OPERATORS MANUAL AND PARTS LIST

APPLETON

AUTOMATIC HIGH SPEED TUBE CUTTER

SERIES D

September, 1973

Appleton Manufacturing Division
Menasha Corporation
P.O. Box 329, Menasha, Wisconsin 54952 • Phone (414) 725-6371
"specialists in service and equipment for the paper industry"

SERIES D TUBE CUTTER SPEC SHEET

OUR ORDER # _____ CUSTOMER ORDER # _____

CUSTOMER NAME: _____ SERIAL # _____

FEATURE	DESCRIPTION	SYMBOL	MODEL
			D
STROKE	2" IS STANDARD	2	
	4" (USED IN TAPE CUTTERS)	4	
CROSS SLIDE	1 SPEED CROSS SLIDE	1	
	2 SPEED CROSS SLIDE	2	
DRIVE	SINGLE HIGH SPEED RANGE	SH	
	SINGLE LOW SPEED RANGE	SL	
	DUAL-HIGH & LOW SPEED RANGE	D	
CORE I.D.			
RANGE	3/4 to 10	10	
	3/4 to 12	12	
	3 to 16	16	
STOCK CORE	121-1/2"	10	
LENGTH	96"	8	
(FRAME)	72"	6	
	60"	5	
	48"	4	
	36"	3	
ADJUSTABLE	FOR CUTTING SHORT PARENT		
FEED RETURN	TUBES	F	
SWITCH			

OPTIONAL EXTRA-COST EQUIPMENT	
ROTATING KNIFE ASSEMBLY (LARGE)	#TC-D-50-35-C
ROTATING KNIFE ASSEMBLY (SMALL)	140-15-B
KNIFE HOLDER FOR STATIONARY KNIFE (TAPE CUTTING)	#140-50-5-B
KNIFE HOLDER FOR CUTTING HARD PLASTIC TUBES	#140-20-B
MYSTIC MIST LUBRICATION	
ADDITIONAL SUPPORT ROLLERS WITH BRGS. & SHAFT	60-4
DRIVEN ROTATING KNIFE	

CORE I. D. (MANDREL SIZE)

MOTOR – VOL. HZ PHASE

CONTROL – VOL. HZ

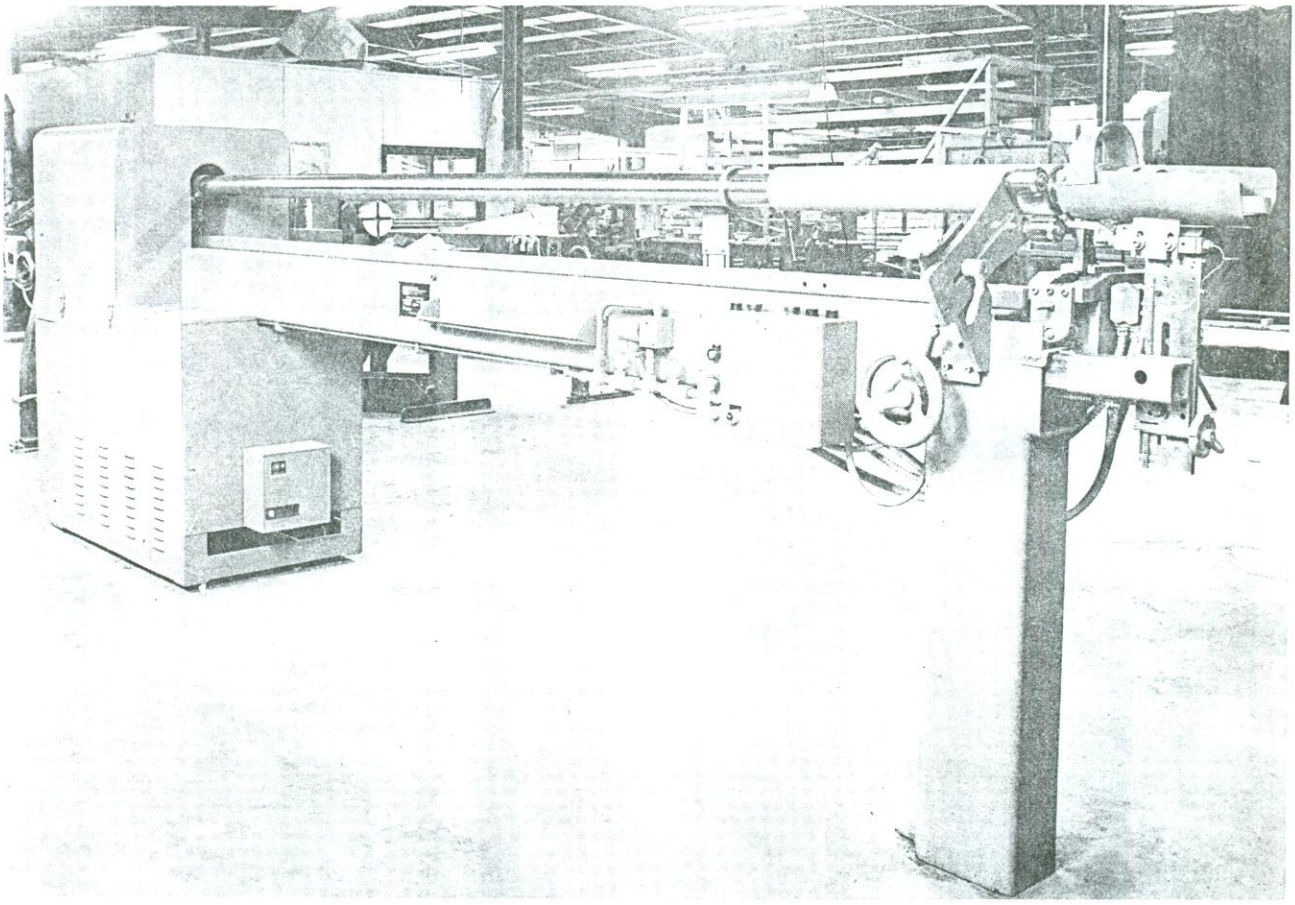
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APPLETON

AUTOMATIC HIGH SPEED TUBE CUTTER

SERIES D



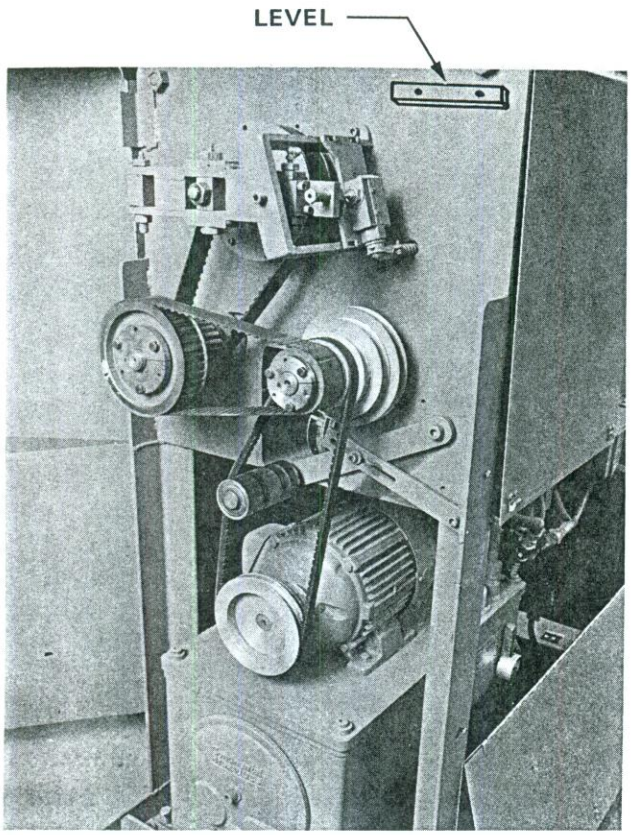


ILLUSTRATION 1

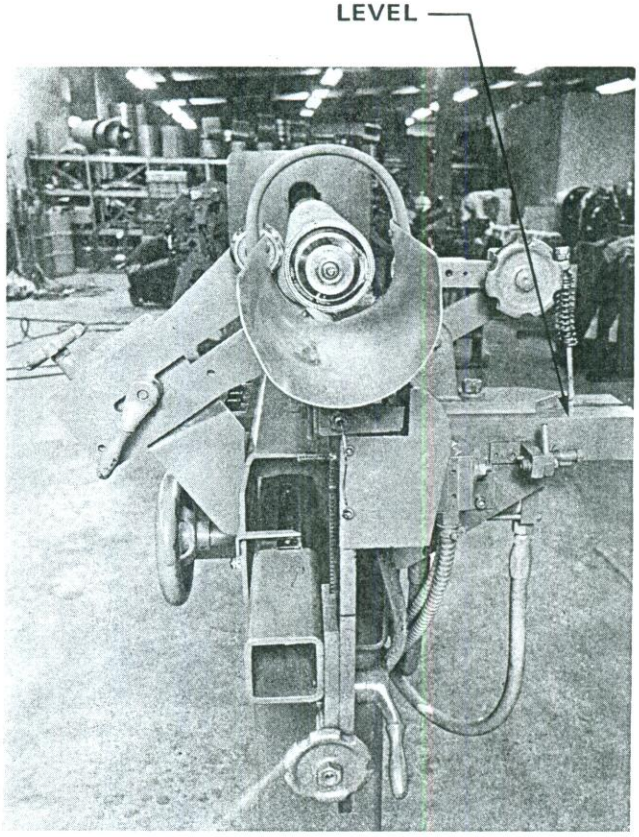


ILLUSTRATION 2

ERECTION OF THE MACHINE

1. Leveling – Cross level is accomplished by leveling on the knife cross slide with the tool holder removed and on the leveling block on the opposite end under rear hood. SEE ILLUSTRATIONS 1 and 2.

2. Electrical Connections – The only connections necessary to make in your plant are the primary motor connection, 220-440-550 etc., to the motor starter. The 110 volt control circuit is taken from the X1 and X2 leg of the transformer. We suggest a 6 amp. fuse in this circuit.

3. The proper motor rotation is clockwise, viewed from the pulley end. Never run it in reverse any more than a "jog" to check connections, otherwise serious damage to the hydraulic system may result.

4. A factory run-in has been made, and the hydraulic system is filled with oil and purged of air, ready to operate. It should never be necessary to bleed the system, as it is so designed that any air will return to the tank and will be vented out. If any air is allowed to enter the system, operation will be sluggish at first but will return to normal during operation.

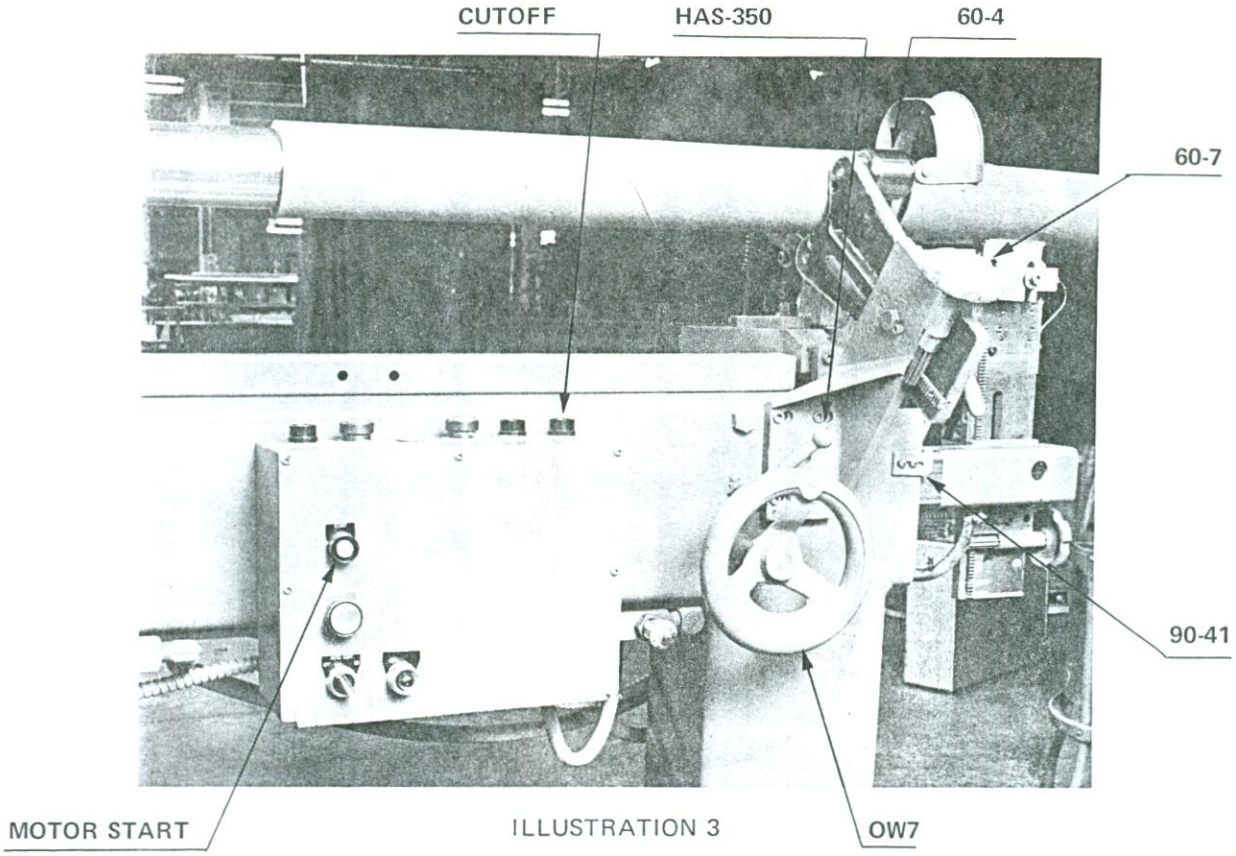


ILLUSTRATION 3

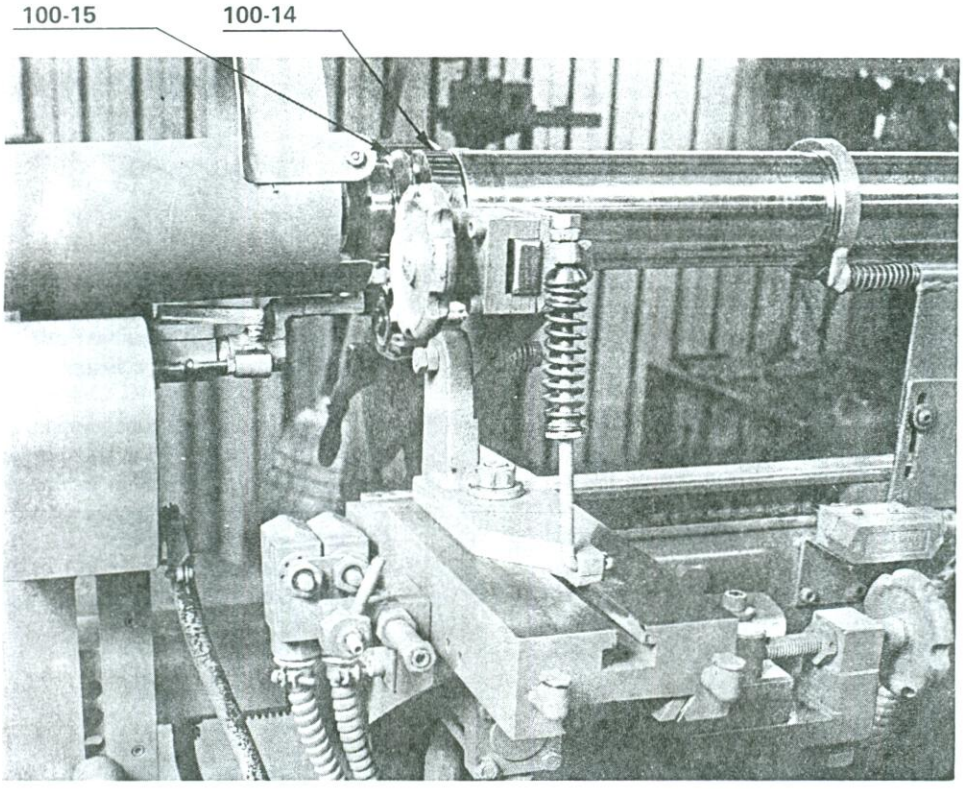


ILLUSTRATION 4

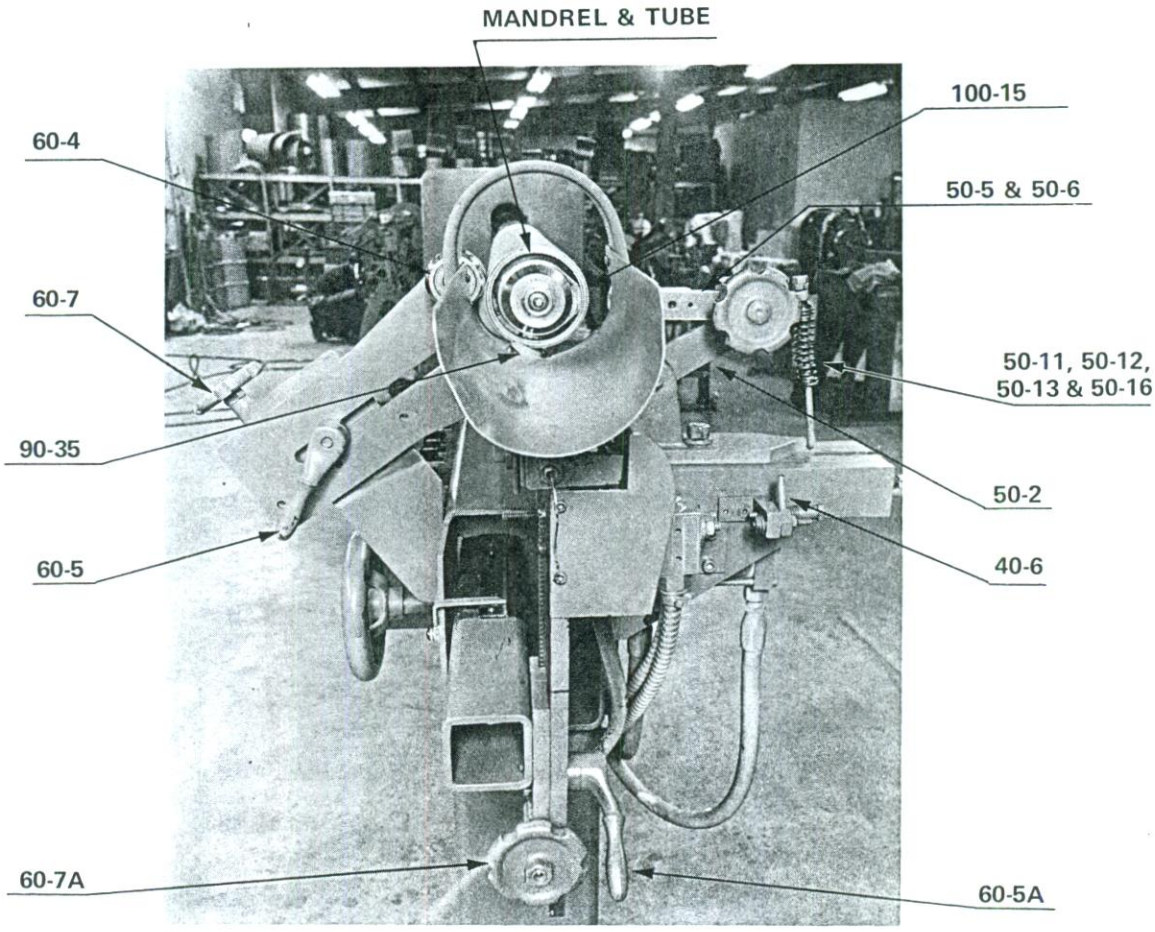


ILLUSTRATION 5

SETTING UP FOR CUTTING

Please Refer to ILLUSTRATIONS

1. Release target lock lever (HAS-350) and set target to desired length, using handwheel OW7 reading scale on target tube at pointer (90-41). Tighten lock lever.

2. With long length of tubing on mandrel, set support rollers (60-4) against tubing with a slight pressure, using handwheel (60-7) and lock lever (60-5). The tube should engage the rollers equally.

3. Slide tubing out to target 90-35. Position target by engaging tube approximately 3/16" with target (90-35) using handwheel (60-7A) and lock lever (60-5A). This and the preceding adjustment need be made only when changing to tubes of a different wall thickness or diameter.

4. Set knife (50-6) as follows (for initial setting only. All subsequent adjustments may be made as in paragraph 5):

   a. Move small lever (40-6) on microswitch actuator outward toward target. If adjustment screw on this actuator is properly set, cross slide will now remain at cutoff end of its stroke when machine is started.
   b. Position tube over the expanding head (100-14) with front edge even with front face of the expanding segments. Thus the tube does not extend across the cutoff area.
   c. Turn on control circuit selector switch, and start motor. Depress cutoff button, and as soon as cross slide traverses to cutoff position and remains there, shut off motor.
   d. Adjust tool holder (50-5) in tool post (50-2) bringing the knife against the carbide pad on the cup (100-15) at the end of the mandrel with sufficient pressure to partly depress the cushioning spring (50-11), -12, or -13, on the tool post approximately 1/16" to 3/8" as required.

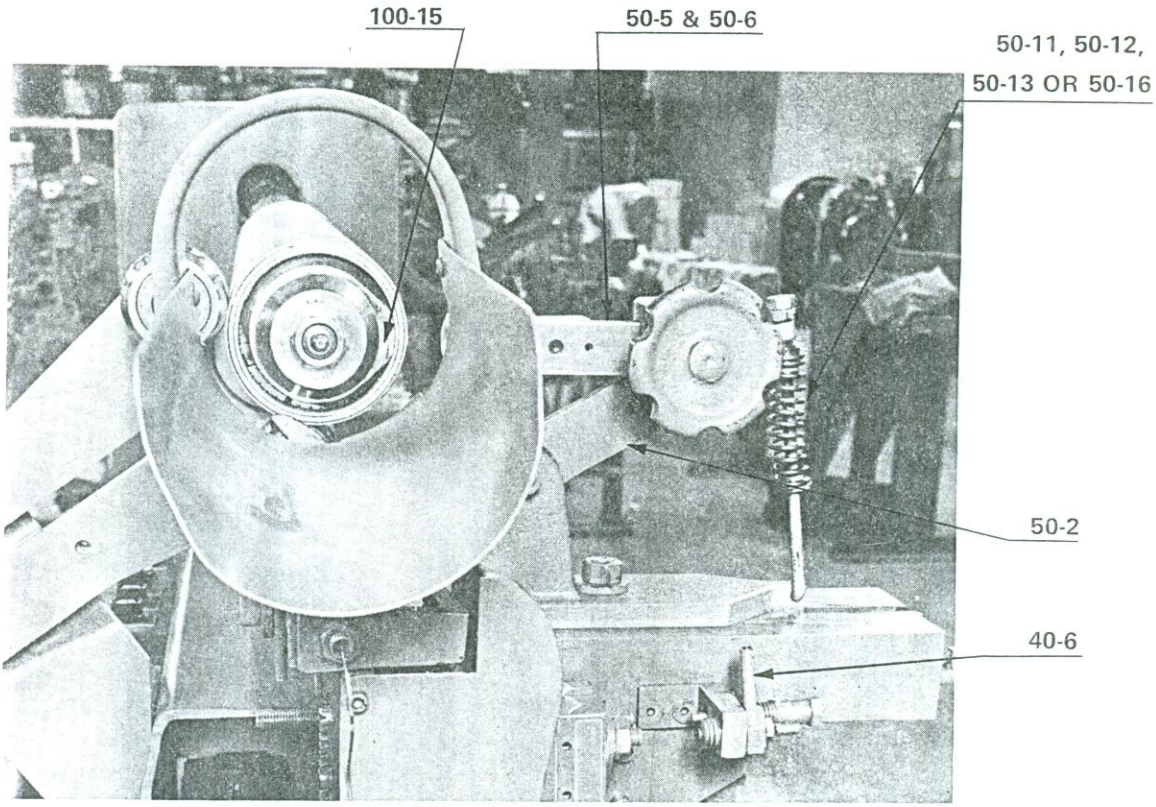


ILLUSTRATION 6

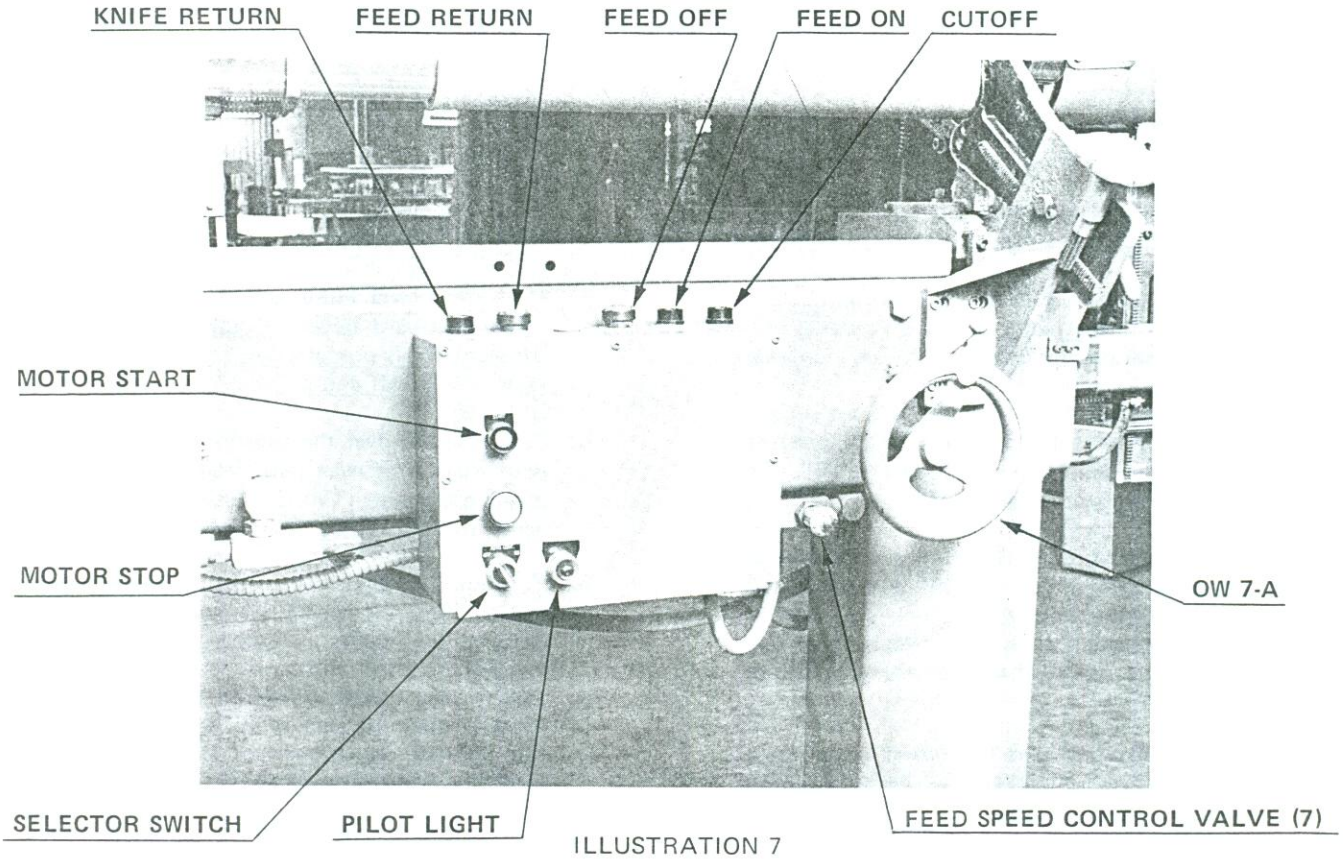


ILLUSTRATION 7

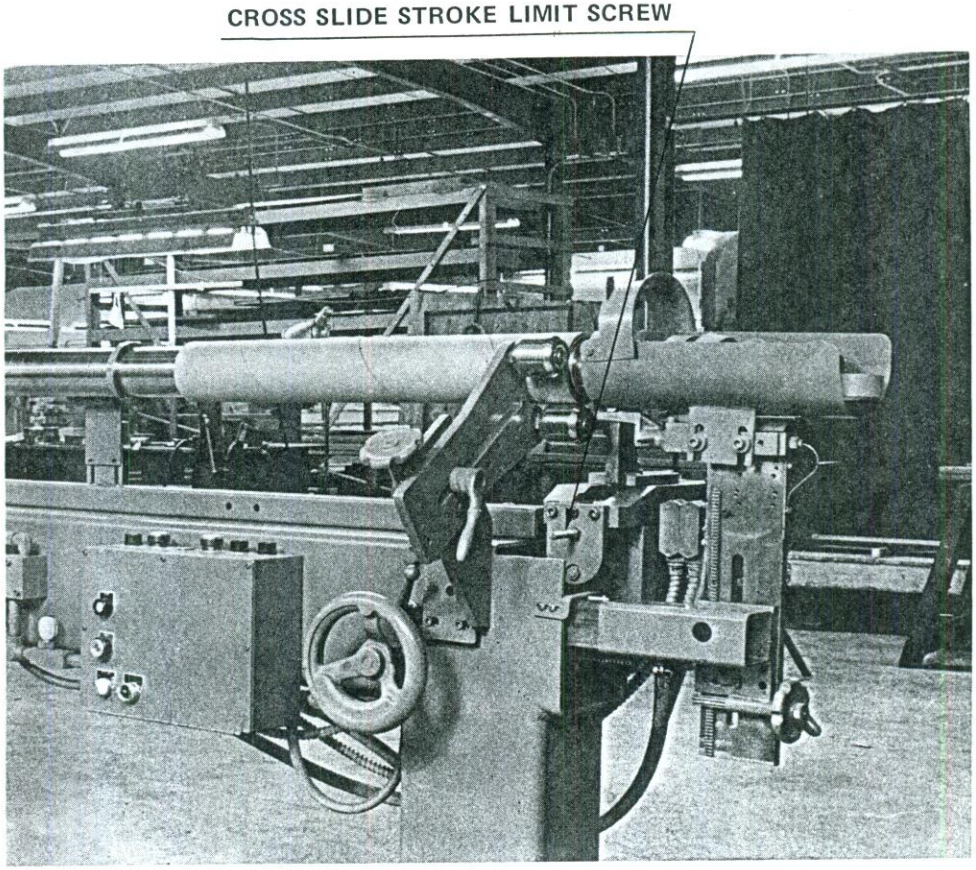


ILLUSTRATION 8

5. Return the small lever (40-6) on microswitch actuator to its original position, turn selector switch to on and start motor; cutter then is ready to operate. Some readjustments of the tool pressure may be necessary. If cutoff is not complete, increase pressure by advancing knife toward mandrel until spring is from 1/16" to 3/8" depressed during the cutoff cycle. If knife is advanced too far, cross slide may not return at the end of the cutoff stroke. To return it, depress Knife Return button and make proper adjustment of tool (50-5) to correct the condition.

The stroke of cross slide should be set so there is a minimum of 1/8" clearance between the knife and the tube. The stroke is set by screwing stroke limit screw in or out. The closer the knive is to the tube the faster the machine will cycle.

* Hard tubes require a stronger spring than a thin wall or soft tube. 50-11 is a light spring; 50-12 is a medium spring; and 50-13 is a heavy spring. 50-16 is an extra heavy spring.

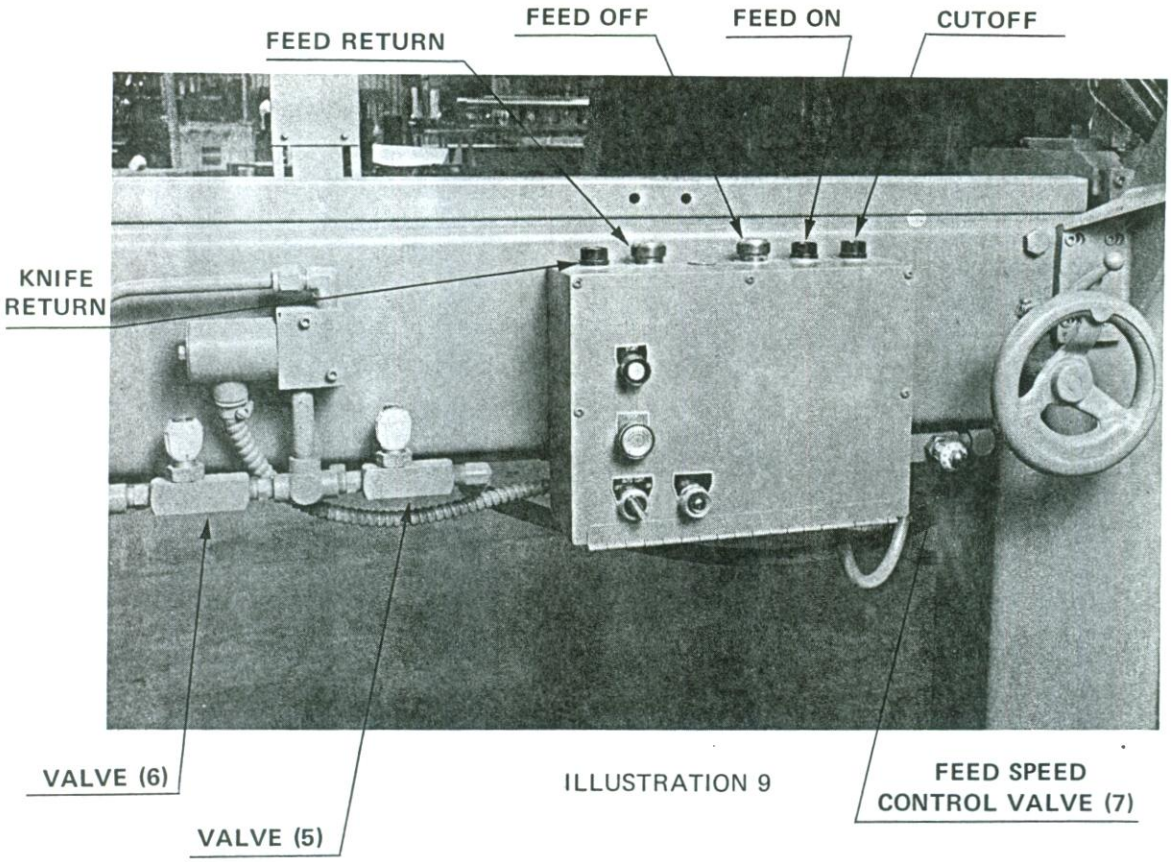


ILLUSTRATION 9

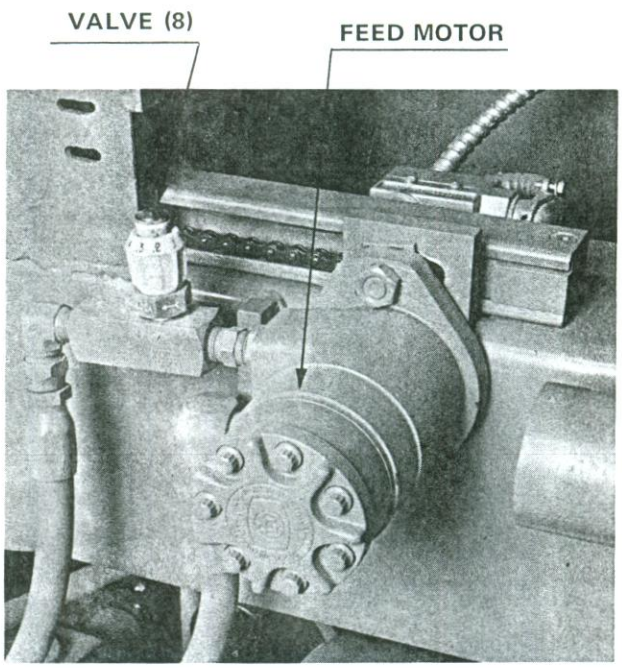


ILLUSTRATION 10

6. Automatic feed is engaged by depressing the feed on button. The feed automatically stops and returns to the rear of the mandrel when the tube is completely cut off of the mandrel, but may be stopped or returned at any point by depressing the feed off switch or the feed return switch.

7. Speed of feed-up is controlled by feed control valve 7, located to left of handwheel. About the only limiting factor to this speed is the possible crushing of the end of a light wall core against the target or damage to the target if the speed is excessive. Speed of feed return is controlled by valve 8 located on feed motor.

8. Cross slide speed (cutoff speed) is controlled by flow valve 5 located to left of the electrical control panel. The speed of the cutoff stroke should be as fast as possible and still yield a smooth cut. The best cutting speed is best determined by experience rather than any particular rule.

   On machines equipped with the two speed cross slide option (usually used for cutting tape) a second flow control valve 6 is mounted to left of valve 5 and under the solenoid valve. This feature allows the cross slide to advance at a rapid rate and then slow down when penetrating the last few plys of the tube. Valve 5 controls rapid advance and valve 6 controls final speed.

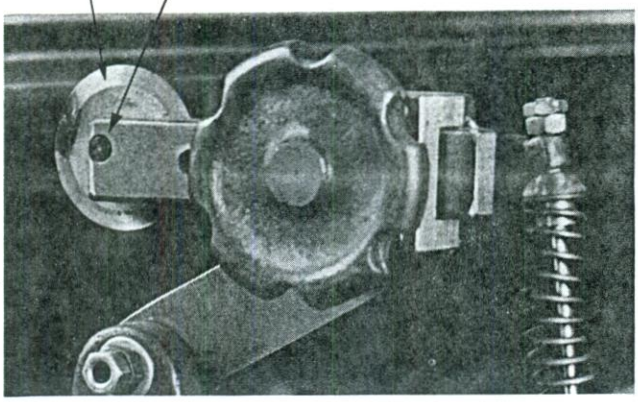


ILLUSTRATION 11

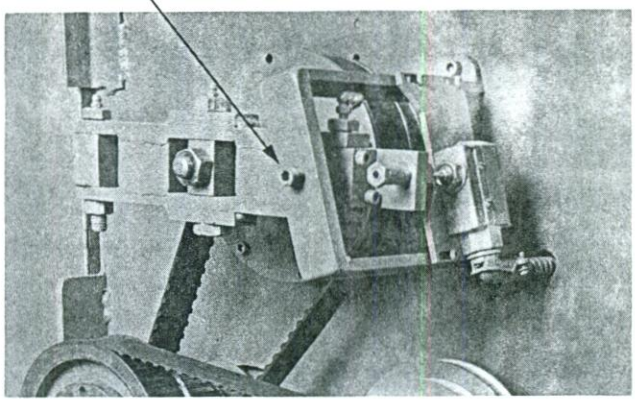


ILLUSTRATION 12

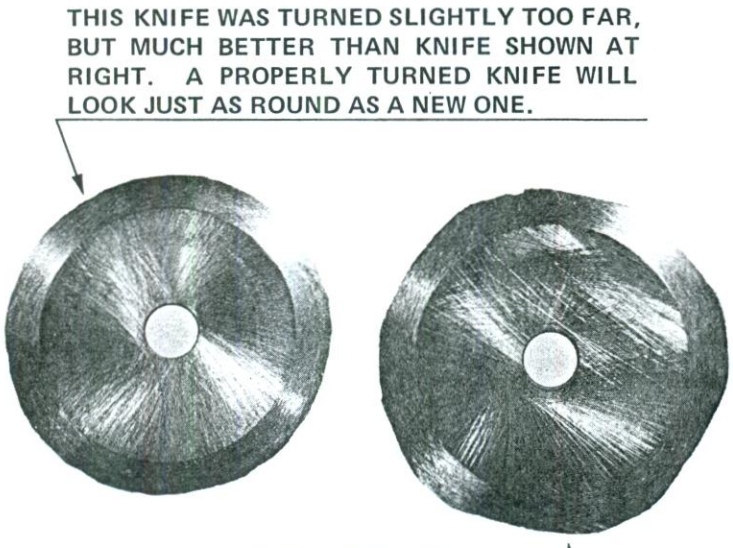


ILLUSTRATION 13

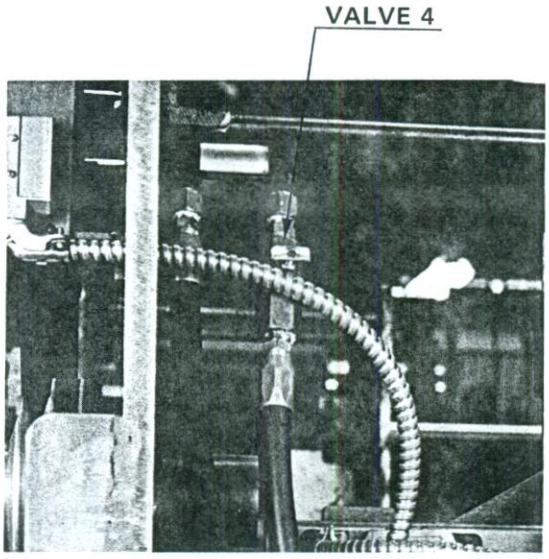


ILLUSTRATION 14

9. The head expanding cylinder is equipped with a stroke limit screw. On thin wall tubes, it will be necessary to cut down the amount of head expansion by limiting the cylinder stroke in order to prevent bursting the tube. **

10. If the tube catches on the knife as it is fed off the mandrel, tighten the adjusting screw on flow control valve 4 located under the rear hood.

11. Changing rotational speed of the tube. Series D Cutters are equipped with step pulleys for changing rotary speed to maintain nearly the same peripheral speeds speeds on various size tubes.

12. When knife 50-6 becomes worn in one position, loosen its binding screw and rotate it slightly away from the operator (turn so that worn spot rises). Important: Do not bring up a full new position, but turn only enough to bring up 1 degree or approximately 1/64 of an inch. This will provide longer life per setting and many more settings per regrind. The resultant cuts are just as satisfactory and the length will be more consistent than if the knife is turned to a full new position. Also, knife will not have to be turned as often, thereby yielding more cuts.

** See Paragraph 5 Under Trouble Shooting.

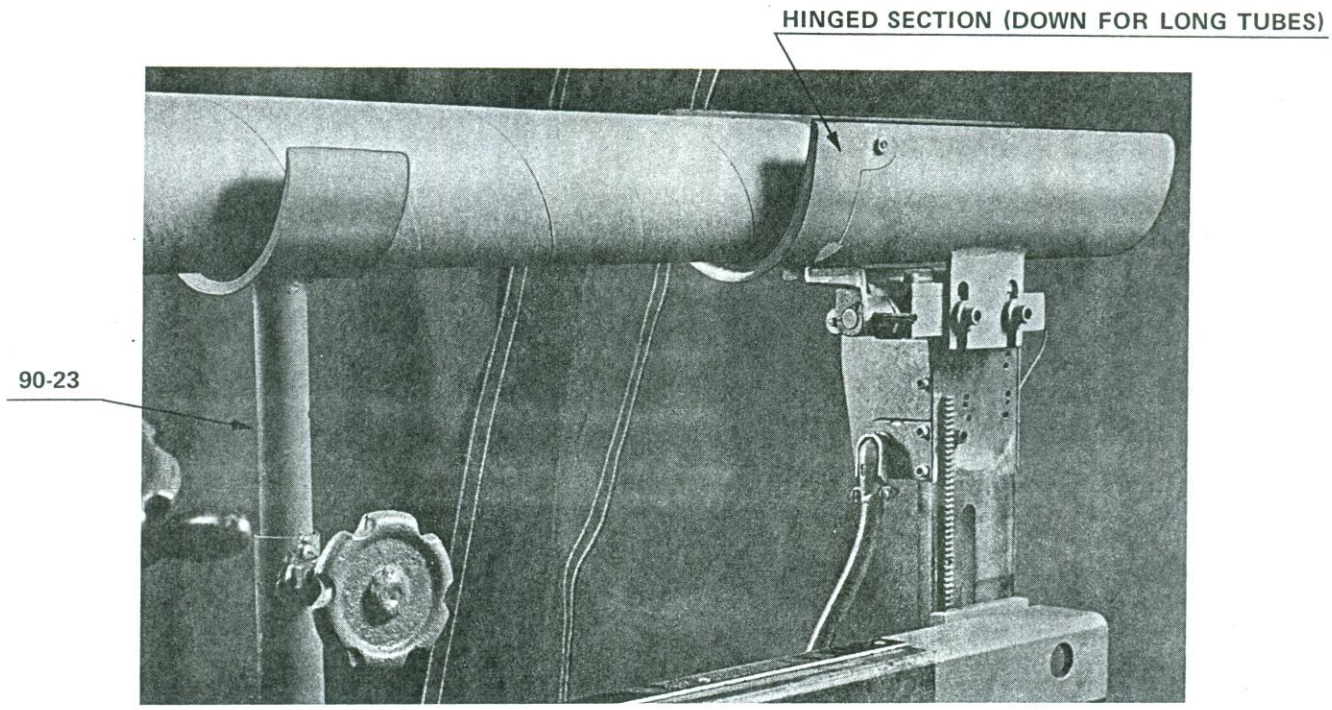


ILLUSTRATION 15

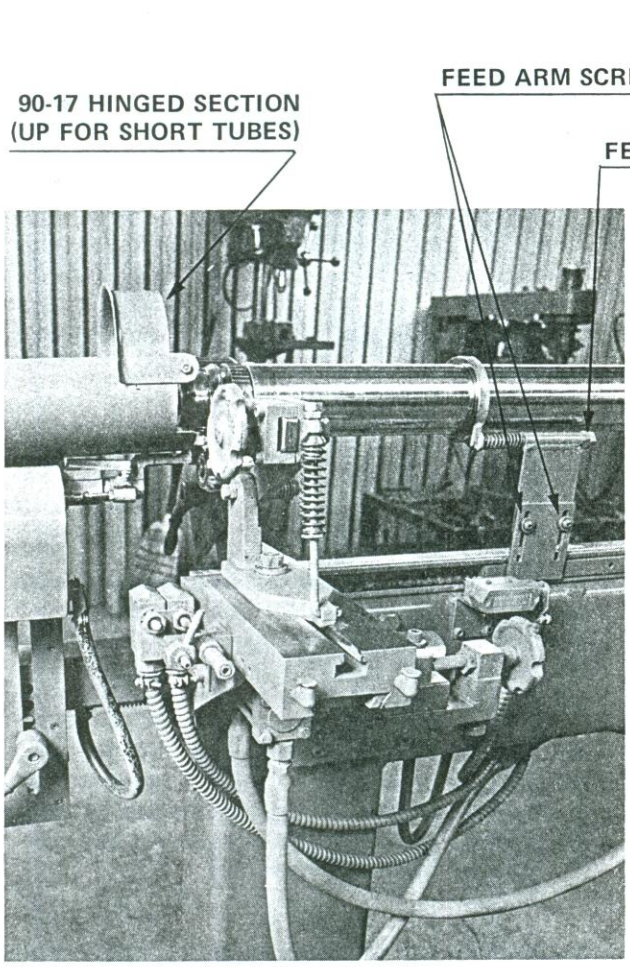


ILLUSTRATION 16

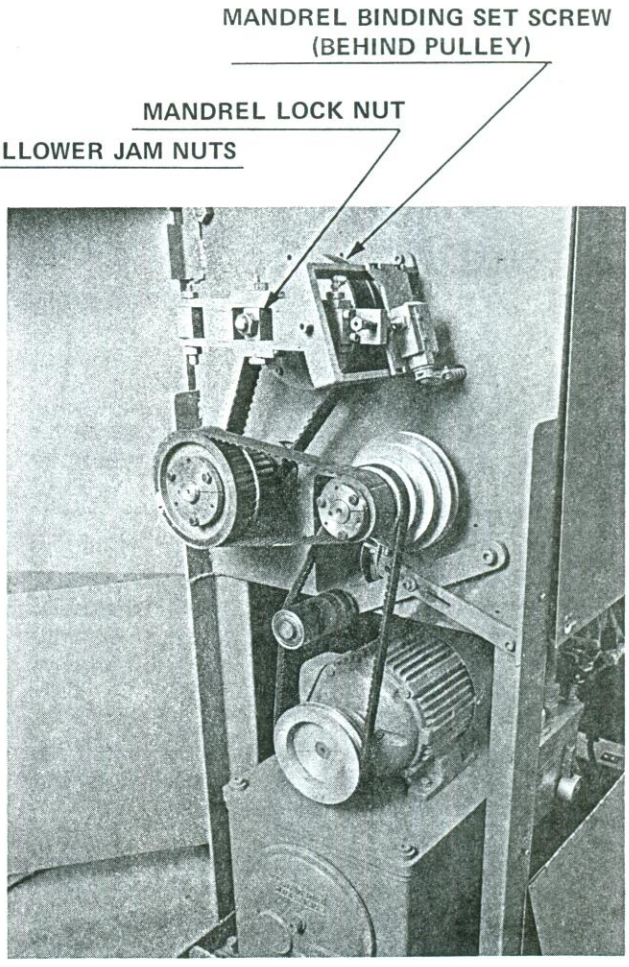


ILLUSTRATION 17

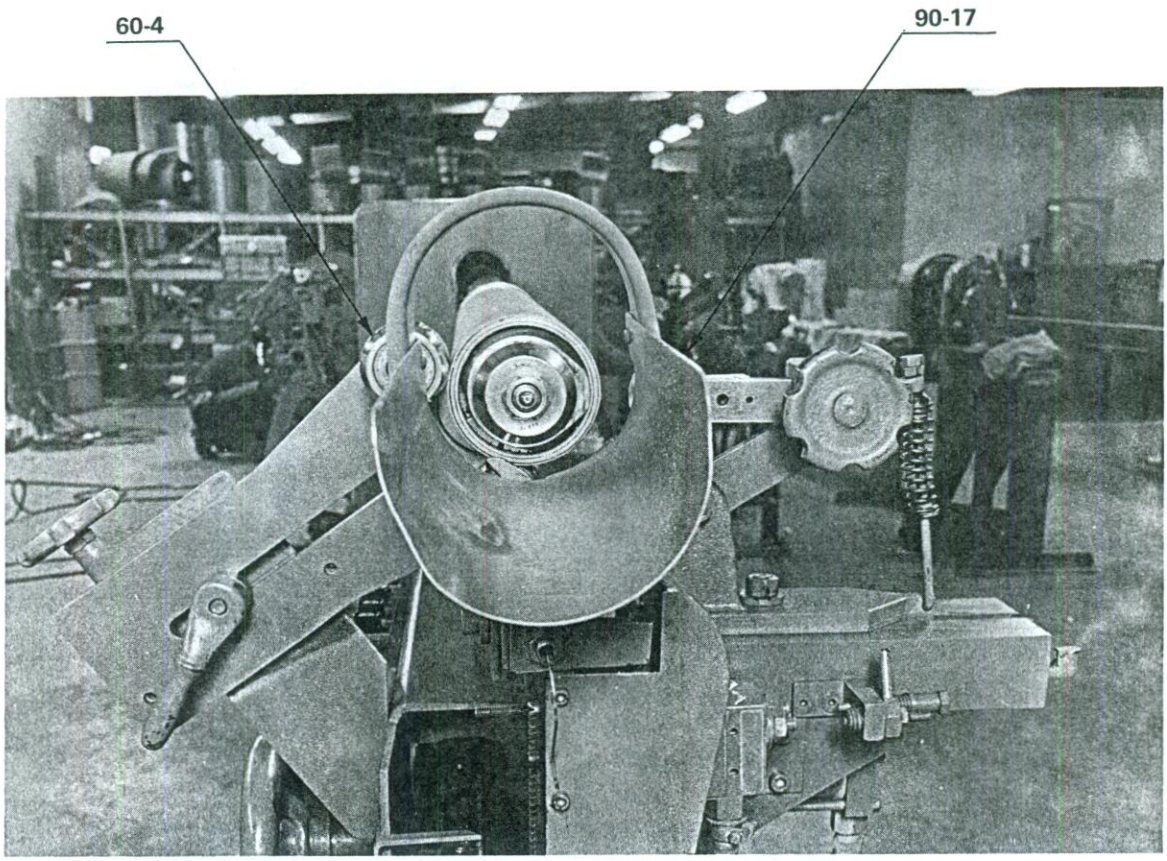


ILLUSTRATION 18

13. The hinged section of the large trough (90-17) is kept down except for very short tubes.

14. The steady rest (90-23) is used only for longer length of cutoffs. Its relative position is roughly one-third (1/3) of the distance from the end of the mandrel to the target.

15. Changing Mandrel – All series D Cutters are equipped so that different sized mandrels can be interchanged.

    1) to remove the lock nut located on the end of the mandrel pull rod on the drive end of the machine.
    2) disconnect the feed follower by removing the jam nuts on the spring rod or removing the screws in the two-part feed arm.
    3) loosen the set screw located behind the top pulley at the rear of the machine. The mandrel may now be removed toward the front and a different one inserted in its place.

The support rollers (60-4) may have to be moved closer together or farther apart, in holes provided (use either outside or inside holes do not use one outside hole and one inside hole or misalignment will occur). Also 90-17 may have to be exchanged with a larger or smaller trough depending on O.D. of the tube being cut.

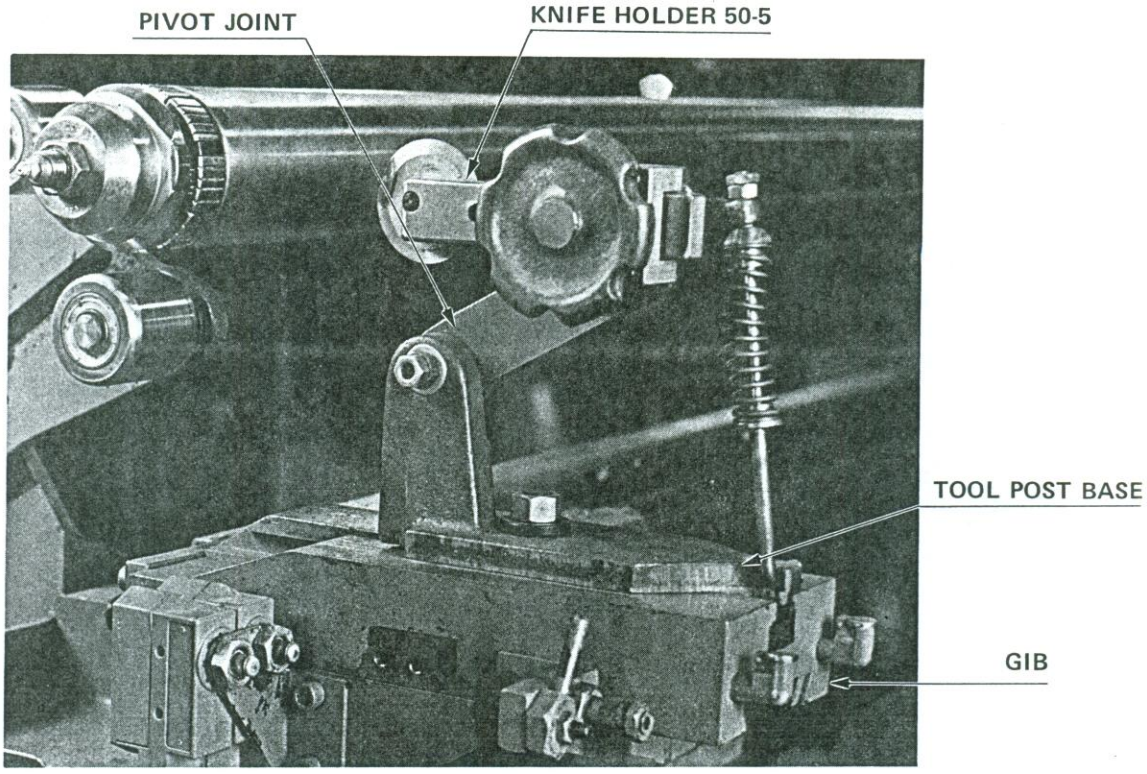


ILLUSTRATION 19

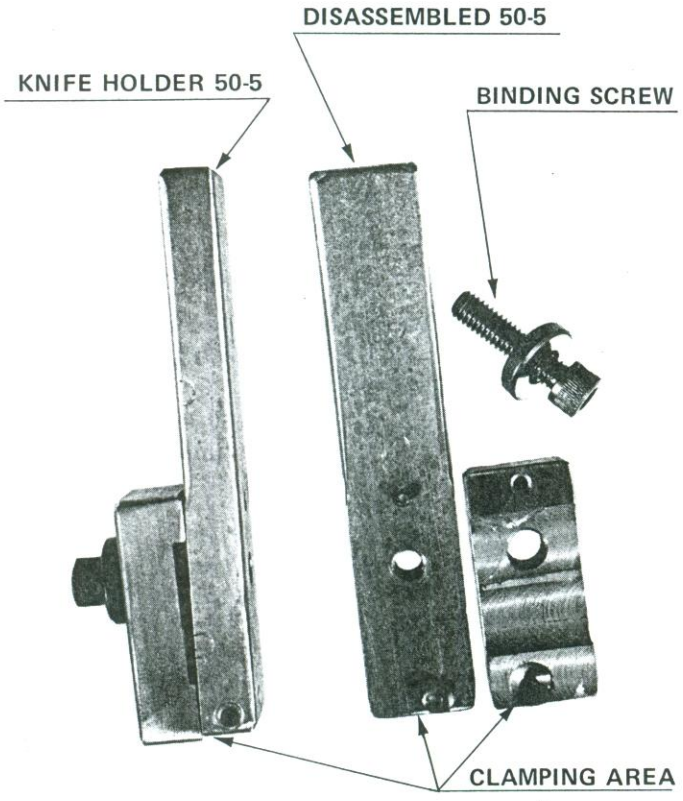


ILLUSTRATION 20

CUTTING PROBLEMS

I. Spiral Cut or Slivers at the Edge of Cut on O.D.

A. Caused by knife not being 90° to axis of tube rotation, due to one or more of the following:

1. Mandrel not properly aligned.
   See Paragraph 4 in Trouble Shooting Section.

2. Worn Pivot Joint on Tool Post.
   Replace Tool Post.

3. Burr on edge of knife at area of contact with carbide pad on mandrel. (a flat area here is normal but a hooked burr is not.)
   Hone contact area of knife.

4. Worn clamping area on knife holder 50-5.
   Replace.

5. Warped Knife.
   Turn knife over in holder; if this does not help, replace.

6. Loose Gibs on Cross Slide.
   Tighten Gibs.

A temporary repair for the above is to shim under, the tool post base so as to tilt knife to 90° to axis of rotation of tube. The thickness of shims and which side to place shims on are determined by trial and error. See Paragraph 6 in trouble shooting section.

If Sliver is on drive side of cut tilt top of knife toward drive end of machine

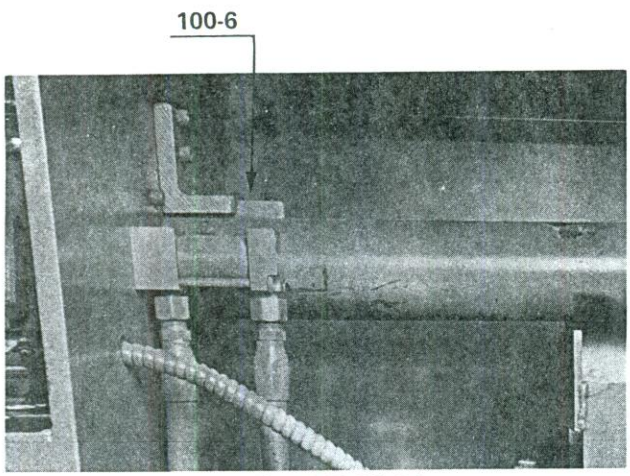


ILLUSTRATION 21

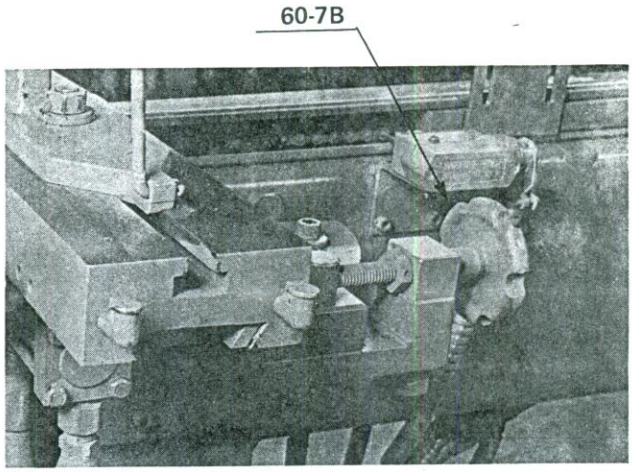


ILLUSTRATION 22

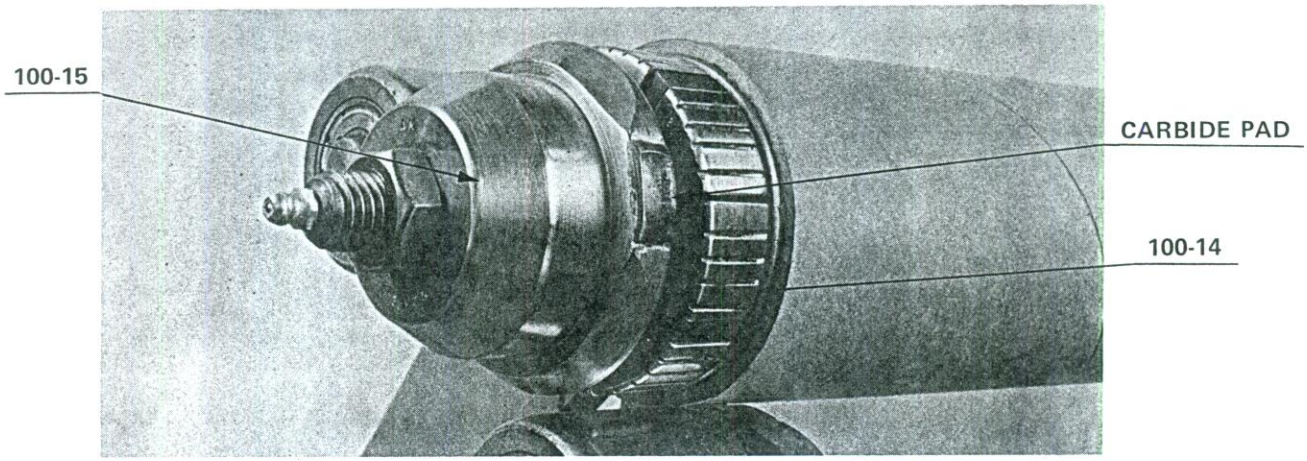


ILLUSTRATION 23

II. Angle on Face of Cut.

An angle on the face of the cut is normal and cannot be done away with. However, the angle should be euqal on both sides of the knife.

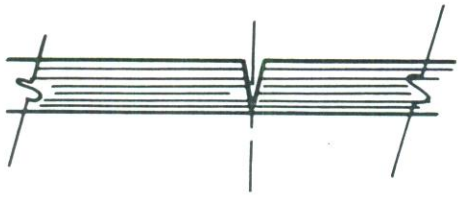


Figure 1: tube wall cross-section shows normal cut that is equal on both sides of the blade.

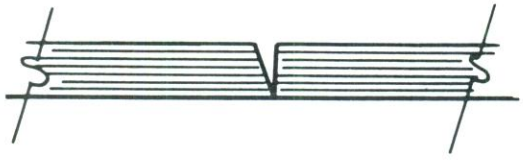


Figure 2: shows undesirable cut.

This condition can be overcome by adjusting the angle of the cross slide relative to the mandrel. Make adjustment with hand wheel (60-7B) (Illustration 22).

When making the above adjustment, it may be necessary to readjust the knife (depth of penetration). Also, the knife will change location relative to the center of the Carbide Pad on the pad mounting cup (100-15). This is corrected by screwing the pad mounting cup forward or backward as needed, then moving the mandrel forward or backward in order to maintain 5/16"* between the head jaws 100-14 and pad mounting cup. When everything is properly set, the knife should contact the center of the pad when at the end of the cut stroke.**

When adjusting the mandrel forward or backward, the set screw in male mandrel guide 100-6 must be adjusted by the amount that the mandrel is to be moved.

** See Paragraph 6 Under Trouble Shooting.

* 9/16 on mandrels for tubes smaller than 2-1/4" diameter.

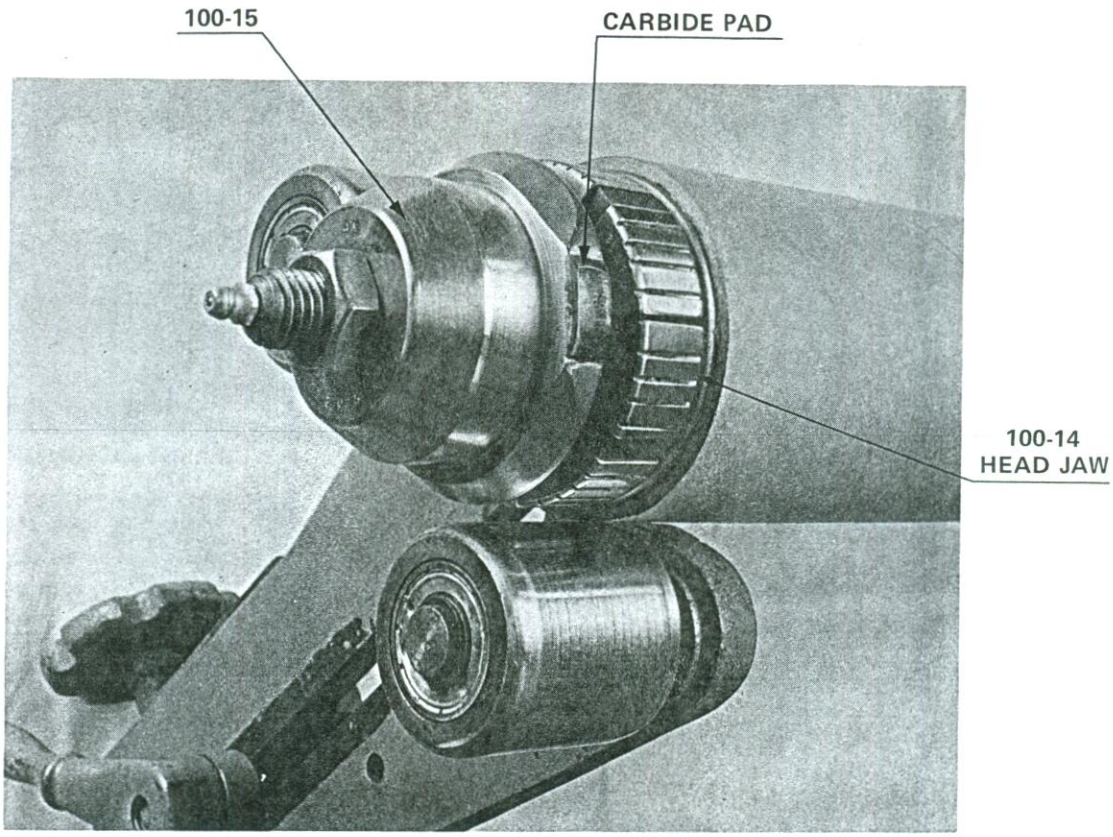


ILLUSTRATION 24

III. Rough Edge on O.D. Of Cut.

Usually caused by one or more of the following:

A. Dull knife.
Turn up new cutting edge. Rotate knife only 1 degree or approximately 1/64".

B. Penetrating speed too fast.
Slow cross slide speed.

C. Rough surface on ground angle of knife.
Replace knife.

IV. Rough Edge on I.D. Of Cut.

Usually caused by one of the following:

A. Knife not penetrating inside wall completely.
Advance tool holder or slow penetrating speed; or turn knife to a new position (rotate knife only 1 degree or approximately 1/64").

B. Pocket worn in Carbide Pad.
Replace pad or pad mounting cup 100-15.

C. Knife does not strike pad in center.
Adjust Mandrel — See Number II this section, and Paragraph 6 Under Trouble Shooting.

V. Rough or Scaley Appearance on Face of Cut.

A. Improperly sharpened knife.
Replace.

B. Knife is dull.
Rotate knife 1 degree or 1/64" to new cutting area.
CAUTION: Always rotate knife away from operator, bringing the new cutting area up from the bottom.

VI. Tube is not completely Cut Off.

See (A) of Number IV this section.

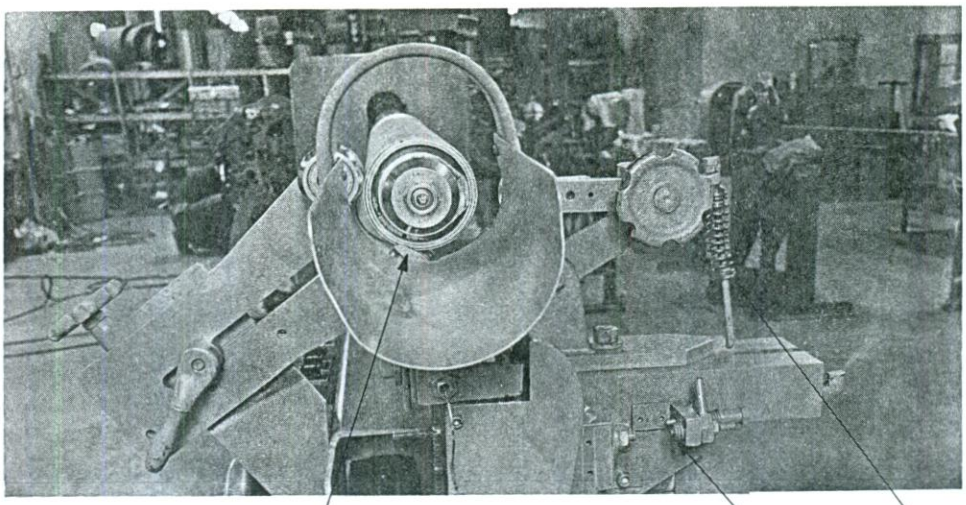


ILLUSTRATION 25

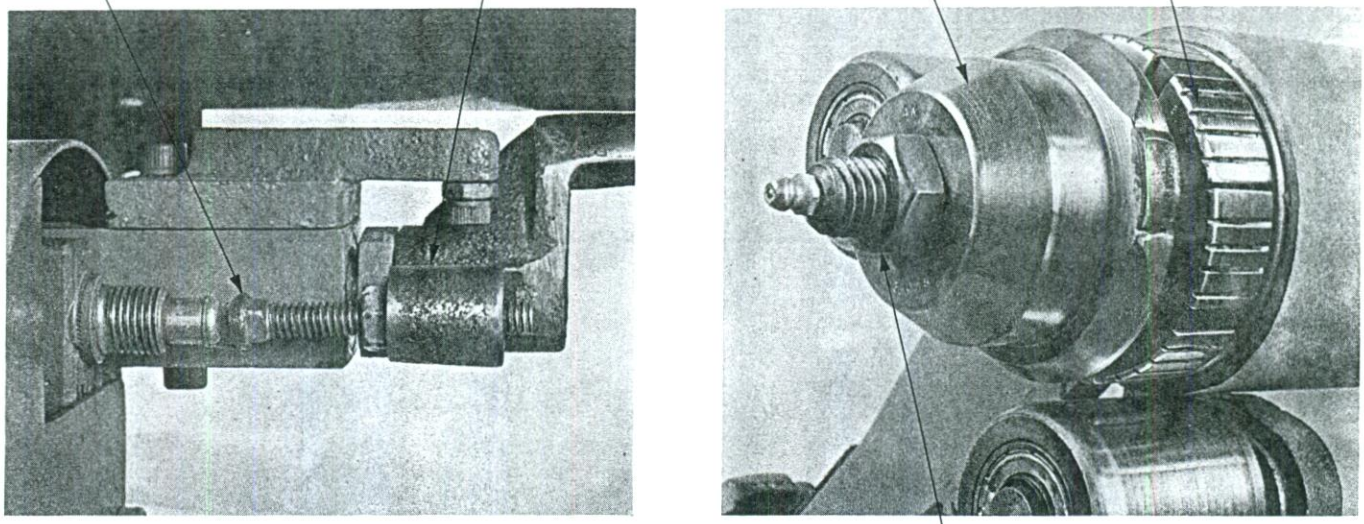


ILLUSTRATION 26

TROUBLE SHOOTING

1. Should the control system fail to operate when the tube is moved against the target, it may be necessary to adjust the set screw on the target butt pad 90-35 which actuates the microswitch within the target assembly. Care must be exercised not to advance the screw farther than necessary as excessive over-travel after tripping the switch may cause inaccuracy of cut. (Overtravel after switch is actuated should be .005 to .010.)

2. If the cross slide fails to return at the end of the cut-off stroke, advance the set screw 40-6 which actuates the return switch. However, if the screw is turned in too far, the kick-out lever will be ineffective, and the screw must be retracted until the kick-out lever serves its proper function; that of causing the cross slide to remain at the end of the cutoff stroke so the knife setting may be adjusted after replacement. Also check pressure gauge on hydraulic unit. Pressure range is 350 PSI minimum – 550 maximum. Adjust pressure so tool post spring will depress the necessary amount to complete the cut, but still allow cross slide to return. See Paragraph 6, pump manufacturers bulletin HD-121 (471).

3. If the head-expanding collet (100-14) fails to retract fully, remove the lock nut and pad mounting cup (100-15). The expanding collet segments may then be removed by pulling them forward as a unit toward the end of the shaft. They may then be cleaned and lubricated and reassembled. Also check for a broken or fatigued spring and replace if required.

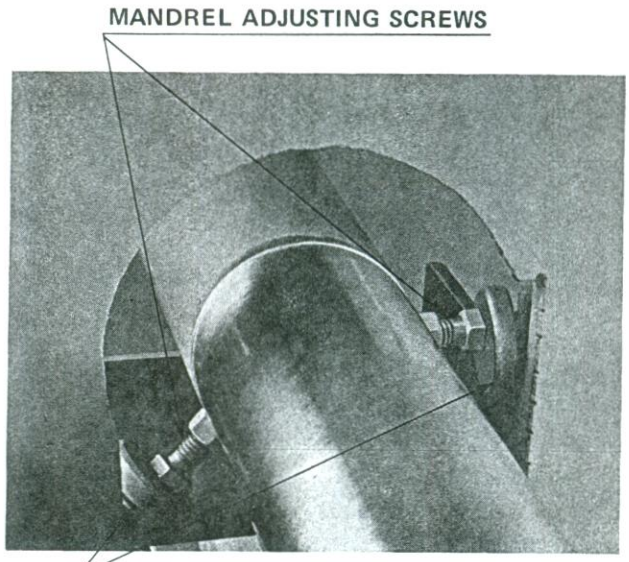


ILLUSTRATION 27

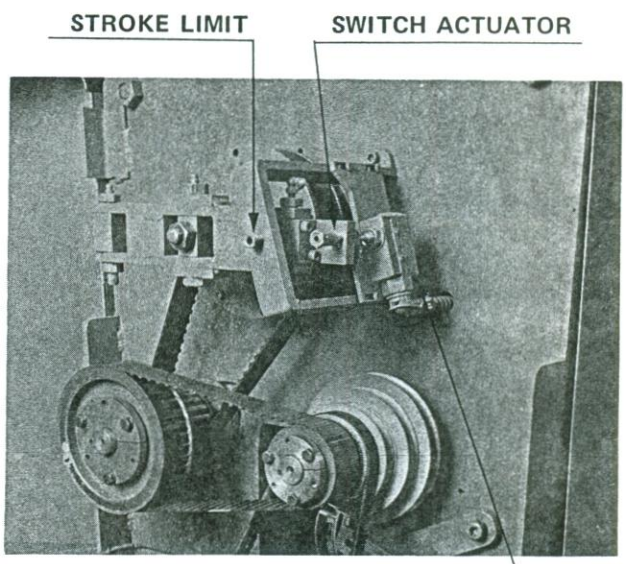


ILLUSTRATION 28

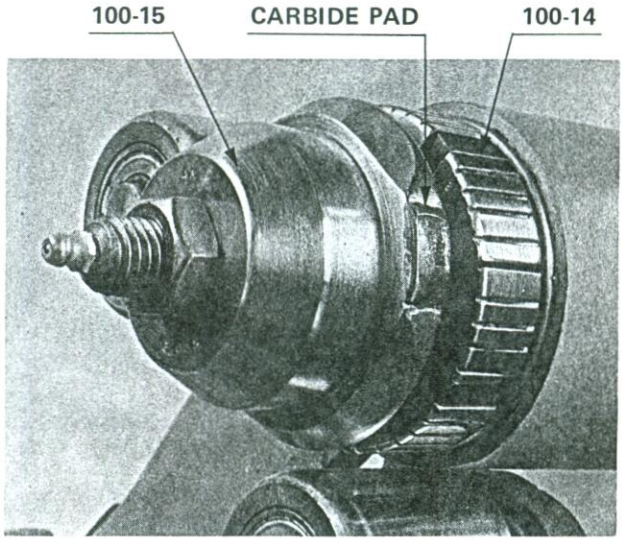


ILLUSTRATION 29

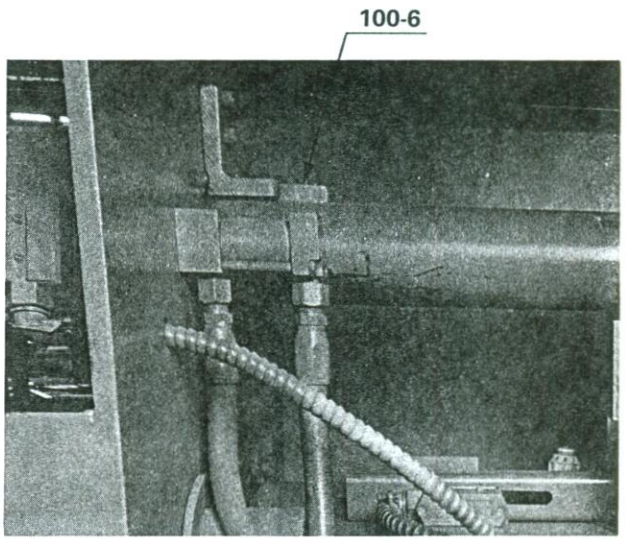


ILLUSTRATION 30

4. If the mandrel should lose alignment with the support rollers to the extent that the tube rides harder on one roller than on the other, it may be adjusted with the screws provided on the mandrel. When mandrel is properly aligned, it will contact both rollers with equal pressure and be parallel with the frame.

5. If target fails to trip out of the way of the tube, so that the tube may be fed forward for next cut, the probable cause is that the switch actuator does not come off the L.S.2. This condition can develop when the stroke limit (for Cylinder 2) is adjusted inward to limit the expansion of the head expanding jaws (100-14). The correction is to adjust the switch actuator away from L.S.2. It should clear the switch nose by no more than 1/16". Too much clearance will allow the target to trip out of contact with the tube before the head jaws, (100-14) can grip the tube, thus allowing the tube to feed past the desired point. When adjusting the stroke limit for Cylinder 2, always check actuator clearance (1/16") relative to L.S.2.

6. If the knife does not strike the center of the carbide pad on part 100-15, the mandrel should be adjusted forward or backward as needed, by adjusting the set screw 100-6 at the top rear of the mandrel. The 5/16"* spacing between 100-14 and 100-15 must be maintained by screwing 100-15 forward or backward as needed.

* 9/16 on mandrels for tubes smaller than 2-1/4".

REMOVE, CLEAN & GREASE 100-14 MONTHLY

OIL SHAFT DAILY

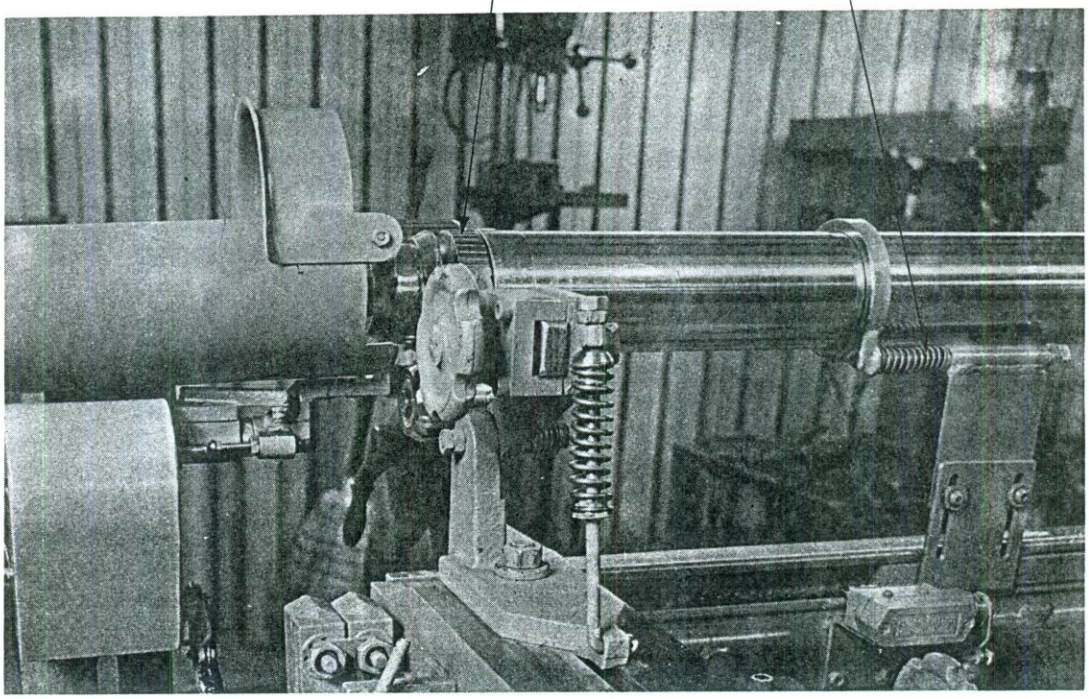


ILLUSTRATION 31

Mobil oil DTE # 24

GREASE WEEKLY

HYD. OIL SHOULD BE SAE 10. RATED @ 200 SUS @ 100° F OR EQUAL

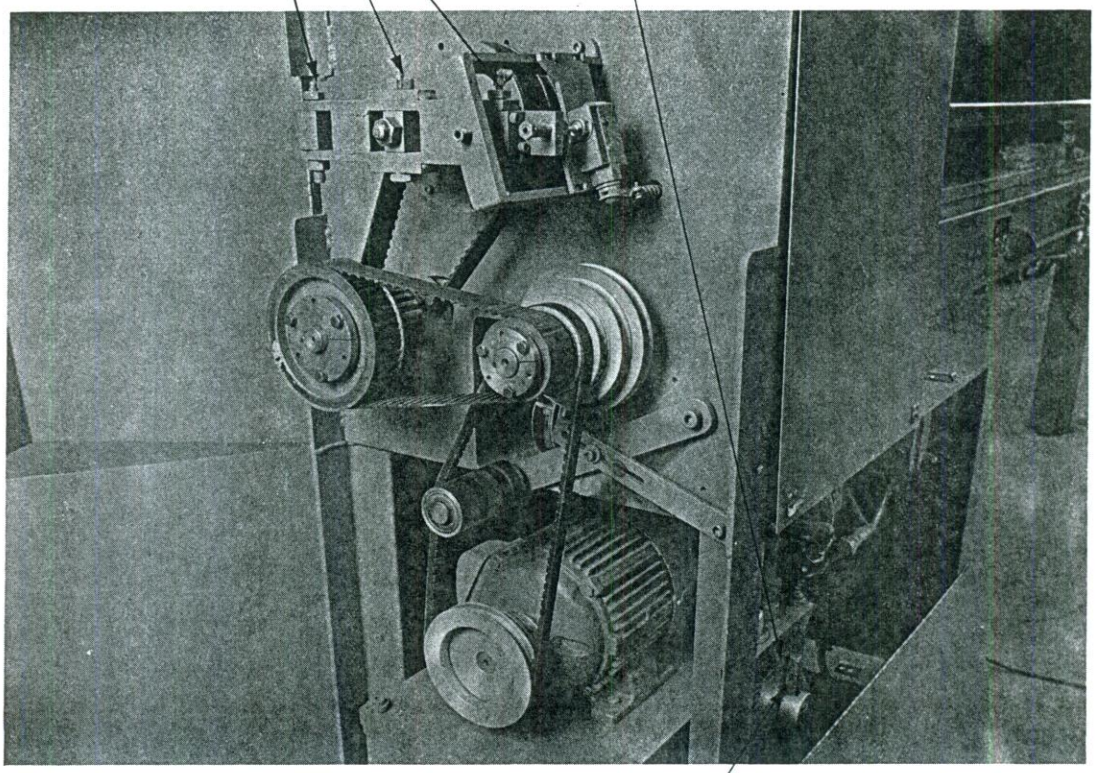


ILLUSTRATION 32

MAINTAIN PROPER OIL LEVEL

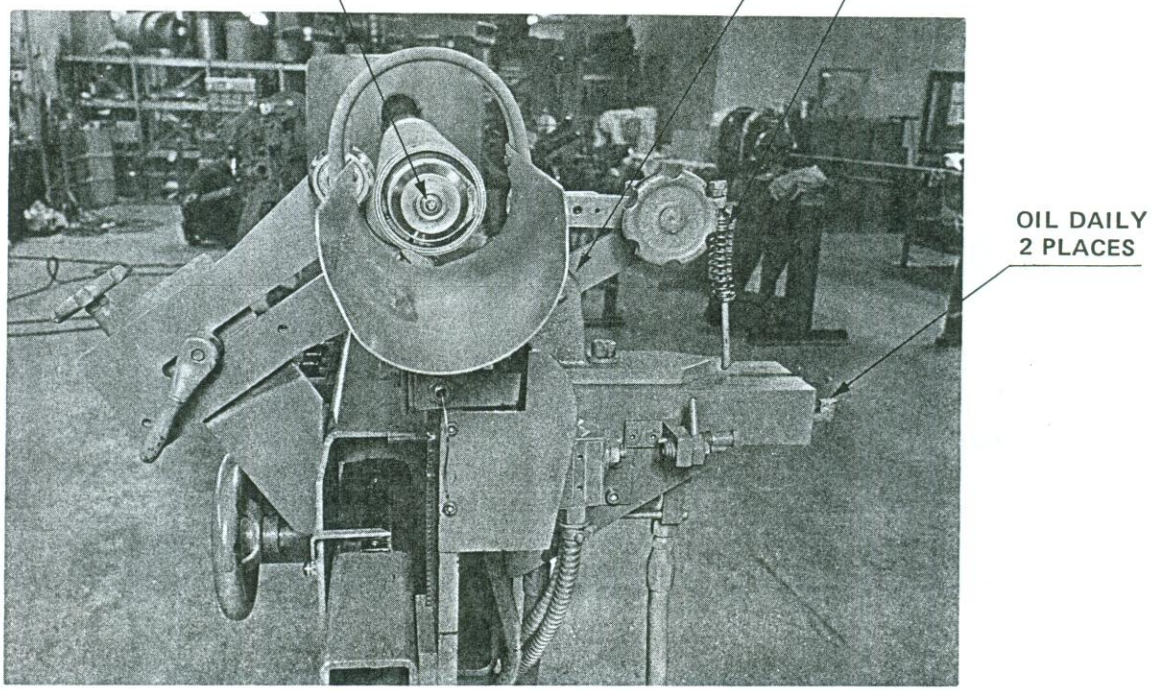


ILLUSTRATION 33

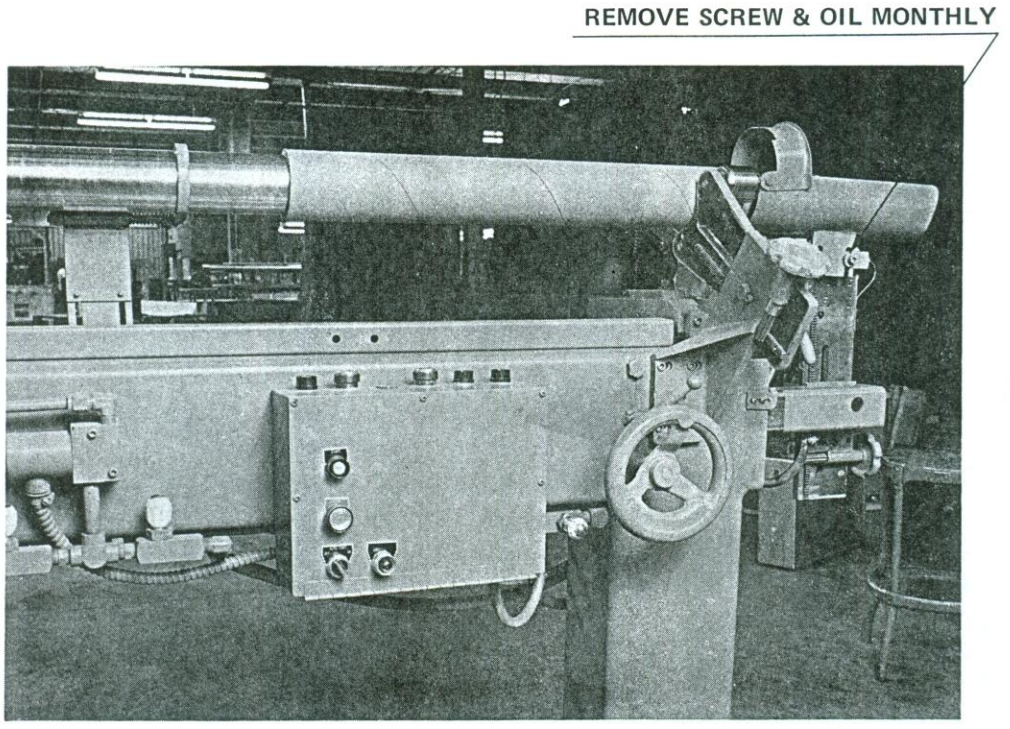


ILLUSTRATION 34

TUBE CUTTER – MODEL D

(REFER TO WIRING DIAGRAM)

SEQUENCE OF OPERATION (AUTOMATIC CONTROL)

1. Push Button No. 1 is pressed, energizing relay No. 1, which in turn energizes Solenoid A of valve No. 1 and starts feed motor. The tube is fed forward until it contacts the target.

2. Target switch is actuated (Limit Switch No. 1); Solenoid A of valve No. 2 is energized. Cylinder No. 1 advances, causing the tube to be gripped and rotated. At the same time but at a slower rate, cylinder No. 2 advances the knife. When the Limit Switch No. 1 is actuated, the holding circuit of the relay No. 1 is broken, de-energizing Solenoid A of valve No. 1 and stopping the feed motor. Also, as Cylinder No. 1 advances, the normally closed terminal of Limit Switch No. 2 is contacted, energizing Solenoid No. 1 and rotating the target out of the path of the tube.

3. On the standard machine, when cylinder No. 2 is fully extended, Limit Switch No. 4 is actuated, energizing Solenoid B of valve No. 2; cylinders No. 1 and 2 retract.

   On machines equipped with two-speed cross slides, as cylinder No. 2 advances, Limit Switch No. 3 is actuated, energizing the Solenoid of valve No. 4. This stops the free flow of oil and diverts the flow through valve No. 6 (2nd speed flow control), causing the cross slide to slow down the final penetration of the knife through the wall of the tube. When cylinder No. 2 is fully extended, Limit Switch No. 4 is actuated, energizing Solenoid B of valve No. 2, cylinders No. 1 and 2 retract.

4. As cylinder No. 1 retracts, the normally closed terminal of Limit Switch No. 2 is opened, de-energizing Solenoid No. 1. This allows the target to rotate back into the path of the tube, setting it up for the next cut. Also, the normally open terminal of Limit Switch No. 2 is closed, energizing relay No. 1 and restarting feed motor, as mentioned in paragraph 1. The cycle now repeats.

5. The above cycle repeats until the tube is completely fed off the mandrel. Limit Switch No. 5 is actuated, energizing relay No. 2, which in turn energizes Solenoid B of valve No. 1. Feed motor reverses direction and returns feed follower to rear of the mandrel. When feed follower reaches the rear most position, Limit Switch No. 6 is actuated, breaking holding circuit of Relay No. 2 and de-energizing Solenoid B of valve No. 2. Feed motor stops. The machine is now ready to receive another tube.

6. Option F provides a movable limit switch in series with L.S.6 so the feed follower can be stopped at any desired point when on the return cycle.

NOTES:

1. Relays No. 1 and 2 are interlocked so that only one Solenoid of valve No. 1 can be energized at a time.

2. The hot wire of the Limit Switch No. 1 is taken from the normally open terminal of Limit Switch No. 2 (wire No. 12). Solenoid A of valve No. 2 cannot be automatically energized at the same time as Solenoid B of valve No. 2.

3. Push buttons are interlocked.

4. Speed of the feed is controlled by flow control valves (valve No. 7 controls the forward speed and valve No. 8 controls return speed of the feed follower).

5. Speed of the cut-off stroke is controlled by valve No. 5. When the two-speed cross slide option is used, valve No. 5 controls the first part of the stroke of cylinder No. 2 and valve No. 6 controls the final speed.