# OPERATING INSTRUCTIONS AND SERVICE MANUAL

CINCINNATI

## *spiropoint drill sharpener*

MODEL LM

SERIES 500, 750 AND 1000


**CINCINNATI LATHE AND TOOL CO.**

Cincinnati 9, Ohio U. S. A.

PUBLICATION SP-155-4

# FOREWORD

This manual has been prepared for use with the Model LM Series 500, 750 and 1000 Spiropoint drill sharpeners manufactured by Cincinnati Lathe and Tool Co., Cincinnati 9, Ohio, U.S.A.

Because of continual betterment of design, it is possible that data contained in this manual may not fully apply to the machine delivered to you. Any differences merely indicate that your machine incorporates improvements to better fulfill your requirements.

## WARRANTY

Cincinnati Lathe and Tool Co. warrants each Cincinnati Spiropoint drill sharpener to be free from defects in material and workmanship. Replacements for any parts of this machine or its equipment, which, when owned by the original user, under normal operation or service, prove defective in material or workmanship as determined by an inspection authorized by us, will be furnished f.o.b. plant, free of charge during a period of one year from date of shipment from factory.

The design and specifications of Cincinnati Spiropoint drill sharpeners are subject to change without notice. Cincinnati Lathe and Tool Co. reserves the right to make such changes without incurring any obligation to apply them to Spiropoints previously sold.

**THE SPIROPOINT IS A PRECISION DRILL SHARPENER. FOR CORRECT OPERATION, IT IS ESSENTIAL THAT THE INSTRUCTIONS IN THIS MANUAL BE READ AND FOLLOWED.**

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Cinti Milicron Prod. Dv
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# *The Spiropoint Drill Sharpener*

## DESCRIPTION I-1

GENERAL . . . . . The Spiropoint Drill Sharpener is a precision drill grinder which automatically applies the "spiral point geometry"* to a standard twist drill. It is designed so that the drill is held in a stationary position. A cylinder grinding wheel gyrates around the drill producing the desired shape on its point. The Spiropoint may be rapidly adjusted to grind a range of drill diameters, to produce clearance angles above or below the normal amount, to produce point angles from 90 degrees to 180 degrees, and to thin the webs of heavy webbed drills. The Spiropoint is a portable type unit supplied with cord plug-in connections for single phase, 50/60 cycle, 115/230 v., a.c. electrical operation.

MAJOR COMPONENTS . . . . . 1. Clearance angle adjustment control.

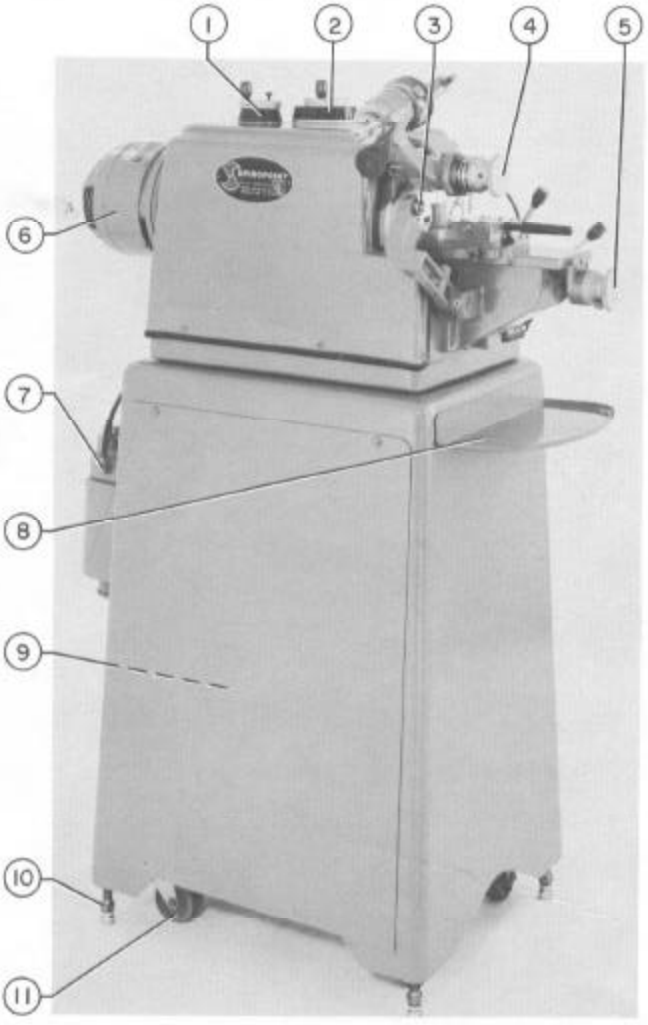



Figure 2

2. Drill diameter adjustment control.
3. Retractable locator for radially positioning the drill.
4. Truing unit micrometer feed control. This control has a micrometer dial, graduated in 0.001" increments, which facilitates precise feed for advancing diamond into wheel.
5. Micrometer feed control. This control has a micrometer dial which facilitates precise feed for stock removal. It is graduated and detented in 0.001" increments.
6. Main drive motor.
7. Mist coolant system.
8. Work tray.
9. Individually motor driven dust collector.
10. Screw jacks.
11. Casters.
12. Adjustable precision truing device which shapes the grinding wheel surface so that the point angle of the drill may be varied between 90 degrees and 180 degrees.

*U. S. Patent No. 2,903,922

13. Truing lever. Swiveling movement of this lever moves diamond along face of wheel, up over its radius, and onto its outside diameter.

14. Cylinder grinding wheel mounted in a rotating spindle which gyrates around and reciprocates along the drill axis producing the desired shape on the drill point.

15. Drill clamping jaws activated by precision left- and right-hand screw which equally clamps both jaws, thereby centering the drill on the axis of wheel gyration.

16. Main slide on which the jaws are advanced toward or retracted from the grinding wheel.

17. Grinding wheel guard.

18. Spindle gyration stop control. This activates a solenoid and stop which accurately position the spindle for grinding wheel truing.

19. Jaw clamping lever.

20. Slide rapid feed lever.

21. On-off electrical switch.

22. Electrical panel and tool storage compartment.

23. Coolant nozzle.

24. Mist coolant adjustment screw.

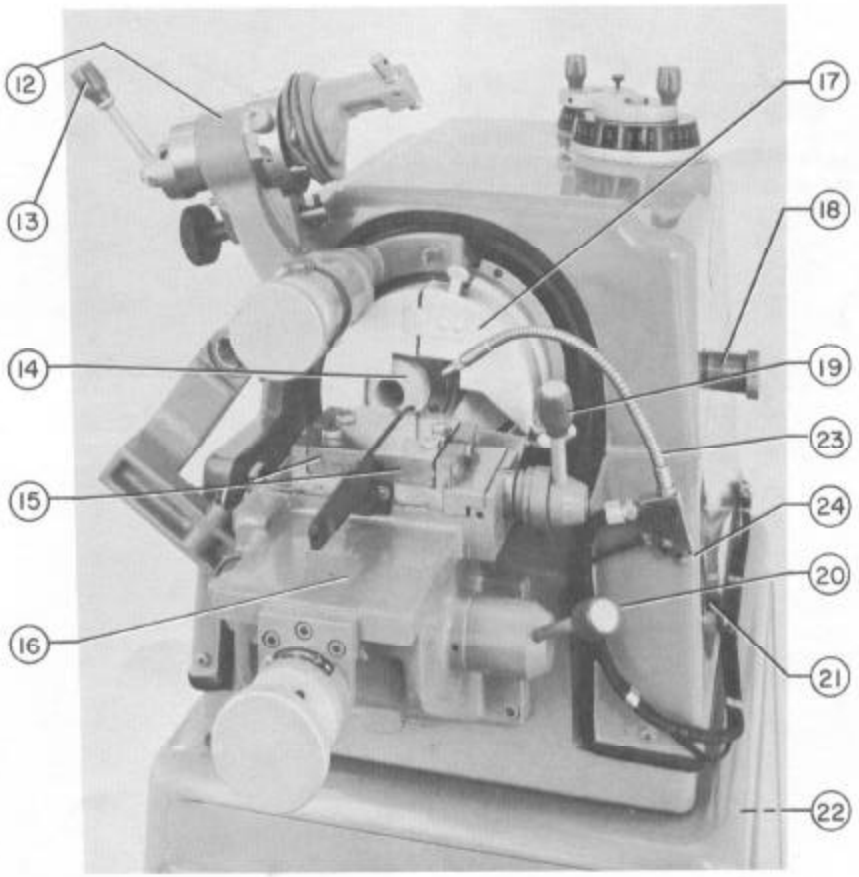



Figure 3

# OPERATING INSTRUCTIONS I-2

## I-2a Grinding Drills

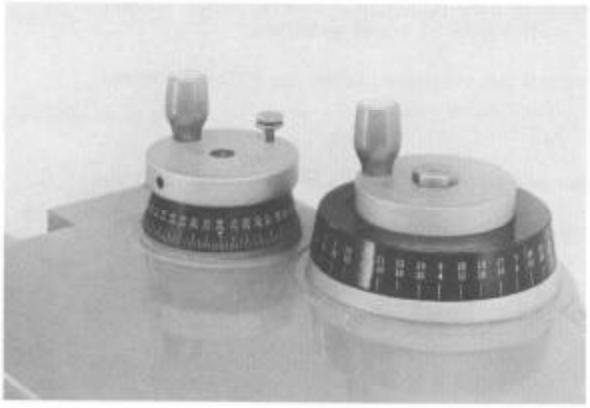


Figure 4a

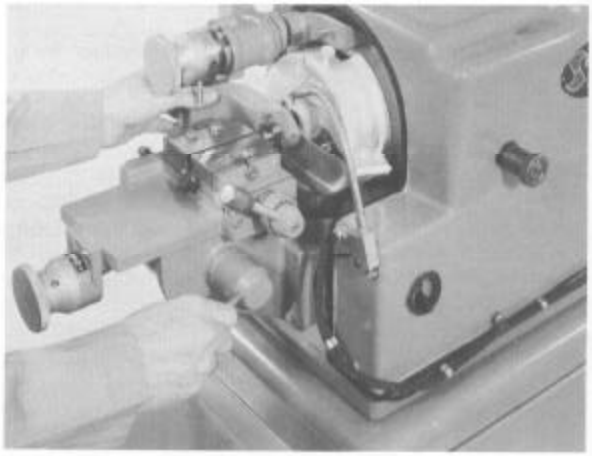


Figure 4b

1. The Spiropoint is adjusted for the specific drill diameter by setting the dial, graduated in 1/32" or one millimeter increments, on top of the unit (see Figure 4a). A cone grind setting is included on the dial. This setting is for truing the grinding wheel.

2. Adjustment for clearance angles above or below the normal amount, as may be required for special applications, is provided by setting the smaller dial on top of the cabinet. See section II-3, "Clearance Angles", for the correct settings for various angles.

3. To sharpen drills, retract the main slide with the rapid feed lever, swing the locator arm down to its positive stop, advance the slide as far as it will go, thereby locking the locator in its correct locating position. (See Figure 4b.)

4. Rotate the micrometer feed control counterclockwise as far as it will go.

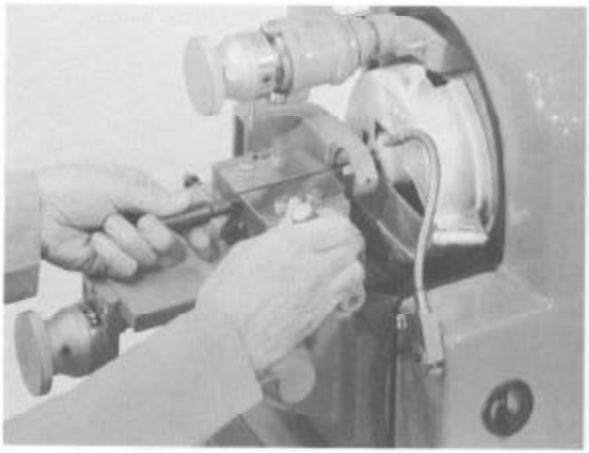


Figure 4c

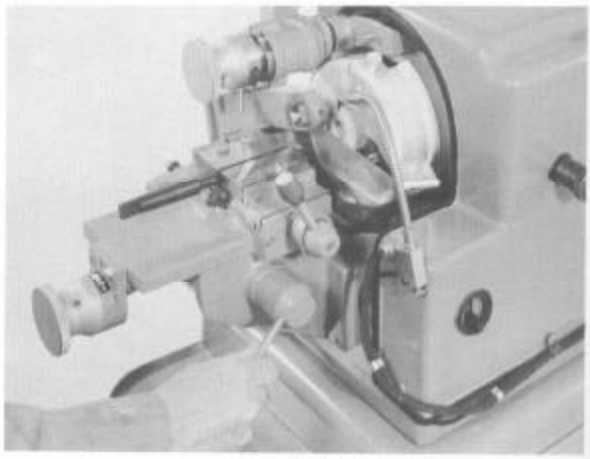


Figure 4d

5. Loosely clamp the drill between the vise jaws. Push the drill into the locator bushing and rotate it clockwise until its lips contact the locator stops. Lock the vise jaws with the clamping lever. (See Figure 4c.)

6. Retract the slide with the rapid feed lever until the locator swings to its retracted position. (See Figure 4d.)

7. Advance the slide with the rapid feed lever until the end of the travel is reached. (See Figure 5a.)

8. Turn on the coolant and direct the nozzle so that the spray covers the drill point.

9. Exert forward pressure on the rapid feed lever while feeding the drill into the grinding wheel with the micrometer feed control. (See Figure 5b.) The drill should be fed at a rate which will produce a bright finish without discoloration or over-heating. This will result in maximum drill life.

10. When the desired amount of stock has been ground from the drill, retract the slide, unclamp the vise jaws and remove the drill.

IF MORE THAN 0.015" to 0.020" OF STOCK IS REMOVED, ON COMPLETION OF THE GRIND, RELOCATE THE DRILL IN THE LOCATOR BUSHING. THEN REMOVE APPROXIMATELY 0.003" to 0.005" MORE STOCK. THIS ADDITIONAL STEP IS USUALLY NECESSARY TO PRODUCE THE CORRECT POINT GEOMETRY. IT MUST ALWAYS BE PERFORMED WHEN GRINDING A "CHISEL POINT" TO A "SPIRAL POINT".

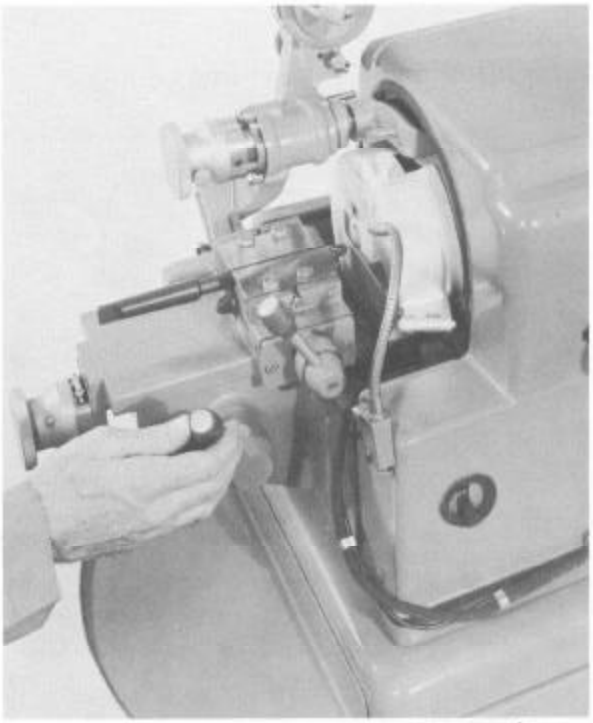


Figure 5a

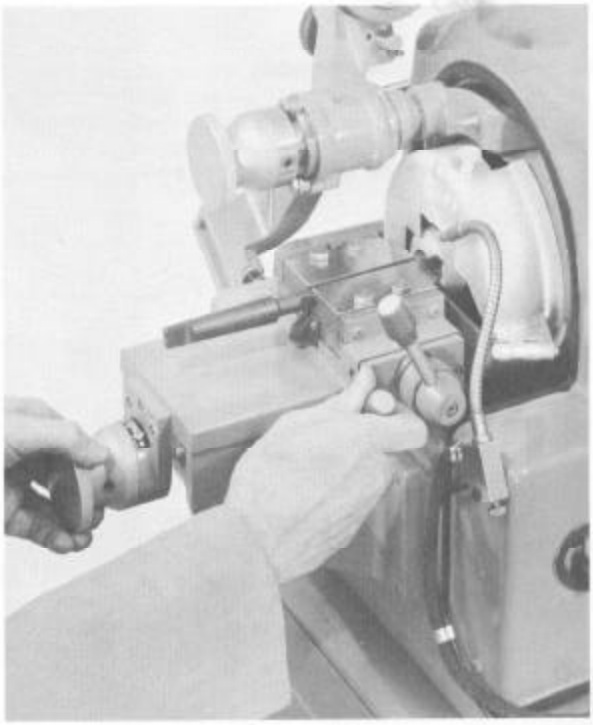
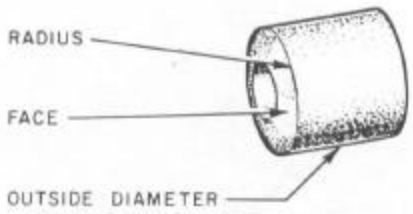


Figure 5b

# OPERATING INSTRUCTIONS 1-2

## 1-2b Grinding Wheel Truing




The grinding wheel has three elements which control the shape of the drill point—its face, radius and outside diameter. The truing unit is adjustable so that precise control of each of these elements may be maintained. Prior to dressing the grinding wheel, stop the machine and make certain that the following adjustments are made properly:

FACE

The face angle of the grinding wheel controls the point angle of the drill. Therefore, the truing unit is adjustable so the face angle may be varied to produce point angles between 90 and 180 degrees. To adjust the truing unit for the desired point angle, loosen the knurled thumbscrew (1, Figure 6) on the angle adjustment plate (2). Rotate the plate until the scribe mark on the housing is in line with the scribe mark for the desired point angle. Retighten the thumbscrew.

RADIUS

The radius of the wheel must be varied for the specific diameter of the drill being ground. To adjust the truing unit to shape the correct radius, unclamp the radius adjustment sleeve (5, Figure 6) by loosening the two hex head screws (6) on either side of the drill diameter plate. (Use the wrench supplied with the machine.) Rotate the sleeve, using its adjustment pin (7), until the scribe mark is in line with the applicable drill diameter mark on the reference plate. Reclamp the sleeve by tightening the two hex head screws. The diameter plate is graduated in 1/16" increments. If no mark is given for the diameter of the drill being ground, set the unit for the next larger drill diameter mark.

1. Adjustment plate thumbscrew.
2. Point angle adjustment plate.
3. Truing lever.
4. Truing unit locking knob.
5. Radius adjustment sleeve.
6. Locking screws.
7. Adjustment pin.
8. Micrometer feed control.
9. Grinding wheel guard door.
10. Set screw for diamond.
11. Diamond nib.
12. Spindle gyration stop control.

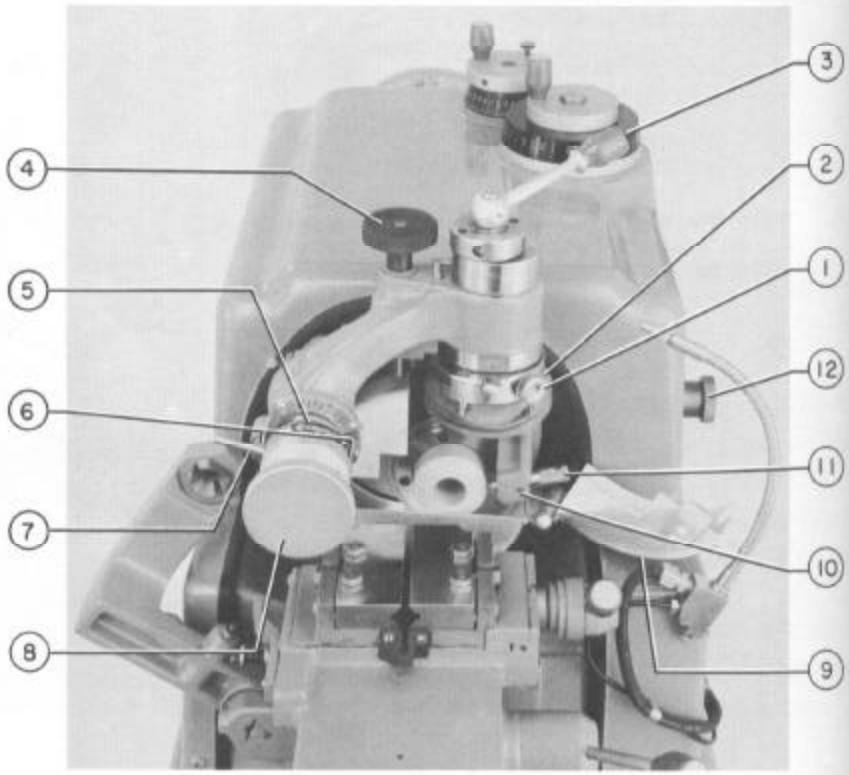



Figure 6

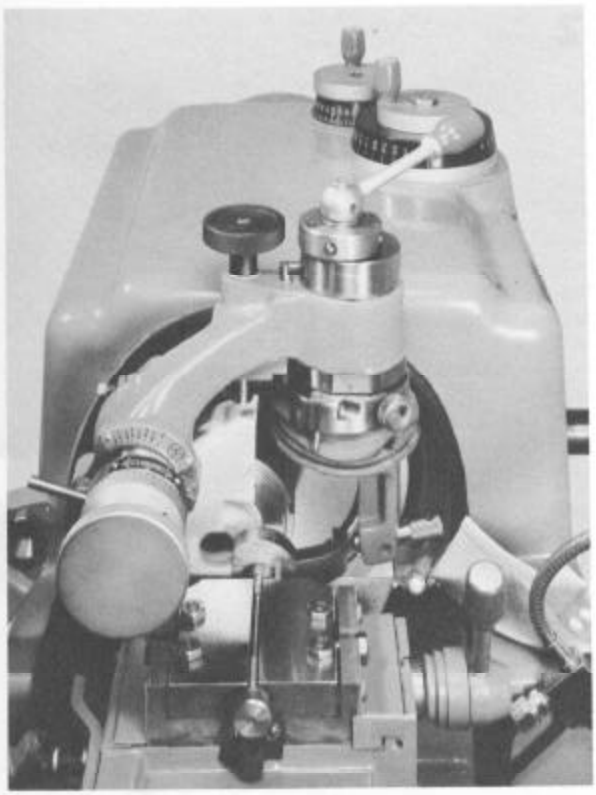


Figure 7a

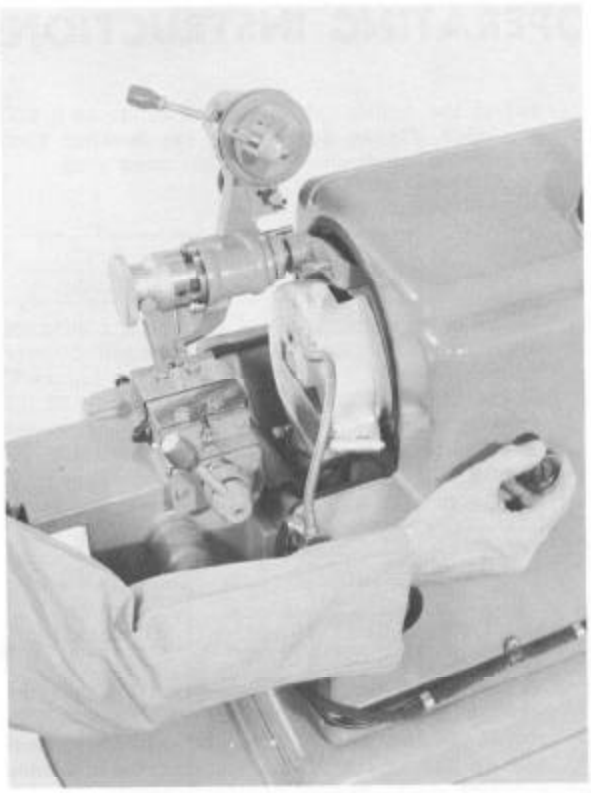


Figure 7b

## OUTSIDE DIAMETER

The outside diameter of the grinding wheel is controlled by the position of the diamond nib (11, Figure 6) in the truing unit. FOR ACCURATE WHEEL TRUING, THE DIAMOND MUST BE POSITIONED CORRECTLY. The diamond must be repositioned every time the radius adjustment is changed or, the diamond has worn due to usage. In addition to correct positioning, the diamond should be rotated a small amount periodically. This causes uniform diamond wear by presenting a new surface to dress the wheel. To position the diamond, set the drill diameter dial at cone grind. Stop the machine so that the grinding wheel comes to rest to the left of the machine's centerline. Swing open the right side section of the grinding wheel guard (9, Figure 6). Swivel the truing unit to its operating position as shown in Figure 7a. Lock it in place with its locking knob (4, Figure 6). Clamp the diamond setting gage in the drill clamping jaws. DO NOT TURN ON THE MACHINE WHILE THE DIAMOND SETTING GAGE IS CLAMPED IN THE JAWS. Locate the gage so the diamond may touch the ground radius on the arm of the gage. Swivel the truing lever (3, Figure 6) until the diamond is in the position corresponding to the position at which it dresses the O.D. of the wheel (as in Figure 7a). Loosen the set screw (10) and move the nib (11) in until the diamond point just touches the recommended feeler gage referred to in chart on page 21. This setting is necessary to insure the correct central cutting edge angle (28°). After setting the diamond nib, lock it in place by tightening the set screw. Remove the setting gage from the jaws.

## OPERATING THE TRUING UNIT

1. Set the drill diameter dial at cone grind.

2. Start the machine. Push in the spindle gyration stop control (Figure 7b) and turn it clockwise. The grinding wheel will be positioned at exactly the right location for truing.

3. Swing open the grinding wheel guard door.

# OPERATING INSTRUCTIONS 1-2

4. Swivel the truing unit clockwise as far as it will go. (See Figure 8a.) Turn the locking knob (Figure 8b) clockwise until it becomes snug.

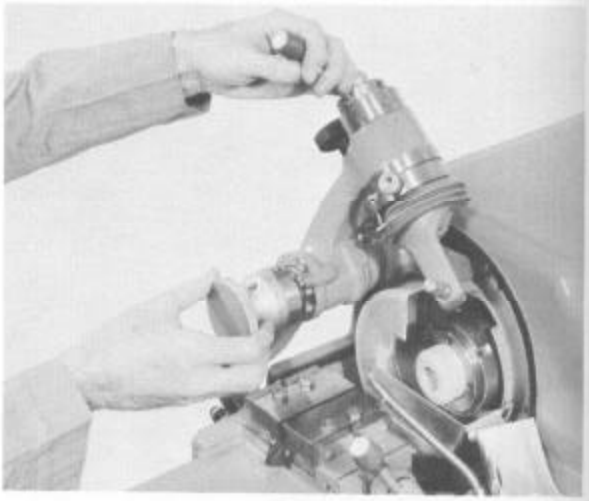


Figure 8a

5. To dress the grinding wheel (Figure 8c), advance the diamond into the wheel with the micrometer control. Swivel the dressing lever (3, Figure 6) so the diamond travels across the face of the grinding wheel, along its radius and across the outside diameter. The radius and outside diameter of the grinding wheel are its most critical dimensions and they should be dressed very carefully.

6. The diamond should be passed over the grinding wheel at a moderate speed. A faster dress will result in a coarser finish on the grinding wheel and eventually the drill. A slow dress will give a better finish on the grinding wheel, but this fine finish will have a tendency to burn the cutting edge of the drill.

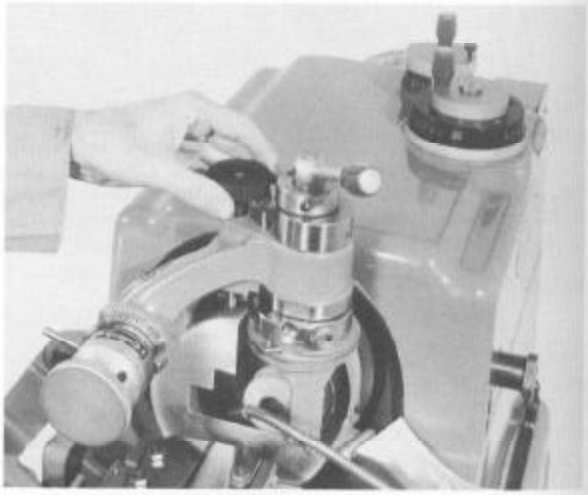


Figure 8b

7. The grinding wheel is dressed with a diamond nib which should only be used for finish truing. It should be fed into the wheel no more than 0.001" per pass. When the radius of the grinding wheel is to be increased for larger size drills, it is recommended that this radius be dressed prior to dressing the entire grinding surface of the wheel. If the desired drill point angle requires a considerable amount of stock removal from the face of the grinding wheel, it is recommended that the initial stock removal be made with a coarse dressing stick. The truing device should then be employed for accurately finishing the grinding wheel. When using the dressing stick, be sure that no stock is removed from the outside diameter of the grinding wheel as this dimension is extremely critical.

8. After truing the grinding wheel, unlock the truing unit by turning the locking knob counterclockwise. Then swivel the unit counterclockwise until it comes to rest on the main housing pin. Close the wheel guard door.

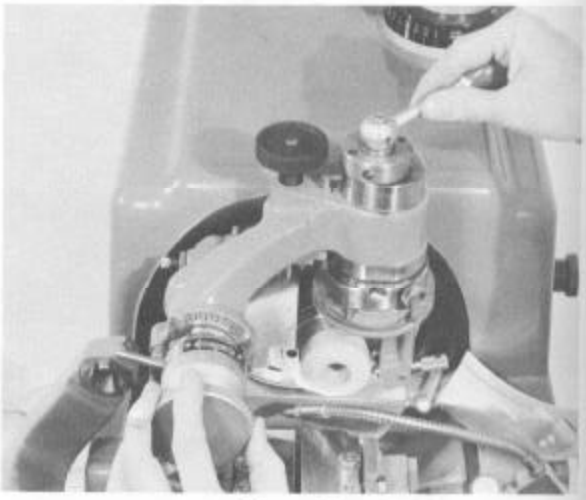


Figure 8c

## I-2c Web Thinning

The Spiropoint drill sharpener may be used for thinning the webs of heavy-webbed drills. Set up the machine in the same manner as for drill sharpening with these two exceptions: 1) the clearance angle dial is set for its maximum reading—59; 2) the drill diameter dial is set according to the chart to the right.

| Actual Drill Diameter | Drill Diameter Dial Setting |
|---|---|
| 1/16 | 3/32 |
| 3/32 | 1/8 |
| 1/8 | 5/32 |
| 5/32 | 3/16 |
| 3/16 | 7/32 |
| 1/4 | 9/32 |
| 9/32 | 5/16 |
| 5/16 | 3/8 |
| 11/32 | 13/32 |
| 3/8 | 7/16 |
| 13/32 | 15/32 |
| 7/16 | 1/2 |
| 15/32 | 17/32 |
| 1/2 | 9/16 |
| 17/32 | 5/8 |
| 9/16 | 21/32 |
| 19/32 | 11/16 |
| 5/8 | 23/32 |
| 21/32 | 3/4 |
| 11/16 | 25/32 |
| 23/32 | 13/16 |
| 3/4 | 27/32 |
| 25/32 | 7/8 |
| 13/16 | 29/32 |
| 27/32 | 31/32 |
| 7/8 | 1 |

1. The radius and face angle of the grinding wheel should be the same as employed for sharpening the drill point.

2. Locate and clamp the drill in the jaws in the normal manner for sharpening the point.

3. Rotate the micrometer feed control counterclockwise at least two complete revolutions (0.100") from its setting when sharpening the drill point.

4. Feed the drill into the grinding wheel employing the micrometer feed control. Use considerable caution in feeding the drill into the wheel. Because the high clearance angle setting gives the wheel its maximum movement parallel to the drill axis, care must be taken to prevent excessive stock removal.

5. The web thinning operation gives the drill point the appearance illustrated in Figure 9. The grey area indicates the stock removed during the thinning operation. The machine operator must determine the amount of stock to be removed. The most important dimension in this decision is the dimension marked "X" on Figure 9. It is recommended that this dimension be held to approximately one-eighth the drill diameter. Should the operator accidentally remove too much stock, this may be corrected by removing a small amount of stock with the normal sharpening process.

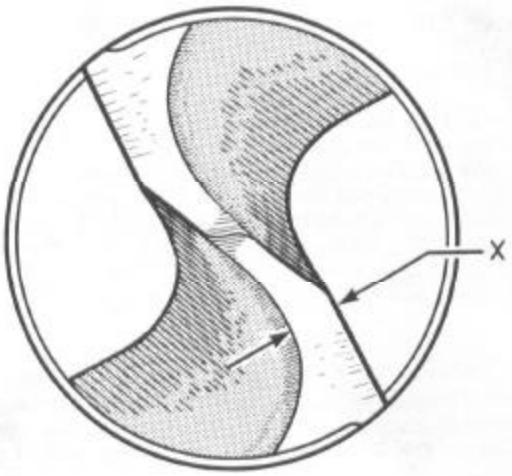
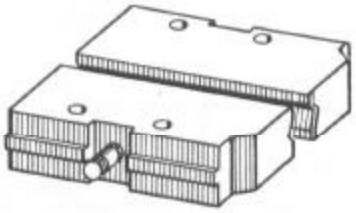



Figure 9

# ADDITIONAL OPERATING INSTRUCTIONS I-3



JAWS

Interchangeable vise jaws are supplied with the Spiropoint for various ranges of drill diameters. The Series 500 is equipped with one set of jaws for 1/8" to 1/4" drills, and one set of jaws for 1/4" to 1/2" drills. The Series 750 is equipped with one set of jaws for 1/8" to 1/4" drills, one set for 1/4" to 1/2" and one set for 1/2" to 3/4" drills. The Series 1000 is equipped with one set of jaws for 1/8" to 1/4", 1/4" to 1/2", 1/2" to 3/4", and 1/2" to 1" diameter drills. The small drill attachment has one set of jaws for #60 to 1/8" drills. Jaws are changed by removing the two nuts on top of the jaw and loosening the nut on its side with the wrench provided. When replacing jaws, be certain that no dirt is between the jaw and its support. A small amount of dirt will throw the jaws out of position.

The right- and left-hand jaws are ground as matched sets. Therefore, when more than one Spiropoint is in use, be sure to keep the right- and left-hand jaws supplied with a particular machine together as a set. For example, never replace the left-hand jaw on one machine with the left-hand jaw from another machine.

LOCATORS

The Series 500 Spiropoint is equipped with two locators, one for 1/8" to 1/4" drills and one for 1/4" to 1/2" drills. The Series 750 has one locator for 1/8" to 1/4", one for 1/4" to 1/2", and one for 1/2" to 3/4" drill diameters. The Series 1000 has one locator for 1/8" to 1/4", 1/4" to 1/2", 1/2" to 3/4" and 3/4" to 1" drill diameters. The small drill attachment has one locator for #60 to 1/8" drills.

To change locators, loosen the Allen screw at the end of the locator arm. The locator may then be removed from its socket. When replacing the locator, place it in its socket and align the flat on its diameter with the scribe line on the locator arm. Retighten the Allen screw at the end of the locator arm.

GRINDING WHEELS

Selection of the proper grinding wheel depends on the size of drill that is to be sharpened. When smaller drills are ground, harder and finer grinding wheels are recommended. A coarse grit grinding wheel is recommended for larger diameter drills. The grinding wheels supplied as standard equipment with the Spiropoint have been selected to cover a range of drill sizes. Half of these grinding wheels are shaped for 118 degree points; half are shaped for 180 degree sheet metal points. The small drill attachment includes an 118 degree grinding wheel and an 180 degree grinding wheel of a grade suited for the small drill range.

Additional grinding wheels should be obtained from the Products Division of the Cincinnati Milling Machine Company. In cases such as drill manufacturing and contract resharpening where it is possible to grind a large number of drills of one size at one time, it is recommended that a specific grade of grinding wheel be employed for a specific drill diameter. Consult the Products Division of the Cincinnati Milling Machine Company for the correct wheel grade for these applications.

REPLACING GRINDING WHEELS

The cylinder grinding wheel is mounted on an arbor which is held in the spindle by a self-locking taper. When replacing or adjusting grinding wheels, remove the arbor from the spindle. Several arbors and grinding wheels are supplied with each machine (2 on 500 and 750 series; 3 on 1000 series) and can be preassembled to facilitate changing grinding wheels.

To replace a grinding wheel remove the removable cover (1, Figure 22). Place the 710497 wrench between the rear arbor nut and spindle end. Apply hand pressure to the wrench to break the arbor loose from the spindle. After removing the arbor from the spindle and using Figure 11 as a guide, remove the

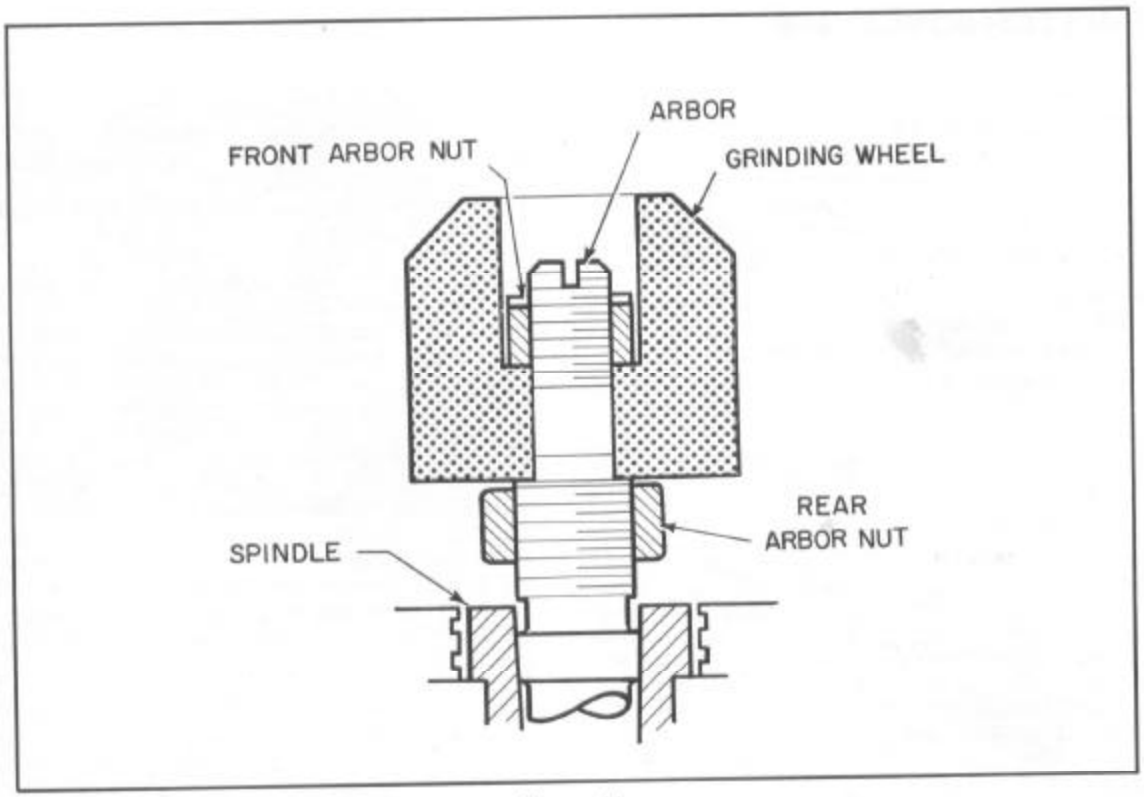



Figure 11

front arbor nut and grinding wheel from the arbor with the 710142 wrench. (Turn nut counterclockwise to remove.) Install the new grinding wheel, being sure the arbor and inside diameter of the grinding wheel are clean and free of foreign material and the rear face of the grinding wheel is seated against the arbor shoulder. Carefully clean tapered surfaces on arbor and in spindle, and install arbor in spindle. Use only hand pressure to seat arbor.

Extended life may be obtained from worn grinding wheels by the following procedure:
Remove the arbor from the spindle following procedure outlined above. Using Figure 11 as a guide, remove the front nut and grinding wheel using the 710142 wrench. Back up the rear arbor nut until the forward face extends past the arbor shoulder approximately 1/2 the nut width. (DO NOT EXCEED THIS LIMIT.) Replace grinding wheel and front arbor nut, being sure the rear face of the grinding wheel contacts the rear arbor nut. Install arbor in spindle using hand pressure only to seat arbor.

## GRINDING WHEEL GUARD

A removable grinding wheel guard is provided as standard equipment for the Spiropoint. This guard should always be employed during both grinding and truing operations. It not only is important for operator safety but also is essential for efficient functioning of the dust collector system.

The upper section of the grinding wheel guard must be removed when changing or adjusting the position of the grinding wheel. To remove this section of the guard, grasp it firmly and pull it toward the front of the machine.

## COOLANT SYSTEM

The Spiropoint is equipped with a spray mist coolant system. In addition to its normal use when drill sharpening and web thinning, it is recommended that the mist be directed at the diamond point when truing the grinding wheel.

To operate the unit, connect shop compressed air (125 psi maximum) to the 1/4" pipe thread inlet hole on the left side of the unit. Fill the reservoir with a water base coolant. Be sure that the coolant contains sufficient rust inhibitor to prevent rusting of exposed metal surfaces.

When the Spiropoint's electrical switch is turned on, coolant flow begins automatically. Adjust the mist to the desired wetness with the knurled screw on the coolant junction block located above the on-off electrical switch.

# MAINTENANCE I-4

ADJUSTING MASTER JAW GIB (See Figure 12a.)

A flat gib is provided to compensate for wear between the bearing surfaces of the master jaws and jaw slide. When wear develops as indicated by loose movement of the jaws, the gib should be adjusted.

To adjust gib, loosen the five jam nuts located at the rear of the main slide. Adjust the gib by tightening the five Allen screws. Relock the jam nuts.

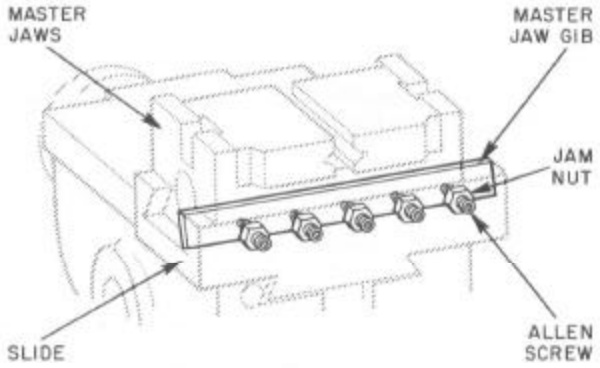



Figure 12a

ADJUSTING THE SLIDE GIB
(See Figure 12b)

A taper gib is provided to compensate for wear between the bearing surfaces of the main slide and the supporting bracket. When wear develops in the slide, as indicated by loose movement, the gib should be tightened. This is accomplished as follows: Loosen the screw at the rear of the gib. Adjust the gib with the screw at its front. Then relock the gib with the screw at its rear. The gib should never be drawn up so tightly that it prohibits free movement of the slide with the rapid feed lever. NOTE: Tightening of the gib throws the jaws off center. To center the jaws, follow the instructions on this page.

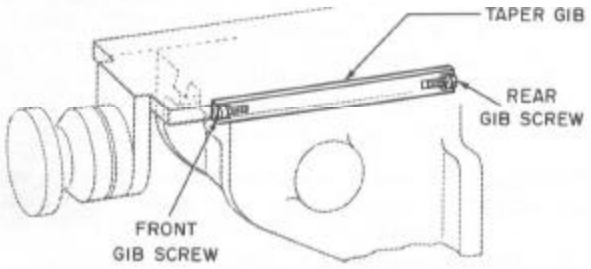



Figure 12b

CENTERING THE JAWS (Reference numbers refer to underlined numbers on Figure 32, page 32.)

To check the horizontal location of the jaws, perform the following steps:

Set the drill diameter dial at 1/4" on the Series 500 Spiropoint, 3/8" on the Series 750, or 1/2" on the Series 1000. Mount the aligning gage supplied with the machine in either the jaws supplied for the 1/4" to 1/2", 1/2" to 3/4", or 1/2" to 1" drill diameters. Locate the gage so that the flat ground surface is vertical and the small locating pin rests on the top of the right jaw (see Figure 12c). Mount a rod in the threaded hole (1/4-20 thread) in the face of the spindle housing. Mount a small dial indicator on the rod and place the indicator point on the vertical flat surface of the gage. Jog or rotate the spindle by hand until the spindle carrier reaches its maximum horizontal travel in the direction the indicator is reading. Set the indicator at zero at the point of maximum horizontal travel.

Relocate the gage so that the pin is snug against the bottom of the left-hand jaw. Jog or rotate the spindle by hand until the indicator reaches the vertical flat surface on the gage. Rotating the spindle by hand, position the spindle carrier at the point of maximum horizontal travel in this direction. If the indicator reads zero, the jaws are horizontally on center. If the indicator does not read zero, the jaws must be repositioned.

To reposition the jaws, use the threaded adjustment bushing (61) on the right of the jaws. Remove outer set screw (34) and loosen set screw beneath it. Remove the rubber boot (50) covering the adjustment bushing (61). Loosen the jam nut (107) by rotating it counter-clockwise. Rotate the bushing clockwise or counter-clockwise to correct the jaw misalignment. Retighten the jam nut (107) and the inner set screw

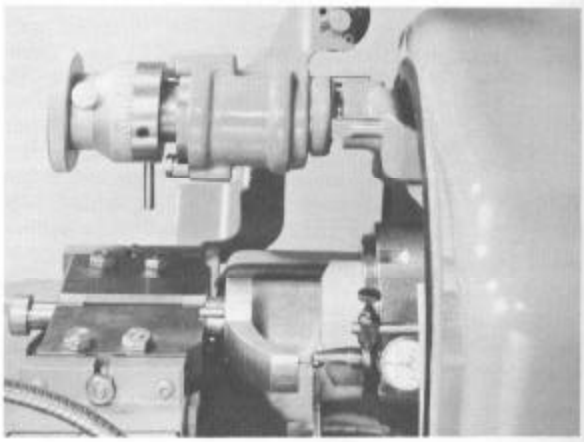


Figure 12c

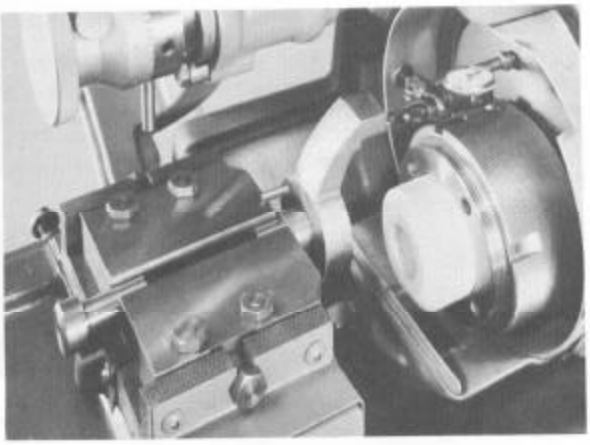


Figure 13a

(34). Clamp and unclamp the jaws three or four times with hard pressure. Repeat the test to make certain the jaws are correctly centered. Then replace the rubber boot and outer set screw (34).

To check the vertical position of the jaws, rotate the gage until its flat ground surface is horizontal (see Figure 13a). To check upper travel, the small locating pin should rest on top of the left jaw. To check lower travel, the pin should be snug against the bottom of the right jaw. Employing the method outlined above, determine if the jaws are high or low. If, for example, the indicator reads 0.004", the work holding bracket must be moved one-half this distance. Leave the indicator in position and move the bracket until the indicator reads 0.002".

To relocate the jaws vertically, loosen the four Allen head screws (88 and 99) which hold the work holding bracket to the main casting. Keep these screws snug. The jaws are raised or lowered with the two screws (100 and 101) at the bottom of the work holding bracket. To raise the jaws, loosen the set screw (100) and turn the Allen head screw (101) clockwise until the desired elevation is reached. Then retighten the set screw (100). To lower the jaws, loosen the Allen head screw (101) and then turn the set screw (100) clockwise. Tighten the Allen head screw (101) after the desired elevation has been reached. On completing the adjustment, retighten the four Allen head screws (88 and 99) which hold the work holding bracket to the base.

CLEANING THE MAIN SLIDE
(Numbers refer to encircled numbers on Figure 32, page 32.)

The bearing surfaces of the main slide and supporting bracket should be cleaned once a week or when movement of the main slide becomes tight or "sticky". To clean these surfaces, remove the front gib screw (82) and remove the gib (83). Back the slide out and lift it off the support bracket. Clean the bearing surfaces of the slide and the support bracket with a clean, dry cloth. NOTE: These bearing surfaces are treated with a dry lubricant. Therefore, they must not be cleaned with solvent or coated with oil.

After cleaning, replace the slide on the bracket, then clean and replace the gib. Adjust the gib according to instructions above.

SETTING LOCATOR
(Numbers refer to bracketed numbers on Figure 32, page 32.)

After checking the jaw alignment, check the setting of the locator as follows:

Remove the locator bushing from the locator arm. After inserting the gage in the jaws so that its arm faces the operator, swing the locator arm into the position used for locating a drill and advance the jaws so that the round end of the gage enters the hole in the locator arm, as shown in Figure 13b. If the gage does not slide into the hole freely, remove set screw (78) and loosen the set screw (77). Rotate the eccentric pin (87) with a screwdriver until the round end of the gage slides freely into the locator hole.

Retighten the set screw.

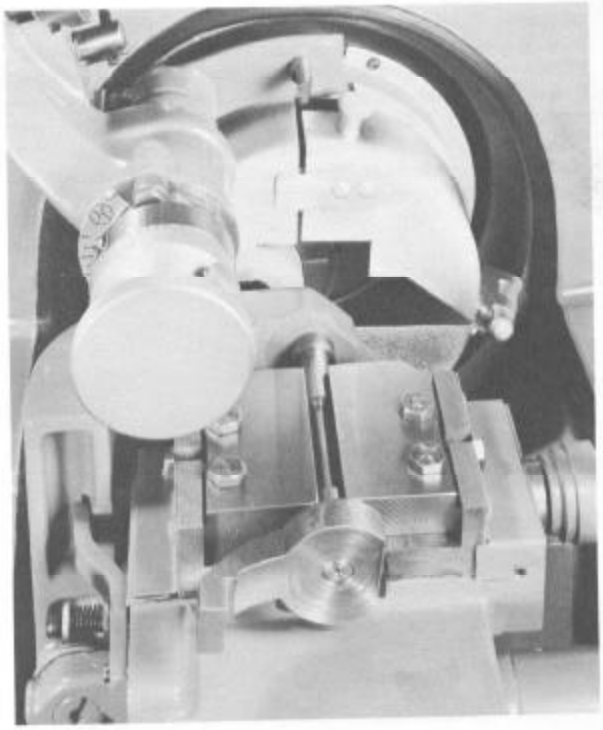


Figure 13b

# MAINTENANCE I-4

## CLEANING THE DUST COLLECTOR

The dust collector must be emptied weekly. To empty it, remove the panel on the left side of the base. The dust bin is clamped by two latches to the bottom of the suction unit. Release the latches, drop the bin, and empty. A fiberglass filter is located on top of the dust bin. This should be replaced periodically or cleaned with forced air.

## RESETTING DRILL DIAMETER AND CLEARANCE ANGLE ADJUSTMENT DIALS

Should it be necessary to remove the drill diameter or clearance angle dials to facilitate internal repairs on the Spiropoint, they may be correctly replaced as follows:

### DRILL DIAMETER DIAL

(Reference numbers refer to underlined numbers on Figure 28, page 28.)

Mount the dial wheel (16) on the leadscrew (21). Mount an indicator on the work slide and place the indicator point against the side of the wheel dresser so that it will record the movement of the spindle carrier in the plane perpendicular to the drill axis as shown in Figure 14a. Turn on the Spiropoint. You will note that two "dwells" are evident on the indicator during one gyration of the wheel around the axis of the drill. The distance between these "dwells" varies with changes in the drill diameter dial setting. You must set the diameter dial so that the total movement between "dwells" is 0.073". The easiest way to accomplish this is to set the indicator "zero" at the midpoint between the "dwells". That is, set the indicator dial so that both "dwells" measure an equal amount on either side of zero. Then, rotate the dial wheel clockwise or counter-clockwise until the "dwell" reads 0.0365" on either side of zero. This measurement should be accurate to plus or minus 0.0005".

Remove the dial wheel and place the dial (18) so that its 1/2" drill diameter graduation coincides with the factory scribe line. If the dial gears do not permit the scribe lines to line up exactly, loosen the screws (1, 2 and 3) and rotate the dial until the scribe lines coincide.

Next, check the "cone grind" setting. With the indicator still in place, set the drill diameter dial at "cone grind". The indicator should read zero; that is, the midpoint between the "dwells". Should it fail to read zero within plus or minus 0.0005", loosen the lock nut (88) on the side of the cam roller bracket and rotate the screw (87) until the reading is zero. Retighten locknut (88).

### CLEARANCE ANGLE DIAL

(Reference numbers refer to encircled numbers on Figure 28, page 28.)

Mount the clearance angle dial wheel (35) on its shaft (40). Mount an indicator on the work slide and place the indicator point on the face of the wheel dresser micrometer feed control knob, as shown in Figure 14b, so that it will record the movement of the spindle carrier in the plane parallel to the drill axis. Set the drill diameter for 1/2" and turn on the Spiropoint. Rotate the clearance dial wheel clockwise or counter-clockwise until the total travel as recorded on the indicator is 0.1108" plus or minus 0.0005".

Remove the dial wheel and place the clearance angle dial (38) so that the scribe line for its reference number 24 coincides with the factory scribe line.

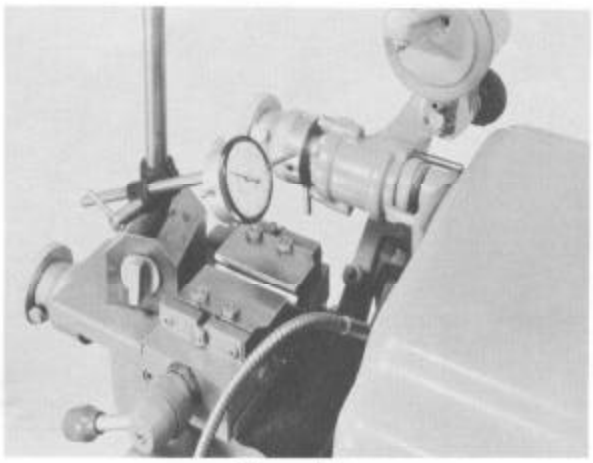


Figure 14a

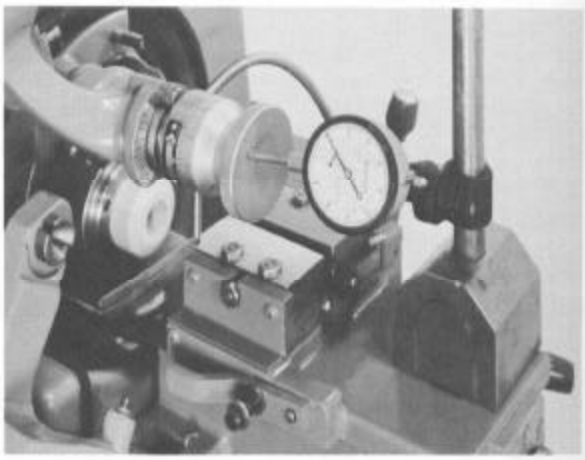
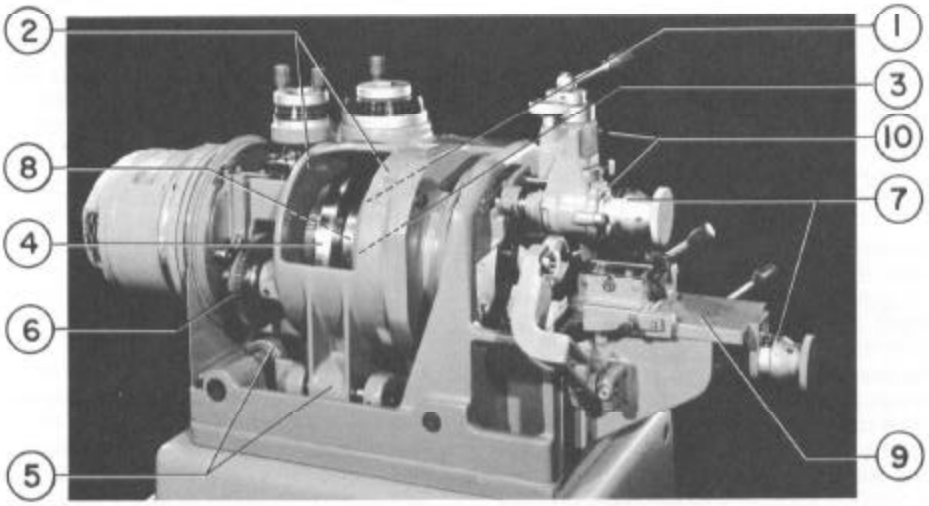


Figure 14b

## LUBRICATION

The Spiropoint has been fully lubricated at the factory prior to shipment. However, it is advisable to lubricate the components charted below when any internal repairs or component overhauls are performed. The main slide (9) has an anti-friction treatment applied to its surface at the factory; therefore, it should not be further lubricated.




| | LUBRICATION POINTS | LUBRICANT | INSTRUCTIONS |
|---|---|---|---|
| 1 | Cam adjusting screws | Grease * | Grease threads of screws. |
| 2 | Housing roller bearings | Grease * | Pack with grease. |
| 3 | Spindle ball bearings | Grease * | Pack with grease. Do not overgrease. |
| 4 | Cam surfaces | Grease * | Wipe cam surfaces of large cam and pivot arm cams with grease. |
| 5 | Housing and plate bearings | Grease * | Pack six bearing cages with grease on inner and outer diameters. |
| 6 | Gears | Grease * | Grease teeth of all gears except those made of nylon and those which mate with nylon gears. |
| 7 | Dials (wheel dresser and work holder) | Grease * | Pack grease in cavities around dial screw. |
| 8 | Roller followers | Grease * | Grease bearings in four roller followers. |
| 9 | Work holder | Grease * | Grease rack and pinion, feed screw and thrust bearings. |
| 10 | Wheel dresser | Grease * | Use grease gun. Do not overgrease. |

* Cincinnati Lathe & Tool Co. Specification P-64. A premium quality, general purpose, lithium base grease. See list of approved products at the right.

APPROVED PRODUCTS

American Oil Co., Amolith Grease No. 2 . . . Cities Service Oil Co., Trojan H-2 . . . Gulf Oil Corp., Gulfcrown Grease 2 . . . Pure Oil Co., Poco H. T. E. P. Grease 2 . . . Shell Oil Co., Alvania 2 . . . Socony-Mobil Oil Co., Mobilux 2 . . . Standard Oil Co. (Ohio), Sohitran 2 . . . Sun Oil Company, Prestige 42 . . . Texaco Inc., Multifak 2

# INSTALLATION INSTRUCTIONS I-5

## UNCRATING INSTRUCTIONS

Upon receipt of shipment, carefully remove the crating and skids. Assemble the four casters and levelscrews to the base. In attaching the casters to the base, be sure to put both nuts above the mounting flange.

## CLEANING THE SPIROPOINT

All finished metal parts have been coated with a film of slushing compound prior to shipment.

Do not move the work holding fixture slides or any other parts before the machine has been thoroughly cleaned. Use a good grease solvent to remove the slushing compound and dirt accumulated in transit. Wipe with rags rather than waste to eliminate lint. Do not use compressed air as this may force grit and dirt into important functioning units. Use a stiff bristle fibre brush to get into corners.

Clean the bearing surfaces of the main slide and the support bracket with a clean, dry cloth. Do not use solvent on these surfaces.

## LIFTING INSTRUCTIONS
(See Figures 16a and 16b)

Four holes are provided in the cabinet to facilitate lifting the machine. Place "S" hooks in the holes or run pipes through them. DO NOT LIFT THE MACHINE BY PLACING A SLING UNDER THE MOTOR, WORK TRAY, OR WORK HOLDING BRACKET.

## PREPARATION FOR OPERATION

The main slide (16, Figure 3) has been locked for shipment. To unlock the slide, loosen the set screw located on the right side of the work holding bracket above and in front of the rapid feed lever (94, Figure 32). Before moving the machine a considerable distance, relock the slide. Swing the locator arm to its locating position, advance the slide, thereby locking the locator arm in position, and tighten the slide lock set screw.

Mount the work tray (see Figure 2) by inserting its two brackets into the two lifting holes in the front of the base.

## ELECTRICAL CORD

The Spiropoint is equipped with an eight-foot electrical cord. If an extension is required, use 14 gage wire or heavier. Do not employ more than 25 feet of extension. If more than this is employed, a voltage drop may occur. A solenoid is employed in the Spiropoint. If there is more than 10% under or over voltage, the solenoid will malfunction. An extension cord longer than 25 feet may cause a voltage drop greater than 10%.

## LEVELING INSTRUCTIONS

Although the Spiropoint is a precision drill sharpener, a precise level need not be maintained. Once the Spiropoint has been placed in its operating location, adjust the jack screws (see Figure 2) for stability of the unit.

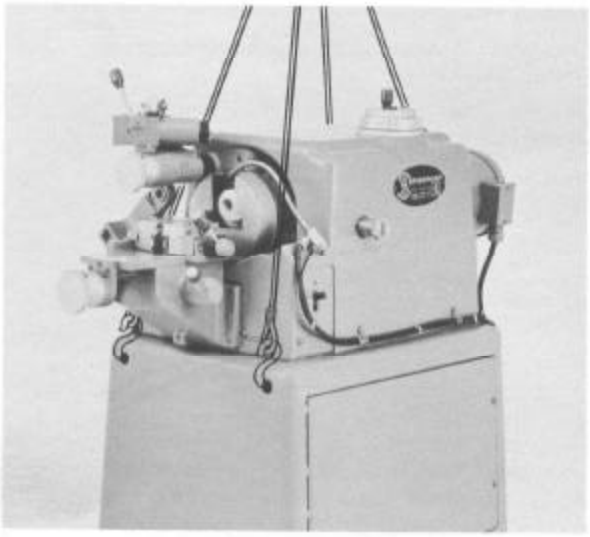


Figure 16a

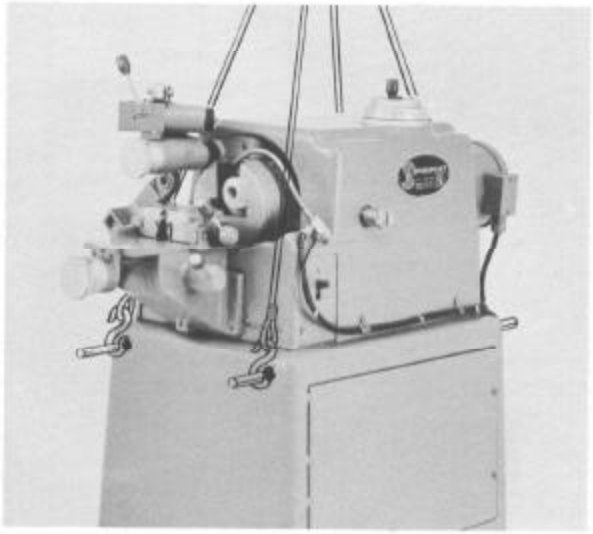
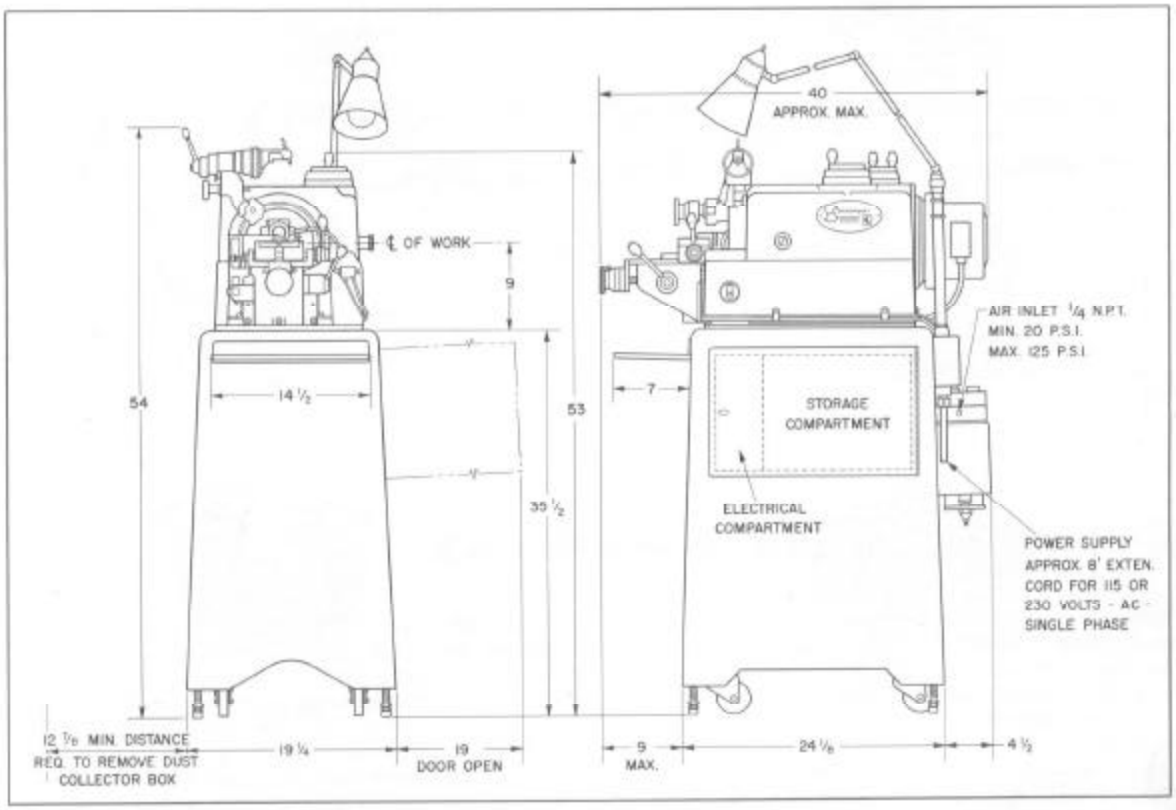


Figure 16b

# SPECIFICATIONS I-6

| | | | |
|---|---|---|---|
| CAPACITY | Drill diameter, inches - | Series 500 | 1/8" to 1/2" |
| | | Series 750 | 1/8" to 3/4" |
| | | Series 1000 | 1/8" to 1" |
| | | Small drill attachment (extra cost) | #60 (0.040") to 1/8" |
| | Point angles | | 90° to 180° |
| | Number of flutes | | 2 |
| | Drill direction | | Right-hand |
| | Drill length, min. - | 3/4" to 1" drill dia. | 6-1/4" |
| | | 1/2" to 3/4" " " | 4-1/2" |
| | | 1/4" to 1/2" " " | 4" |
| | | 1/8" to 1/4" " " | 2-1/4" |
| | | #60 to 1/8" " " | 1-1/4" |




STANDARD EQUIPMENT SUPPLIED WITH MACHINE

Complete electrical equipment including motor and controls for 115/230 volts, single phase, 60 cycle current (50 cycle optional)

Dust collector system with individually driven motor

Mist coolant system

Grinding wheel dresser including one diamond and a diamond setting gage

Jaws

Locators

Necessary wrenches

Grinding wheels shaped for 118 degree drills and grinding wheels shaped for 180 degree drills

Work tray

Casters

Leveling screws

Tool storage compartment

Electrical compartment

OPTIONAL EQUIPMENT SUPPLIED AT EXTRA COST

Small drill attachment - #60 (0.040") to 1/8" capacity including locator, jaws, and two grinding wheels

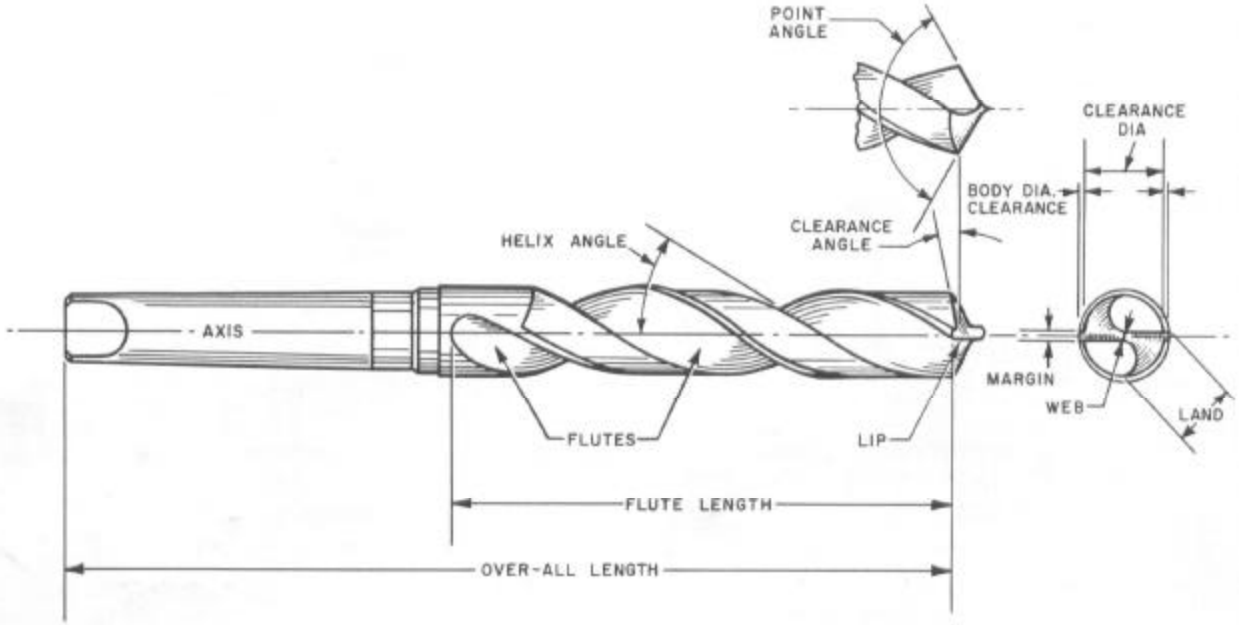
Adjustable light, mounted, complete

Extra diamond nib

Special jaws

# DRILL NOMENCLATURE II-1

To assist in the identification of drill elements discussed hereafter, refer to the drill nomenclature chart below.




# RECOGNIZING A GOOD POINT II-2

The spiral point is a precision drill point for precision drilling. It is critical, therefore, that the precise geometry built into the Spiropoint be applied to the drill. Deviations from this geometry will reduce the effectiveness of the spiral point.

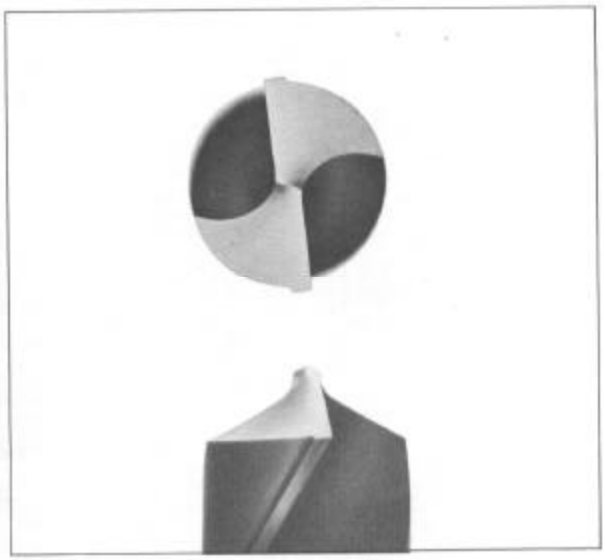
There are several critical adjustments on the Spiropoint which, if incorrectly made, will result in inferior point geometry. By examining the drill point produced by the Spiropoint, it is possible to quickly determine whether or not all adjustments have been properly made on the machine.

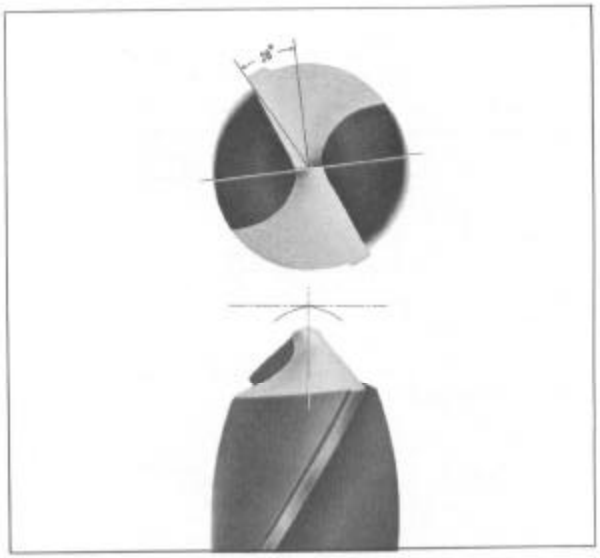
Four views of a drill with an 118 degree point angle and a perfect spiral point are illustrated on the facing page. The side elevation (upper right illustration) shows the spiral point of the drill to consist of two gently sloping arcs terminating at the axis of the drill. Both arcs should be of equal length. These arcs are generated by the radius of the grinding wheel. If the point of the drill is flat, the radius of the grinding wheel is undersize. Should the point appear too rounded and too long, the radius of the grinding wheel is oversize. If either of these conditions develops, make certain that the correct setting for the truing unit is being used. If the correct setting is in use, then the difficulty is caused by incorrect positioning of the diamond nib.

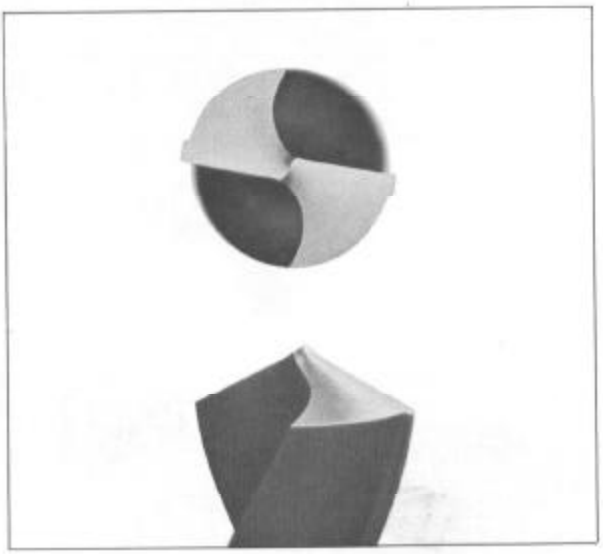
With the drill axis parallel to the line of vision, the spiral point shows the characteristic "S" shape formed by the intersection of two arcs which tend to blend into the primary cutting edge. A line drawn perpendicular to the tangent to the arcs should form approximately a 28 degree angle to a line drawn from the axis of the drill to the tip of the primary cutting edge (upper right illustration).

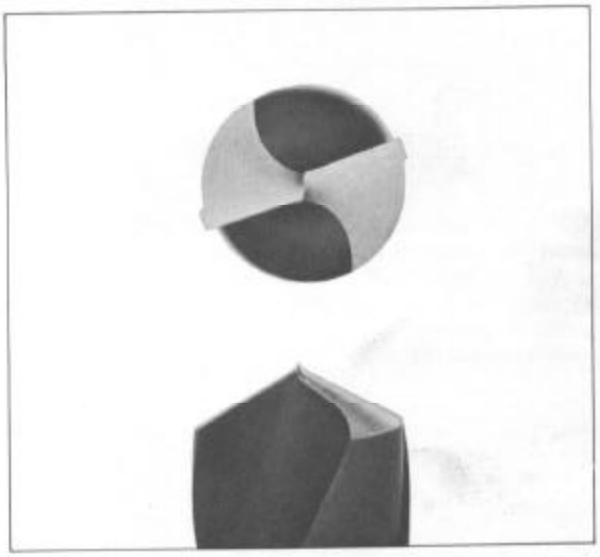
If this angle is considerably less than 28 degrees, the outside diameter of the grinding wheel is undersize. If the angle is considerably greater than 28 degrees, the outside diameter of the grinding wheel is oversize. Both conditions are caused by incorrect positioning of the diamond nib in the truing unit.

To assure a correct central cutting edge angle of 28°, the operator should refer to chart on page 21 when setting the diamond nib to the gage.









# CLEARANCE ANGLE II-3

The clearance angle adjustment control is graduated in reference numbers from 1 to 59. Set the control at reference number 24 to obtain the clearance angle which Cincinnati Lathe and Tool Co. recommends for general purpose use with 118 degree point angles. In the case of a 1/2" drill with a 118 degree point angle, reference number 24 gives a 10 degree clearance angle at the periphery of the drill. It gives an 11 degree clearance angle to a 1/4" drill, and a 9-1/2 degree clearance to a 3/4" drill.

If values of clearance above or below this normal are required, refer to the charts on the following page for the correct setting. For example, if an 8 degree clearance angle is required for a 1/4" drill with a 118 degree point angle, the dial should be set at 21.

DIFFERENT SETTINGS ARE REQUIRED FOR DIFFERENT POINT ANGLES. To obtain the recommended "general purpose" dial setting for point angles other than 118 degrees, find the recommended clearance angle for the specific drill diameter on the 118 degree point angle chart. Then find the dial setting for this clearance angle on the applicable point angle chart.

Settings for 90, 118, 135 and 180 degree point angles are given on page 20. If other point angles are employed, the correct setting may be estimated from these charts.

# CLEARANCE ANGLE SETTING

90° POINT ANGLE

| DRILL DIA. | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | 15° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/16 | 22¼ | 22½ | 22¾ | 23 | 23¼ | 23½ | 23¾ | 24¼ | 24½ | 24¾ | 26 |
| 3/32 | 22 | 22½ | 23 | 23¼ | 23½ | 24 | 24½ | 25 | 25¼ | 26 | 27 |
| 1/8 | 22 | 22½ | 23 | 23½ | 24 | 24½ | 25 | 25½ | 26 | 27 | 28 |
| 5/32 | 22 | 22½ | 23¼ | 23¾ | 24¼ | 25 | 25½ | 26¼ | 27 | 28 | 29 |
| 3/16 | 21¾ | 22½ | 23¼ | 24 | 24¾ | 25½ | 26¼ | 27 | 28 | 29 | 30 |
| 7/32 | 21¾ | 22½ | 23¼ | 24¼ | 25 | 26 | 26¾ | 27½ | 28½ | 29¾ | 30¾ |
| 1/4 | 21½ | 22½ | 23½ | 24½ | 25¼ | 26½ | 27½ | 28½ | 29½ | 30½ | 31½ |
| 9/32 | 21½ | 22½ | 23½ | 24¾ | 26 | 27 | 28¼ | 29¼ | 30¼ | 31½ | 32½ |
| 5/16 | 21¼ | 22½ | 23¾ | 25 | 26¼ | 27½ | 28¾ | 30 | 31¼ | 32½ | 33¾ |
| 11/32 | 21¼ | 22½ | 24 | 25¼ | 26½ | 28 | 29¼ | 30¾ | 32 | 33½ | 34¾ |
| 3/8 | 21 | 22½ | 24 | 25½ | 27 | 28½ | 30 | 31½ | 33 | 34½ | 36 |
| 13/32 | 21 | 22½ | 24 | 25¾ | 27¼ | 29 | 30½ | 32¼ | 33¾ | 35½ | 37 |
| 7/16 | 21 | 22½ | 24¼ | 26 | 27¾ | 29¼ | 31 | 32¾ | 34½ | 36¼ | 38¼ |
| 15/32 | 20¼ | 22½ | 24¼ | 26¼ | 28 | 30 | 31¾ | 33½ | 35½ | 37½ | 39½ |
| 1/2 | 20½ | 22½ | 24½ | 26½ | 28½ | 30¼ | 32¼ | 34¼ | 36¼ | 38¼ | 40¼ |
| 17/32 | 20½ | 22½ | 24½ | 26¾ | 28¾ | 30¾ | 33 | 35 | 37¼ | 39¼ | 41½ |
| 9/16 | 20½ | 22½ | 24¾ | 27 | 29 | 31¼ | 33½ | 35¾ | 38 | 40¼ | 42½ |
| 19/32 | 20¼ | 22½ | 24¾ | 27¼ | 29½ | 31¾ | 34¼ | 36½ | 39 | 41¼ | 43¾ |
| 5/8 | 20 | 22½ | 25 | 27½ | 29¾ | 32¼ | 34¾ | 37¼ | 39¾ | 42¼ | 45 |
| 21/32 | 20 | 22½ | 25 | 27½ | 30 | 32¾ | 35¼ | 38 | 40½ | 43¼ | 45¾ |
| 11/16 | 19¾ | 22½ | 25¼ | 28 | 30¾ | 33¼ | 36 | 38¾ | 41½ | 44¼ | 47¼ |
| 23/32 | 19¾ | 22½ | 25¼ | 28¼ | 31 | 33¾ | 36½ | 39½ | 42¼ | 45¼ | 48¼ |
| 3/4 | 19¾ | 22½ | 25½ | 28¼ | 31¼ | 34¼ | 37 | 40 | 43¼ | 46¼ | 49¼ |
| 25/32 | 19½ | 22½ | 25½ | 28¾ | 31¾ | 34¾ | 37¾ | 40¾ | 44 | 47¼ | 50½ |
| 13/16 | 19½ | 22½ | 25¾ | 28¾ | 32 | 35¼ | 38¼ | 41½ | 44¾ | 48¼ | 51½ |
| 27/32 | 19¼ | 22½ | 25¾ | 29 | 32¼ | 35¾ | 39 | 42¾ | 45¾ | 49¼ | 52½ |
| 7/8 | 19¼ | 22½ | 26 | 29¼ | 32¾ | 36¼ | 39¾ | 43 | 46½ | 50¼ | 53¾ |
| 29/32 | 19 | 22½ | 26 | 29½ | 33 | 36¾ | 40¼ | 43¾ | 47½ | 51¼ | 55 |
| 15/16 | 19 | 22½ | 26 | 29¾ | 33½ | 37 | 40¾ | 44½ | 48¼ | 52¼ | 56 |
| 31/32 | 18¾ | 22½ | 26¼ | 30 | 33¾ | 37½ | 41½ | 45¾ | 49¼ | 53¼ | 57 |
| 1 | 18¾ | 22½ | 26¼ | 30¼ | 34¼ | 38 | 42 | 46 | 50 | 54 | 58 |

Series 500 — Series 750 — Series 1000

135° POINT ANGLE

| DRILL DIA. | 5° | 6° | 7° | 8° | 9° | 10° |
|---|---|---|---|---|---|---|
| 1/16 | 21 | 21½ | 21¾ | 22¼ | 22¾ | 23¼ |
| 3/32 | 20½ | 21¼ | 21¾ | 22½ | 23 | 24 |
| 1/8 | 20 | 21 | 21½ | 22½ | 23½ | 24½ |
| 5/32 | 19 | 20½ | 21¾ | 23 | 25 | 27 |
| 3/16 | 18 | 20 | 22 | 24 | 26 | 28 |
| 7/32 | 17 | 19 | 20 | 22 | 24 | 26 |
| 1/4 | 16½ | 17½ | 18½ | 20 | 22 | 24 |
| 9/32 | 15¾ | 17 | 18 | 19½ | 21¾ | 27 |
| 5/16 | 15¼ | 16¼ | 17½ | 19 | 21½ | 30 |
| 11/32 | 14½ | 15¾ | 17¼ | 18½ | 21¼ | 34 |
| 3/8 | 14 | 15¼ | 16¾ | 18¼ | 21¼ | 31 |
| 13/32 | 13¼ | 14¾ | 16½ | 18 | 21¼ | 28 |
| 7/16 | 12½ | 14½ | 16 | 18 | 21¾ | 26¾ |
| 15/32 | 12 | 13¾ | 15½ | 18 | 21 | 25¼ |
| 1/2 | 11¾ | 13½ | 15½ | 18 | 21 | 24 |
| 17/32 | 10¾ | 12¾ | 14¾ | 17 | 20 | 23¾ |
| 9/16 | 10 | 12¼ | 14½ | 16¾ | 19½ | 23¼ |
| 19/32 | 9¼ | 11½ | 14 | 16¼ | 19 | 23 |
| 5/8 | 8¾ | 11¼ | 13¾ | 16 | 18½ | 22½ |
| 21/32 | 8¼ | 10¾ | 13¼ | 15¾ | 18¼ | 22 |
| 11/16 | 7½ | 10¼ | 12¾ | 15½ | 18¼ | 21½ |
| 23/32 | 7 | 9¾ | 12½ | 15¼ | 18 | 21 |
| 3/4 | 6¼ | 9¼ | 12 | 15 | 18 | 20¾ |
| 25/32 | 5½ | 8¼ | 11¾ | 14¾ | 17¾ | 20¾ |
| 13/16 | 5 | 8 | 11¼ | 14½ | 17½ | 20¾ |
| 27/32 | 4½ | 7½ | 10¾ | 14¼ | 17½ | 20¾ |
| 7/8 | 3¾ | 7 | 10½ | 13¾ | 17¼ | 20¾ |
| 29/32 | 3 | 6½ | 10 | 13½ | 17¼ | 20¾ |
| 15/16 | 2½ | 6 | 9¾ | 13¼ | 17 | 20¾ |
| 31/32 | 1¾ | 5½ | 9¼ | 13 | 16¾ | 20¾ |
| 1 | 1¼ | 5 | 9 | 12¾ | 16¾ | 20½ |

Series 500 — Series 750 — Series 1000

118° POINT ANGLE

| DRILL DIA. | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | 15° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/16 | 21½ | 22½ | 22½ | 23¼ | 24¼ | 24¾ | 25 | 25½ | 25¾ | 26 | 26¼ |
| 3/32 | 20½ | 21¼ | 21¾ | 23 | 24½ | 25½ | 26 | 26¾ | 27½ | 28 | 28½ |
| 1/8 | 20 | 20½ | 20¾ | 22½ | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 5/32 | 19½ | 20 | 20½ | 21 | 24 | 27 | 28½ | 30 | 31 | 32 | 33½ |
| 3/16 | 19 | 19¾ | 20½ | 21½ | 23 | 28 | 30 | 32 | 33 | 34 | 36 |
| 7/32 | 18½ | 19½ | 20¼ | 21 | 22½ | 26 | 27½ | 30 | 32 | 33 | 34½ |
| 1/4 | 18 | 19 | 20 | 21 | 22 | 23½ | 25 | 28 | 31 | 32 | 33 |
| 9/32 | 17½ | 18¾ | 19¾ | 20¾ | 22 | 23½ | 25½ | 28¾ | 32½ | | |
| 5/16 | 17¼ | 18¼ | 19½ | 20¾ | 22 | 23¼ | 25½ | 30¾ | 34 | | |
| 11/32 | 16¾ | 18 | 19¼ | 20¾ | 22 | 23¼ | 26 | 30 | 36 | | |
| 3/8 | 16¼ | 17¾ | 19 | 20½ | 22 | 23½ | 27 | 31 | 37 | | |
| 13/32 | 15¾ | 17¼ | 18¾ | 20½ | 22 | 23½ | 28 | 32 | 38 | | |
| 7/16 | 15¼ | 17 | 18½ | 20¼ | 22 | 23¾ | 27¼ | 30 | 35 | | |
| 15/32 | 14¾ | 16½ | 18½ | 20¼ | 22 | 24 | 26¾ | 28 | 33 | | |
| 1/2 | 14¼ | 16¼ | 18¼ | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
| 17/32 | 13¾ | 16 | 18 | 20 | 22 | 24¼ | 26¼ | 28½ | 30½ | 32¾ | 34¾ |
| 9/16 | 13¼ | 15½ | 17¾ | 20 | 22 | 24¼ | 26½ | 28¾ | 31 | 33¼ | 35½ |
| 19/32 | 12¾ | 15¼ | 17½ | 19¾ | 22 | 24½ | 26¾ | 29¼ | 31½ | 34 | 36¼ |
| 5/8 | 12½ | 14¾ | 17¼ | 19¾ | 22 | 24½ | 27 | 25½ | 32 | 34½ | 37 |
| 21/32 | 12 | 14½ | 17 | 19½ | 22¼ | 24¾ | 27¼ | 30 | 32½ | 35¼ | 38 |
| 11/16 | 11½ | 14 | 16¾ | 19½ | 22¼ | 24¾ | 27½ | 30¼ | 33 | 35¾ | 38¾ |
| 23/32 | 11 | 13¾ | 16½ | 19¼ | 22¼ | 25 | 27¾ | 30¾ | 33¼ | 36½ | 39½ |
| 3/4 | 10½ | 13½ | 16¼ | 19¼ | 22¼ | 25 | 28 | 31 | 34 | 37 | 40¼ |
| 25/32 | 10 | 13 | 16 | 19 | 22¼ | 25¼ | 28¼ | 31½ | 34½ | 37¾ | 41 |
| 13/16 | 9½ | 12¾ | 15¾ | 19 | 22¼ | 25½ | 28½ | 31¾ | 35 | 38½ | 41¾ |
| 27/32 | 9 | 12¼ | 15¾ | 19 | 22¼ | 25½ | 28¾ | 32¼ | 35½ | 39 | 42½ |
| 7/8 | 8¾ | 12¼ | 15½ | 18¾ | 22¼ | 25¾ | 29 | 32½ | 36 | 39¾ | 43¼ |
| 29/32 | 8¼ | 11¾ | 15¼ | 18¾ | 22¼ | 25¾ | 29½ | 33 | 36½ | 40¼ | 44 |
| 15/16 | 7½ | 11¼ | 15 | 18½ | 22¼ | 26 | 29¾ | 33½ | 37¼ | 41 | 44½ |
| 31/32 | 7¼ | 11 | 14¾ | 18½ | 22¼ | 26 | 30 | 33¾ | 37½ | 41½ | 45 |
| 1 | 6¾ | 10½ | 14½ | 18¼ | 22¼ | 26¼ | 30¼ | 34¼ | 38¼ | 42¼ | 46¼ |

Series 500 — Series 750 — Series 1000

180° POINT ANGLE

| DRILL DIA. | 5° | 6° | 7° | 8° | 9° | 10° | 11° | 12° | 13° | 14° | 15° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/16 | 18 | 18½ | 19 | 19¼ | 19½ | 20 | 20¼ | 20¾ | 21 | 21½ | 22 |
| 3/32 | 17½ | 18¼ | 18¾ | 19¼ | 20 | 20¾ | 21¼ | 22 | 22½ | 23 | 23¾ |
| 1/8 | 17 | 18 | 18¾ | 19½ | 20¼ | 21¼ | 22 | 23 | 24 | 24¾ | 25½ |
| 5/32 | 16¼ | 17½ | 18¾ | 19¾ | 20¾ | 22 | 23 | 24 | 25¼ | 26¼ | 27½ |
| 3/16 | 15½ | 17 | 18½ | 19¾ | 21 | 22¾ | 24 | 25¼ | 26¾ | 28 | 29½ |
| 7/32 | 15 | 16¾ | 18¼ | 20 | 21½ | 23¼ | 25 | 26½ | 28 | 29¾ | 31¼ |
| 1/4 | 14¼ | 16¾ | 18 | 20 | 22 | 24 | 25¾ | 27½ | 29½ | 31 | 33 |
| 9/32 | 13¾ | 16 | 18 | 20 | 22¼ | 24½ | 26½ | 28¾ | 31 | 33 | 35 |
| 5/16 | 13 | 15½ | 18 | 20¼ | 22½ | 25¼ | 27½ | 30 | 32¼ | 34½ | 37 |
| 11/32 | 12½ | 15 | 17¾ | 20¼ | 23 | 26 | 28½ | 31 | 33¾ | 36 | 39 |
| 3/8 | 11¾ | 14¾ | 17¾ | 20½ | 23½ | 26½ | 29¼ | 32 | 35 | 38 | 41 |
| 13/32 | 11 | 14½ | 17½ | 20¾ | 24 | 27¼ | 30 | 33 | 36½ | 39½ | 42½ |
| 7/16 | 10½ | 14 | 17¼ | 20¾ | 24¼ | 28 | 31 | 34½ | 38 | 41 | 45 |
| 15/32 | 9¾ | 13½ | 17¼ | 21 | 24½ | 28½ | 32 | 35½ | 39¼ | 42¾ | 46½ |
| 1/2 | 9¼ | 13 | 17 | 21 | 25 | 29 | 33 | 36½ | 40¾ | 44½ | 48½ |
| 17/32 | 8½ | 12¾ | 17 | 21 | 25¼ | 29¾ | 33¾ | 37¾ | 42 | 46 | 50¼ |
| 9/16 | 8 | 12½ | 16¾ | 21¼ | 25¾ | 30½ | 34½ | 39 | 43½ | 47½ | 52¼ |
| 19/32 | 7½ | 12 | 16¾ | 21½ | 26 | 31 | 35½ | 40 | 45 | 49½ | 54½ |
| 5/8 | 6¾ | 11¾ | 16½ | 21½ | 26½ | 32 | 36½ | 41 | 46¼ | 51 | 56 |
| 21/32 | 6 | 11¼ | 16½ | 21¾ | 26¾ | 32½ | 37¼ | 42½ | 47¾ | 52½ | 58 |
| 11/16 | 5½ | 11 | 16¼ | 21¾ | 27¼ | 33 | 38 | 43½ | 49 | 54½ | 60 |
| 23/32 | 4¾ | 10½ | 16 | 22 | 27½ | 33¾ | 39 | 44½ | 50½ | 56 | |
| 3/4 | 4 | 10 | 16 | 22 | 28 | 34 | 40 | 46 | 52 | 58 | |
| 25/32 | 3½ | 9½ | 15¾ | 22¼ | 28½ | 35 | 41 | 47 | 53½ | 59¼ | |
| 13/16 | 3 | 9 | 15¾ | 22¼ | 28¾ | 35½ | 41¾ | 48 | 55 | | |
| 27/32 | 2 | 9 | 15½ | 22¼ | 29 | 36¼ | 42½ | 49 | 56 | | |
| 7/8 | 1½ | 8½ | 15¼ | 22½ | 29½ | 37 | 43½ | 50½ | 57½ | | |
| 29/32 | 1 | 8 | 15 | 22½ | 30 | 37½ | 44½ | 51½ | 59 | | |
| 15/16 | ¼ | 7½ | 15 | 22¾ | 30¼ | 38¼ | 45¼ | 52½ | | | |
| 31/32 | | 7¼ | 15 | 23 | 30½ | 39 | 46 | 54 | | | |
| 1 | | 7 | 15 | 23 | 31 | 39½ | 47 | 55 | | | |

Series 500 — Series 750 — Series 1000

# GAGE THICKNESS FOR DIAMOND SETTING

CLEARANCE DIAL SETTINGS

| Drill Dia. | 0→5 | 6→10 | 11→15 | 16→20 | 21→25 | 26→30 | 31→35 | 36→40 | 41→45 | 46→50 | 51→55 | 56→60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/16 | — | — | — | .004 | .002 | — | — | — | — | — | — | — |
| 1/8 | — | — | — | .006 | .002 | .002 | — | — | — | — | — | — |
| 3/16 | — | — | — | .007 | .003 | .002 | .002 | — | — | — | — | — |
| 1/4 | — | — | .015 | .008 | .005 | .003 | .002 | .002 | — | — | — | — |
| 5/16 | — | — | .015 | .009 | .006 | .004 | .003 | .002 | — | — | — | — |
| 3/8 | — | — | .016 | .010 | .007 | .005 | .003 | .003 | .002 | — | — | — |
| 7/16 | — | — | .016 | .011 | .008 | .006 | .004 | .003 | .003 | — | — | — |
| 1/2 | — | .025 | .017 | .012 | .009 | .007 | .005 | .004 | .003 | .003 | — | — |
| 9/16 | — | .026 | .018 | .013 | .010 | .008 | .006 | .005 | .004 | .003 | .003 | — |
| 5/8 | — | .026 | .019 | .014 | .011 | .009 | .007 | .006 | .005 | .004 | .003 | .003 |
| 11/16 | — | .026 | .020 | .015 | .012 | .010 | .008 | .007 | .006 | .005 | .004 | .004 |
| 3/4 | .035 | .027 | .021 | .016 | .013 | .011 | .009 | .007 | .006 | .005 | .005 | .004 |
| 13/16 | .035 | .027 | .022 | .017 | .014 | .012 | .010 | .008 | .007 | .006 | .005 | .005 |
| 7/8 | .035 | .028 | .022 | .018 | .015 | .013 | .011 | .009 | .008 | .007 | .006 | .005 |
| 15/16 | .036 | .029 | .023 | .019 | .016 | .014 | .012 | .010 | .009 | .008 | .007 | .006 |
| 1 | .036 | .030 | .024 | .020 | .017 | .015 | .013 | .011 | .010 | .009 | .008 | .007 |

# PARTS LIST III-1

INTRODUCTION . . . . . This parts list has been prepared for your assistance in ordering replacement parts for the Series 500, 750 and 1000 Spiropoint Drill Sharpeners.

The parts listings are divided into four columns. The figure and index numbers of the parts are listed in the first column. The figure number indicates the assembly illustration on which the part is shown. The index number is keyed to the illustration of the individual part. The second column contains the Cincinnati Lathe and Tool Co. part number. The third column contains the complete name of the part. The last, or right-hand, column contains the number of parts required for the assembly.

Electrical equipment parts for these machines are not listed in detail. Contact the local representative of the electrical manufacturer for servicing and maintenance of his equipment.

ORDERING REPAIR PARTS

You will receive quicker service when ordering repair parts if you will proceed as follows:


Figure 21

1. Give complete serial number of the machine. The serial number is stamped on the left-hand side of the front of the base (see Figure 21).
2. State amount wanted.
3. Give part number stamped on part, or shown in the parts list, specifying where you obtained the number.
4. Give size of machine, i.e., Series 500, 750 or 1000.
5. Specify each individual part required. Never use the term "complete assembly"; it always raises the question of how much of a unit to supply.
6. State how and where to ship. Do not say, "Ship quickest way." Be definite and state the agency desired, that is, Air Parcel Post, Special Delivery, Railway Express, Motor Freight, etc. Give complete destination.

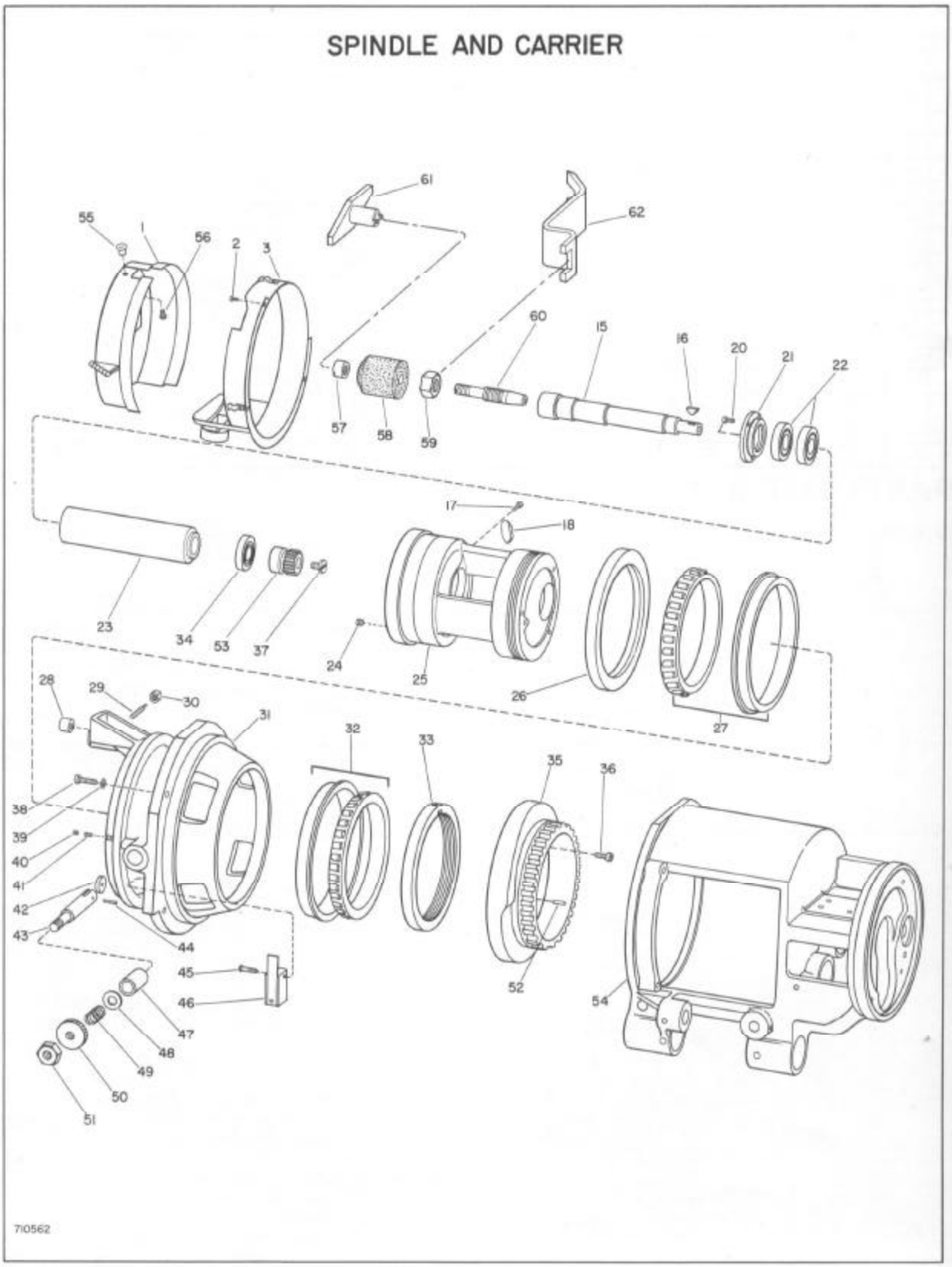

SPINDLE AND CARRIER
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Figure 22

# SPINDLE AND CARRIER (See Figure 22)

| Figure and Index No. | Part No. | Part Name | Amt. Used |
|---|---|---|---|
| 22-1 | 710882 | Cover - Removable | 1 |
| -2 | 701480 | Screw | 3 |
| -3 | 710858 | Cover - Stationary | 1 |
| -15 | 710490 | Spindle | 1 |
| -16 | 3279 | Key | 1 |
| -17 | 3198 | Screw | 2 |
| -18 | 710870 | Plate - Switch | 1 |
| -20 | 3199 | Screw | 3 |
| -21 | 710034 | Cap - Bearing | 1 |
| -22 | 710027 | Bearing - (Matched Set) | 1 |
| -23 | 710119 | Spacer | 1 |
| -24 | 2332 | Screw | 1 |
| -25 | 710777 | Carrier - Spindle | 1 |
| -26 | 710734 | Seal | 1 |
| -27 | 710729 | Bearing - Roller | 1 |
| -28 | 710296 | Bushing | 1 |
| -29 | 710907 | Screw | 1 |
| -30 | 2304 | Nut - Hex | 1 |
| -31 | 710732 | Housing - Bearing | 1 |
| -32 | 710729 | Bearing - Roller | 1 |
| -33 | 110298 | Nut | 1 |
| -34 | 710036 | Bearing - Ball | 1 |
| -35 | 710564 | Cam | 1 |
| -36 | 3218 | Screw | 3 |
| -37 | 710032 | Screw | 1 |
| -38 | 3400 | Screw | 4 |
| -39 | 3267 | Washer | 4 |
| -40 | 2354 | Screw | 1 |
| -41 | 3228 | Screw | 1 |
| -42 | 710694 | Roller - Switch | 1 |
| -43 | 710416 | Shaft - Plunger | 1 |
| -44 | 139446 | Pin | 1 |
| -45 | 98487 | Screw | 2 |
| -46 | 710418 | Switch - Limit | 1 |
| -47 | 710733 | Bushing | 1 |
| -48 | 3441 | Washer | 1 |
| -49 | 259500 | Spring | 1 |
| -50 | 229470 | Nut - Adjusting | 1 |
| -51 | 3473 | Nut - Hex | 1 |
| -52 | 143599 | Pin | 1 |
| -53 | 710565 | Gear - Pinion | 1 |
| -54 | 710981 | Housing | 1 |
| -55 | 710009 | Knob | 1 |
| -56 | 2362 | Screw | 1 |
| -57 | 710120 | Nut - Arbor | 1 |
| -58 | | Wheel - Grinding | |
| | 710335 | #60 - 1/8 Drills | 1 |
| | 710345 | #60 - 1/8 Drills | 1 |
| | 710123 | 1/8 - 1/2 Drills | 1 |
| | 710128 | 1/8 - 1/2 Drills | 1 |
| | 710144 | 1/2 - 3/4 Drills | 1 |
| | 710146 | 1/2 - 3/4 Drills | 1 |
| | 710145 | 3/4 - 1 Drills | 1 |
| | 710147 | 3/4 - 1 Drills | 1 |
| -59 | 710430 | Nut - Arbor | 1 |
| -60 | 710442 | Arbor | 1 |
| -61 | 710142 | Wrench - Spanner | 1 |
| -62 | 710497 | Wrench | 1 |

# MOTOR DRIVE AND CLUTCH

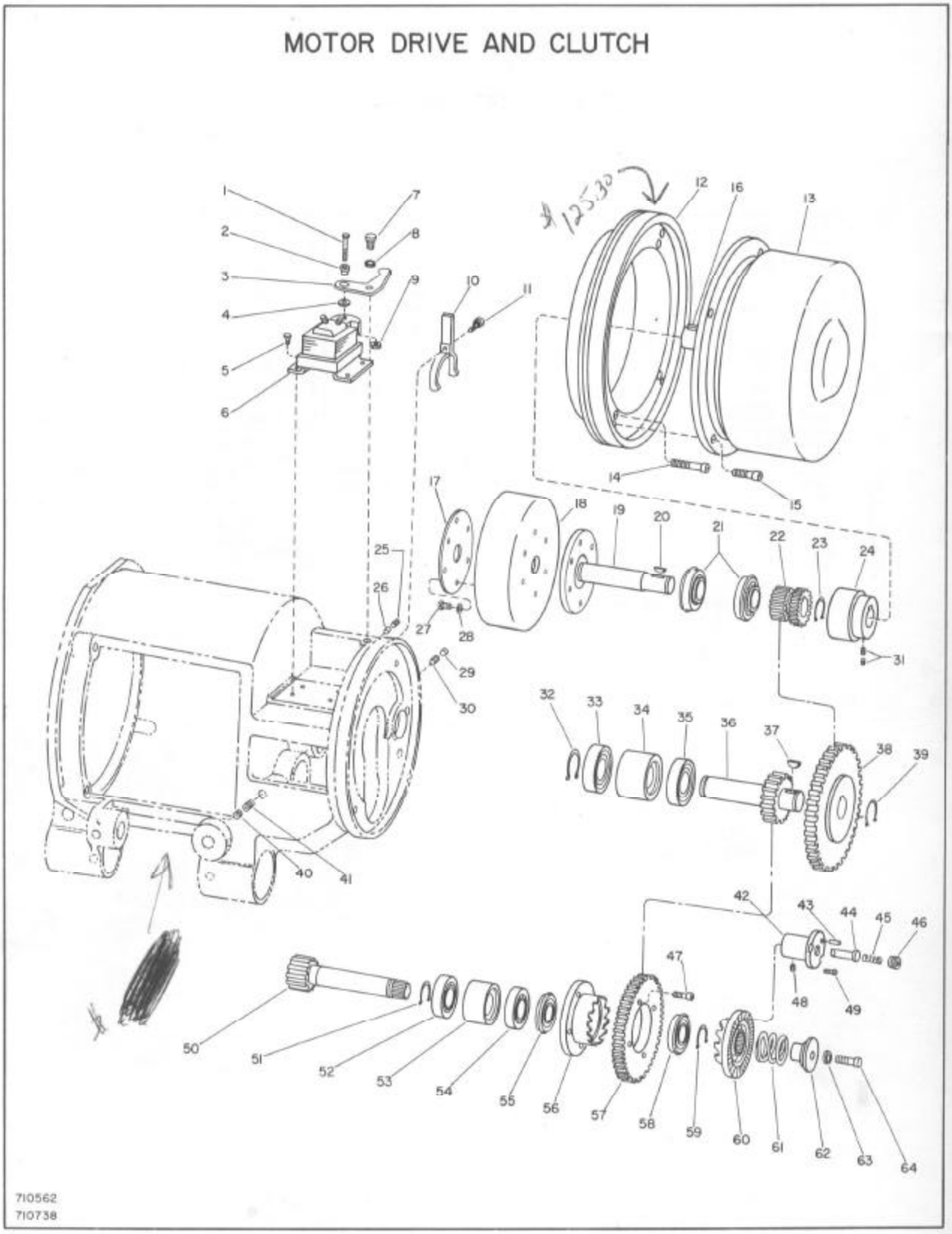


Figure 24

# MOTOR DRIVE AND CLUTCH (See Figure 24)

| Figure and Index No. | Part No. | Part Name | Units Per Assy |
|---|---|---|---|
| 24-1 | 03237 | Screw | 1 |
| -2 | 710412 | Bushing | 1 |
| -3 | 710411 | Lever - Arm | 1 |
| -4 | 232044 | Washer | 1 |
| -5 | 2285 | Screw | 4 |
| -6 | 710424 | Solenoid | 1 |
| -7 | 226191 | Screw | 1 |
| -8 | 240130 | Washer | 1 |
| -9 | 204424 | Nut | 1 |
| -10 | 710414 | Fork | 1 |
| -11 | 1797-T | Screw | 1 |
| -12 | 710982 | Plate - Adapter, 1/2 H. P. Motor | 1 |
| -13 | 710402 | Motor - Grinding Wheel | 1 |
| -14 | 3217 | Screw | 4 |
| -15 | 4093 | Screw | 4 |
| -16 | 3447 | Key | 1 |
| -17 | 710151 | Plate | 1 |
| -18 | 710150 | Gear - Internal | 1 |
| -19 | 710149 | Shaft - Drive | 1 |
| -20 | 3279 | Key | 1 |
| -21 | 235246 | Bearing | 2 |
| -22 | 710633 | Pinion | 1 |
| -23 | 710019 | Ring | 1 |
| -24 | 710632 | Coupling - Internal | 1 |
| -25 | 2331 | Screw | 1 |
| -26 | 1994 | Plug | 1 |
| -27 | 106137 | Screw | 6 |
| -28 | 217968 | Washer - Lock | 6 |
| -29 | 2356 | Screw | 1 |
| -30 | 3233 | Screw | 1 |
| -31 | 2354 | Screw | 2 |
| -32 | 171364 | Ring | 1 |
| -33 | 710021 | Bearing - Ball | 1 |
| -34 | 710199 | Spacer | 1 |
| -35 | 710021 | Bearing - Ball | 1 |

| Figure and Index No. | Part No. | Part Name | Units Per Assy |
|---|---|---|---|
| 24-36 | | Shaft | |
| | 710742 | Model 500 Machines | 1 |
| | 710740 | Model 750 and 1000 Machines | 1 |
| -37 | 3279 | Key | 1 |
| -38 | 710743 | Gear | 1 |
| -39 | 237432 | Ring | 1 |
| -40 | 2356 | Screw | 1 |
| -41 | 3233 | Screw | 1 |
| -42 | 710603 | Bushing | 1 |
| -43 | 266693 | Pin - Roll | 1 |
| -44 | 710413 | Pin - Index | 1 |
| -45 | 221928 | Spring | 1 |
| -46 | 2356 | Screw | 1 |
| -47 | 3194 | Screw | 4 |
| -48 | 605520 | Screw | 2 |
| -49 | 3198 | Screw | 2 |
| -50 | 710197 | Shaft - Pinion | 1 |
| -51 | 171364 | Ring | 1 |
| -52 | 710021 | Bearing - Ball | 1 |
| -53 | 710199 | Spacer | 1 |
| -54 | 710021 | Bearing - Ball | 1 |
| -55 | 701966 | Bearing - Ball | 1 |
| -56 | 710682 | Clutch - Positive | 1 |
| -57 | | Gear | |
| | 710741 | Model 500 Machines | 1 |
| | 710695 | Model 750 and 1000 Machines | 1 |
| -58 | 701966 | Bearing - Ball | 1 |
| -59 | 171364 | Ring | 1 |
| -60 | 710681 | Clutch - Sliding | 1 |
| -61 | 222029 | Spring | 1 |
| -62 | 710198 | Retainer | 1 |
| -63 | 205678 | Washer - Lock | 1 |
| -64 | 244020 | Screw | 1 |

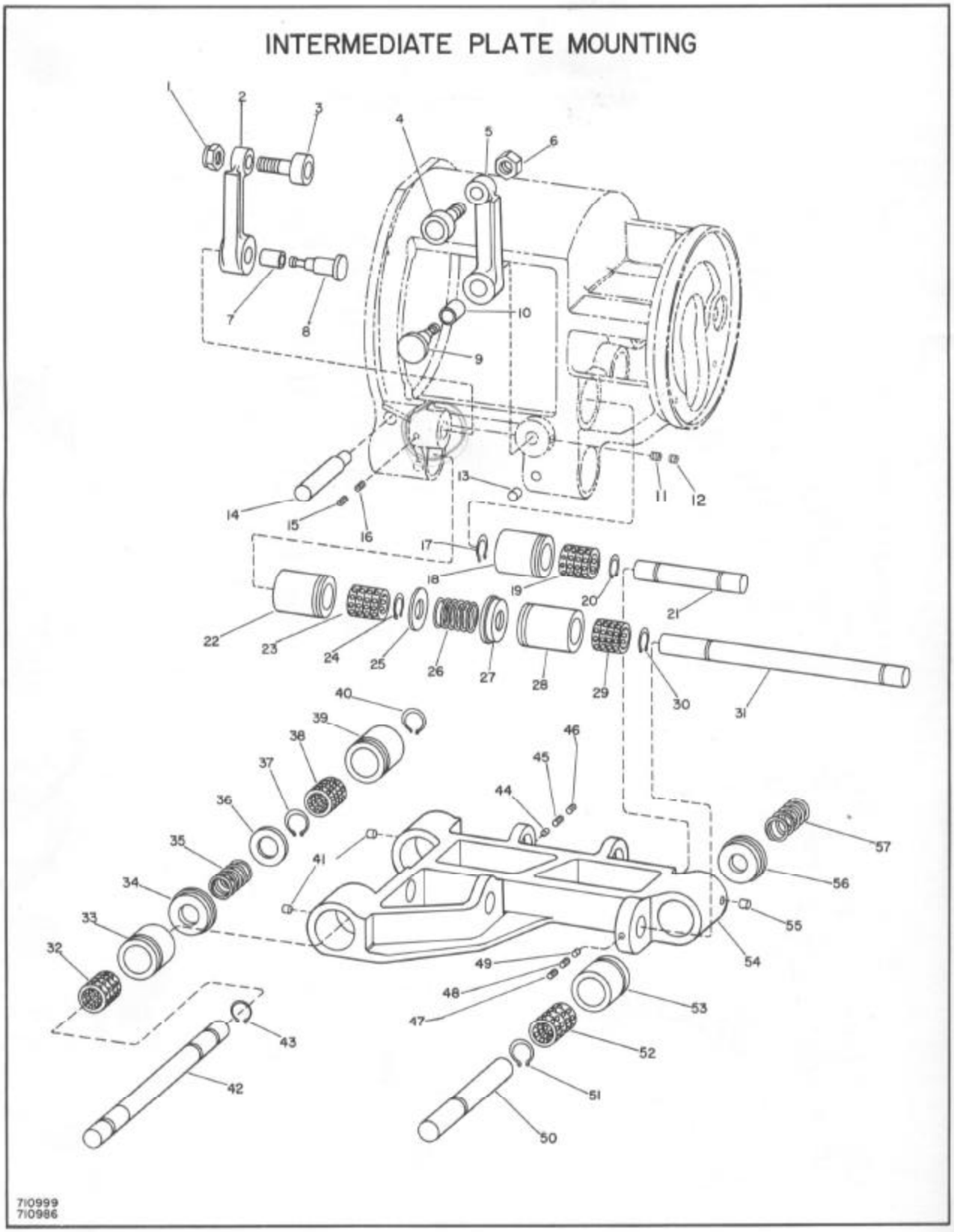
INTERMEDIATE PLATE MOUNTING
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Figure 26

# INTERMEDIATE PLATE MOUNTING (See Figure 26)

| Figure and Index No. | Part No. | Part Name | Units Per Assy |
|---|---|---|---|
| 26-1 | 710072 | Nut - Stop | 1 |
| -2 | 710621 | Arm - Transverse Cam | 1 |
| -3 | 710071 | Follower - Cam | 1 |
| -4 | 710071 | Follower - Cam | 1 |
| -5 | 710620 | Arm - Axial Cam | 1 |
| -6 | 710072 | Nut - Stop | 1 |
| -7 | 710812 | Bushing | 1 |
| -8 | 710663 | Shaft - Arm | 1 |
| -9 | 710663 | Shaft - Arm | 1 |
| -10 | 710812 | Bushing | 1 |
| -11 | 2354 | Screw | 1 |
| -12 | 101782 | Screw | 1 |
| -13 | 710000 | Pin | 3 |
| -14 | 710482 | Pin - Stop | 1 |
| -15 | 2354 | Screw | 1 |
| -16 | 101782 | Screw | 1 |
| -17 | 710979 | Ring - Retaining | 1 |
| -18 | 710977 | Bushing | 1 |
| -19 | 710976 | Retainer - Bearing | 1 |
| -20 | 710979 | Ring - Retaining | 1 |
| -21 | 710995 | Rod - Guide | 1 |
| -22 | 710977 | Bushing | 1 |
| -23 | 710976 | Retainer - Bearing | 1 |
| -24 | 710979 | Ring - Retaining | 1 |
| -25 | 116003 | Washer | 1 |
| -26 | 710080 | Spring | 1 |
| -27 | 710085 | Retainer - Spring | 1 |
| -28 | 710977 | Bushing | 1 |
| -29 | 710976 | Retainer - Bearing | 1 |
| 26-30 | 710979 | Ring - Retaining | 1 |
| -31 | 710994 | Rod - Guide | 1 |
| -32 | 710976 | Retainer - Bearing | 1 |
| -33 | 710977 | Bushing | 1 |
| -34 | 710085 | Retainer - Spring | 1 |
| -35 | 710697 | Spring | 1 |
| -36 | 116003 | Washer | 1 |
| -37 | 710979 | Ring - Retaining | 1 |
| -38 | 710976 | Retainer - Bearing | 1 |
| -39 | 710977 | Bushing | 1 |
| -40 | 710979 | Ring - Retaining | 1 |
| -41 | 710000 | Pin | 2 |
| -42 | 710991 | Rod - Guide | 1 |
| -43 | 710979 | Ring - Retaining | 1 |
| -44 | 137156 | Plug | 1 |
| -45 | 2316 | Screw | 1 |
| -46 | 2355 | Screw | 1 |
| -47 | 2355 | Screw | 1 |
| -48 | 2316 | Screw | 1 |
| -49 | 137156 | Plug | 1 |
| -50 | 710993 | Rod - Guide | 1 |
| -51 | 710979 | Ring - Retaining | 1 |
| -52 | 710976 | Retainer - Bearing | 1 |
| -53 | 710977 | Bushing | 1 |
| -54 | 710602 | Plate - Intermediate | 1 |
| -55 | 710000 | Pin | 1 |
| -56 | 710085 | Retainer - Spring | 1 |
| -57 | 710988 | Spring | 1 |

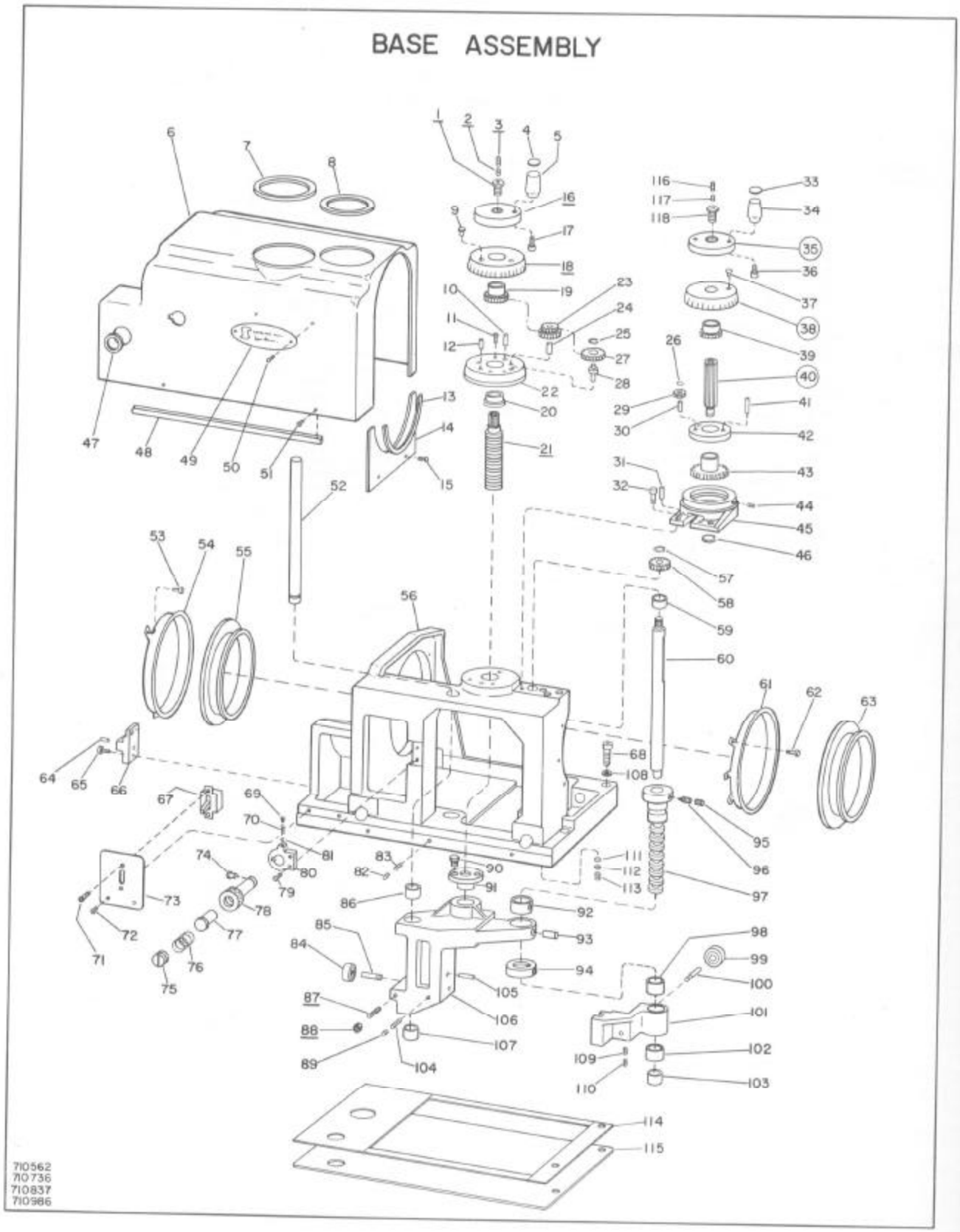
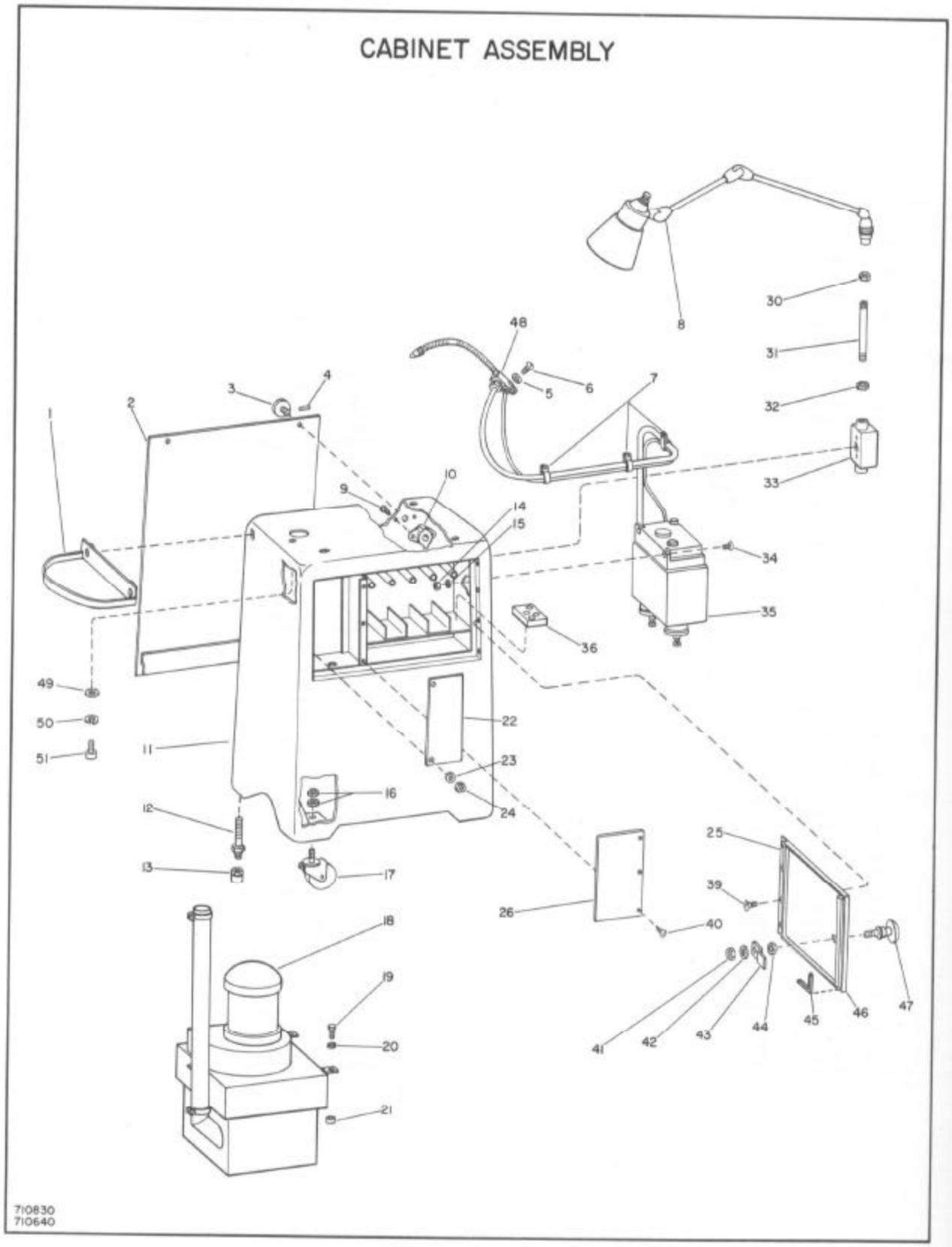



Figure 28

# BASE ASSEMBLY (See Figure 28)

| Figure and Index No. | Part No. | Part Name | Units Per Assy |
|---|---|---|---|
| 28-1 | 710698 | Screw | 1 |
| -2 | 710065 | Screw | 1 |
| -3 | 710066 | Screw | 1 |
| -4 | 4331 | Plate | 1 |
| -5 | 4327 | Knob | 1 |
| -6 | 710921 | Shell | 1 |
| -7 | 710967 | Ring - Dial | 1 |
| -8 | 710966 | Ring - Dial | 1 |
| -9 | 710659 | Pin | 2 |
| -10 | 148097 | Pin - Roll | 2 |
| -11 | 3396 | Screw | 3 |
| -12 | 1372 | Pin | 1 |
| -13 | 710718 | Seal | 1 |
| -14 | 710778 | Cover - Rear | 1 |
| -15 | 710450 | Screw | 2 |
| -16 | 710984 | Wheel - Dial | 1 |
| -17 | 3396 | Screw | 1 |
| -18 | | Dial | |
| | 710702 | Model 500 Machines | 1 |
| | 710703 | Model 750 Machines | 1 |
| | 710662 | Model 1000 Machines | 1 |
| | 710041 | 13 M.M. - Model 500 Machines | 1 |
| | 710042 | 19 M.M. - Model 750 Machines | 1 |
| | 710043 | 25 M.M. - Model 1000 Machines | 1 |
| -19 | 710661 | Gear - Dial | 1 |
| -20 | 243781 | Bushing | 1 |
| -21 | 710610 | Screw - Lead | 1 |
| -22 | 710611 | Plate - Mounting | 1 |
| -23 | 710810 | Gear - Pinion | 1 |
| -24 | 1377 | Pin | 1 |
| -25 | 253007 | Ring - Retaining | 1 |
| -26 | 244098 | Ring - Retaining | 2 |
| -27 | 710649 | Gear - Dial | 1 |
| -28 | 710609 | Shaft - Gear | 1 |
| -29 | 710769 | Gear - Dial | 2 |
| -30 | 710768 | Shaft - Gear | 2 |
| -31 | 150577 | Pin - Roll | 2 |
| -32 | 2320 | Screw | 2 |
| -33 | 4331 | Plate | 2 |
| -34 | 4327 | Knob | 2 |
| -35 | 710037 | Wheel - Dial | 1 |
| -36 | 3396 | Screw | 2 |
| -37 | 710659 | Pin | 1 |
| -38 | 710770 | Dial | 1 |
| -39 | 710661 | Gear - Dial | 1 |
| -40 | 710039 | Shaft | 1 |
| -41 | 96676 | Pin | 1 |
| -42 | 710772 | Plate - Dial | 1 |
| -43 | 710773 | Gear | 1 |
| -44 | 2339 | Screw | 1 |
| -45 | 710771 | Bracket | 1 |
| -46 | 123820 | Ring - Retaining | 1 |
| -47 | 710875 | Grommet | 1 |
| -48 | 710324 | Seal | 1 |
| -49 | 710403 | Plate - Name | 2 |
| -50 | 3178 | Screw | 4 |
| -51 | 2369 | Screw | 6 |
| -52 | 710686 | Pin - Guide | 1 |
| -53 | 3194 | Screw | 3 |
| -54 | 710709 | Ring | 1 |
| -55 | 710728 | Seal | 1 |
| -56 | 710076 | Base | 1 |
| -57 | 123820 | Ring - Retaining | 1 |

| Figure and Index No. | Part No. | Part Name | Units Per Assy |
|---|---|---|---|
| 28-58 | 710186 | Gear | 1 |
| -59 | 603484 | Bushing | 1 |
| -60 | 710614 | Shaft | 1 |
| -61 | 710710 | Bracket - Rear Seal | 1 |
| -62 | 3194 | Screw | 3 |
| -63 | 710728 | Seal | 1 |
| -64 | 3431 | Pin | 2 |
| -65 | 3204 | Screw | 2 |
| -66 | 710990 | Tongue | 1 |
| -67 | | Switch - Manual | |
| | 710705 | With Overload Protection | 1 |
| | 710961 | Without Overload Protection | 1 |
| -68 | 147061 | Screw | 2 |
| -69 | 2355 | Screw | 1 |
| -70 | 710869 | Spring | 1 |
| -71 | 2361 | Screw | 2 |
| -72 | 2369 | Screw | 2 |
| -73 | 710582 | Plate - Switch | 1 |
| -74 | 710423 | Pin | 1 |
| -75 | 1744 | Screw | 1 |
| -76 | 87327 | Spring | 1 |
| -77 | 710421 | Plunger | 1 |
| -78 | 710873 | Knob | 1 |
| -79 | 3462 | Screw | 2 |
| -80 | 710647 | Bracket - Plunger | 1 |
| -81 | 30060 | Ball - Steel | 1 |
| -82 | 2354 | Screw | 1 |
| -83 | 2333 | Screw | 1 |
| -84 | 710070 | Bearing - Follower | 1 |
| -85 | 710874 | Pin | 1 |
| -86 | 710813 | Bushing | 1 |
| -87 | 710008 | Screw | 1 |
| -88 | 3472 | Nut | 1 |
| -89 | 2330 | Screw | 1 |
| -90 | 3396 | Screw | 2 |
| -91 | 710631 | Bushing | 1 |
| -92 | 710140 | Bushing | 1 |
| -93 | 710094 | Pin - Roll | 1 |
| -94 | 601907 | Nut - Lock | 1 |
| -95 | 2355 | Screw | 1 |
| -96 | 103333 | Screw | 1 |
| -97 | 701615 | Leadscrew - Bushing | 1 |
| -98 | 710608 | Bushing | 1 |
| -99 | 710070 | Bearing - Follower | 1 |
| -100 | 710674 | Pin | 1 |
| -101 | 710838 | Bracket - Roller | 1 |
| -102 | 710608 | Bushing | 1 |
| -103 | 710005 | Bushing | 1 |
| -104 | 2340 | Screw | 1 |
| -105 | 3369 | Pin | 1 |
| -106 | 710606 | Bracket - Cam Roller | 1 |
| -107 | 710813 | Bushing | 1 |
| -108 | 1029 | Washer | 2 |
| -109 | 2339 | Screw | 1 |
| -110 | 2353 | Screw | 1 |
| -111 | 2368 | Plug | 2 |
| -112 | 2301 | Screw | 2 |
| -113 | 2356 | Screw | 2 |
| -114 | 710943 | Pad - Felt | 1 |
| -115 | 710942 | Pad - Asbestos | 1 |
| -116 | 710066 | Screw | 1 |
| -117 | 710065 | Screw | 1 |
| -118 | 710698 | Screw | 1 |


CABINET ASSEMBLY
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710830
710640

Figure 30

# CABINET ASSEMBLY (See Figure 30)

| Figure and Index No. | Part No. | Part Name | Amt. Used |
|---|---|---|---|
| 30-1 | 710944 | Tray - Drill | 1 |
| -2 | 710652 | Cover | 1 |
| -3 | 710801 | Stud | 2 |
| -4 | 600478 | Pin - Cross | 2 |
| -5 | 205678 | Washer - Lock | 1 |
| -6 | 2367 | Screw | 1 |
| -7 | 710950 | Clamp | 3 |
| -8 | 603792 | Worklight - Adjustable | 1 |
| -9 | 710802 | Screw | 4 |
| -10 | 603416 | Spring | 2 |
| -11 | 710129 | Cabinet | 1 |
| -12 | 710651 | Screw - Leveling | 4 |
| -13 | 710547 | Pad - Toggle | 4 |
| -14 | 3477 | Nut | 2 |
| -15 | 2123 | Washer - Lock | 2 |
| -16 | 166 | Nut | 8 |
| -17 | 710545 | Caster | 4 |
| -18 | 710023 | Collector - Dust | 1 |
| -19 | 235820 | Screw | 3 |
| -20 | 1029 | Washer | 3 |
| -22 | 710822 | Panel - Mounting | 1 |
| -23 | 3267 | Washer | 2 |
| -24 | 156 | Nut | 2 |
| 30-25 | 710821 | Hinge | 1 |
| -26 | 710823 | Cover | 1 |
| -30 | Comm'l | Nut - Conduit Lock, 1/2" | 1 |
| -31 | 710953 | Conduit - Worklight | 1 |
| -32 | Comm'l | Nut - Conduit Lock, 1/2" | 1 |
| -33 | 710007 | Box - Worklight Mounting | 1 |
| -34 | 2372 | Screw | 2 |
| -35 | 710949 | Coolant System - Spray Mist | 1 |
| -36 | 710827 | Holder - Locator | 1 |
| -39 | 2363 | Screw | 4 |
| -40 | 710480 | Screw | 3 |
| -41 | Example | Nut (Furnished with 30-47) | 1 |
| -42 | Example | Washer (Furnished with 30-47) | 1 |
| -43 | 710828 | Latch - Lock | 1 |
| -44 | Example | Nut (Furnished with 30-47) | 1 |
| -45 | 245460 | Strip - Neoprene | 1 |
| -46 | 710825 | Door - Cabinet | 1 |
| -47 | 129854 | Handle - Locking | 1 |
| -48 | 710949-6 | Jet - Flexible Extension | 1 |
| -49 | 1030 | Washer | 1 |
| -50 | 2135 | Washer, Lock | 1 |
| -51 | 3399 | Screw | 1 |

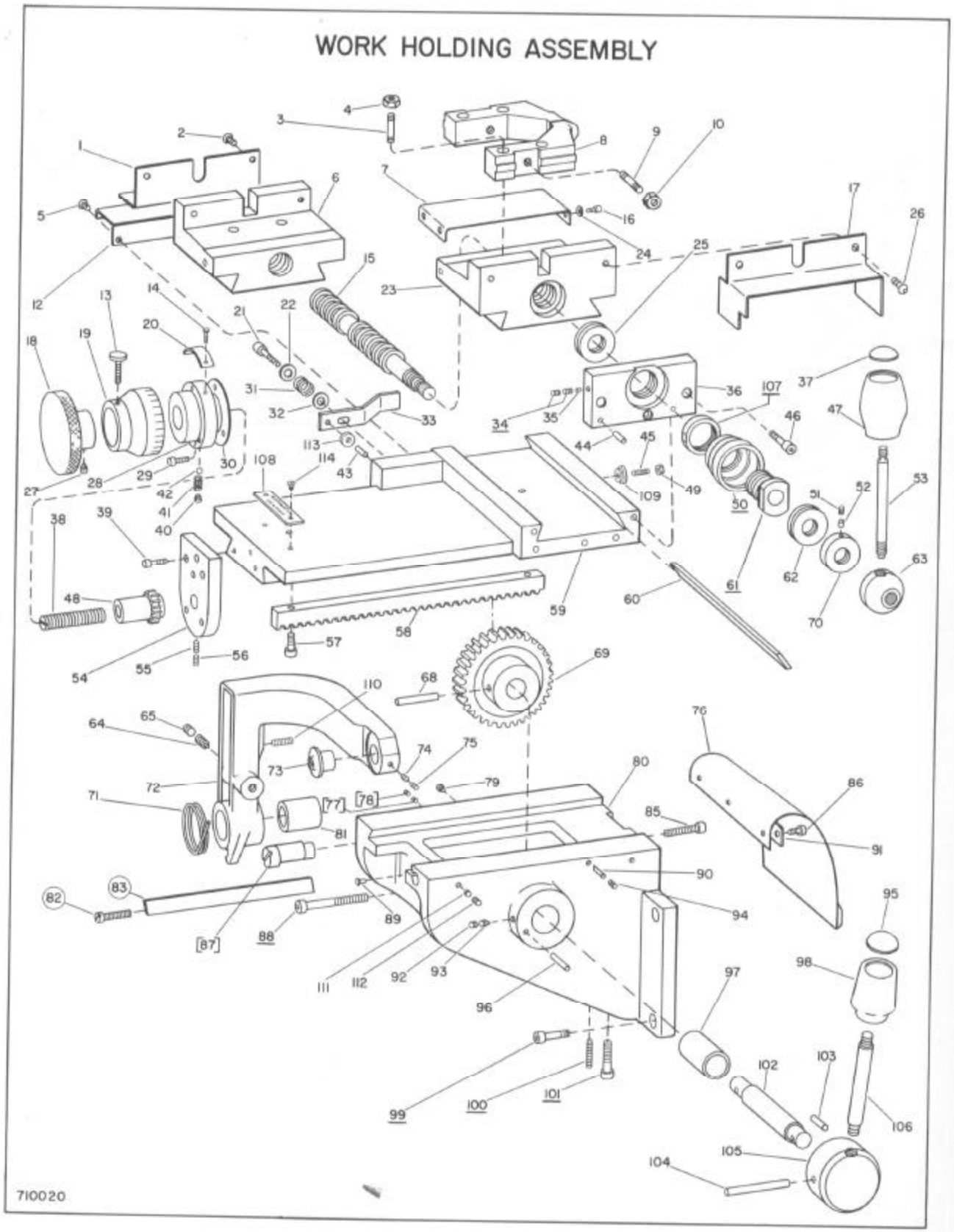


Figure 32

# WORK HOLDING ASSEMBLY (See Figure 32)

| Figure and Index No. | Part No. | Part Name | Amt. Used |
|---|---|---|---|
| 32-1 | 710971 | Cover - L. H. | 1 |
| -2 | 2362 | Screw | 2 |
| -3 | 710437 | Stud - Top | 4 |
| -4 | 3472 | Nut | 4 |
| -5 | 2362 | Screw | 2 |
| -6 | *710011 | Jaw - Master (Half) R. H. & L. H. | 1 |
| -7 | 710970 | Cover | 1 |
| -8 | | Jaw - Removable | |
| | 710912 | #60 to 1/8 inch Drills | 2 |
| | 710910 | 1/8 to 1/4 inch Drills | 2 |
| | 710909 | 1/4 to 1/2 inch Drills | 2 |
| | 710911 | 1/2 to 3/4 inch Drills Eng/Metric | 2 |
| | 710124 | 1/2 to 1 inch Drills Eng/Metric | 2 |
| -9 | 710958 | Stud - Jaws | 2 |
| -10 | 3472 | Nut | 2 |
| -12 | 710972 | Cover | 1 |
| -13 | 710691 | Screw - Thumb | 1 |
| -14 | 3178 | Screw | 2 |
| -15 | 710010 | Screw - Clamping | 1 |
| -16 | 3459 | Screw | 4 |
| -17 | 710933 | Cover - R. H. | 1 |
| -18 | 710487 | Knob - Hand | 1 |
| -19 | 710406 | Dial | 1 |
| -20 | 710431 | Plate - Direction | 1 |
| -21 | 3397 | Screw | 1 |
| -22 | 936 | Washer | 1 |
| -23 | *710011 | Jaw - Master (Half) | 1 |
| -24 | 294 | Washer | 4 |
| -25 | 101615 | Bearing - Thrust | 1 |
| -26 | 2362 | Screw | 2 |
| -27 | 2339 | Screw | 1 |
| -28 | 710877 | Cap - Ratchet | 1 |
| -29 | 251177 | Screw | 3 |
| -30 | 710880 | Shim | 1 |
| -31 | 209040 | Spring | 1 |
| -32 | 936 | Washer | 1 |
| -33 | 710857 | Stop - Latch | 1 |
| -34 | 2332 | Screw | 2 |
| -35 | 2008 | Plug | 1 |
| -36 | 710932 | Plate | 1 |
| -37 | 4331 | Plate | 1 |
| -38 | 710879 | Screw - Stop | 1 |
| -39 | 3218 | Screw | 3 |
| -40 | 2355 | Screw | 1 |
| -41 | 95208 | Spring | 1 |
| -42 | 30060 | Ball | 1 |
| -43 | 3431 | Pin | 1 |
| -44 | 3162 | Pin | 2 |
| -45 | 3165 | Screw | 5 |
| -46 | 3396 | Screw | 3 |
| -47 | 4327 | Knob | 1 |
| -48 | 710899 | Ratchet | 1 |
| -49 | 3472 | Nut | 5 |
| -50 | 710595 | Boot - Protective | 1 |
| -51 | 2353 | Screw | 1 |
| -52 | 1994 | Plug | 1 |
| -53 | 710126 | Handle - Clamp | 1 |
| -54 | 710878 | Apron | 1 |
| -55 | 600671 | Screw | 1 |
| -56 | 2330 | Screw | 1 |
| -57 | 3218 | Screw | 2 |
| -58 | 710876 | Rack | 1 |
| 32-59 | 710939 | Slide | 1 |
| -60 | 710931 | Gib | 1 |
| -61 | 710012 | Nut - Adjusting | 1 |
| -62 | 101615 | Bearing - Thrust | 1 |
| -63 | 710326 | Hub - Clamp | 1 |
| -64 | 3233 | Screw | 1 |
| -65 | 2301 | Screw | 1 |
| -68 | 266706 | Pin - Roll | 1 |
| -69 | 710677 | Gear - Spur | 1 |
| -70 | 600883 | Nut - Lock | 1 |
| -71 | 710122 | Spring - Torsion | 1 |
| -72 | 710658 | Bracket - Locator | 1 |
| -73 | | Locator | |
| | 710922 | #60 to 1/8 - Models 500, 750 and 1000 | 1 |
| | 710996 | 1/8 to 1/4 - Models 500, 750 and 1000 | 1 |
| | 710997 | 1/4 to 1/2 - Models 500, 750 and 1000 | 1 |
| | 710998 | 1/2 to 3/4 - Models 750 and 1000 | 1 |
| | 710061 | 3/4 to 1 - Model 1000 Only | 1 |
| -74 | 2332 | Screw | 1 |
| -75 | 2354 | Screw | 1 |
| -76 | 710502 | Curtain | 1 |
| -77 | 101782 | Screw | 1 |
| -78 | 2354 | Screw | 1 |
| -79 | 605908 | Button | 1 |
| -80 | 710017 | Bracket | 1 |
| -81 | 710040 | Bushing | 1 |
| -82 | 710016 | Screw | 1 |
| -83 | 710814 | Gib - Cross Slide | 1 |
| -85 | 604536 | Screw | 1 |
| -86 | 2361 | Screw | 3 |
| -87 | 710563 | Pin - Eccentric | 1 |
| -88 | 2326 | Screw | 1 |
| -89 | 605908 | Button | 1 |
| -90 | 710951 | Shoe - Gib | 1 |
| -91 | 710503 | Plate - Curtain | 1 |
| -92 | 2354 | Screw | 1 |
| -93 | 3228 | Screw | 1 |
| -94 | 2333 | Screw | 1 |
| -95 | 4331 | Plate | 1 |
| -96 | 710881 | Pin - Roll | 1 |
| -97 | 710676 | Bushing | 1 |
| -98 | 4327 | Knob | 1 |
| -99 | 2320 | Screw | 3 |
| -100 | 3231 | Screw | 1 |
| -101 | 3251 | Screw | 1 |
| -102 | 710675 | Shaft - Gear | 1 |
| -103 | 710881 | Pin - Roll | 1 |
| -104 | 154555 | Pin - Roll | 1 |
| -105 | 710002 | Hub | 1 |
| -106 | 710003 | Handle | 1 |
| -107 | 710013 | Nut - Lock | 1 |
| -108 | 710530 | Plate - Instruction | 1 |
| -109 | 710509 | Washer | 1 |
| -110 | 710531 | Screw - Long lock | 1 |
| -111 | 2331 | Screw - Set | 2 |
| -112 | 282982 | Plug | 2 |
| -113 | 143513 | Washer | 1 |
| -114 | 3178 | Screw | 2 |

* Cannot be purchased separately.

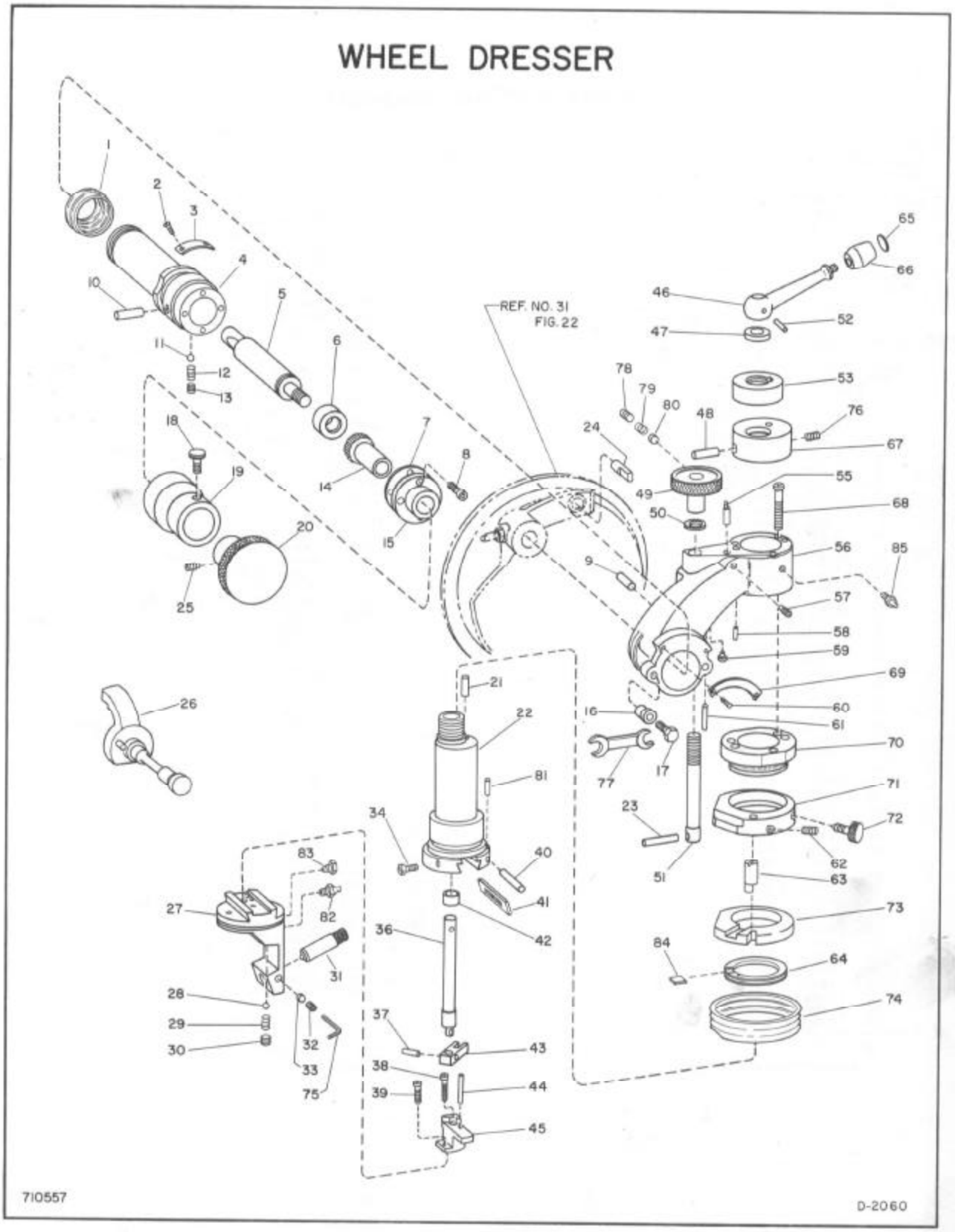


Figure 34

# WHEEL DRESSER (See Figure 34)

| Figure and Index No. | Part No. | Part Name | Amt. Used |
|---|---|---|---|
| 34-1 | 710595 | Boot | 1 |
| -2 | 3178 | Screw | 2 |
| -3 | 710431 | Plate - Direction | 1 |
| -4 | 710900 | Bushing - Eccentric | 1 |
| -5 | 710895 | Pin - Guide | 1 |
| -6 | 710902 | Spacer | 1 |
| -7 | 710918 | Shim | 1 |
| -8 | 3189 | Screw | 4 |
| -9 | 148098 | Pin | 1 |
| -10 | 3544 | Pin | 1 |
| -11 | 30060 | Ball | 1 |
| -12 | 95208 | Spring | 1 |
| -13 | 2355 | Screw | 1 |
| -14 | 710899 | Ratchet | 1 |
| -15 | 710901 | Flange | 1 |
| -16 | 710905 | Clamp - Heel | 2 |
| -17 | 3378 | Screw | 2 |
| -18 | 710691 | Screw | 1 |
| -19 | 710486 | Dial | 1 |
| -20 | 710487 | Knob | 1 |
| -21 | 3541 | Pin | 1 |
| -22 | 710559 | Spindle | 1 |
| -23 | 154160 | Pin - Roll | 1 |
| -24 | 710898 | Pin - Stop | 1 |
| -25 | 2339 | Screw | 1 |
| -26 | 710130 | Gage | 1 |
| -27 | 710566 | Slide - Diamond | 1 |
| -28 | 30060 | Ball | 1 |
| -29 | 222941 | Spring | 1 |
| -30 | 2316 | Screw | 1 |
| -31 | 710893 | Nib - Diamond | 1 |
| -32 | 2332 | Screw | 1 |
| -33 | 1550 | Plug | 1 |
| -34 | 710567 | Screw - Gib | 2 |
| -36 | 710925 | Shaft - Yoke | 1 |
| -37 | 710006 | Pin | 1 |
| -38 | 274840 | Screw | 1 |
| -39 | 3246 | Screw | 1 |
| -40 | 3277 | Pin | 1 |
| -41 | 710560 | Gib | 1 |
| -42 | 600342 | Bushing | 1 |
| -43 | 710973 | Yoke | 1 |
| -44 | 710975 | Pin | 1 |
| 34-45 | 710974 | Key | 1 |
| -46 | 710439 | Lever | 1 |
| -47 | 117785 | Washer | 1 |
| -48 | 3541 | Pin | 1 |
| -49 | 710903 | Knob | 1 |
| -50 | 3441 | Washer | 1 |
| -51 | 710890 | Stud - Clamping | 1 |
| -52 | 152449 | Pin - Roll | 1 |
| -53 | 710508 | Nut - Lock | 1 |
| -55 | 710896 | Pin - Eccentric | 1 |
| -56 | 710891 | Bracket | 1 |
| -57 | 3229 | Screw | 1 |
| -58 | 3636 | Pin | 2 |
| -59 | 605908 | Button | 1 |
| -60 | 3178 | Screw | 2 |
| -61 | 266706 | Pin - Roll | 1 |
| -62 | 2331 | Screw | 1 |
| -63 | 710510 | Pin - Eccentric | 1 |
| -64 | 710917 | Ring | 1 |
| -65 | 4331 | Plate | 1 |
| -66 | 4327 | Knob | 1 |
| -67 | 710886 | Cap - Slide | 1 |
| -68 | 229485 | Screw | 3 |
| -69 | | Plate - Radius | |
| | 710049 | English | 1 |
| | 710050 | Metric | 1 |
| -70 | 710913 | Ring - Locator | 1 |
| -71 | 710892 | Ring | 1 |
| -72 | 710978 | Screw | 1 |
| -73 | 710894 | Ring - Guide | 1 |
| -74 | 710513 | Boot - Dust | 1 |
| -75 | 4053 | Wrench - Diamond Nib | 1 |
| -76 | 2331 | Screw | 1 |
| -77 | 710835 | Wrench | 1 |
| -78 | 710280 | Screw | 1 |
| -79 | 115642 | Spring | 1 |
| -80 | 282982 | Plug - Nylok | 1 |
| -81 | 265503 | Pin | 1 |
| -82 | 3342 | Fitting - Lubrication | 1 |
| -83 | 1994 | Plug | 1 |
| -84 | 710512 | Arm - Stop | 1 |
| -85 | 3342 | Fitting - Lubrication | 1 |

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