DELTA Machine Tools
-MILWAUKEE-

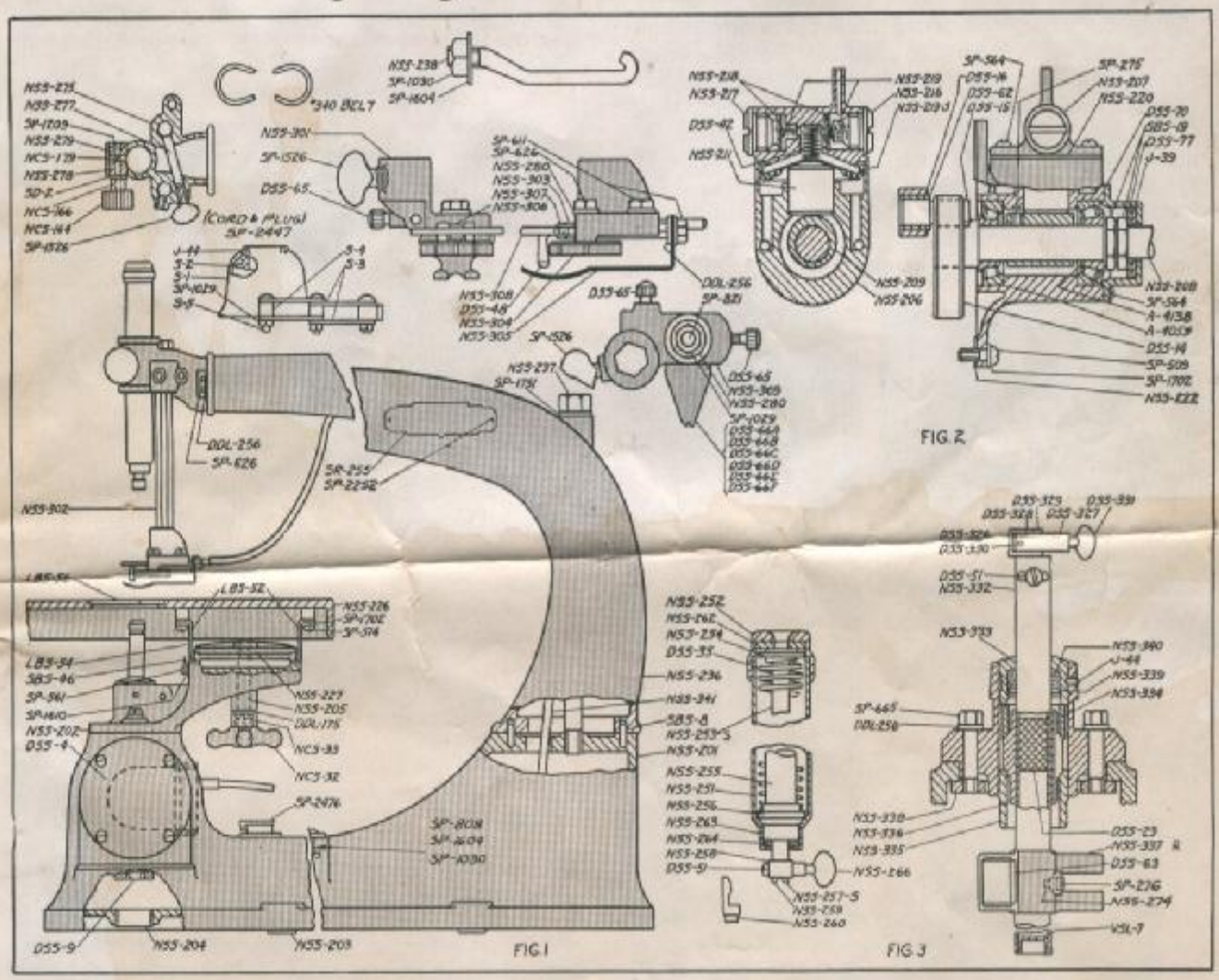
PM-1512

Revised: 11-1-46

40-B: Scroll Saw Instruction Manual

U. S. Patent No. 1,877,705; 1,959,199; 1,964,651; 1,964,652; 1,969,827; 1,984,500; 2,004,678; 2,073,430; 2,099,321; Re 19,501

24" SCROLL SAW
Operating and Maintenance Instructions



After unpacking the machine, insert the rubber bushings (which will be found in the envelope with the bolts) into the holes in the base, then bolt the machine to stand. To fasten to stand, use hook bolts NSS-238. Unpack the table, remove the clamp knob and set the table in place with the graduated scale to the front of the machine. When bolting to bench use a rubber washer either under the head of the carriage bolt or under the nut and washer, to prevent "drumming" in the bench.

Place a blade in the machine, setting it perfectly vertical, then set the table pointer to the zero mark on the scale, and lock it in this position with the round-head screw.

Any 1/3 H.P. motor will provide ample power for this machine. It should be bolted in place on the base before the machine is finally bolted down to bench or stand. See that the belt is not too tight; just tight enough to prevent whipping is correct. Direction of motor rotation is not important, unless the other end of the motor shaft is to be used to drive some other machine, in which case the rotation can suit the other machine.

Four-speed cone pulley No. 718 should be used on the motor, of No. 40-205 which will provide speeds of 650, 1,000, 1,300 and 1,750 R. P. M. with a standard 1725 R. P. M. motor.

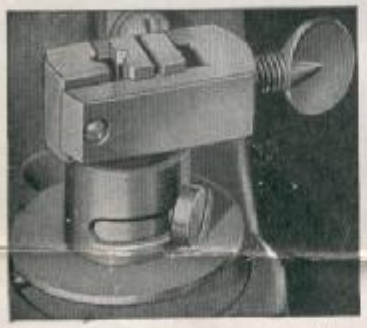
INSERTING BLADES

To insert jeweler's blades in the chucks, remove the table insert and turn the pulley until the lower chuck is at the top of its stroke. Loosen the chuck thumbscrew DSS-331, and insert the end of the blade about one-half inch BETWEEN THE TWO OUTER FLAT JAWS DSS-328 and DSS 329, Fig. 3. Hold the blade in a vertical position, and see that the end of the blade is at the center of the jaws.

When the blade is in the correct position tighten the thumbscrew to hold it. Loosen knurled clamp knob NCS-164 on the upper head, and slide the entire upper graduated tube down until the upper end of the blade enters ½ inch between the jaws of the upper chuck. Tighten the upper chuck, then raise the graduated tube until the blade has the correct tension and re-tighten clamp knob to hold it in place.

ADJUSTING TENSION ON BLADE

Any degree of tension may be obtained by merely sliding the upper graduated tube up or down and clamping it with clamp knob NCS-164. Since the exact tension required for any blade depends to some extent on the character of the work, the material being sawed, the thickness of the material, the length of the blade engaged by the chucks, etc., it is impossible to specify exactly what graduations should be used for certain blades. Enough tension should be put on the blade to hold it up to the cut, but not so much as to cause the blade to be broken easily.



Above. Chuck in normal position.

Jeweler's blades are held between flat jaws as in Fig. A.

Saber blades are held in V-jaws as in Fig. B.

Files are held in V-jaws as in Fig. C.

Fig. A

Fig. B

Fig. C

The following tensions for representative blades are intended only as a rough guide:

#84	12 to 14 Graduations
#95	14 to 16 Graduations
#98	16 to 18 Graduations
#64	16 to 18 Graduations

Since blades over ⅛ in. wide are generally used as sabre blades no tensions are given for wider blades.

It must be remembered that these tensions are only approximate. The adjustable tension is especially valuable for the finer puzzle and marquetry blades, and the graduations on the upper tube enable the user to return to the same tension every time he uses a particular blade.

INSERTING SABER BLADES

Saber blades are held between the V-jaws of the lower chuck, instead of between the flat jaws. The chuck is turned so that the thumbscrew faces the front of the machine, by loosening screw DSS-51 (See Fig. 3), turning the chuck to the left and re-tightening the screw. Do not neglect this last precaution. Slip the saber blade between the V-jaws of the chuck, opening the jaws wide for the purpose, then tighten the thumbscrew.

PIN BLADES

To use pin blades, simply knock the pins out, and insert them in the same manner as jeweler's blades.

ADJUSTMENT OF GUIDE

The guide on this machine is of a universal type, which makes it adaptable to blades of practically any size. It consists of three parts, the bracket, NSS-301, the roller slide NSS-307 with its roller NSS-306 and the guide disk NSS-304. The slide and the guide disk are fastened to the bracket by means of screws SP-611 and NSS-280 and are adjustable independently of each other.

To adjust the guide to a blade of any thickness, loosen both hexagon-head screws SP-611 and NSS-280, then rotate the guide disk until a slot comes to the front which will suit the thickness of the blade. Select a slot which is neither too loose nor too tight. Draw the guide disk forward until its rim is JUST BEHIND the root of the teeth, then tighten the screw. Be sure that the blade is not set too far into the slot, because then the teeth will rub on the slot sides. If the disk is set with the edge of the slot just behind the teeth it will be set correctly. Now move the roller slide forward until the roller just LIGHTLY touches the back of the blade, tighten the screw clamping the slide, and the guide is set.

FIG.4

FIG 5

FIG 6

FIG.7

No matter what the thickness or the width of the blade, a slot and a roller position can be found that will guide it correctly. Fig. 4, for example, shows the relative positions of guide disk and roller when a wide, thick blade is used in the machine, using a wide slot in the disk, and having the roller set well back. Fig. 5 shows how a narrow, thick blade is adjusted, using the same slot and merely moving disk and roller forward.

Fig. 6 shows the adjustment for a wide, thin blade and Fig. 7 the adjustment for a narrow, thin blade. The drawing below Figs. 5 and 6 show how the V-notch of the guide is used for the very finest jewelers, puzzle or marquetry blades, the guide being set in the same way as for heavier ones.

If a great deal of cutting is done with one blade, as in marquetry and puzzle cutting, it is recommended that a set of individual blade guides No. 1202 be purchased and used instead of the regular universal guide.

Fig. 8 shows a side view of the guide properly adjusted both for a wide blade with coarse teeth and a narrow blade with fine teeth. Note how in each case the disk can be set so that the blade is guided right at the bottom of the teeth.

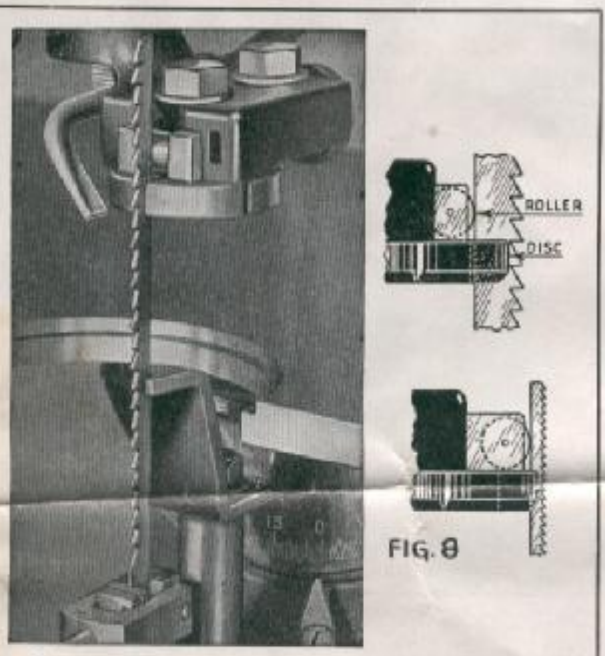


FIG. 8

How the guide is set for either a wide or a narrow blade. Photo above shows guide correctly set for saber blade, using both upper and lower guides.

FILING

Regular filing-machine files, having ¼ inch round shank, are the proper kind to use in this machine; the round shank provides stiffness and strength which are not found in tapered-shank files. They may be flat, round, half-round, three-cornered or square—in fact of any commercial cross section, but must not be more than 5 inches long.

To insert the file, remove the table insert, loosen the guide-post thumbscrew and shove the guide up completely out of the way, loosen the jaws of the chuck and insert the file between the V-jaws. If the work is fed from the front of the table, the chuck thumbscrew should face the front also, so that the pressure of the work is taken by the back of the chuck.

IMPORTANT. Most machine files are not perfectly straight, and occasionally it will be found that one will not line up square with the table. In the case of a round or square file, this can often be adjusted merely by turning the file in the chuck until a position is reached where the file is square. If this cannot be done, say in the case of a flat file which is decidedly bent toward one flat side, grasp the file in the chuck with the EDGE facing the front, then tilt the table slightly until it is square with the face of the file, and feed the work from the side. The table is tilted in the same manner, of course, when filing work at an angle.

SANDING

The sanding attachment No. 711 is fitted with a ¼ inch shank so that it may be held in the chuck in the same manner as the files. It is exceedingly useful for sanding the edges of scroll-sawed or band-sawed work, being semi-circular in cross section so that it can be used either for straight or curved work.

Garnet-paper sleeves of the proper size are available for the sanding attachment. To change sleeves, simply loosen the knurled nut at the top of the sander, slip off the old sleeve and slip on the new one, then retighten the nut.

To use the sander, remove the table insert and move the guide up out of the way. Set the sander shank down into the V-jaws of the lower chuck, with the straight or curved face forward as required, then tighten the chuck thumbscrew.

CHANGING LOWER-CHUCK POSITION

For certain kinds of work it is necessary or desirable to change the position of the lower and upper chuck so that the teeth of the saw blade face the side of the table. The normal position of the lower chuck is with the thumbscrew facing the right. To turn the chuck through 90 degrees, so that the thumbscrew faces the front, simply loosen the screw holding the chuck to the lower plunger (DSS-51), turn the chuck with the thumbscrew to the front, and re-tighten the screw. To turn the chuck with the thumbscrew facing the left, remove screw DSS-51, then turn the chuck completely around to the left until it will expose a new hole to receive screw DSS-51. When blade is sidewise, table should be turned through 90 degrees also, otherwise slot in insert will not line up with blade.

CHANGING UPPER-CHUCK POSITION

To change the position of the upper chuck, loosen knurled clamp knob NCS-164, so as to loosen the upper-plunger graduated tube. Slide the tube either up or down until the keys on the tube are disengaged from the keyway in the head casting, then turn the tube until the key engages in the other keyway, and slide the tube up or down to position again.

TILTING AND ROTATING TABLE

To tilt the table, loosen knob NCS-32 and tilt the table to the degree desired, then re-tighten clamp.

Above: Table rotated through 90 deg., and also tilted so that long work may be ripped at an angle.

IMPORTANT. When the table is to be tilted to a full 45 degrees to the right, the position of the lower chuck must be reversed as described above, so that the thumbscrew points to the left, otherwise the thumbscrew will strike the table.

If, when ripping or cutting work at an angle, the length of the work is such that it would strike the rear column of the machine before the cut is completed, the table may be rotated through 90 degrees so that it may be tilted to the front. With the work then fed from the side any length may be accommodated. Rotation of the table is effected by loosening capscrews SP-665 (Fig. 3).

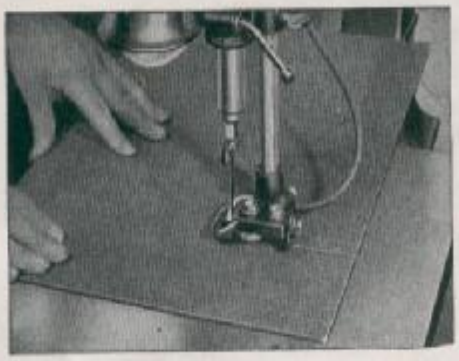
REVERSING DRIVE SHAFT

The machine is shipped with the drive pulley at the left side of the machine. If necessary the drive can be reversed so that the pulley is at the right. Remove the four screws holding the drive-shaft housing to the base, also the four holding the opposite crankcase cover; housing and cover can be removed. The crosshead (NSS-337, Fig. 3) must now be turned halfway round. To do this, remove screws NSS-274 and SP-276, hold the chuck to prevent the plunger from turning, turn the crosshead around until it faces the other opening in the crankcase and until the screw hole is opposite the other hole in the plunger. Reinsert screws NSS-274 and SP-276 and tighten firmly.

Scrape all dirt from the cover flanges, then spread a thin coating of shellac on the flanges and fasten in place with the screws. The pump-housing cover NSS-207, should now be reversed so that the outlet tube is at the top. Turn the pulley by hand several times to check before turning on the power.

AIR BLOWER

The blower is designed so that plenty of air is furnished to blow sawdust away from around the lines marking the design on the work, but not enough to cause a blast which might blow sawdust in the eyes. If the blower fails, examine the rubber tubing and see that it is not choked, kinked, or caught under the base in any way. Examine the nozzle on the guide and see that it is clear. If the trouble is not found here, then remove the pump-housing cover by loosening screw SP-564 (Fig. 2), remove the diaphragm NSS-213-S and see that this is in good shape and does not need renewal. No trouble should be encountered with valves.



Above, chucks turned 90 deg., and guide post transferred so as to permit cutting from the side

Above: How spring hold-down is tilted to suit tilt of table.

CHANGING GUIDE POSITION

When the saw is set from the side of the table, the guide post, carrying the guide, is transformed from the hexagon hole at the left of the upper head to the hole at the right. This automatically brings the guide to the proper position for side cutting. Thumbscrew SP-1526 is also transferred from one tapped hole to the other to adjust the post. Only the thumbscrew need be transferred, as the lock pin is not required in the right-hand hole.

Above: When necessary the guide may be completely removed and laid aside when additional clearance is desirable above the blades.

OILING

All lower parts which require lubrication are enclosed in the crankcase. THE CASE MUST BE FILLED BEFORE USING. Fill it with light winter-grade automobile oil or Finol to within one-eighth inch of the lower end of the oil cup SP-2476. The upper plunger bearing is self-lubricating, and, as the plunger itself is hard-chrome plated, this requires no attention for the life of the machine. Crankcase capacity is 1¼ pints. If oil comes out of filler during operation there is too much oil in the crankcase.

PUZZLE-BLADE JAW

To insert special puzzle-blade jaw NSS-260 (Fig. 3) in place of the regular jaw, remove screw DSS-51, holding the fixed jaw up into place and re-insert screw DSS-51.

Above: Special puzzle-blade jaw for upper chuck, replaces regular jaw and centers blade automatically.

BLADES

This scroll saw is designed to take jeweler's blades 5 inches long and saber blades 4½ inches long. There is no advantage in using pin blades, in fact there is a disadvantage, as a wider range of sizes can be obtained in jeweler's blades.

Always use the widest blades possible, consistent with the radius of the curves to be sawn. Use narrow blade for sawing small, abrupt curves and for fine, delicate work only. This will not only save blades, but will produce the best work.

RECOMMENDED BLADES AND SPEEDS

The accompanying table gives approximate speeds at which various materials may be cut, together with the blades recommended for cutting them. Remember, however, that these recommendations are only approximate, and that in some cases they may be bettered by individual experiment:

Blades and Speeds Recommended for Cutting Materials on the 24" Scroll Saw

Blade No.	58	59	60	61	64	65	81	82	83	84	85	86
Hardwood ...13/16"					1750							
Plywood .....1/4"	1000	1000	1000				1000	1000	1000	1000		
Plymetal .....1/4"	1000	1000	1000	1750	1000	1000						
Aluminum ....1/16"	1000	1000	1000	1000	1000	1000						
Brass .....1/16"				1000	650	650						
Red Fiber .....1/8"	1000	1000	1000									
Sheet Iron ....1/16"				650		650						
Cold Roll. Steel. 1/16"	1000	1000	1000	650		650						
Plastics											1300	1300

Blade No.	87	88	91	92	93	94	95	96	97	98	703	704
Hardwood ...13/16"						1750					1750	1750
Soft Wood ...13/16"				1750	1750	1750					1750	1750
Plywood .....1/4"				1750	1750	1750	1000	1000	1000	1750	1750	1750
Plymetal .....1/4"			1000	1000	1000	1000	1000	1000	1000	1750		
Aluminum ....1/16"			1000	1000	1000		1000	1000	1000	1000		
Brass .....1/16"			650	1000	1000					1000		
Reb Fiber .....1/4"			1000	1000	1000	1000						
Red Fiber .....1/8"			1000	1000	1000	1000	1000	1000	1000			
Bakelite .....1/4"			650	1000	1000	1000						
Sheet Iron ....1/16"			650							650		
Cold Roll. Steel. 1/16"			650							650		
Engravings			1750									
Plastics	1300	1300										

REPLACEMENT PARTS

IMPORTANT: To avoid possible errors, be sure to include the serial number of the machine when ordering parts for repair and replacements.

Part No.	Description	No. Req.
	UPPER-PLUNGER AND HEAD PARTS	
NSS-251	Upper Plunger Casing	1
NSS-251-R	Upper Casing Assembly complete with Chuck	1
NSS-252	Knurled Safety Cap	1
NSS-253-S	Upper Plunger Assembly	1
NSS-254	Upper Plunger Washer	1
NSS-255	Upper Plunger Bearing	1
NSS-256	Upper Plunger Bearing Collar	1
NSS-257-S	Pin and Jaw Assembly	1
NSS-258	Upper Chuck Body	1
NSS-258-R	Upper Chuck Body, complete with Jaws and Screws	1
NSS-259	Upper Chuck, Fixed Jaw	1
NSS-260	Special Jaw	1
NSS-262	Upper Plunger Bumper	1
NSS-263	Upper Plunger Seal Retainer	1
NSS-264	Upper Plunger Felt Seal	1
NSS-266	Chuck Clamp Screw	1
NSS-275	Upper Head, only	1
NSS-275-P	Upper Head, complete with Plunger, Casing, Chuck, etc. (less guide)	1
NSS-277	Guide Post and Lock Plunger	1

Part No.	Description	No. Req.
	UPPER PLUNGER AND HEAD PARTS, Cont.	
NSS-278	Upper Casing Lock Sleeve, R.H.	1
NSS-279	Upper Casing Lock Sleeve, L.H.	1
NSS-280	¼ in. Washer	1
NSS-301	Saw Guide Bracket	1
NSS-301-S	Saw Guide, complete with Bracket, Roller, Disk, Nozzle, etc.	1
NSS-302	Hex. Guide Post	1
NSS-303	Blade Support	1
NSS-303-S	Blade Support, complete with Roller	1
NSS-304	Blade Guide Disk	1
NSS-305	Hold-down Spring	1
NSS-306	Blade-support Roller	1
NSS-307	Roller Pivot Pin	1
NSS-308	Blade Guard	1
NSS-309	Individual Guide Bracket	1
DDL-256	Special ⅜ O.D. x 17/64 I.D. Washer	2
DSS-35	Upper Plunger Spring	1
DSS-48	Blower Nozzle	1
DSS-51	Special Screw	1
DSS-65	Knurled-head Setscrew	1
DSS-66-A	Saw Blade Guide .014 wide, .010 Deep	1
DSS-66-B	Saw Blade Guide .020 wide, ⅛ deep	1

(Continued on next page)

REPLACEMENT PARTS (Continued)

Part No.	Description	No. Req.
	UPPER PLUNGER AND HEAD PARTS, Cont.	
DSS-66-C	Saw Blade Guide .025 wide, 5/64 deep	1
DSS-66-D	Saw Blade Guide .040 wide, 9/64 deep	1
DSS-66-E	Saw Blade Guide .050 wide, ⅜ deep	1
DSS-66-F	Saw Blade Guide ⅛ wide, x 90° deep	1
NCS-164	Clamp Knob	1
NCS-166	Lock Knob Stud	1
NCS-179	Stop Rod Spring	1
SD-2	⅜ x ¼ x ⅛ Bakelite Washer	1
SP-611	¼-20 x ½ Hex. Hd. Screw	2
SP-626	¼-20 x ¼ Hex. Hd. Screw	3
SP-821	¼ x ¼ Carriage Bolt	1
SP-1029	¼-20 Hex. Nut	1
SP-1209	¼-28 Hex. Nut	1
SP-1526	⅜-18 x ⅝ Thumb Screw	2
	BASE PARTS	
NSS-201	Base	1
NSS-203	Rubber Foot	4
NSS-204	Oil Plug	1
NSS-238	Hook Bolt	4
NSS-274	¼"-28x⅜" Full Dog Allen Set Screw	1
NSS-337-R	Replacement Crosshead Assembly, with Shoe, Set Screws, and Instructions	1
DSS-4	Housing Cover	1
DSS-9	Lower Plunger Bushing	1
DSS-63	Steel Crosshead Shoe	1
SBS 8	Dowel	2
SP-276	¼-28 x ⅛ Head Screw	1
SP-509	¼-20 x ½ R. H. Machine Screw	4
SP-808	¼ x 1 Carriage Bolt	4
SP-1030	¼ Hex.	4
SP-1604	¼-in. Washer	4
SP-2476	Oil Filler Cup	1
	DRIVE-SHAFT PARTS	
NSS-206	Drive-Shaft Housing	1
NSS-206-S	Drive-Shaft Housing Assembly, including Bearings, Pump, etc.	1
NSS-207	Pump Head	1
NSS-208-S	Drive Shaft, with Crank and Pin	1
NSS-209	Pump Eccentric	1
NSS-209-S	Eccentric Sleeve, with Screw	1
NSS-211	Plunger	1
NSS-213-S	Blower Piston	1
NSS-216	Exhaust Valve Screw	1
NSS-217	Inlet Valve Screw	1
NSS-218	Valve	2
NSS 219	Valve Spring	2
NSS-220	Pump Head Gasket	1
NSS 222	Gasket	1
DSS-16-S	Fiber Slide Block	1
DSS-42	Blower Spring	1
DSS-70	Felt Seal Cap	1
DSS-70-S	Felt Seal Cap with washers	1
DSS-75-S	Timken Bearing	2
DSS-77	Fiber Washer	1
J-39	Felt Washer	1
SBS-19	⅝-18 Special Nut	2
SP-275	¼-28 x ¼ Allen Screw	1
SP-509	1-20 x ½ Round Head Mach. Screw	4
SP-564	6-32 x ⅓ R. H. Screw	7
SP-1702	¼ Lock Washer	4
	TRUNNION SWIVEL BRACKET PARTS	
NSS-202	Trunnion Swivel Bracket	1
NSS-205	Trunnion Clamp Stud	1
NSS-227	Trunnion Clamp Plate	1
NSS-280	Special Washer	1
NSS-332-S	Lower Plunger, with Corks and Lower Cap	1
NSS-332-R	Lower Plunger and Chuck, complete	1

Part No.	Description	No. Req.
	TRUNNION SWIVEL BRACKET PARTS, Cont.	
NSS-333	Bearing Retaining Screw	1
NSS-334	Bearing Ring	1
NSS-335	Bearing Seat	1
NSS-336	Upper Bearing	1
NSS-338	Clamp Ring	1
NSS-339	Packing Spring	1
NSS-340	Upper Bearing Packing	1
NSS-346-A	Sabre-Blade Guide for ⅛ in. blade	1
NSS-346-C	Sabre-Blade Guide for ¼ in. blade	1
NSS-347	Sabre-Blade Guide Post	1
DDL-175	Washer	1
DDL-256	Special ⅜ O.D. x 17/64 I.D. Washer	2
DSS-23	Cork Plug	1
DSS-51	Special Screw	1
DSS-326	Lower Chuck Body only	1
DSS-326-R	Lower Chuck, complete with jaws	1
DSS-327	Yoke	1
DSS-328	Lower Chuck V-Jaw	1
DSS-329	Lower Chuck Plain Jaw	1
DSS-330	Lower Chuck Clamp Pin	1
DSS-331	Lower Chuck Thumbscrew	1
J-44	8-32 x ⅛ Headless Setscrew	1
NCS-32	Star Wheel, ⅞-14 Tap	1
NCS-33	Star Wheel Spring	1
SBS-46	Indicator Pointer	1
SP-561	10-32 x ⅜ Round Head Mach. Screw	1
SP-611	¼-20 x ½ Hex. Hd. Screw	1
SP-665	¼-28 x 1¼ Hex. Hd. Screw	1
SP-1504	⅜-18 x ⅜ Thumbscrew	1
SP-1610	Indicator Spacer	2
VLS-7	Oil Wick Cover	1
	GUARD PARTS	
NSS-242	Stud	1
NSS-244	Pin	1
NSS-314	Belt Guard Front Casting	1
NSS-315	Belt Guard Rear Casting	1
LBS-177	Knurled Nut	1
	OVER-ARM PARTS	
NSS-236	Over Arm	1
NSS-237	Bolt	1
NSS-341	Rubber Tubing	.60 in.
DDL-256	Special ⅜ O.D. x 17/64 I.D. Washer	2
SR-255	Name Plate	1
SP-626	¼ x ¼ Hex. Hd. Cap Screw	2
SP-1751	⅝ Shakeproof Washer	1
SP-2252	Parker Kalon Drive Screw	2
	TABLE PARTS	
NSS 226	Table only	1
LBS-52	Trunnion	2
LBS-54	Index Plate	1
LBS-56	Table Insert	1
LBS-56-B	Blank Insert	1
SP-514	¼ x ⅜ R. H. Screw	4
SP-1702	¼ Lock Washer	4
	MISCELLANEOUS	
SP-2147	Cord and Plug	1
#340	V-Belt cir.: In. 34⅝", Out. 36½"	1
#716	Steel Stand	1
#718	Four Step Motor Pulley (½ in. bore)	1
#882	Lamp Attachment with Cord and Plug, Links and Bracket	1
#1203	Belt Guard complete for No. 1200 Scroll Saw only	1
#1444	Variable Speed Attachment, complete	1
#1525	Small Box Wrench	1

DELTA Machine Tools
MILWAUKEE

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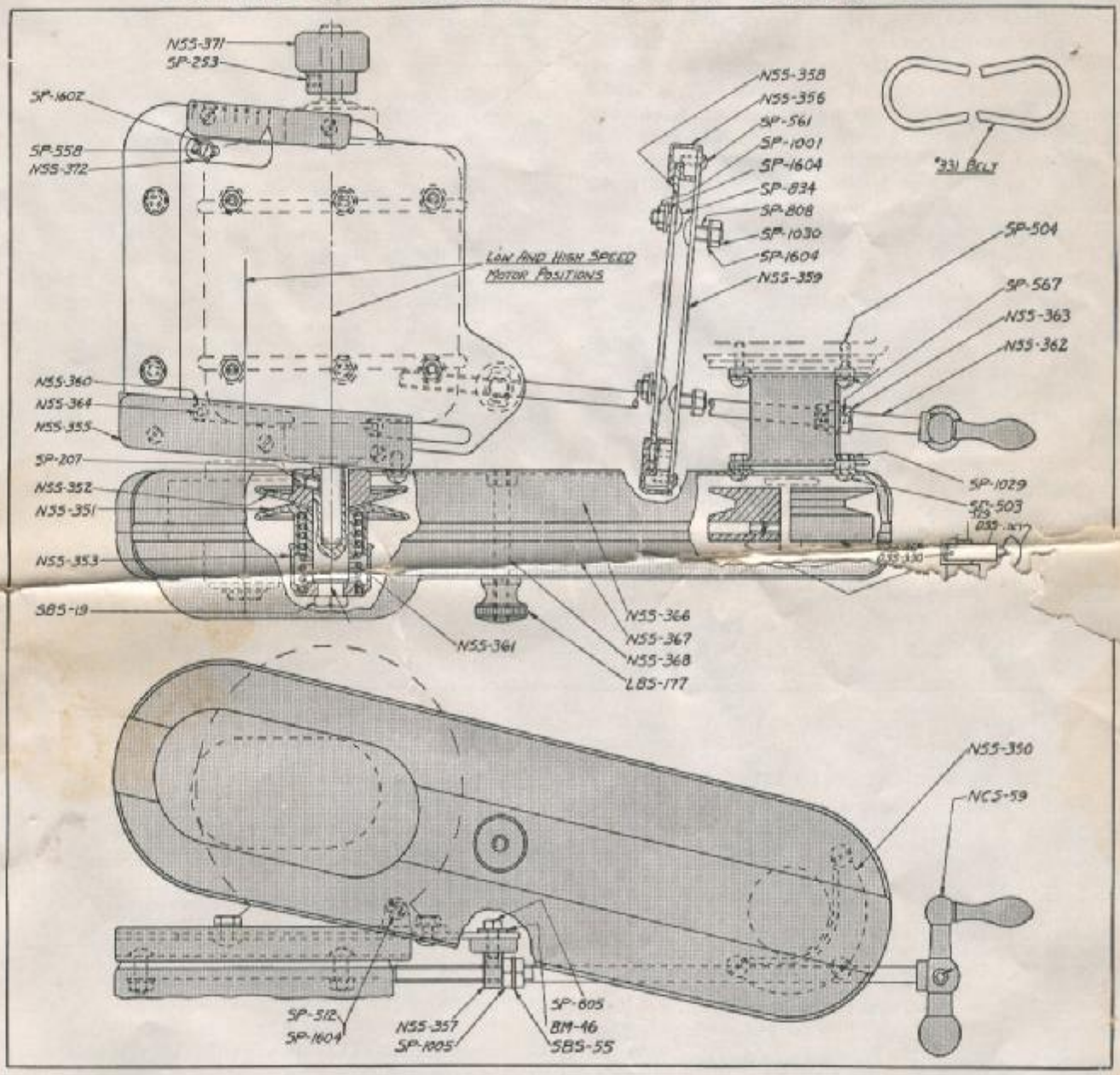
No. 1444 VARIABLE SPEED ATTACHMENT and No. 1442 BELT GUARD for the 24" SCROLL SAW



The Variable Speed Unit comes to you in sub-assemblies for convenience in packing. Attachment to your scroll saw is simple if instructions are carefully followed.

Remove the motor and the crankshaft cone pulley from your machine if you have a standard 4-Speed model, then when you add the No. 1444 accessory group, your machine will be the same as the Multi-Speed Model, which is without motor or pulley.

MOUNTING MOTOR

Mount the sliding motor base plate assembly, with the graduated slide at the right, on the scroll saw base and fasten from the bottom with the 4 SP-834 carriage bolts and SP-1030 Hexagon nut and SP-1604 washer. The bolt holes in both the scroll saw base and the lower motor plate, are slotted for adjustment. In setting up the motor plate on your machine, it is best to set it with the screws in the middle of the slots, allowing an equal amount of adjustment in either direction. The upper and lower motor plates come assembled with the slides and both upper and lower sets of carriage bolts, and it is unnecessary to dis-assemble for mounting.

After the motor plates are in place and securely fastened to the base, mount a No. 60 310 motor, using the carriage bolts provided, so that the switch on the motor is on the right-hand side. Next, slip the variable-speed pulley No. 1446 onto the motor shaft and fasten with set screw SP-207.

To mount the bearing bracket NSS-350, remove the front upper and two lower round head machine screws, SP-509, from the present drive shaft housing, NSS-206-S, and put the bearing bracket, NSS-350, in place, using the three SP-504 round head machine screws which are furnished and fasten both the drive shaft housing, NSS-206-S and the bearing bracket, NSS-350, with the longer screws.

To mount the control rod NSS-362, remove the round head machine screw SP-567, from the collar nearest the thread on the control rod and slip off the collar.

Slip control rod through the hole in bearing bracket, NSS-350, and slip collar back on the control rod. Before tightening in place, thread the two lock nuts, SP-1005, with the washer, SBS-55, between as shown, to the end of the thread. Then thread the nut NSS-357, onto control rod so the rod sticks through the nut approximately 1". Fasten control-rod nut into motor plate, NSS-358, by slipping the round shank of the nut into the hole on the motor plate and fastening from the top with hexagon-head cap screw, SP-605, and BM-46 washer.

Slide entire motor plate and control rod assembly to the rear until front collar of control rod touches front of bearing bracket NSS-350, then tighten rear collar, NSS-363, with round head machine screw, SP-567.

Fasten the flywheel pulley, No. 1443, onto the crankshaft by tightening Allen set screw, SP-201, against the flat on the shaft, with the belt groove nearest the machine, allowing 1/16" clearance between the pulley and the bearing cap. Then, slip the special belt No. 331 in place.

ADJUSTING ATTACHMENT

SP-1030 [illegible] unit is now ready for adjustment.
SP-1604
SP-2476 d this is done as follows: Start the motor, and screw the control rod to the right (which brings the motor forward and increases the speed), until the belt is flush with the outside diameter of the variable speed pulley. Set the locknuts, SP-1005, on the control rod so that they are against the control rod nut, NSS-357, at this speed. Set the indicator pointer, NSS-372, to point to graduation No. 1, and fasten with round head machine screw, SP-558, and SP-1602 washer. Your machine should now be ready for operation.

Adjustment for variation in belts and wear can be made by shifting the motor on the upper motor plate, NSS-358.

INSTALLING GUARD

The belt guard, No. 1442, for the variable speed unit, is mounted as follows: Remove the variable speed pulley from the motor shaft, and the flywheel pulley, No. 1443, from the crankshaft. Place the inside part of the guard in position so that the large oblong hole fits over the motor shaft, and the small round hole over the crankshaft. Fasten the crankshaft end of the rear guard, NSS-366, to the bearing bracket, NSS-350, with two round head machine screws, SP-503 and two hexagon nuts, SP-1029. The motor end is fastened to the lug on the motor plate slide bracket, NSS-355, with a round head machine screw, SP-512 and washer, SP-1604. The pulleys are then replaced in their respective positions.

The front guard, NSS-367, is held in place by the center stud, NSS-368, and the knurled knob, LBS-177.

Before operating machine, check the alignment of the belt. This is done best by checking the inside faces of the pulleys when the motor is adjusted to the high speed position (to the front). In this position the belt engages the variable speed pulley at its largest diameter similar to any standard pulley, and is in perfect alignment with the front pulley.

TABLE 1. REPLACEMENT PARTS

IMPORTANT: Give both the Part Number and the Description of each item when ordering from this list: also the Serial Number of the machine on which the parts are to be used.

Part No.	Description	No. Req.
	NO. 1444 VARIABLE SPEED ATTACHMENT	
NSS-350	Bracket for Control Rod and Belt Guard Pan	1
NSS-351	Variable Speed Pulley, Sliding Half	1
NSS-352-S	Variable Speed Pulley, Fixed Half, with Hub	1
NSS-353	Spring Cover for Variable Speed Pulley	1
NSS-355	Guide Rail, 7 1/16" Long	1
NSS-356	Guide Rail, 4" Long, with Scale Graduations	1
NSS-357	Bracket Nut, 3/8"-16 Thread, for Control Rod	1
NSS-358	Sliding Motor Plate, 7 x 8 5/8", 1/4" Thick	1
NSS-359	Base Plate, 7 3/16 x 6 31/32", 1/4" Thick	1
NSS-360	Roller, 3/4" Diameter x 7/64" Thick, 3/16" Bore	2
NSS-361	Coil Spring, 1 1/2" Diameter, 3 1/2" Free Length	1
NSS-362	Control Rod, 3/8-16 x 13 1/2", with Flat	1
NSS-363	Set Collar, 3/8" I.D., with 1/16" Side Holes	2
NSS-364	Steel Pin, 3/32 x 21/64"	2
NSS-372	Pointer, 1/2 x 2" Flat Body, with Bent Point	1
BM-46	Special 29/64" Steel Washer	1
NCS-59-S	Ball Crank, 3/8" Hole, with Set Screw	1
SBS-19	Special 3/8"-18 Hexagon Jam Nut, 7/32" Thick	1
SBS-55	Special 29/64" Steel Washer	1
SP-201	1/16-18 x 5/16" Hexagon Socket Set Screw	3
SP-207	1/16-18 x 1/2" Hexagon Socket Set Screw	1
SP-504	1/4-20 x 3/4" Round Head Machine Screw	3
SP-558	#8-32 x 3/4" Round Head Machine Screw	1
SP-561	#10-32 x 3/4" Round Head Machine Screw	5
SP-567	#6-32 x 3/4" Round Head Machine Screw	4
SP-605	5/16-18 x 1/2" Hexagon Head Cap Screw	1

Part No.	Description	No. Req.
SP-808	5/16-18 x 1" Carriage Bolt	4
SP-834	5/16-18 x 3/4" Carriage Bolt	4
SP-1001	5/16"-18 Hexagon Jam Nut	4
SP-1005	3/8"-16 Hexagon Jam Nut	2
SP-1030	5/16"-18 Hexagon Nut	4
SP-1602	5/16" Steel Washer	1
SP-1604	5/16" Steel Washer	8
No. 331	V-Belt, 35 1/4" Outside Circumference	1
No. 1443	3 7/8" Crank Shaft Pulley, 1/2" Bore, with Set Screws	1
No. 1444	Variable Speed Attachment, Complete	1
No. 1446	Variable Speed Pulley, 3 3/4" Diameter, 1/2" Bore, Assembled	1
	No. 1442 BELT AND PULLEY GUARD	
NSS-366	Belt Guard Pan, Die Cast	1
NSS-367	Belt Guard Cover, Die Cast	1
NSS-368	Stud, 1/4-16 x 3 5/8", Threaded Both Ends	1
NSS-371-S	Hand Knob, with Set Screw, for Motor Shaft	1
LBS-177	Hand Knob, 1 1/2" Diameter, 3/8"-16 Thread	1
SP-253	1/4-28 x 1/4" Hexagon Socket Set Screw	1
SP-503	1/4-20 x 5/8" Round Head Machine Screw	2
SP-512	1/16-18 x 1/2" Round Head Machine Screw	1
SP-1029	1/4"-20 Hexagon Nut	2
SP-1604	5/16" Steel Washer	1
No. 1442	Belt and Pulley Guard, Complete	1

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