



ROCKWELL
MANUFACTURING COMPANY
PITTSBURGH 8, PENNSYLVANIA



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DELTA RADIAL DRILL PRESS DRILLS TO CENTER OF 32" CIRCLE

The new radial drill press possesses all of the basic features of the popular Delta 11" Drill Press. Added to its advantages of flexibility and capacity, the new Delta Radial Drill Press is far "superior" to conventional type drill presses or to similar machines costing four or five times more.

INSTALLATION

After removing your #11-280 Radial Drill Press from the carton, place the base, vertical column and table assembly on a Delta No. 50-821 steel stand or any other suitable level surface. The base should be fastened to the stand or work bench using three 5/16 inch round head stove bolts. Remove the vertical column clamp assembly Fig. 1 from the tee bracket. Place the head, motor plate, and tee bracket assembly on the vertical column. Replace the clamp assembly, taking care to reassemble in the same order. When the motor is installed and the motor pulley and V-Belt are assembled, it is necessary to move the head to take up belt slack. The head Fig. 6 (25) is secured by two set screws (2). At the same time, the head should be set perpendicular to the table surface. Check this setting by means of a drill in the chuck and a square off the table surface. This adjustment should be performed with the plunger locator (12) engaged in the milled slot in the horizontal column (9). This can be checked by noticing the scribed line on the column opposite the milled slot. This line will correspond with the zero mark on the scale (15) when the plunger is engaged.

SELECTING THE MOTOR

We recommend a Delta No. 62-413 1 1/3 hp, AC, 115 volt, 60 cycle, 1725 rpm motor.

When selecting a motor from any other source, be sure that it is capable of taking end thrust and that it is protected against loss of lubricant when operated in the vertical position.

Use a constant speed 1725 rpm motor. Do not exceed this speed, as higher rates will shorten the life of the spindle bearings.

SPINDLE SPEEDS

The four pulley steps give spindle speeds of 700, 1250, 2400, and 4700 rpm when a 1725 rpm motor is used.

PULLEY AND BELT

The No. 985 motor pulley furnished with this drill press has 1/2-inch bore. It will fit the Delta motor recommended.

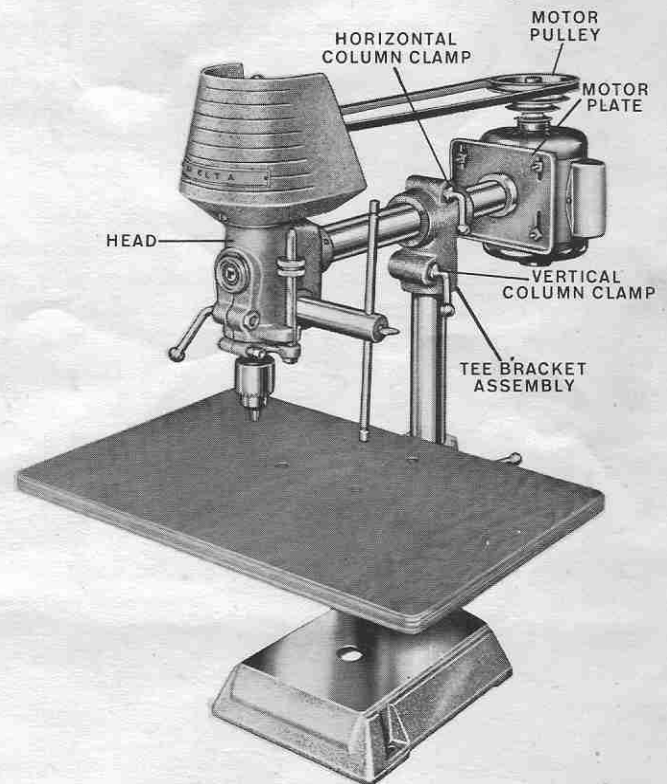


Figure 1

INSTALLING THE MOTOR

Attach the motor to the mounting bracket in the vertical position, with the shaft upward, using the carriage bolts SP-808 with washers and nuts. The bracket is slotted to receive the 6-inch frame motor recommended above; some other motors may require special mounting arrangements. Do not tighten the bolts permanently until the belt has been lined up.

Slip the motor pulley No. 985, with the smallest step downward, onto the motor shaft. Make sure that the set screws SP-201 engage the flat of the shaft, and tighten them firmly. Install the drive belt over corresponding steps of the motor and spindle pulleys.

The motor should run clockwise when viewed from above. If it runs the wrong way, reverse its rotation according to the manufacturer's directions furnished on motor name plate.

BELT ALIGNMENT AND TENSION

Place a straight edge across the top of the motor pulley to check the elevation with respect to the spindle pulley. Raise or lower the motor in the slots of the mounting bracket to make the pulleys level. Keep the motor shaft vertical; there is some play in the slots, which might permit the motor to tilt slightly. Tighten

the motor bolts permanently when the alignment is correct. Check with the straight edge. The belt will wear rapidly if the pulleys are out of line.

The belt should be just tight enough to prevent slipping. Excessive tension will reduce the life of belt, pulleys and bearings. The correct tension is such that the belt can be flexed about one inch out of line midway between pulleys, using finger pressure.

POWER CONNECTIONS

Before connecting the motor to the power line, be sure that the electric current is of the same characteristics as stamped on the motor name plate.

Do not connect the motor to a circuit which will be overloaded. If an extension cord is used, it must have adequate capacity. All line connections should make good contact. Running on low voltage will injure the motor.

ANGLE DRILLING

Disengage the plunger (12) from the column slot and loosen the horizontal column clamp. Tilt the head and column assy. right or left using the scribed line on horizontal column (9) as a guide in selecting the angle desired on the calibrated scale (15). Tighten the horizontal column clamp securely. When the drilling operation is completed return the scribed line on the column to read zero on the scale. The plunger will then engage the column, resetting the head for vertical drilling.

LUBRICATION

Apply a few drops of light machine oil to the spindle bearings once or twice a month. The oil holes in the front of the quill near its ends are accessible when it is run down and clamped. The lower hole feeds the thrust bearing SP-5330 in addition to the lower spindle bearing. The spindle pulley bearing is sealed and needs no lubrication.

Lubricate the surface of the quill occasionally, by applying a drop or two of oil inside the head casting. Also oil the quill rack, clock spring, pinion where it enters the head casting, upper end of the spindle above the pulley, flat surfaces of the stop rod and interior of the chuck.

To allow free movement of the horizontal column apply a coating of white vaseline.

DEPTH CONTROL

Maximum quill travel of this drill press is 3 $\frac{3}{8}$ inches. The knurled nuts DP-274 on the stop rod HDP-113 may be set to stop the drill at any lesser depth. They can be locked when a number of holes are to be drilled to the same depth.

QUILL CLAMP

To clamp the quill in any convenient position, tighten the lock bolt DP-11 on the front of the head. Avoid clamping too tightly, and be sure to release the quill fully before operating it, so that the accurately ground surfaces will not be damaged.

Clamping the quill is necessary in operations such as routing; it is also convenient when oiling and in measuring to set the stop nuts for depth control, and when changing spindles.

The clamp handle may be adjusted to stand in any convenient position when tight, by shifting the hexagon nut DP-223 in its socket. The handle should hang downward when loose.

SPINDLE RETURN SPRING ADJUSTMENT

The quill should operate freely and return instantly from any drilling position, but without slamming the stop collar too hard against the head casting. The return spring DP-232-S is adjusted at the factory for average conditions; it may need tightening when some of the heavier spindle accessories or tools are used.

Turn the clock spring case counter-clockwise to wind the spring tighter, clockwise to loosen it. Adjustment may be made $\frac{1}{4}$ turn at a time, by engaging successive notches of the case over the two anchor lugs on the left side of the drill press head. In adjusting the spindle return spring, proceed as follows:

Loosen the hexagon nuts SP-1227 on the left end of the pinion shaft and back them off about $\frac{1}{8}$ inch from the spring case, for clearance. Grip the case firmly, to hold the spring tension while pulling the case away from the lugs; rotate the case $\frac{1}{4}$ turn and slip the next pair of notches over the lugs. Keep the case against the head casting, so that the lugs hold the spring tension while you test the quill action and take a new grip. When the desired action has been obtained, push the case firmly against the head and make sure that both lugs are fully engaged. Turn the inner hexagon nut against the spring case lightly, not tight enough to cause binding. Lock it in this position by means of the outer nut, using two wrenches to jam them together.

To remove the clock spring, take off the hexagon nuts, release the spring tension entirely, and slip the case off of the pinion shaft. When installing the spring, be careful to engage the flat inner end into the slot of the shaft.

CHANGING SPINDLES

To remove the spindle, run the quill down until the set collar HDP-107-S above the quill is accessible through the opening in the head. Opening is covered with name plate which has to be removed. Clamp the quill in this position. While holding the spindle to avoid dropping it, release the set screw SP-201 with Allen Wrench to loosen the set collar. Swing the table to one side and raise the quill to the top of its stroke; there will be plenty of clearance for lowering the spindle out of the bearings.

Reverse the above procedure when installing the spindle, observing these precautions: Be sure that the spindle is passed through the fiber washer DSS-77 and the set collar HDP-107-S as the upper end comes through the quill. Rotate the spindle to enter the splines into the pulley. Tighten the set screw against the solid surface of the spindle, not into a spline groove, to avoid damage.

To eliminate all end play in the spindle, clamp the table at suitable height and lower the spindle against it with moderate pressure while clamping the quill. Push the set collar down against the quill while tightening the set screw. This method removes slack between thrust collar, thrust bearing and quill.

QUILL

The quill travels in the ground seat of the head casting. These parts will remain accurate indefinitely if kept clean and lubricated according to instructions.

Any play which might develop between head and quill after considerable use can be taken up by partially tightening the lock bolt DP-11. If the quill needs replacement, order the item HDP-102-S.

A hog ring HDP-105 holds the thrust bearing SP-5330 into the lower end of the quill. When replacement is necessary, pry out the hog ring and install the new bearing with the narrow opening to the bottom.

When using the mortising attachment #976, remove the stop collar DP-270 and install the chisel holder in its place. Tighten the clamp nut enough to hold the attachment from slipping, but avoid excessive pressure which might deform the quill. Observe the same precaution when remounting the stop collar. In either case, align the stop rod in the groove on the right side of the head so that it operates without drag.

Keep the quill as high as the work will permit, so that any side thrust will be transmitted directly to the head casting. This is especially important when routing, sanding, shaping, and for other operations in which the side of the tool does the work. Do not run the quill down to reach the work; rather raise the table to bring the work as close as possible to the head.

SPINDLE PULLEY BEARING

Replacement of the spindle pulley bearing will not be necessary until the machine has had a long period of heavy use. To check the bearing, remove the spindle so that the pulley will run idle; if it turns smoothly and runs with no noise beyond the whirring due to the belt, the bearing is still in good condition.

To replace the bearing, take off the spindle pulley guard HDP-802-S, withdraw the hexagon head cap screw DP-279 from the front of the head, and push the pulley upward out of the headcasting. Remove the retainer plate DP-278 from the inside of the pulley and press the old bearing out of the pulley. Install a new bearing SP-5373 and re-assemble the parts according to Fig. 6. In mounting the pulley, enter the inner race of the bearing so that the threaded hole meets the hole in the head casting, and tighten it into position by means of the screw DP-279.

DRILLING IN METAL

Use stop bolts in table slots when drilling in metal. The work should never be held in the hand alone; the lips of the drill may seize the work at anytime, especially when breaking through the stock. If the piece is whirled out of the operator's hand, he may be injured. In any case, the drill will be broken when the work strikes the column.

The work must be held steady while drilling; any tilting, twisting or shifting results not only in a rough hole, but also increases drill breakage. For flat work, lay the piece on a wooden base and hold it firmly down against the table, allowing the bolts to prevent it from turning. If the piece is of irregular shape and cannot be laid flat on the table, it should be securely blocked and clamped.

ROUTING

For routing, grooving, carving, and mortising use the No. 974 spindle with 1/2-inch hole, shown in Fig. 2. Insert the bit into the spindle to full depth, and clamp it by tightening the two hexagon socket set screws against the shank. Router bits with 1/2-inch shank are available in five sizes, from 1/4 to 1/2-inch diameter.

Use the highest spindle speed for router operations. Support the work against a fence whenever possible, so that it is not twisted out of the hands when caught by the deep flutes of the bit. When starting a cut, feed down slowly to the desired depth in the work, then clamp the quill to maintain the same depth over the entire area to be routed.

The work should be advanced so that the push caused by the cutting action of the bit is against the direction of feed. With the fence in the usual position behind the work, this means that the feed should be from left to right.

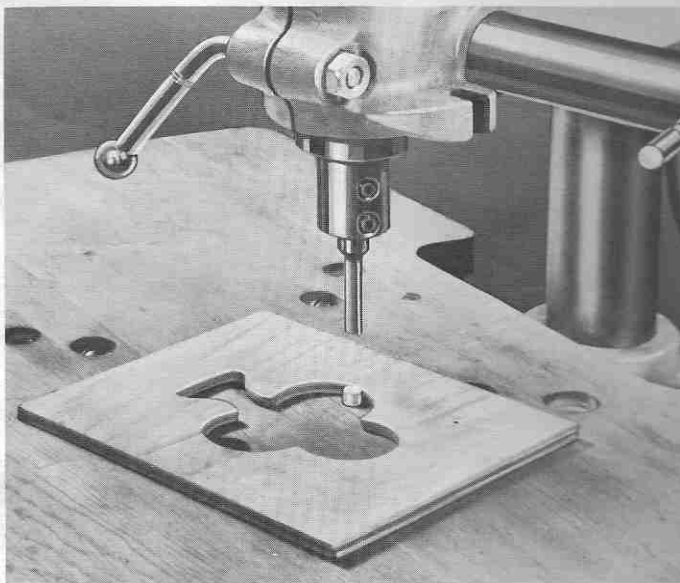


Fig. 2. Router Bit, Plywood Table, Dowel and Pattern for Routing.

Routing to a pattern or template is illustrated in Fig. 2 and 3. This is the proper method when the shape of the work makes the use of a fence impossible. Cut a full size pattern from thin stock, using the scroll saw. Such pattern is shown in Fig. 2. Tack the pattern to the underside of the work.

Drill a hole in the wooden table, using the router bit, and drive a dowel of the same diameter into the hole to project slightly less than the thickness of the pattern. Lay the work over the dowel and rout the face of the work to the desired depth, using the dowel to limit travel of the work. The result will be an exact copy of the pattern.

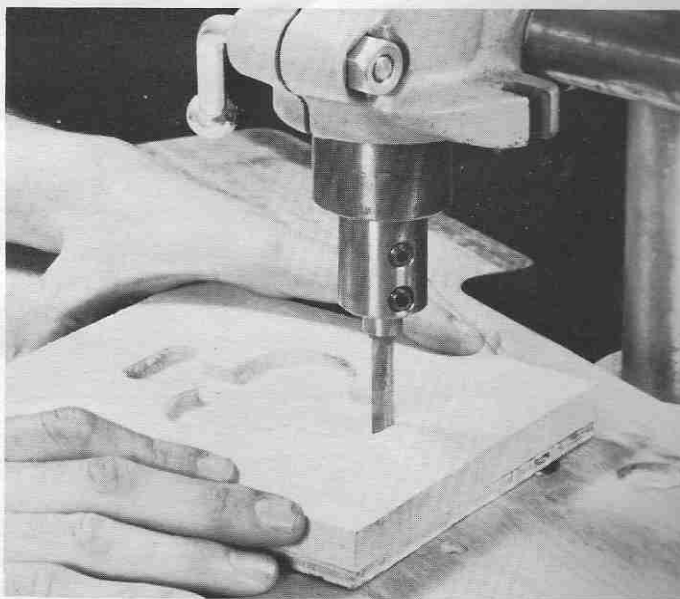


Fig. 3. Routing from a Pattern

BORING IN WOOD

Twist drills, although intended for metal drilling, may also be used for boring holes in wood. However, machine spur bits are generally preferred for working in wood; they cut a square-bottom hole and are designed for removal of wood chips. Do not use hand bits which have a screw tip; at drill press speeds they turn into the wood so rapidly as to lift the work off the table and whirl it.

For through boring, line up the table so that the bit will enter the center hole, to avoid damage. Scribe a vertical line on the front of the column and a match mark on the table bracket, so that the table can be clamped in center position at any height.

Feed slowly when the bit is about to cut through the wood, to prevent splintering the bottom face. Use a scrap piece of wood for a base block under the work; this helps to reduce splintering and protects the point of the bit.



Fig. 4. Sanding a Wooden Bracket.

SANDING

One of the special uses of this drill press is in sanding the surfaces of wooden or metal parts, as illustrated in Fig. 4. Sanding drums of various sizes from 1 1/16-inch diameter by 2 1/2 inches long to 3 by 3 inches are available. These drums have a patented rubber cushioned core feature which permits use of interchangeable abrasive sleeves of various grades. We offer garnet sleeves for sanding wood and aluminum oxide for metals.

Use the No. 974 spindle for these sanding drums. The smallest has a 1/2 inch shank to fit directly into the spindle; the larger drums have a 1/2 inch hole and set screws for attaching them by means of a short piece of 1/2 inch steel rod, Cat. No. 11-834.

Three-inch sanding drums should be run at 1250 rpm, smaller drums at higher speeds. To utilize the full face of the drum, mount a board on the drill press table and cut a hole in the board, slightly larger than the drum. Run the drum down into the hole as shown in the photograph, and clamp the quill. The abrasive sleeve will then extend below the work to cut equally across the entire face.

The fence may be used as a guide when sanding flat surfaces. Bolts, pivot pins or templates fastened to the table are useful for curved work. Such fixtures help to produce accurate results and protect the operator. Always feed the work against the rotation of the drum, to prevent jamming.

Avoid the use of excessive pressure which increases side thrust on the spindle and bearings. Abrasive sleeves remove material by the cutting action of the grit. Effective operation depends upon the correct type and size of grit for the material and the proper drum speed. When the sleeve becomes worn or loaded, discard it and install a new one.

MORTISING

The mortising attachment No. 976 is a handy accessory for accurately cutting mortises of various widths and lengths. It consists of a base which is arranged to mount on the drill press table, a fence, holddowns and chisel holder. The spindle with 1/2-inch hole, No. 974, is used to hold the mortising bits. The attachment is adjustable for size of stock and location of cut.

Hollow chisels and bits are available in four sizes, from 1/4 to 1/2 inch. Any desired width and length of mortise can be made by overlapping cuts.

Conversion of the drill press for mortising is made by installing the No. 974 spindle and attaching the chisel holder on the quill in place of the regular stop collar DP-270. Bushings are used to hold the mortising bits in the spindle. Complete instructions for mortising operations are given in the handbook, and are also included in the instruction sheet which is furnished with the attachment.

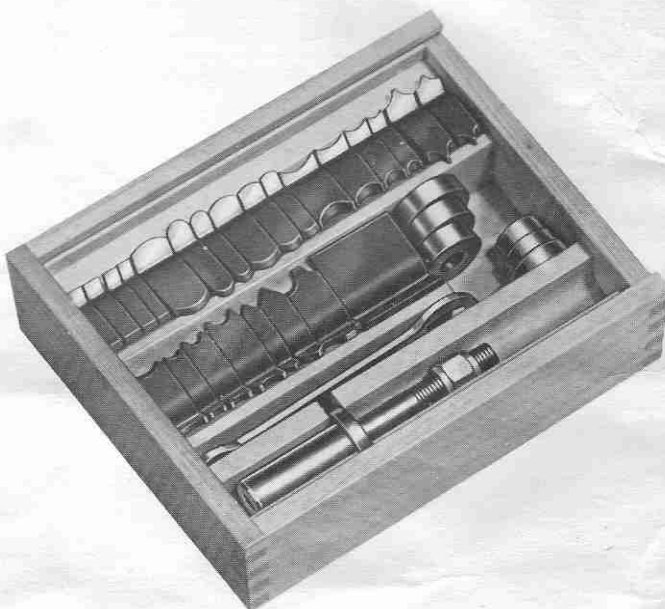


Fig. 5. Set of 3-Lip Shaper Cutters, Collars and Adapters

SHAPING

This drill press is easily arranged to operate as a shaper. The maximum spindle speed of 4700 rpm is sufficient for smooth cuts. A wide selection of 3-lip shaper cutters, such as shown in Fig. 5, are available. These cutters have a 5/16-inch hole to mount on the special spindle No. 977. They may also be carried by the No. 974 spindle when the adapter No. 978 is used.

Do not attempt to use larger shaper cutters on this drill press; only the small 3-lip cutters with 5/16-inch hole may be run safely on this machine.

The plywood table provides all facilities for accurate shaper work when equipped with the regular shaper fence No. 982 and the spring type holddown attachment No. 983.

The plywood table should be mounted to the cast iron table, with the rear edge of the plywood table as far away from the column as possible. This position allows for maximum work support.

Cutters must be mounted on the spindle with lips facing to the left when the regular drilling position is used. Feed of the work must be from left to right in this case.



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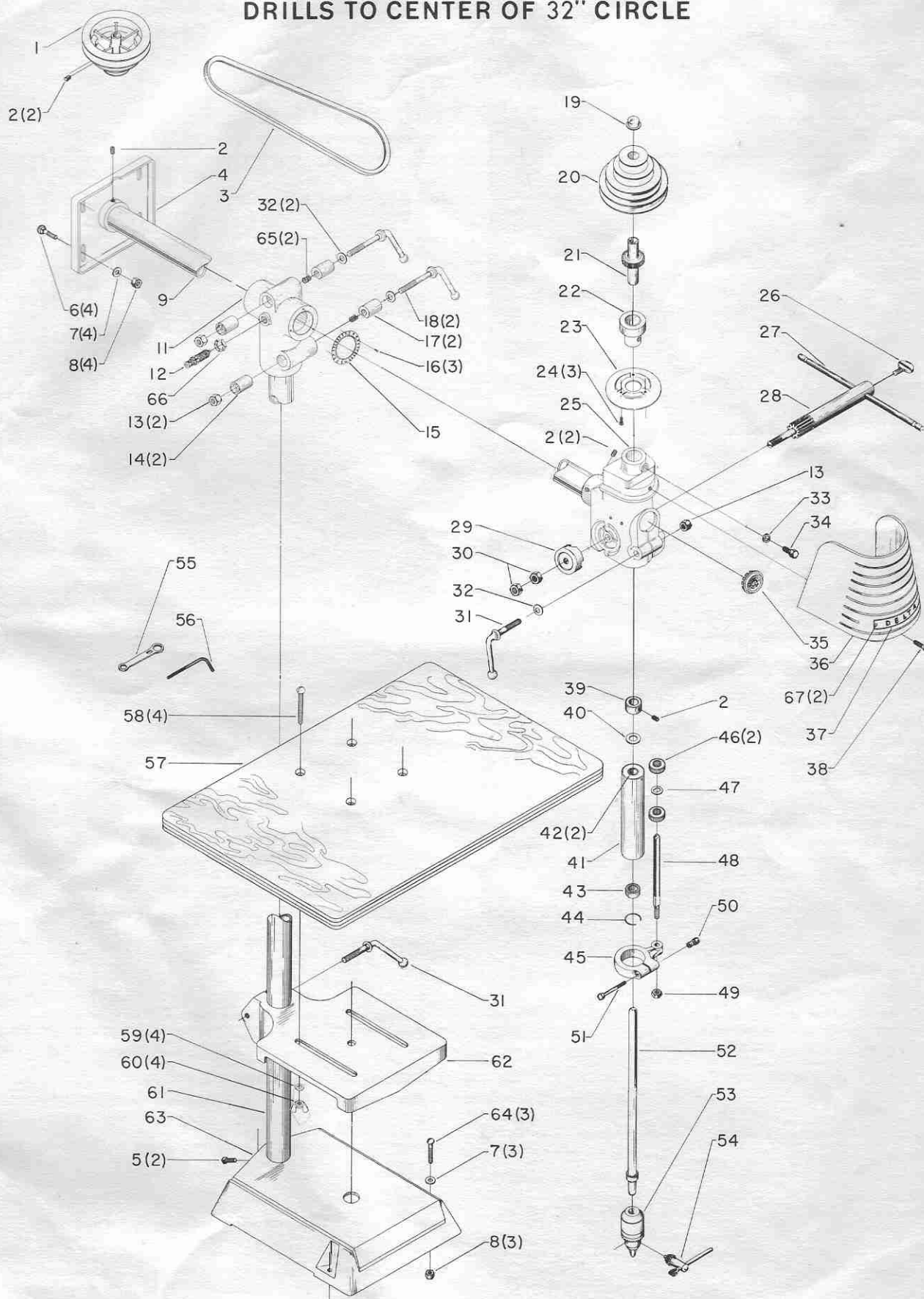


Figure 6

Replacement Parts

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	Cat. #985	Motor Pulley, Including:	34	DP-279	3/8"-24 x 5/8" Hex. Hd. Scr.
2	SP-201	5/16"-18 x 5/16" Set Scr.	35	448-01-331-0001	Cover Name Plate
3	Cat. #49-172	V-Belt	36	402-01-354-0004	Pulley Guard, Including:
4	448-01-372-0003	Motor Plate, Including:	67	SP-2252	#2 x 3/16 Drive Screw
2	SP-201	5/16"-18 x 5/16" Set Scr.	37	960-02-010-1875	Name Plate
6	SP-808	5/16 x 1" Carriage Bolt	38	SP-3800	5/16"-18 x 7/8" Fil. Hd. Scr.
7	SP-1604	5/16 I.D. x 3/4 O.D. x .065" Steel Washer	39	HDP-107-S	Spacer, Including:
			2	SP-201	5/16"-18 x 5/16" Set Screw
8	SP-5435	5/16"-18 Hex. Jam Nut	40	DSS-77	Washer
9	448-01-030-0001	Horizontal Column	41	HDP-102-S	Quill, Including:
11	448-01-314-0002	Bracket Assembly, Including:	42	HDP-130	Bushing
15	951-02-011-4338	Scale	43	SP-5330	Bearing
16	SP-2250	#4 x 3/16 Drive Screw	44	HDP-105	Retainer
12	448-01-312-0001	Plunger, Including:	45	DP-270	Stop Collar
66	SP-2957	5/16"-18 Palnut	46	DP-274	Knurled Nut
13	DP-223	7/16"-14 Hex. Nut	47	DP-318	Washer
14	448-01-027-0001	Clamp Shoe	48	HDP-113	Stop Rod
17	448-01-027-0002	Clamp Shoe	49	SP-1005	3/8"-16 Hex. Jam Nut
18	931-04-051-6351	Handle	50	DP-221	1/4"-20 Hex. Clamp Nut
*	DP-265-U	Spindle Pulley, Consisting of:	51	SP-622	1/4"-20 x 2" Hex. Hd. Scr.
19	DP-267	Cover	52	DP-255-SA	Spindle
20	DP-265	Pulley	53	**	Key Chuck
21	DP-264	Sleeve	54	**	Key
22	SP-5373	Bearing	55	Cat. #1526	Wrench
23	DP-278	Retainer	56	Cat. #194	Hex. Wrench
24	SP-3801	#8-32 x 3/8" Rd. Hd. Screw	57	448-01-091-0001	Plywood Table
25	448-01-057-0003	Head Casting	58	SP-515	5/16"-18 x 1 1/4" Rd. Hd. Scr.
26	DP-282	3/8"-24 Thumb Screw	59	SP-1620	11/32 x 11/16 x 1/16" Stl. Washer
27	DP-233	Feed Handle	60	SP-1403	5/16"-18 Wing Nut
28	DP-807-S	Pinion Shaft	61	448-01-030-0002	Vertical Column
29	DP-232-S	Return Spring	62	402-01-091-0003	Table
30	SP-1227	1/2"-20 Hex. Jam Nut	63	Cat. #49-194	Base, Including:
31	DP-11	Lock Bolt	5	SP-309	5/16"-18 x 5/8" Sq. Hd. Scr.
32	BM-45	Spring Washer	64	SP-523	5/16"-18 x 1 1/2" Rd. Hd. Scr.
33	SP-1709	3/8" Lockwasher	65	NCS-33	Spring

* Not Shown

** Please refer to the following list when replacing chucks or keys for the 11" Drill Press.

IDENTIFICATION NUMBER FOUND ON CHUCK	ORDER DELTA CHUCK PART NUMBER
#MC-33 Jacobs	402-01-025-0002
#H5T33 Supreme	402-01-025-0002
#MC33R33 Jacobs	402-01-025-0003

IDENTIFICATION NUMBER FOUND ON KEY	ORDER DELTA KEY PART NUMBER
#K-32 Jacobs	955-03-081-3707
#S-5 Supreme	955-03-081-3707
#KR Jacobs	955-03-081-3740

