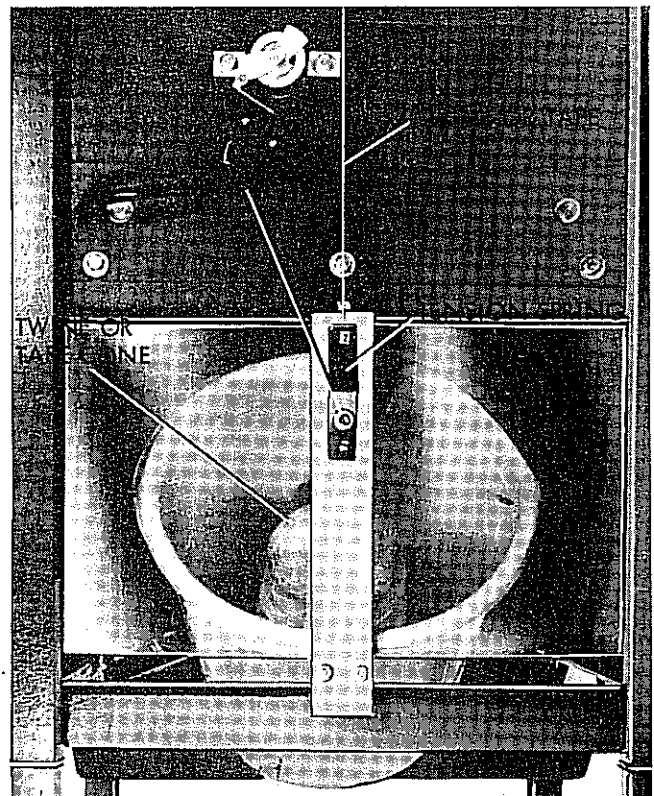


Figure 32. Twine or Tape Running Tension Adjustment

STRINGHOLDER BUTTON PRESSURE. The adjustment for the stringholder button pressure is the button adjusting nuts (figure 33) and button spring. To adjust, proceed as follows:

1. If pressure is excessive, a finished knot will have a long tail. Loosen button adjusting nuts about 1/4 turn at a time using two thin 3/8 inch open-end offset wrenches.
2. If pressure is too light, twine in button will tend to pull out. Tighten button adjusting nuts in same manner as described in step 1, above.

KNOTTER RELEASE. The adjustment for the knotter release (tightness of knotter jaws) is the knotter release post (figure 34, jam nut, and screw). To adjust, proceed as follows:

1. Hold screw in place using a screwdriver and loosen jam nut in counter-clockwise direction using a box-end wrench.
2. Slightly loosen screw in counter-clockwise direction.
3. Position a test package in tying machine and manually rotate twine arm (by hand with electric power off) through a tying cycle until a knot is formed.
4. Turn screw in clockwise direction until knotter jaws release knot, then turn screw an additional 1/4 turn clockwise.
5. Holding screw in this position, fully tighten jam nut in clockwise direction.
6. Complete tying cycle and remove test package from tying machine.

V-BELT TENSION. Test V-belt (figure 35) tension by depressing either side of V-belt at approximate center and measuring amount of deflection. Maximum deflection should be 1/8 inch. To adjust V-belt for proper tension, remove the gear box cover and left side panel on tying machine. Loosen four motor mounting screws, and proceed as follows:

1. If V-belt deflection is less than 1/8 inch (too tight), raise electric motor assembly, fully tighten four motor mounting screws, and replace left side panel and gear box cover.
2. If V-belt deflection is more than 1/8 inch (too loose), lower electric motor assembly, fully tighten four motor screws, and replace left side panel and gear box cover.

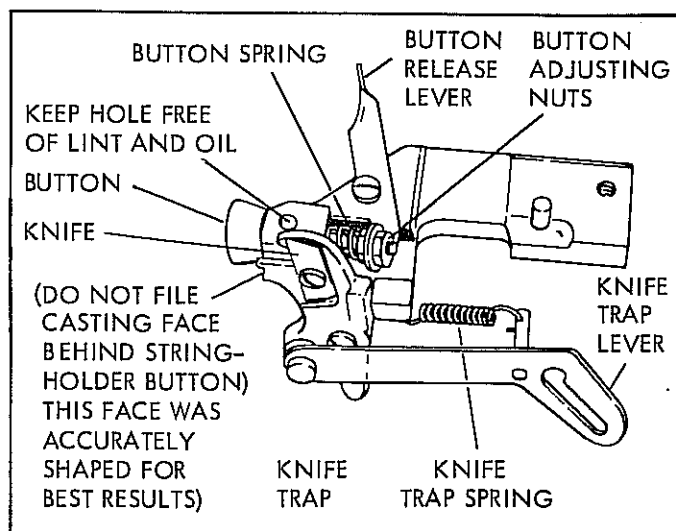


Figure 33. Stringholder Button Pressure Adjustment

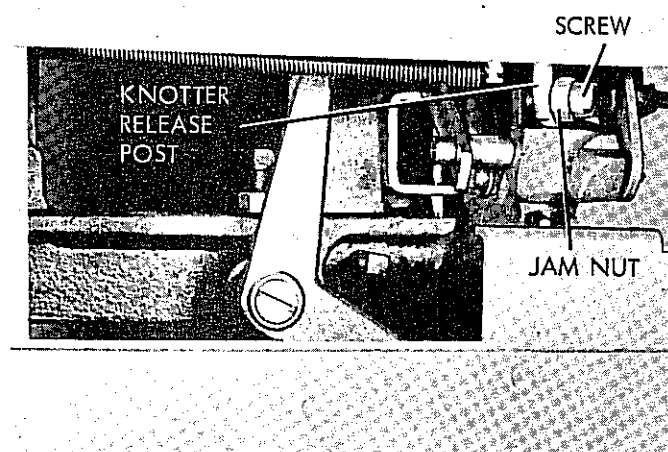


Figure 34. Knotter Release Adjustment

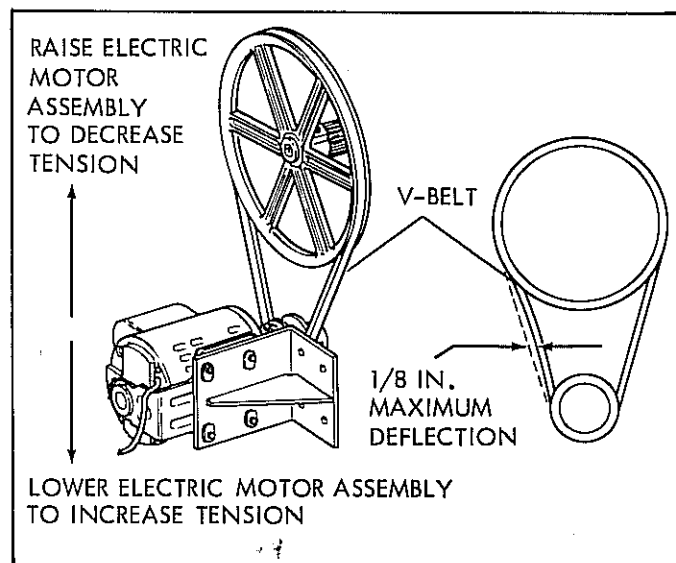


Figure 35. V-Belt Tension Adjustment

CHAIN TENSION. Test chain (figure 36) tension by depressing chain at approximate center on side opposite idler and measure amount of deflection. Maximum deflection should be 1/16 inch. To adjust chain for proper tension, proceed as follows:

1. Remove rear cover and gear box cover, and set to one side.
2. Loosen idler mounting screw.
3. Rotate twine arm in clockwise direction as viewed from front of tying machine, then back off twine arm until chain deflection is 1/16 inch.
4. Slide idler to left (as viewed from rear of tying machine) until taut and fully tighten idler mounting screw.
5. Replace gear box cover and rear cover.

STRIPPER SHEARING ACTION. Bend stripper (figure 37) slightly by tapping down or prying up, as required, on front end of stripper using a light hammer or screwdriver. Notched face in stripper should be in line with step in lower jaw of knotter as knotter draws back along side of stripper.

MICRO SWITCH MOTOR TIMING CAM MODELS 14108, 14208, 14408, 14114, 14214, 14414, 14220, AND 14420. To adjust the micro switch motor timing cam, proceed as follows:

1. Disconnect power to tying machine.
2. Remove rear cover and gear box cover from tying machine.
3. Manually rotate pulley in clockwise direction until tying machine has completed its tying cycle and tip of drawslide is aligned with outer edge of stringholder button (figure 38).
4. Loosen screw (figure 39) and position center of cam on micro switch roller. Tighten screw.
5. Replace gear box cover and rear cover.

MICRO SWITCH MOTOR TIMING CAMS MODELS 14308 AND 14508. To adjust the micro switch motor timing cams, proceed as follows:

1. Disconnect power to tying machine.
2. Remove rear cover and gear box cover from tying machine.

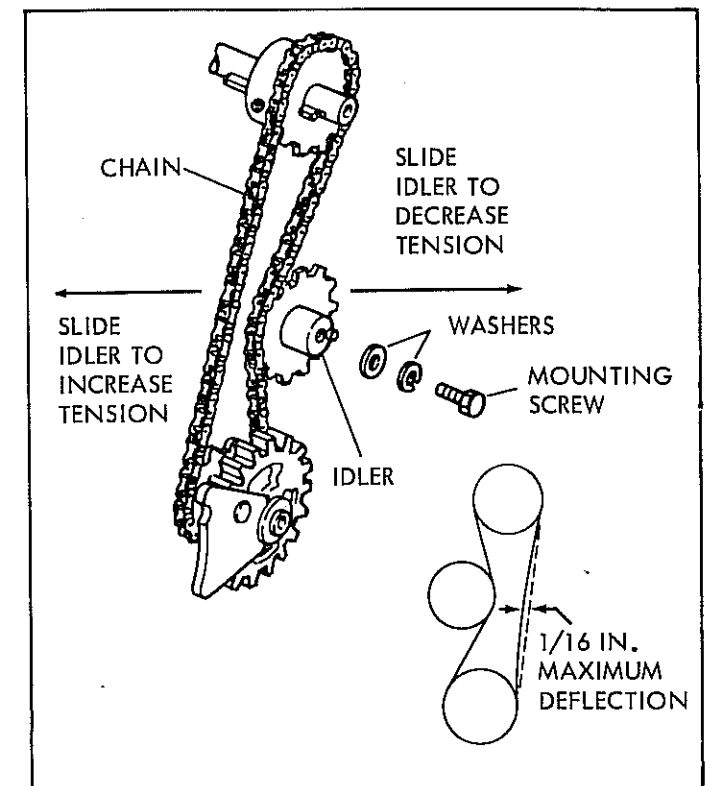


Figure 36. Chain Tension Adjustment

3. Manually rotate pulley in clockwise direction until tying machine has completed its tying cycle and tip of drawslide is aligned with outer edge of stringholder button (figure 38).
4. Loosen screw (figure 41) and position center of cam on micro switch roller. Tighten screw.
5. Manually rotate pulley in clockwise direction until inside edge of twine arm is approximately 6 inches past center of main shaft (figure 40).
6. Slightly loosen screw (figure 41) taking care not to upset position of first cam setting. Position center of second cam on micro switch roller. Tighten screw.
7. Replace gear box cover and rear cover.

TYING MACHINE ALIGNMENTS

STRIPPER POINT AND KNOTTER ALIGNMENT. Tap left side of stripper (figure 42) using a hammer if stripper is not snug against side of knotter as knotter moves back along side of stripper. A flat punch may be held against right side of stripper and tapped with a hammer to gain more force from tap of hammer, if stripper is riding on (or too tight against) side of knotter.

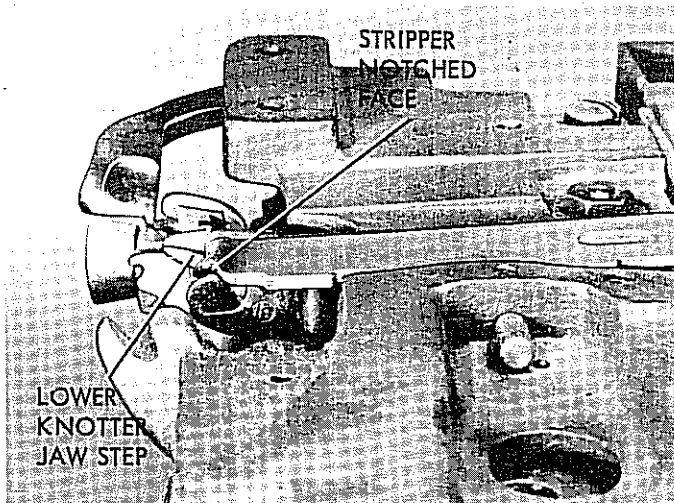


Figure 37. Stripper Shearing Action Adjustment

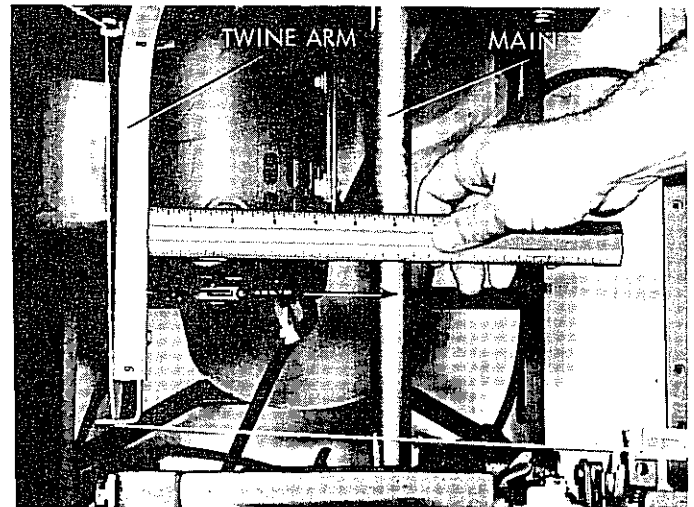


Figure 40. Aligning Twine Arm with Main Shaft

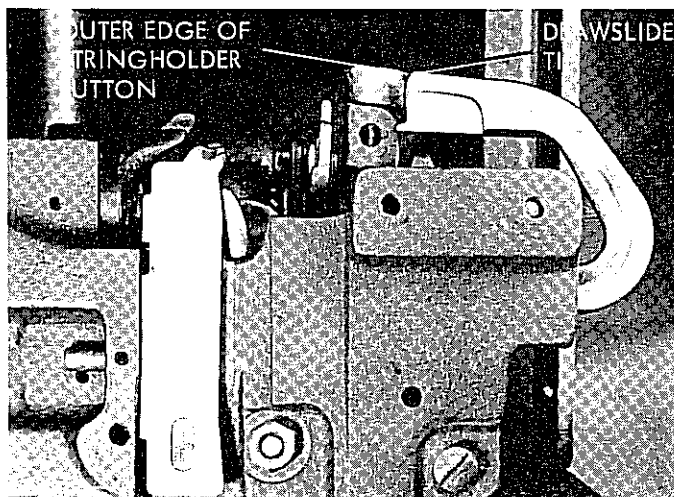


Figure 38. Aligning Drawslide with Stringholder Button

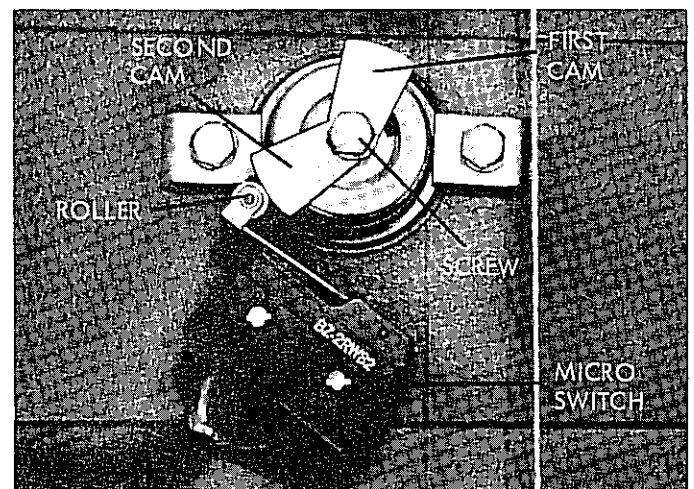


Figure 41. Micro Switch Roller and Motor Timing Cams Alignments for Models 14308 and 14508

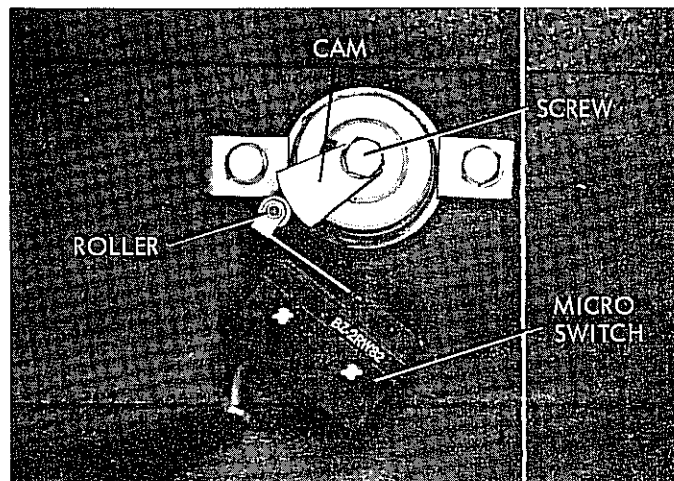


Figure 39. Micro Switch Roller and Motor Timing Cam Alignment for Models 14108, 14208, 14408, 14114, 14220, and 14420

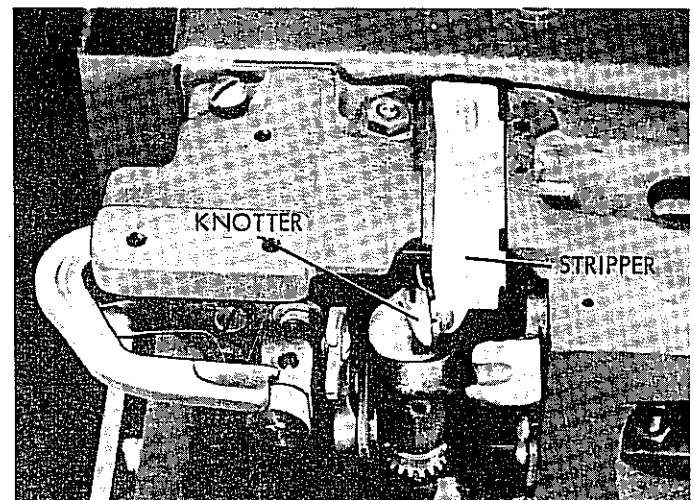


Figure 42. Stripper Point and Knotter Alignment

KNOTTER TIMING. Knotter is timed correctly when the two taper pins (figure 43) in the miter gears are parallel to each other, with knotter roller at bottom of cam, and knotter jaws are pointing straight ahead. Observe position of teeth on star wheel and shaft assembly. Star wheel contains seven uniform teeth and one slightly beveled. When timed properly, beveled tooth will be slightly to right of center line at 5 o'clock as shown in figure 43. If beveled tooth is not in correct position, remove taper pin and miter gear, located at end of star wheel and shaft assembly, and time correctly. It is possible to get knotter back in time without removing knotter head assembly from tying machine. Insert a screw driver between knotter lever and stop stud and pry knotter lever open so that the knotter may be turned back into position. If knotter holds loops of knot and fails to release after tying cycle, readjust knotter release in accordance with instructions in this section of the manual.

DEFECTIVE PARTS REPLACEMENT

KNIFE. To replace a defective knife in the string-holder assembly, proceed as follows:

1. Disconnect power to tying machine.
2. Depress and hold knife trap (7, figure 49).
3. Remove screw (5) and defective knife (6) from knife trap (7).
4. Position new knife (6) in knife trap (7) and secure with screw (5).
5. Release knife trap (7).

KNOTTER BODY ASSEMBLY. To replace a defective knotter body assembly in the knotter head assembly, proceed as follows:

1. Disconnect power to tying machine.
2. Remove front panel and right side panel.
3. Remove screws (1 and 2, figure 44) and stringholder assembly from tying machine.
4. Loosen setscrew (3, figure 44) and screw (4, figure 44) securing knotter pivot assembly (5, figure 44) to mounting block. Slip knotter pivot assembly from mounting block and remove knotter head assembly (1, figure 43) from tying machine.

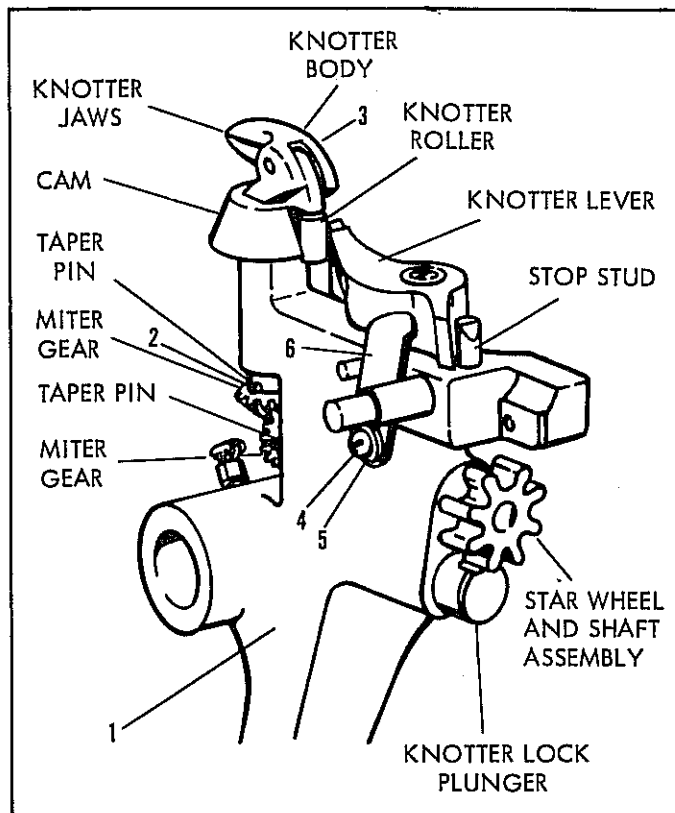


Figure 43. Knotter Timing

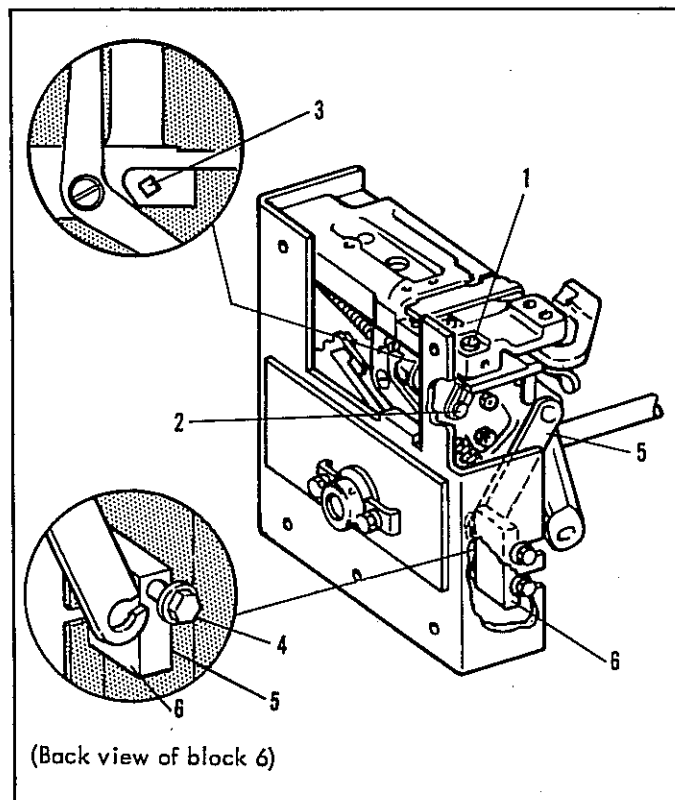


Figure 44. Housing Assembly

5. Remove taper pin (2, figure 43) securing knotter body assembly (3) in knotter head assembly.

6. Position a new (or repaired) knotter body assembly in the head assembly and secure with taper pin (2).

NOTE

Check the condition of the two flat springs (6, figure 43), and replace if broken or weak.

7. Replace knotter head assembly in tying machine and secure pivot assembly to mounting block. Tighten setscrew (3, figure 44).

8. Replace stringholder assembly and secure with screws (1 and 2, figure 44).

9. Replace side and front panels.

KNOTTER FLAT SPRING. To replace defective knotter head assembly proceed as follows:

1. Follow steps 1 through 4 for removing knotter body assembly.

2. Remove screw (4, figure 43), flat washer (5), knotter flat springs (6) from knotter head assembly.

3. Position new knotter flat springs on knotter head assembly and replace head assembly in tying machine. Follow steps 7, 8, and 9 in knotter body assembly copy above.

MOTOR TIMING CAM (OR CAMS). To replace a defective motor timing cam (or cams) in the drive assembly, proceed as follows:

1. Disconnect power to tying machine.

2. Remove back cover from tying machine.

3. Remove screw (53, figure 45), washer (15), and cam (52) from main shaft (41).

4. Position cam (52) on main shaft (41) and secure with washer (15) and screw (53).

5. Adjust cam (or cams) in accordance with appropriate "Micro-Switch Motor Timing Cam(s)" paragraph in this manual.

6. Replace back cover on tying machine.

SWITCH HEATER. To replace a defective switch heater in the power switch, proceed as follows:

1. Disconnect power from tying machine.

2. Remove screws, nameplate, switch box cover (64, figure 44), and gasket from switch box assembly (65).

3. Pull switch heater (67) out of power switch (66).

4. Slide new switch heater (67) into power switch (66).

5. Position gasket, switch box cover (64), and nameplate over power switch (66) and secure with screws.

POWER SWITCH. To replace a defective power switch in the electrical system installation, proceed as follows:

1. Disconnect power from tying machine.

2. Remove screws, nameplate, switch box cover (64, figure 44), and gasket from switch box assembly (65).

3. Remove screws securing power switch (66) to switch box assembly (65).

4. Loosen screws connecting electric power cord assembly (63) and electric power cord assembly (73) wire leads to power switch (66).

5. Connect electric power cord assembly (63) and electric power cord (73) wire leads to new power switch (66) in accordance with wiring instructions in this manual.

6. Secure power switch (66) to switch box assembly with screws.

7. Position gasket, switch box cover (64), and nameplate over power switch (66) and secure with screws.

RELAY ASSEMBLY. To replace a defective relay assembly in the electrical system installation, proceed as follows:

1. Disconnect power to tying machine.

2. Remove front panel.

3. Remove screws and junction box cover (61, figure 44) from junction box assembly (62).

4. Loosen screws connecting electric cord assembly (59), power cord assembly (58), electric assembly cord (63) electric assembly cord (68), electric assembly cord (70) wire leads, and terminal block jumper leads to relay assembly (60).

5. Remove screw relay assembly (60), washer, and nut from junction box assembly (62).

6. Secure new relay assembly (60) to junction box assembly (62) with screw, washer, and nut.

7. Connect electric cord assembly (70), electric cord assembly (68) electric cord assembly (63), power cord assembly (58), electric cord assembly (59) wire leads, and terminal block jumper leads to new relay assembly (60) in accordance with wiring instructions in this manual.

8. Position junction box cover (61) over junction box assembly (62) and secure with screws.

9. Replace front panel.

ELECTRIC MOTOR ASSEMBLY. To replace a defective electric motor assembly in the electrical system installation, proceed as follows:

1. Disconnect power from tying machine.

2. Remove screws (8, figure 45) and back table assembly (9) from twine arm.

3. Remove gear box cover.

4. Manually rotate twine arm until it is out of way of electric motor assembly (69).

5. Disconnect electric cord assembly (68) wire leads connected to relay assembly (60).

6. Remove screws (12), washers (13 and 14), and electric motor assembly (69) from motor mounting bracket assembly (42) taking care to work V-belt (47, figure 46) off of electric motor sheave (46).

7. Carefully lower new electric motor assembly (69) into position on motor mounting bracket assembly (42), taking care to work V-belt (47, figure 46) into electric motor sheave (46), and secure to

motor mounting bracket using screws (12, figure 45), and washers (13 and 14).

8. Adjust V-belt tension in accordance with instructions in this manual.

9. Connect electric cord assembly (68) wire leads to relay assembly (60).

10. Position back table assembly (9) on twine arm and secure with screws (8).

11. Replace gear box cover.

V-BELT. To replace a defective V-belt in the drive assembly, proceed as follows:

1. Disconnect power to tying machine.

2. Remove gear box cover and left side panel.

3. Loosen screws (12, figure 45) securing electric motor assembly (69) to motor mounting bracket (42).

4. Carefully raise electric motor assembly and work V-belt (47, figure 46) off of electric motor sheave (46).

5. Remove screws (31) and washers (32) securing pulley shaft (48) to front plate assembly (1) and rear plate assembly (25), and carefully pull pulley assembly (44) and V-belt out from between front plate and rear plate assemblies.

6. Position new V-belt (47) on pulley assembly (44) and guide pulley assembly through front and rear plate assemblies.

7. Carefully align pulley assembly (44) and secure pulley shaft (48) to front plate assembly (1) and rear plate assembly (25) with washers (32) and screws (31).

8. Raise electric motor assembly (69, figure 45) and carefully work new V-belt (47, figure 46) onto electric motor sheave (46).

9. Adjust V-belt tension in accordance with instructions in this manual.

10. Replace left side panel and gear box cover.

Section VII / PARTS LIST

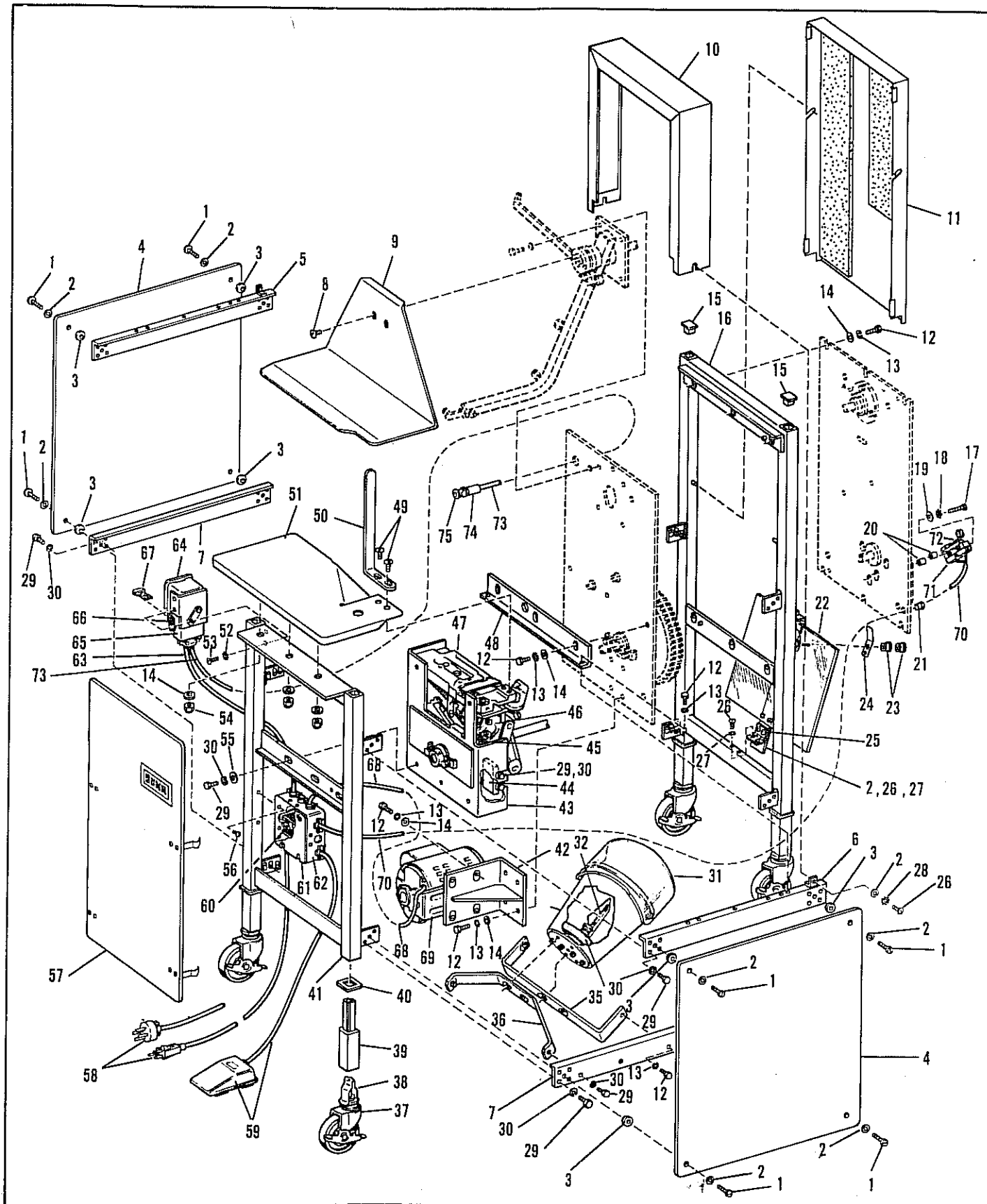


Figure 45. Base Parts and Electrical System Installation

Section VII / PARTS LIST

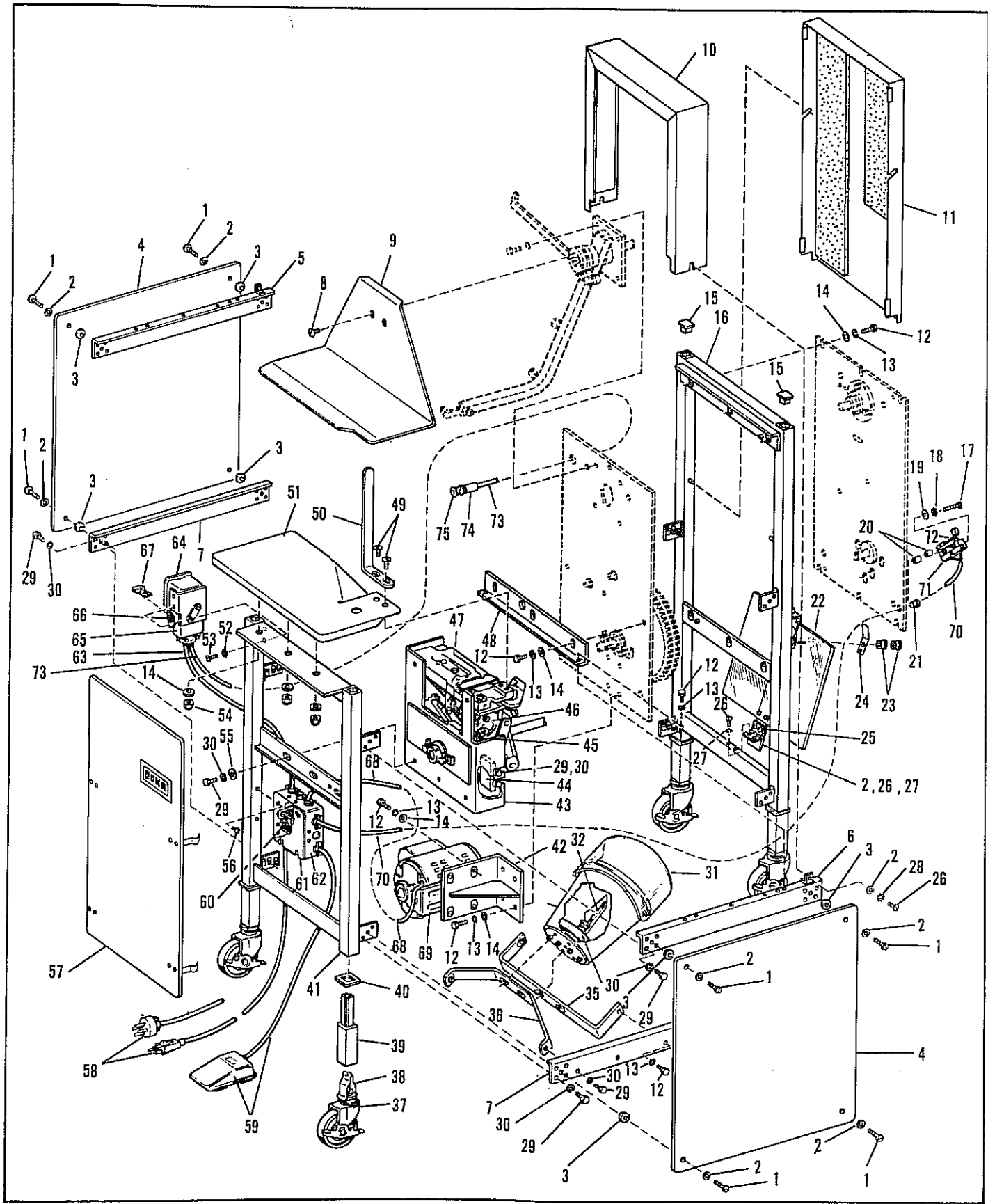


Figure 45. Base Parts and Electrical System Installation

Base Parts and Electrical System Installation

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
1	*	Screw-Machine, pan head 10-24 x 1 in. long	8	11	109023	Rear Cover	1
2	*	Washer-Flat, No. 10	12	12	*	Screw-Cap, hex head, 1/4- 20 x 5/8 in. long	AR
3	*	Spacer (3/8 in. faucet washer)	8	13	*	Washer-Lock, split, 1/4 in.i.d.	AR
4	038061	Side Panel (Models 14108, 14208, 14308, 14408, & 14508)	2	14	*	Washer-Flat, 5/8 in. o.d. x 9/32 in. i.d. x 1/16 in. thk.	AR
	038065	Side Panel (Models 14214 & 14414)	2	15	081064	Plug-Rear frame tube	2
	038023	Side Panel (Models 14220 & 14420)	2	16	001066	Rear Frame Assembly	1
5	068004	Angle Frame Assy.-Upper, left hand (Models 14108, 14208, 14308, 14408 & 14508)	1		001128	Rear Frame Assy. (Model 14000 Series)	1
	068086	Angle Frame Assy.-Upper, left hand (Models 14214 & 14414)	1	17	*	Screw-Machine, round head, 10-24 x 1/2 in. long	2
	068080	Angle Frame Assy.-Upper, left hand (Models 14220 & 14420)	1	18	*	Washer-Lock, external tooth, No. 6	2
6	068041	Angle Frame Assy.-Upper, right hand (Models 14108, 14208, 14308, 14408 & 14508)	1	19	*	Washer-Flat, No. 6, 3/8 in. o.d. x 5/8 in. i.d. x 3/64 in. thk.	2
	068043	Angle Frame Assy.-Upper, right hand (Models 14214 & 14414)	1	20	126032	Spacer-Micro switch	2
	068062	Angle Frame Assy.-Upper, right hand (Models 14220 & 14420)	1	21	013033	Bushing-Nylon	1
7	068037	Angle Frame-Lower, right and left hand (Models 14108, 14208, 14308, 14408, and 14508)	2	22	130105	Twine Tension Assy.(Used with twine)	1
	068077	Angle Frame-Lower, right and left hand (Models 14214 & 14414)	2		130104	Twine Tension Assy.(Used with tape)	1
	068039	Angle Frame-Lower, right and left hand (Models 14220 & 14420)	1	23	*	Nut-Knurled, 12-24 NC, brass	2
8	*	Screw-Machine, truss head, 1/4-20 x 3/8 in. long	2	24	074001	Spring-Twine tension (Used on 130105)	1
9	010058	Back Table Assy.(Models 14108, 14208, 14308, 14408, & 14508)	1		074023	Spring-Tape tension (Used on 130104)	1
	010059	Back Table Assy. (Models 14214 & 14414)	1		100043	Catch	1
	010060	Back Table Assy. (Models 14220 & 14420)	1		130100	Plate-Twine tension, plastic	1
10	034028	Gear Housing Cover	1	25	101006	Plate Hinge-Twine tension assy.	1
				26	*	Screw-Machine, round head, 10-24 x 1/2 in. long	AR
				27	*	Washer-Lock, split, No. 10	AR
				28	*	Washer-Lock, external tooth, No. 10	AR
				29	*	Screw-Cap, hex head, 5/16-18 x 3/4 in. long	AR
				30	*	Washer-Lock, split, 5/16 in.	AR
					110018	Twine Container Assembly	1
				31	037019	Shield-Twine container	1
				32	070002	Pilot Assy.-Twine cone	1
				33	077027	Pad	1
				34	110010	Container-Twine	1
				35	084008	Support-Upper, twine container	1
				36	084009	Support-Lower, twine container	1
				37	135002	Caster Assy.-Equipped with side brake	4
				38	135001	Socket-Caster	4
				39	006042	Leg Extension Assy.(Used on 002036)	4

* Items marked with an asterisk may be purchased from a local hardware supplier.
Items marked "AR" indicate "As Required".

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 126032, Spacer-Micro Switch (1) for Model 14108, serial number 128.

Base Parts and Electrical System Installation (continued)

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
40	094013	Ring Trim (Used on 002036)	4		050105	Junction Box Assembly (220 volt, 50 cycle electrical system)	1
41	002027	Front Frame Assembly	1		050041	Electric Cord Assy.-Junction box to power switch (110 volt, 60 cycle electrical system)	1
	002036	Front Frame Assy.(Early Model 14000 Series) use with leg ext. (006042)	1	63	050104	Electric Cord Assy.-Junction box to power switch (220 volt, 50 cycle electrical system)	1
42	025131	Bracket Assy.-Motor mounting	1		050062	Cover-Switch box (Used on 050099)	1
43	034032	Housing - Main Table Assembly	1		050065	Cover-Switch box (Used on 050108)	1
44	025172	Mounting Block-Knotter pivot Assy.	1	65	050099	Switch Box Assy.(Used on 110 volt, 60 cycle electrical system)	1
	**008037	Tying Unit-Regular light	1		050108	Switch Box Assy.(Used on 220 volt, 50 cycle electrical system)	1
45	**017040	Knotter Head Assy. (See figure 48 for parts breakdown)	1	64	050066	Switch-Toggle, power (Used on 110 volt, 60 cycle electrical system)	1
46	**030051	Stringholder Assy. (See figure 49 for parts breakdown)	1		050130	Switch-Toggle, power (Used on 220 volt, 50 cycle electrical system)	1
47	**008032	Main Table Assy. (See figure 47 for parts breakdown)	1	67	050051	Heater-Toggle switch (Used on 050066)	1
48	085119	Bracket-Front	1		050075	Heater-Toggle switch (Used on 050130)	1
49	*	Screw-Machine, truss head, 1/4-20 x 1/2 in. long	2	68	050040	Electric Cord Assy.-Junction box to electric motor (110 volt, 60 cycle electrical system)	1
50	127028	Standard	1		050103	Electric Cord Assy.-Junction box to electric motor (220 volt, 50 cycle electrical system)	1
51	007032	Front Table Assy.-Split type	1	69	039015	Motor Assy.-Electric, 110 volts alternating current, single-phase, 60 cycles, 1/4 hp, 1725 rpm (110 volt, 60 cycle electrical system)	1
	007053	Front Table Assy-Newspaper type	1		039016	Motor Assy.-Electric, 220 volts alternating current, single-phase, 50 cycles, 1/4 hp, 1425 rpm (220 volt, 50 cycle electrical system)	1
	007055	Front Table Assy-Laundry type	1		050039	Electric Cord Assy.-Junction box to micro switch	1
52	*	Washer-Lock, external tooth, No. 8	2	71	050050	Cover-Micro switch	1
53	*	Screw-Machine, round head, 8-32 x 1/2 in. long	2	72	050049	Micro Switch	1
54	*	Nut-Stop, 1/4-20	3	73	050071	Electric Cord Assy.-Power switch to pilot light	1
55	*	Washer-Flat, 11/16 in. o.d. x 11/32 in. i.d. x 1/16 in. thk.	3	74	050068	Insulator Tubing	1
56	*	Screw-Self tapping, round head, 10-24 x 1/2 in. long	2	75	050084	Pilot Light Assy.-Power-on indicator (110 volt, 60 cycle electrical system)	1
57	038063	Front Panel Assembly	1		050074	Pilot Light Assy.-Power-on indicator (220 volt, 50 cycle electrical system)	1
58	050038	Power Cord Assy.-Power supply source to junction box (Used on 110 volt, 60 cycle electrical system)	1				
	050101	Power Cord Assy.-Power supply source to junction box (Used on 220 volt, 50 cycle electrical system)	1				
	050131	Receptacle-Electrical, 4-prong (Used on 050101)	1				
59	050080	Foot Pedal Switch & Cord Assy.-	1				
60	050060	Relay (Used on 110 volt, 60 cycle electrical system)	1				
	050061	Relay (Used on 220 volt, 50 cycle electrical system)	1				
61	125010	Cover w/Diagram-Junction Box (110V-60 cycle electrical system)	1				
	125015	Cover w/Diagram-Junction Box (220V-50 cycle electrical system)	1				
62	050098	Junction Box Assembly (110 volt, 60 cycle electrical system)	1				

* Item marked with an asterisk may be purchased from a local hardware supplier.

** Tying unit for 8-10 ply cotton twine.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 126032, Spacer-Micro Switch (1) for Model 14108, serial number 128.

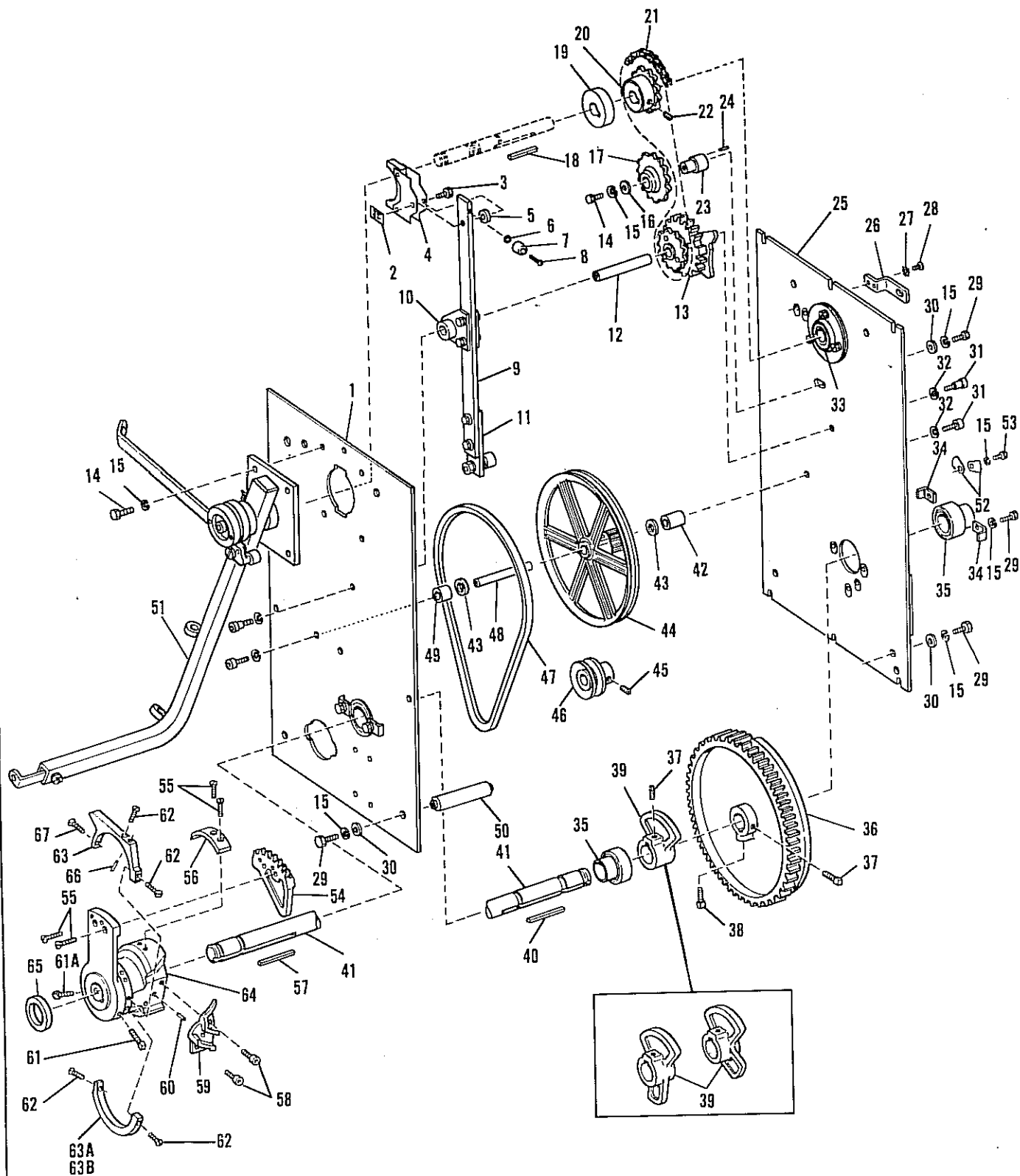


Figure 46. Drive Assembly

Drive Assembly

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
	062014	Drive Assy. (Model 14108, fixed back table)	1	13	020106	Gear Assy.-Chain (Used on Models 14108, 14208, 14308, 14214, & 14220)	1
	062012	Drive Assy. (Model 14108, loose back table)	1		020107	Gear Assy.-Chain (Used on Models 14408, 14508, 14414, & 14420)	1
	062001	Drive Assy. (Model 14208, loose back table)	1	14	*	Screw-Cap, hex head, 1/4-20 x 1/2 in. long	1
	062015	Drive Assy. (Model 14208, fixed back table)	1	15	*	Washer-Lock, split, 1/4 in.	14
	062013	Drive Assy. (Model 14308, loose back table)	1	16	*	Washer-Flat, 7/8 in. o.d. x 9/32 in. i.d. x 1/16 in. thk.	1
	062016	Drive Assy. (Model 14308, fixed back table)	1	17	020161	Sprocket-18 teeth	1
	062002	Drive Assy. (Model 14408, loose back table)	1	18	083086	Key	1
	062017	Drive Assy. (Model 14408, fixed back table)	1	19	034027	Hub-Brake (Use 2 each screw-set, socket head, cup point, 2-1/4-20 NC x 3/8 in. long)	1
	062022	Drive Assy. (Model 14508, loose back table)	1	20	020097	Sprocket, 15 teeth (Used on Models 14108, 14208, 14308, 14214, & 14220)	1
	062023	Drive Assy. (Model 14508, fixed back table)	1		020091	Sprocket-12 teeth (Models 14408, 14508, 14414, & 14420)	1
	062026	Drive Assy. (Model 14114)	1	21	135003	Chain-Roller, 23-1/2 links with connecting link, No. 40, 1/2 in. long	1
	062018	Drive Assy. (Model 14214)	1		*	Screw-Set, socket head, cup point, 1/4-20 NC x 3/8 in. long	1
	062019	Drive Assy. (Model 14414)	1	22	*	Screw-Set, socket head, cup point, 1/4-20 NC x 3/8 in. long	1
	062027	Drive Assy. (Model 14120)	1	23	012099	Shaft (Models 14108, 14208, 14308, 14214, & 14220)	1
	062020	Drive Assy. (Model 14220)	1		012101	Shaft (Models 14408, 14508, 14414, & 14420)	1
	062021	Drive Assy. (Model 14420)	1	24	*	Pin-Groove, type 4, 3/16 in. dia. x 3/8 in. long	1
1	130109	Front Plate Assembly	1	25	130108	Rear Plate Assembly	1
	014005	Brake Arm Assy. (Models 14108, 14208, 14308, 14214, & 14220)	1	26	070039	Guide-Twine	1
	014007	Brake Arm Assy. (Models 14408, 14508, 14414, & 14420)	1	27	*	Washer-Lock, split, No. 10	1
2	*	Clip-Speed, flat 5/16-18	1	28	*	Screw-Machine, round head, 10-24 x 1/2 in. long	1
3	*	Screw-Cap, hex head, 5/16-18 x 7/8 in. long	1	29	*	Screw-Cap, hex head, 1/4-20 NC x 3/4 in. long	9
4	014006	Brake Shoe Assembly	1	30	*	Washer-Flat, 5/8 in. o.d. x 9/32 in. i.d. x 1/16 in. thk.	9
5	126030	Spacer-Brake shoe support	1	31	*	Screw-Shoulder, 3/8 in. dia. x 1/2 in. long	7
6	*	Washer-Flat, 1/2 in. o.d. x 13/64 in. i.d. x 3/64 in. thk.	1	32	*	Washer-Lock, split, 3/8 in.	5
7	100053	Bumper-Rubber	1	33	013031	Bearing-Ball, quill shaft	1
8	*	Screw-Machine, round head, slotted, 8/32 x 3/4 in. long	1	34	100045	Clip-Bearing retainer	4
9	032056	Lever-Brake	1	35	013030	Bearing, Ball, main shaft	2
10	011012	Pivot Assy.-Brake (Used on 014005)	1	36	020108	Main Gear (Models 14108 & 14114)	1
	011013	Pivot Assy.-Brake (Used on 014007)	1		020095	Main Gear (Models 14208, 14308, 14408, 14508, 14214, 14414, 14220, 14420)	1
11	025143	Bracket-Roller adjustment	1				
12	126013	Shaft-Chain gear	1				

* Items marked with an asterisk may be purchased from a local hardware supplier.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 014005, Brake Arm Assy. (1) for Model 14108 serial number 128.

Drive Assembly (continued)

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
37	*	Screw-Set, square head, cup point, 5/16-18 NC x 1/2 in. long	2		009049	Cam-Motor timing (Models 14308 & 14508)	
38	*	Screw-Set, square head, cup point, 5/16-18 NC x 5/8 in. long	1	53	*	Screw-Cap, hex head, 1/4-20 NC x 1/2 in. long	
39	009039	Cam-Brake (Models 14108, 14208, 14408, 14214, 14414, 14220, & 14420)	1	54	020100	Rack Assy.-Knotted cam and pins	
	009040	Cam-Brake (Model 14308)	1	55	*	Screw-Machine, flat head, 12-24 NC x 3/4 in. long	
	009067	Cam-Brake (Model 14508)	1	56	**009015	Riser-Cam, long	
40	*	Key-Main gear and brake cam 1/4 in. x 1/4 in. x 2-1/2 in. long	1	57	083057	Key-Cam assy., 1/4 in. x 1/4 in. x 3-3/8 in. long	
41	012074	Shaft-Main (Models 14108, 14208, & 14308)	1	58	*	Screw-Socket head, cap 1/4 20NC x 5/8" long	
	012078	Shaft-Main (Models 14408 & 14508)	1	59	009025	Switch-Cam	
	012075	Shaft-Main (Models 14214 & 14114)	1	60	*	Pin-Groove, type 2, 1/8 in. dia. x 1/2 in. long	
	012079	Shaft-Main (Model 14414)	1	61	*	Screw-Set, square head, cup point, 5/16-18NC x 1-1/4 in. long	
	012076	Shaft-Main (Model 14220)	1	61-A	*	Screw-Set, square head, cup point, 5/16-18NC x 1-1/2 long	
	012080	Shaft-Main (Model 14420)	1	62	*	Screw-Machine, flat head, 10-24 NC x 1 in. long	
42	126015	Spacer-Pulley	1	63	009079	Cam Drawslide-Top (Models 14108, 14208, 14308, 14408, 14508, 14114, 14214, 14414, 14120, 14220, 14420)	
43	100055	Washer-Thrust, 3/4 in. o.d. x 1/2 in. i.d. x 1/16 in. thk.	2	63-A	009034	Cam Drawslide-Bottom (Models 14108, 14114, 14120)	
44	019038	Pulley Assembly-V-belt	1	63-B	009080	Cam Drawslide-Bottom (Models 14208, 14308, 14408, 14508, 14214, 14414, 14220, 14420)	
45	*	Screw-Set, socket head, cup point, 5/16-18 NC x 7/16 in. long	1	64	009064	Cam Wheel	
46	019004	Sheave-Electric motor	1	65	126048	Spacer-Cam drawslide	
47	040005	V-Belt-Drive (4 L Section, 34 inch outside circumference)	1	66	*	Pin-Groove, Type-2, 3/16 in. dia. x 78 in. long	
48	126018	Shaft-Pulley	1	67	*	Screw-Machine, flat head, 10-24 NC x 5/8 in. long	
49	126016	Spacer-Pulley	1				
50	126044	Spacer-Gear box	4				
51		Twine Arm & Drawback Lever Assy. (See Figure 46 for parts breakdown)	1				
52	009049	Cam-Motor timing (Models 14108, 14208, 14408, 14214, 14414, 14220, & 14420)	1				

* Items marked with an asterisk may be purchased from a local hardware supplier.

** For 8-10 ply cotton twine.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 014005, Brake Arm Assy. (1) for Model 14108 serial number 128.

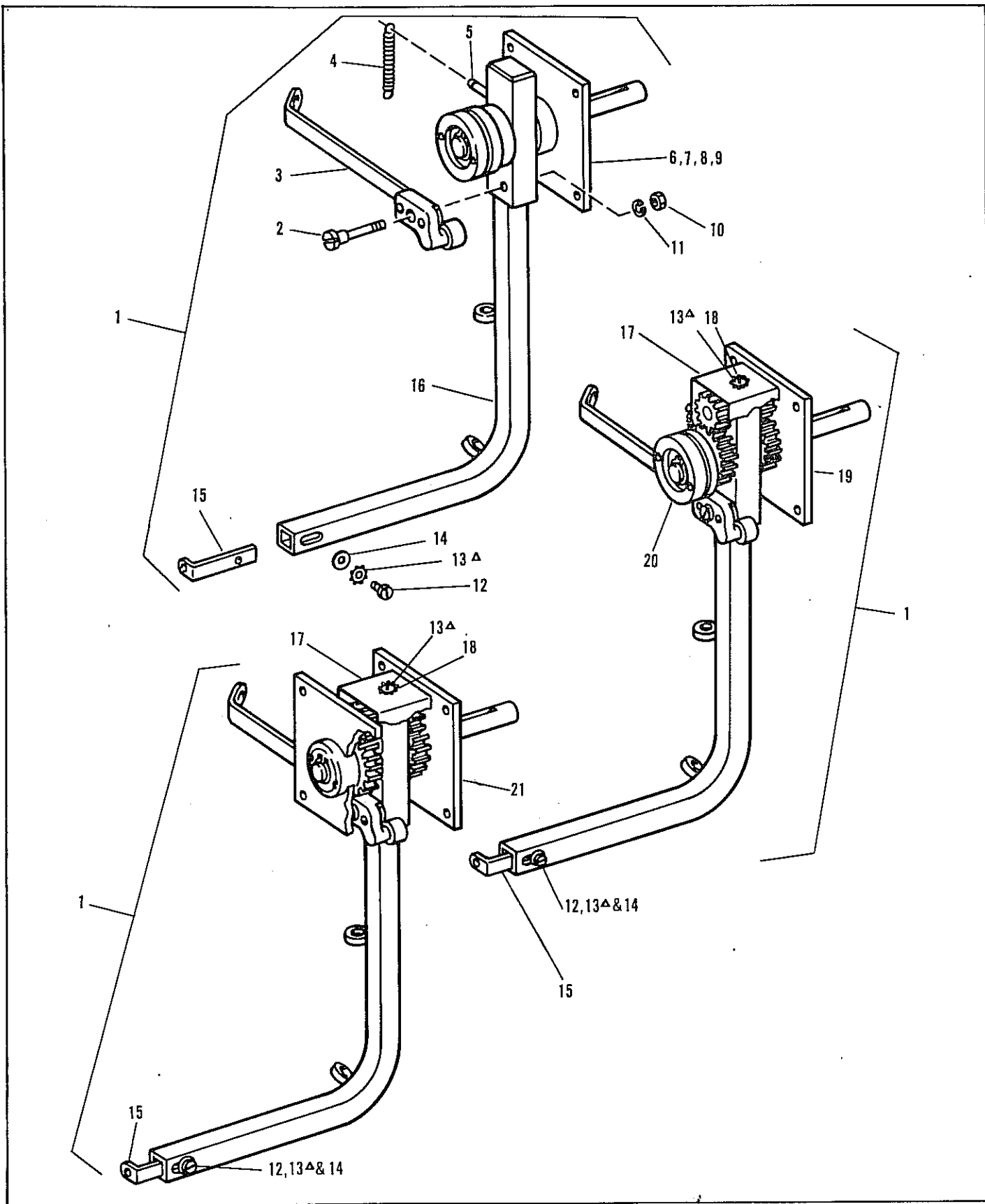


Figure 47. Twine Arm and Drawback Lever Assemblies

Twine Arm and Drawback Lever Assemblies

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
1	041007	Twine Arm & Drawback Lever Assy.-(Used on loose back table Models 14108, 14208, 14308, 14408, & 14508)	1	7	100051	Retaining Ring	2
	041014	Twine Arm & Drawback Lever Assy.-(Used on late fixed back table back geared Models 14108, 14208, 14308, 14408 & 14508)	1	8	100038	Washer-Thrust, 1-1/2 o.d. x 3/4 i.d. x 0.062 in. thk.	2
	041001	Twine Arm & Drawback Lever Assy.-(Used on early fixed back table back geared Models 14108, 14208, 14308, 14408, & 14508)	1	9	013037	Washer-Thrust, Torrington part number TRA-1220	2
	041002	Twine Arm & Drawback Lever Assy.-(Used on fixed back table back geared Models 14214 & 14414)	1	10	*	Nut-Hex, 5/16-24 UNF	1
	041003	Twine Arm & Drawback Lever Assy.-(Used on fixed back table back geared Models 14220 & 14420)	1	11	*	Washer-Lock, split, 5/16 in.	1
2	100040	Screw-Pivot, drawback lever	1	12	*	Screw-Pan head, 10-32 NF x 3/8 in. long	1
3	034047	Hub & Bearing Assy.-(Used on twine arm and drawback lever assy 041007)	1	13 Δ	*	Washer-Lock, external tooth, No. 10, Shakeproof part number 1110-00 (see Δ below)	1
4	074018	Spring-Drawback lever	1	14	*	Washer-Flat, SAE No. 10, 1/2 o.d. x 7/32 i.d. x 3/64 in. thk.	1
5	*	Pin-Groove, type 7, 3/16 in. dia. x 1-1/4 in. long	1	15	033049	Tip, Twine guide	1
6	034048	Hub & Bearing Assy.-(Used on twine arm and drawback lever assy 041007)	1	16	035028	Twine Arm Assy. -(Used on 041007)	1
				17	132068	Guard (Used on 041002 & 041003)	1
				18	*	Screw-Machine, round head, 10-32 NF x 1/4 in. long (Used on 041001, 041002, 041003, & 041014)	1
				19	034046	Gear Plate & Bearing Assy.-(Used on 041002 & 041003)	1
				20	034045	Hub & Bearing Assy.-(Used on 041002 & 041003)	1
				21	034108	Gear Plate & Bearing Assy.-(Used on 041001)	2

* Items marked with an asterisk may be purchased from a local hardware supplier.

Δ Items marked with a triangle use a quantity of 1 each for twine arm and drawback lever assembly 041007 and a quantity of 2 each for twine arm and drawback lever assemblies 041001, 041002, 041003, and 041014.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 074018, Spring-Drawback lever (1) for all models, serial number 128.

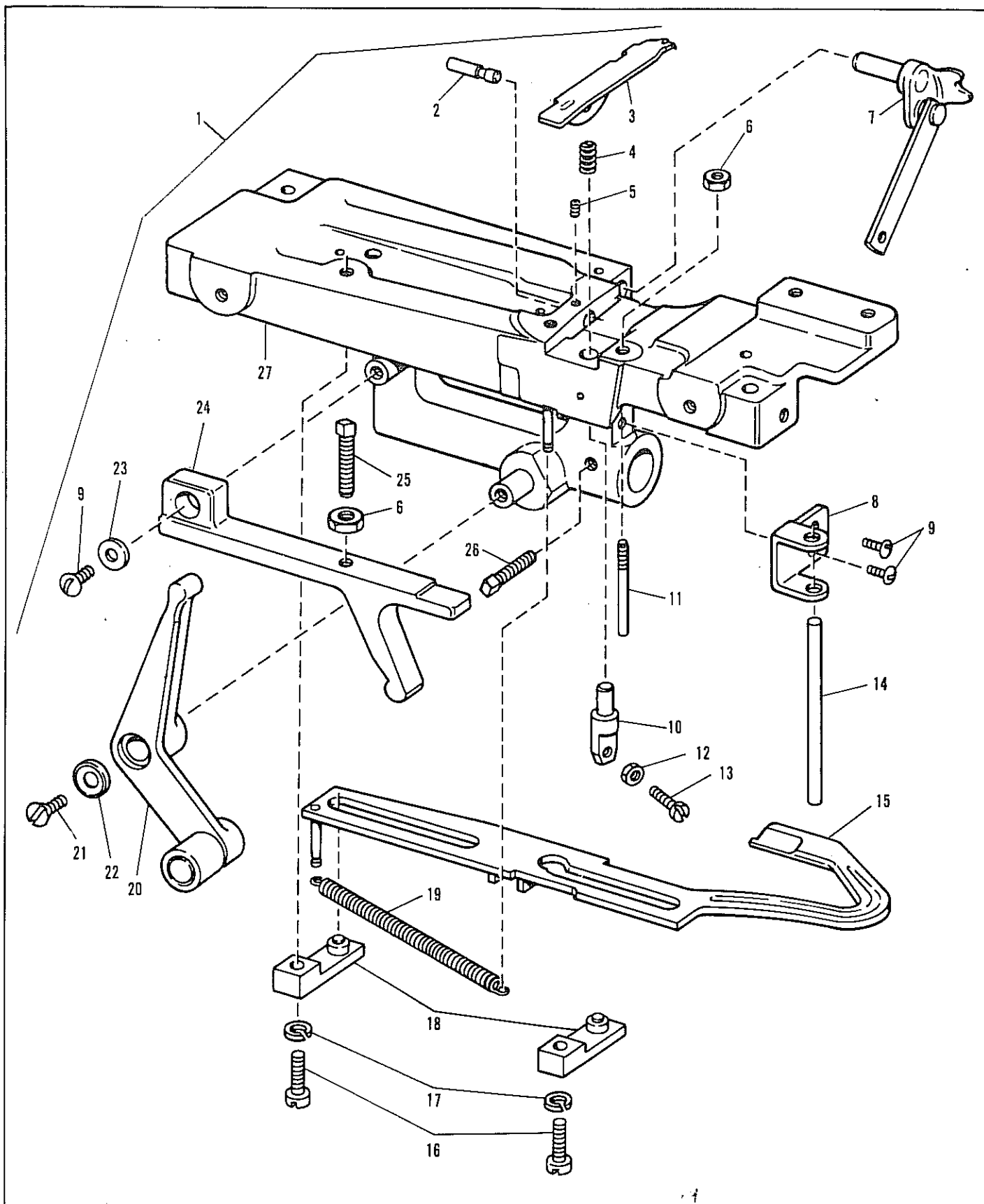


Figure 48. Main Table Assembly (Regular Light Stripper)

Main Table Assembly (Regular Light Stripper)

ex ber	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
**008032		Main Table Assy.-Regular light stripper	1	15	045007	Drawslide Assy.-Regular	1
083071		Pin-Stripper pivot	1	16	*	Screw-Fillister head, 1/4-20 NC x 1 in. long	2
052021		Stripper-Light	1	17	*	Washer-Lock, split, 1/4 in.	2
074006		Spring-Stripper	1	18	070049	Drawslide Cap Assembly	2
*		Screw-Set, socket head, cup point, 8-32 x 1/4 in. long	1	19	074014	Spring-Drawslide	1
*		Nut-Hex, 1/4-20 NC	2	20	032075	Drawslide Lever Assembly	1
032035		Tip-Up Assembly	1	21	*	Screw-Flat head, 1/4-20 NC x 1/2 in. long	1
083073		Guide-Riser pin	1	22	100019	Washer	1
*		Screw-Round head, 10-24 NC x 3/8 in. long	3	23	*	Washer-Flat, 1/2 o.d. x 7/32 i.d. x 3/64 in. thk.	1
081056		Stud-Knotter release	1	24	032003	Riser Lever	1
081017		Stud-Knotter head stop	1	25	*	Screw-Set, square head, half dog point, 1/4-20 NC x 1 in. long	1
*		Nut-Jam, hex, 1/4-28NF	1	26	*	Screw-Set, square head, cup point, 1/4-20 NC x 1 in. long	1
*		Screw-Fillister head, 1/4-28NF x 1/2 in. long	1	27	008009	Main Table Subassembly	1
083060		Pin-Riser	1				

* Items marked with an asterisk may be purchased from a local hardware supplier.

** For 8-10 ply cotton twine.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 032003, Riser Lever (1) , for Model 14108, serial number 128.

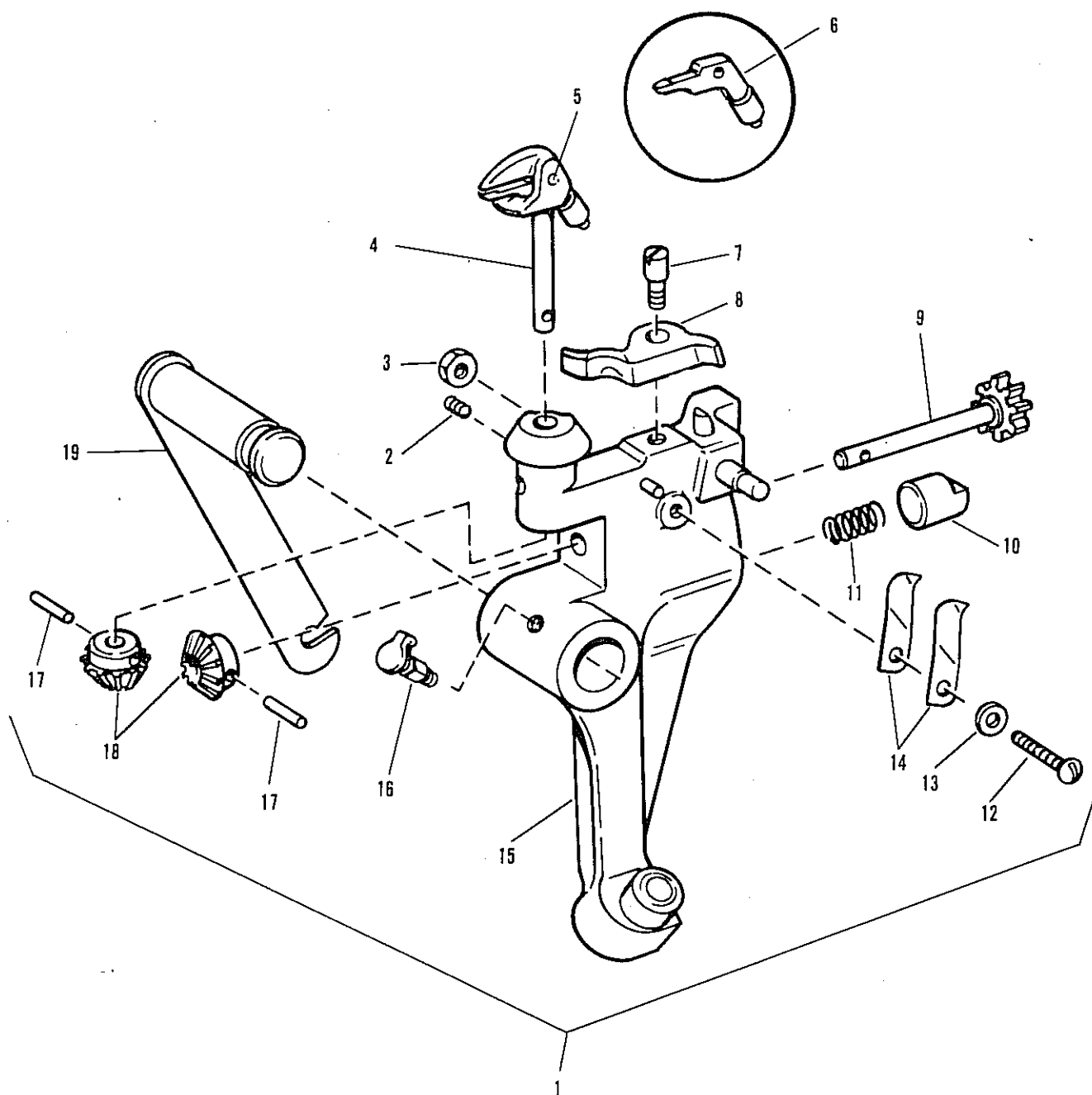


Figure 49. Knotter Head Assembly

Knotter Head Assembly

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
**017040		Knotter Head Assembly	1	10	082003	Plunger-Knotter lock	1
*		Screw-Set, socket head, cup point, 10-32 NF x 5/16 in. long	1	11	074006	Spring-Knotter lock	1
*		Nut-Hex, 10-24 NC	1	12	*	Screw-Round head, 10-24 NC x 1 in. long	1
***017061		Body Assy.-Knotter	1	13	*	Washer-Flat, No. 10	1
083072		Pin-Knotter jaw	1	14	074013	Spring-Flat, knotter	2
017050		Knotter-Jaw Assembly, light	1	15	017035	Knotter Head Subassembly	1
100009		Screw-Shoulder, knotter lever	1	16	100017	Oil Cup	1
032042		Lever-Knotter	1	17	*	Pin-Taper, No. 0 x 3/4 in. long	2
020170		Star Wheel & Shaft Assembly	1	18	020018	Gear-Miter knotter	2
				19	011004	Pivot Assy.-Knotter head	1

* Item marked with an asterisk may be purchased from a local hardware supplier.

** For 8-10 ply cotton twine.

*** Assembly includes 1 pin (index number 17) and 1 gear (index number 18).

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 100017, Oil Cup (1) for Model 14108, serial number 128.

Stringholder Assembly

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
	No Number	Stringholder Assembly	1	9	032089	Knife Trap Lever Assy.-Short (used on 032041 assy.)	1
	*	Screw-Fillister head, 5/16-18 NC x 1-1/4 in. long	1		032090	Knife Trap Lever Assy.-Long, (use on 032040 assy.)	1
2	100011	Screw-Knife trap	1		032093	Knife Trap Lever Assy.-Medium (Used on 032092 assy.)	1
3	100012	Screw-Knife trap pivot	1	10	030071	Stringholder Assy.-Light	1
4	032041	Knife Trap & Lever Assy.-Short	1	11	030014	Button-Stringholder	1
	032092	Knife Trap & Lever Assy.-Medium (service only)	1	12	032007	Lever-Button release	1
	032040	Knife Trap & Lever Assy.-Long (service only)	1	13	100010	Screw-Button release	1
5	*	Screw-Binder head, 8-32 NF x 1/4 in. long	1	14	*	Nut, Hex, 12-24 NC	2
6	021002	Knife	1	15	030111	Stringholder Subassembly	1
7	030012	Knife Trap-Regular	1	16	*	Nut-Hex, 10-32 NF	2
8	081024	Rivet-Knife trap	1	17	*	Washer-Flat, No. 10, 5/8 o.d. x 7/32 i.d. x 1/16 in. thk.	1
				18	074008	Spring-Light	1
				19	074011	Spring-Knife trap	1

* Items marked with an asterisk may be purchased from a local hardware supplier.

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 074025, Spring-Light (1), Model 14108, serial number 128.

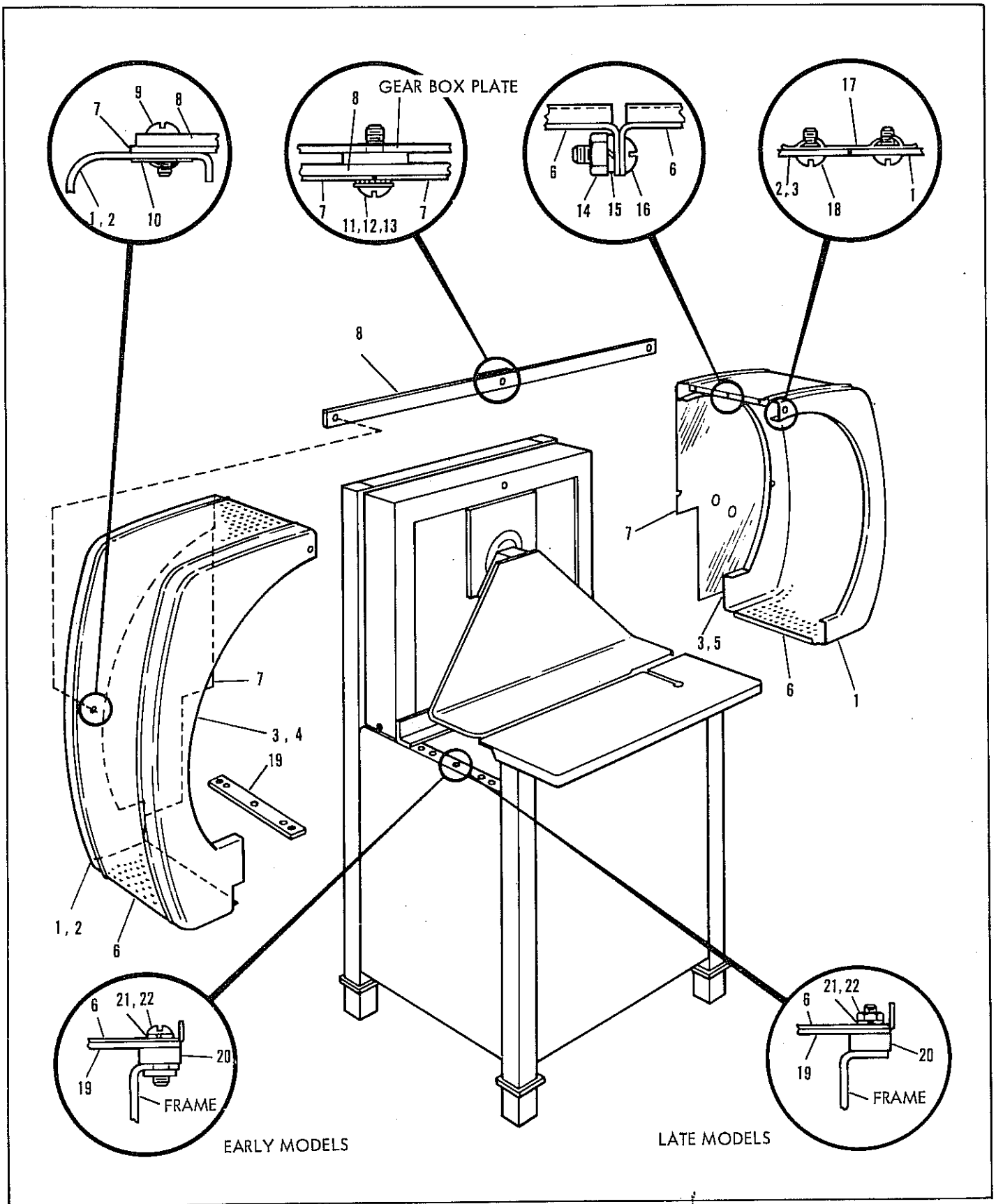


Figure 51. Twine Arm Guard

Twine Arm Guard

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
	132063 ■	Twine Arm Guard (Models 14108, 14208, 14308, 14408, & 14508)	1	15	*	Washer-Lock, No. 8 (Used on 132063)	3
	132064	Twine Arm Guard (Models 14114, 14214, & 14414)	1		*	Washer-Lock, No. 8 (Used on 132064)	4
	132065	Twine Arm Guard (Models 14220 & 14420)	1		*	Washer-Lock, No. 8 (Used on 132065)	5
1	130168	Bezel-Right front or left rear (Used on 132063)	2	16	*	Screw-Pan head, slotted, 8-32 x 3/8 in. long (Used on 132063)	3
	130094	Bezel-Right front (Used on 132064 & 132065)	1		*	Screw-Pan head, slotted, 8-32 x 3/8 in. long (Used on 132064)	4
2	130097	Bezel-Left rear (Used on 132064 & 132065)	1		*	Screw-Pan head, slotted, 8-32 x 3/8 in. long (Used on 132065)	5
3	130167	Bezel-Left front or right rear (Used on 132063)	2	17	*	Clip-Speed, twin type	2
4	130154	Bezel-Left front (Used on 132064 & 132065)	1	18	*	Screw-Pan head, slotted, 10-24 x 3/8 in. long	4
5	130096	Bezel-Right rear (Used on 132064 & 132065)	1	19	130071	Plate-Mounting (Used on 132063)	2
6	132058	Center Section (Used on 132063)	2	20	126024	Spacer-Shield (Used on 132063)	10
	132059	Center Section (Used on 132064)	2		126024	Spacer-Shield (Used on 132064)	14
	132147	Center Section (Used on 132065)	2		126024	Spacer-Shield (Used on 132065)	16
7	137022	Shield	2	21	*	Washer-Lock, No. 10 (used on 132063)	10
8	084022	Support-Twine arm guard (Used on 132064 & 132065)	1		*	Washer-Lock, No. 10 (Used on 132064)	14
9	*	Screw-Machine, round head, 10-24 x 5/8 in. long (Used on 132064 & 132065)	2		*	Washer-Lock, No. 10 (Used on 132065)	16
0	*	Clip-Speed, flat type, 10-24 (Used on 132064 & 132065)	2	22	*	Screw-Machine, round head, 10-24 x 3/4 in. long (Used on early 132063)	10
1	*	Screw-Machine, round head, 10-24 x 3/4 in. long (Used on 132064 & 132065)	1		*	Screw-Machine, round head, 10-24 x 3/4 in. long (Used on early 132064)	14
2	*	Washer-Flat, No. 10, 0.063 in. thk. (Used on 132064 & 132065)	1		*	Screw-Machine, round head, 10-24 x 3/4 in. long (Used on early 132065)	16
3	*	Washer-Lock, int. ext. tooth, No. 10 (Used on 132064 & 132065)	1	23	*	Nut-Hex, 10-24 (Used on late 132063)	10
4	*	Nut-Hex, 8-32 (Used on 132063)	3		*	Nut-Hex, 10-24 (Used on late 132064)	14
	*	Nut-Hex, 8-32 (Used on 132064)	4		*	Nut-Hex, 10-24 (Used on late 132065)	16
	*	Nut-Hex, 8-32 (Used on 132065)	5				

* Items marked with an asterisk may be purchased from a local hardware supplier.

■ Used on early models

NOTE: Half shields are sold in left and right hand assemblies as follows:

132186 Assembly, Left Hand Guard Half (Part of 132148)	} 14108, 14208, 14308, 14408 & 14508
132187 Assembly, Right Hand Guard Half (Part of 132148)	
132188 Assembly, Left Hand Guard Half (Part of 132064)	} 14114, 14214, 14414
132189 Assembly, Right Hand Guard Half (Part of 132064)	
132190 Assembly, Left Hand Guard Half (Part of 132065)	} 14220 and 14420
132191 Assembly, Right Hand Guard Half (Part of 132065)	

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 137022, Shield (2) for Model 14108, serial number 128.

Twine Arm Brake and Hinged Motor Assemblies

Index Number	Part Number	Description	Number Required	Index Number	Part Number	Description	Number Required
1	014018	Twine Arm Brake Assy.	1	9	039015	Electric Motor Assy. - 115 volts AC, single phase, 60 cycles, 1/4 H.P., 1725 rpm	1
2	*	Washer-Flat, 1/4 in. i.d.	2		039016	Electric Motor Assy. - 230 volts AC, single phase, 50 cycles, 1/4 H.P., 1425 rpm	1
3	*	Screw-Cap, hex head, 1/4-20 NC x 5/8 in. long	6	10	*	Nut-Hex, 1/4-20 NC	4
4	*	Nut-Hex, Self-Locking, Elastic Stop, No. 10-32 NF	2	11	*	Washer-Lock, ext. & int. tooth, 1/4 in. i.d.	4
5	*	Washer-Lock, ext. tooth, No. 10 i.d.	2	12	101001	Hinge	1
6	014014	Brake Shoe	1				
7	*	Washer-Flat, No. 10 i.d.	2				
8	*	Screw-Machine, round head, No. 10-32 NF x 1-1/4 in. long	2				

* Items marked with an asterisk may be purchased from a local hardware supplier.

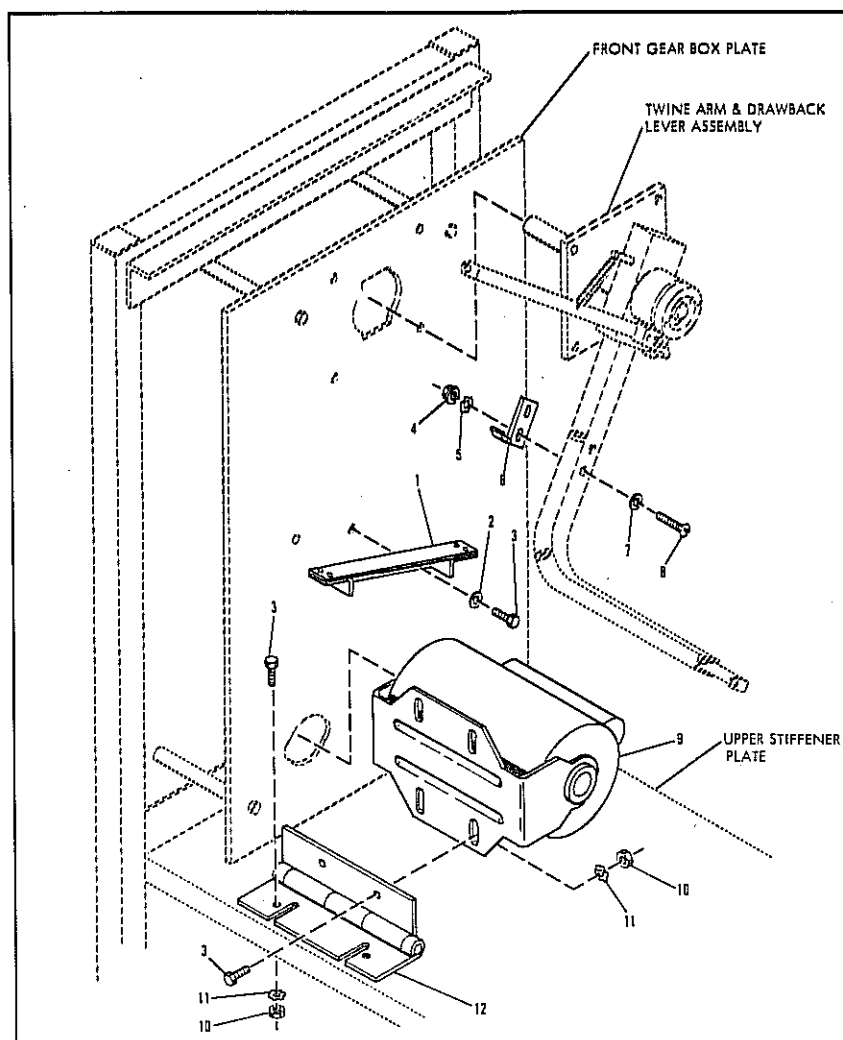


Figure 52. Twine Arm Brake and Hinged Motor Assemblies

When ordering parts, please state: part number, part name, quantity required, model and serial number of your machine. For example: Part No. 014018, Twine Arm Brake Assy. (1) for Model 14108, serial number 128.

All machines manufactured starting with Serial #60,000 are equipped per attached sketch.

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