

Operations

Press hard against the quill feed lever to be sure the tips of the drive center and lathe center are engaged, then lock the quill in place.

WARNING

If you're using a cup center, generously wax or soap the end of the stock that mounts to the cup center. This lubrication helps keep the cup center from wearing into the stock and causing the stock to loosen on the lathe.

NOTE

- Use as little quill extension as possible.
- If you've mounted a live center in the tailstock, its ball bearing construction will permit more headstock pressure than the non-rotating cup center.

Mounting a Spindle Template

Accurate mounting of your spindle template is essential to prevent inaccurate diameters, improper positioning profiles or unwanted tapering. To properly mount a spindle template, follow this procedure:

1. Adjust the right-hand template support assembly. Loosen the bracket mounting screw (11). Use a ruler and the tool rest assembly to position the template support assembly so that the front edge of the template clamp (5) is 1-1/4" back from the cup of the tailstock center. (See Figure 7.) With the top edge of the template support bracket parallel to the channel, tighten the screw (11) securely.

NOTE

The template will go 3/4" into the template clamp slot. This will align the template end line, which is 2" from the end of the template, with the end of the workpiece. If additional stock is left on the

workpiece which you intend to cut off, adjust the template support bracket an appropriate amount toward the square.

2. Mount the template. Loosen the mounting screw (11) of the left-hand template support assembly. Insert the template between clamp (5) and bracket (9) of the right-hand template support assembly, then move the left-hand template support assembly to accept the other end of the template. Both ends of the template should butt up squarely against the spacers (6). Use the 5/16" Allen wrench to tighten the left-hand screw (11), keeping the top of the support bracket (9) parallel to the channel.

3. Align the template. Align the template holes with the centering hole in each template clamp (5). (See Figure 8.) To align the template easily and exactly, insert a 1/4" dowel through the centering hole in each clamp (5) to engage the template hole. Use the 5/32" Allen wrench to tighten the two rear setscrews (4), one in each template clamp.

Mounting an Original Spindle

If you're using an original spindle such as a chair rung or antique table leg as a template, mount it according to the following procedures:

1. Rotate the template support assemblies. Rotate the template support brackets 90° so that the template centers (3) are in-line with and pointing toward each other.

2. Mount the original spindle. Engage the center hole of the original spindle with the right-hand template center (3). Then move the left-hand template support over to engage its template center in the other end of the original spindle. Loosen the two wing nuts (1), then use a medium, flat-bladed screwdriver in the slotted end of each template center to turn the centers in to secure the spindle. Tighten the wing nuts.

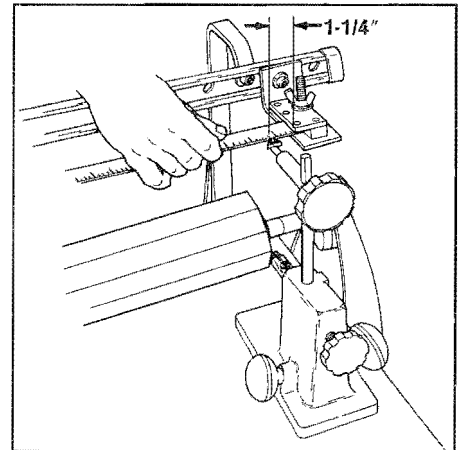


Figure 7. Adjust the right-hand template support assembly.

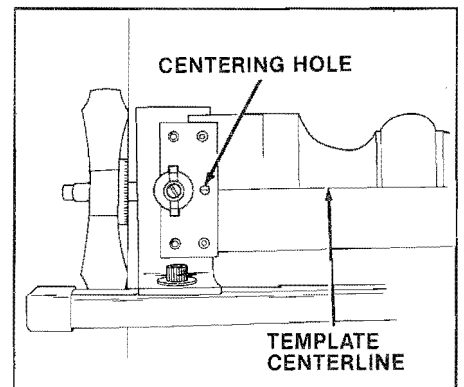


Figure 8. Align the template

NOTE

- The template centers must penetrate the center holes of the original spindle at least 1/8" with enough pressure to keep the spindle from rotating.
- The ends of the original spindle must be flush with the ends of the workpiece. After mounting the workpiece, readjust the template centers as required to shift the original spindle into end-to-end alignment with the workpiece.
- If you are duplicating an original spindle with square corners, then you MUST position the original spindle with the square corners pointing at the follower.

Duplicating a Spindle

Duplicate a spindle according to the following procedures:

WARNING

- Keep the guard in place whenever you're performing turning operations.
- Do not exceed recommended speeds.
- Periodically turn off the Mark V and check that the workpiece remains securely mounted.
- Do not allow the cutter to come in contact with parts of the duplicator or Mark V.

1. **Position the guard assembly.** Place the tool rest assembly on the table in a cutting position, then adjust the guard to be as close as possible to the workpiece without interfering with the rotation of the workpiece or the movement of the tool rest assembly underneath it.

WARNING

Keep the guard in place during all turning operations.

2. **Make a five-point check.** All five locks—headstock, carriage, table height, quill, tailstock—must be secure.
3. **Move the table and guard.** Move the table and guard to the right-hand end of the workpiece. Lock the table.
4. **Adjust the height of the follower if required.** The follower should be positioned so it's at the center of the template edge or at the center of the original spindle. If adjustment is required, loosen the follower adjusting knob (44) and lower or raise the follower support. Retighten the knob securely. Wiggle the follower as the knob is tightened to properly seat it.
5. **Develop a firm grip on the tool rest assembly.** Before turning on the lathe, determine the best method

of gripping the tool rest assembly. Depending on your hand size, you may find it necessary to grip each knob with all five fingers or to grip each knob with four fingers with your thumbs wrapped around the back of the tool rest.

WARNING

When gripping the tool rest assembly, do not extend your fingers beyond the front face of the tool rest base.

6. **Round off the workpiece.** Check that the proper speed has been set, then turn on the Mark V. Roughly round off the corners of the workpiece by cutting small areas at a time. (See Figure 9.) Start at the right-hand end of the workpiece. When each small area becomes round, you will feel less vibration and hear a change in the noise level.

After the first area is rounded, cut subsequent small areas from left to right (from the octagon surface to the rounded surface). When you are turning a long workpiece and the part of the workpiece that's over the table is rounded, turn off the machine and move the table and the guard to the left. Brush off the table and tool rest, then check that the workpiece is still mounted securely. Turn on the machine and, to reduce vibration, finish off the rounding procedure by working from the left-hand end of the workpiece.

Increase the speed dial setting from rounding to shaping, and then turn off the machine.

7. **Offset the carbide cutter.** Because the follower will be guided against the template to make the rough shaping cut, the carbide cutter must be backed off from 1/64" to 1/32" from its aligned position to leave enough extra stock for final detail shaping.

Loosen the two setscrews (43) which secure the cutter support (58). Then loosen the position indicating setscrew (42) 1/4 turn. Back off the adjusting knob (51) one-half turn to allow the

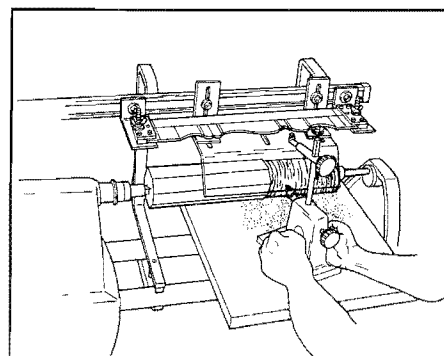


Figure 9. Roughly round off the corners of the workpiece by cutting small areas at a time.

cutter support to be moved back 1/32" (a one-quarter turn will allow 1/64" movement). Move the cutter support back until it contacts the stud of the cutter adjusting knob.

Align the cutter support according to "Cutter Support Alignment" in the **Alignment and Adjustment** section. When tightening the cutter support setscrews (43) during adjustment, **press the cutter support against the adjusting knob stud** instead of using the position indicating setscrew (42) in the groove of the cutter support.

NOTE

Because of the cutter offset, you'll be cutting away less stock than on your template. But when you work down an edge like a cove or around a bead, the cutter offset does not compensate for side-to-side adjustment. So if you go straight in, down a shoulder, the follower will go to the exact position (final dimension). To avoid this, keep the follower perpendicular to the profile area of the template. (See Figure 10.)

After you've become experienced in handling the tool rest assembly, backing off the carbide cutter won't be necessary. You'll be able to guide the follower near the pattern without making contact, down to a final gap of about 1/32".

Operations

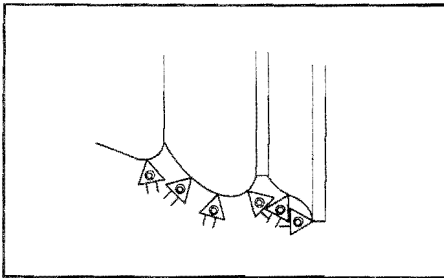


Figure 10. Keep the follower perpendicular to the profile area of the template.

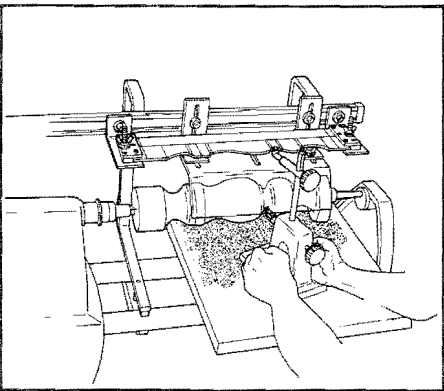


Figure 11. When the follower makes gentle contact with all the large contours of the template, rough shaping is completed.

8. Rough shape the workpiece. Move the table and guard to either end of the workpiece. Lock the table. Check that the proper speed has been set, then turn on the Mark V.

Start cutting the larger diameters first, then work on the smaller diameters. Don't force the cutter into the stock. Work it in gradually, using a back and forth motion in one small area at a time. If cutting a V-groove, work into it—don't go straight in.

Turn off the machine, then move the table and guard to the other end if necessary to finish the rough shaping. Brush off the table and tool rest, and check that the workpiece is still mounted securely before turning on the machine again.

When the follower makes gentle contact with all the large contours of the template, rough shaping is completed. (See Figure 11.) Increase the speed dial setting for detail shaping, and then turn off the machine.

9. Reposition the cutter support. Loosen the two setscrews (43) which secure the cutter support (58). Then readjust the cutter support flats according to "Cutter Support Alignment" in the **Alignment and Adjustment** section.

NOTE

If you used a thick carbide cutter for rounding and rough shaping, and you change to a thinner cutter for detail shaping, you'll need to raise the table slightly to center the thinner cutter on the workpiece centerline and lower the follower support to center the follower on the template edge or the original spindle centerline.

10. Detail shape the workpiece. Move the table and guard to either end of the workpiece. Lock the table. Check that the proper speed has been set then, turn on the Mark V.

NOTE

Because detailing cuts are less "aggressive," you'll need to quickly switch attention between the cutter and the follower to maintain uniform spacing between the follower and template and to watch the cutter's action.

Cut in much the same manner as you did in rough shaping, except cut "downhill" when turning the transition from the square of the spindle to a round profile.

When shaping beads and coves, cut in an "uphill" direction. (See Figure 12.)

Turn off the machine, then move the table and guard to the other end to finish the detail shaping. Brush off the table and tool rest, and check that the workpiece is still mounted

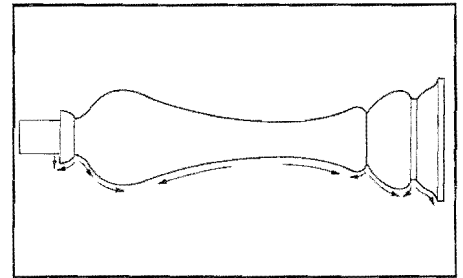


Figure 12. When shaping beads and coves, cut in an "uphill" direction.

securely before turning on the machine again.

When the follower makes contact with all the contours of the template, detail shaping is completed. (See Figure 13.) Turn off the machine and inspect your finished piece.

Spindle Turning Tips

- To turn a straight cylinder, use a straightedge as your template. Mounting it off center at one end will give you a tapered cylinder.
- If your spindle will have a pin which needs to fit a hole diameter **exactly**, first turn a trial piece. Check the diameter and readjust the template if necessary. Such a piece requires a very precise template setup. Cut beyond the pin length to allow for cutoff.
- If you're using two different cutters for extensive production runs, round off and rough shape all your spindles at one time. Then change cutters to do the detail shaping of all. Or you can use two tool rest assemblies, each set up for a different cutter, to turn out one spindle at a time without cutter changeover delays.
- Do not push the follower against the template. Use a very light touch to follow the template and make final cuts.
- Practice makes perfect. Expect to make some mistakes. Practice on scrap stock before attempting a project with expensive hardwood.

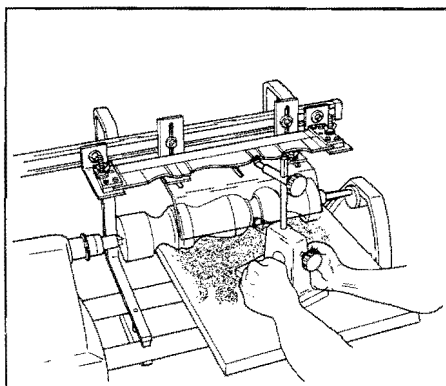


Figure 13. When the follower makes contact with all the contours of the template, detail shaping is completed.

Faceplate Turning

You can duplicate faceplate turnings by using a flat faceplate template. (See Figure 14.)

Set up for faceplate turning according to the following procedures:

NOTE

Initial setup of the channel and support bracket assembly was for maximum spindle capacity. For faceplate turning, the left-hand support bracket assembly, the left-hand template support assembly and the headstock must be repositioned. The right-hand support bracket remains in the third hole from the right. The tailstock and right-hand template support assembly are not used.

1. **Remove the tailstock assembly** to provide an unobstructed area for faceplate turning.
2. **Remove the right-hand template support assembly.** Loosen screw (11) and remove the right-hand template support assembly.
3. **Move the table to the right** as far as it will go, then lock it in position.
4. **Reposition the left-hand support bracket and the headstock.** Use the 5/16" Allen wrench to loosen the left-hand clamp screw (18) enough to

disengage the clamp (16) from the way tubes. Remove the screw (19) and washer (20) attaching the support bracket (15) to the channel (13).

Move the headstock until it almost touches the table, then lock it in place.

Remount the left-hand support bracket in the ninth hole from the right with screw (19) and washer (20). Fingertighten screw (19). Properly align and engage the clamp (16) on the way tubes. Tighten the screw (19) and washer (20) securely, then tighten the clamp screw (18) securely.

Mounting a Faceplate Workpiece

Mounting a workpiece on the lathe is an extremely important operation.

Improperly mounted stock is dangerous and difficult to turn. To properly mount a workpiece on the Mark V, follow this procedure:

WARNING

- If you're turning glued-up stock, make sure the glue joints are strong. Glue the stock and leave it clamped for at least 24 hours prior to turning.
- Make sure the workpiece does not have splits, loose knots, or other defects.
- Always cut the workpiece round using a bandsaw.
- The surface of the workpiece that mounts against the faceplate must be flat and smooth.

NOTE

If you don't want screw holes in the bottom of your finished project, mount the workpiece to a spacer block, then mount this block to the faceplate. Select a piece of stock at least 1" thick and cut it round about the same diameter as the faceplate you'll be using. Find the center of this spacer block, then glue the block to the workpiece, face-to-face with the centers aligned with each other.

Put a piece of newspaper in between the spacer block and the workpiece when you glue them up—later on, this paper will make it easier for you to use a chisel to part the block from the workpiece. **Leave clamped at least 24 hours.** (See Figure 15.)

1. **Find the center of the workpiece.** Use a center finder and pencil to mark two or more intersecting lines to locate the center.
2. **Mount the workpiece to the faceplate** with three #12 x 1-1/4" round head wood screws. Make sure the screws are sunk into the workpiece at **least 1" deep.** For large, bulky turnings or when mounting a faceplate onto end grain use longer screws.

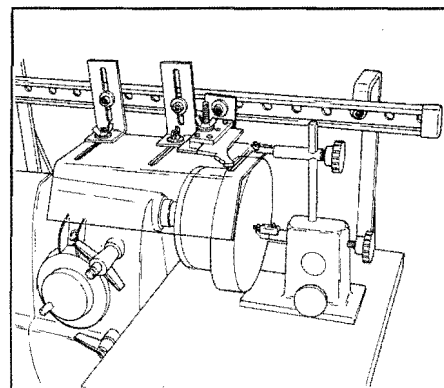


Figure 14. Setup for faceplate turning with a flat template.

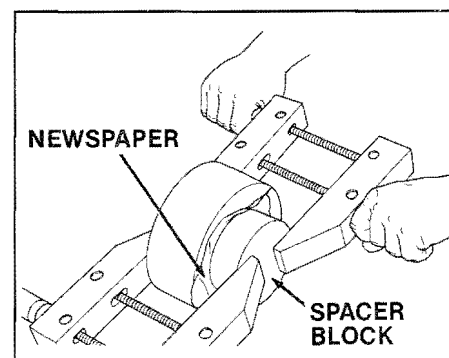


Figure 15. Glue a spacer block to your workpiece.

Operations

NOTE

When making extensive production runs, three or four faceplates work better than one. Turn each piece, then sand and finish all together. Or you could use a specialty chuck that's designed for quick mounting and release of the stock.

3. Set the Mark V at the proper speed and run it briefly.

4. Mount the faceplate (with the workpiece attached) on the main spindle. Extend the quill as needed to provide better access to the back of the workpiece. Lock the quill. Also set the quill depth lock at the maximum depth position for protection in case the quill lock is accidentally loosened.

Mounting a Faceplate Template

Accurate mounting of your faceplate template is essential to prevent inaccurate diameters or improper positioning of profiles or unwanted tapering. To properly mount a faceplate template, follow this procedure:

1. Mount the template. Insert the template between clamp (5) and bracket (9). The end of the template should butt up squarely against the spacer (6). Align the template hole with the centering hole in the template clamp (5). Insert a 1/4" dowel through both holes to align the template exactly. Use the 5/32" Allen wrench to tighten the two setscrews (4), clamping in the template securely.

2. Adjust the left-hand template support assembly. Loosen screw (11), then move the assembly until the end line marked on the template is directly over the end of the workpiece. With the top of the template support bracket parallel to the channel, tighten the screw (11) securely.

Duplicating a Faceplate Turning

Duplicate a faceplate turning according to the following procedures:

WARNING

- **Keep the guard in place whenever you're performing turning operations.**
- **Do not exceed recommended speeds.**
- **Periodically turn off the Mark V and check that the workpiece remains securely mounted.**
- **Do not allow the cutter to come in contact with parts of the duplicator or Mark V.**

1. Position the guard assembly. Attach the right-hand bracket (29) to the middle slot of the guard. Place the tool rest assembly on the table. Then adjust the guard to be as close as possible to the workpiece without interfering with the rotation of the workpiece or the movement of the tool rest assembly underneath it.

2. Make a five-point check. Headstock, carriage, table height, quill, quill depth locks must be secure.

3. Adjust the height of the follower. The follower should be positioned so it's at the center of the template edge. If adjustment is required, loosen the follower adjusting knob (44) and lower or raise the follower support. Retighten the knob securely. Wiggle the follower as the knob is being tightened to properly seat it.

4. Develop a firm grip on the tool rest assembly. Depending on your hand size, you may find it necessary to grip each knob with all five fingers or to grip each knob with four fingers with your thumbs wrapped around the back of the tool rest.

WARNING

When gripping the tool rest assembly, do not extend your fingers beyond the front face of the base.

5. Round off the workpiece. Check that the proper speed has been set, then turn on the Mark V. Roughly round off the outside edges of the workpiece by cutting small areas at a time. When each small area becomes round, you will feel less vibration

and hear a change in the noise level. After the outside edge is rounded, straighten the face.

Increase the speed dial setting from rounding to shaping, and then turn off the machine.

6. Offset the carbide cutter according to Step 7 of "Duplicating a Spindle."

7. Rough shape the outside profile first. (See Figure 16.) Turn the outside profile first. Cut your beads and coves "uphill" in the same manner as you would for spindle turning.

When the follower makes gentle contact with all the large contours of the template, rough shaping of the outside profile is completed. Turn off the machine.

8. Rough shape the inside profile. If you're using a dual-centerline template for a thin-walled bowl or cup, re-center the template for the inside profile. If using two separate templates, change to the inside profile template.

WARNING

- **Before you turn on the Mark V, place the cutter against the workpiece and turn the workpiece by hand. The workpiece MUST NOT contact the tool rest base.**
- **Cut only on the downward motion side of the workpiece.**

Work on the inside profile from the tailstock end. (See Figure 17.) When the inside profile is rough shaped, turn off the machine.

9. Reposition the cutter support according to Step 9 of "Duplicating a Spindle."

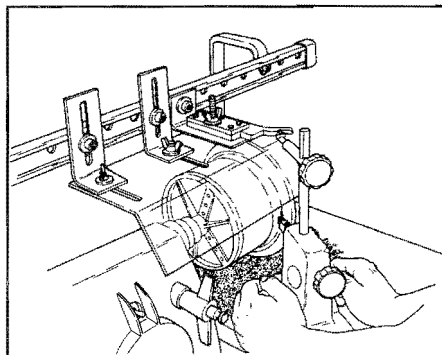


Figure 16. Rough shape the outside profile first.

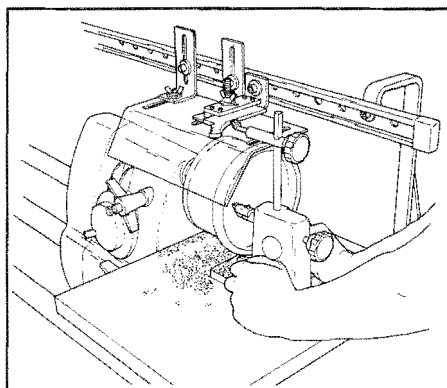


Figure 17. Rough shape the inside profile from the tailstock end.

10. Detail shape the workpiece. Check that the proper speed has been set, then turn on the Mark V. Cut in much the same manner as you did in rough shaping, except cut "downhill" when shaping from the top of a sharp shoulder to a round profile.

When both profiles have been detailed, turn off the machine and inspect your finished piece.

Freehand Turning

You can perform freehand spindle and faceplate turning using the tool rest assembly. No template is required. Set up basically the same as for duplicating. Since you are not using a template, remove the template support assemblies from the channel, and the follower support and upright from the tool rest assembly. Keep the channel and support bracket assembly, table and table support assembly, and the guard assembly in place. To freehand turn, follow the applicable procedures in "Duplicating a Spindle" and "Duplicating a Faceplate."

Sanding and Finishing

It's much easier to sand and finish a spindle or faceplate turning on the lathe than it is to remove it and hand sand or finish it. Place a cloth over the way tubes to protect them from grit and finish.

WARNING

- Remove ALL Lathe Duplicator components before sanding and finishing a turning on the lathe.
- Never use a rag with frayed edges and never wrap sandpaper, steel wool or a rag around a turning when sanding and finishing. Your fingers could be pulled in between them and the rotating turning.

Sanding

1. Make your sandpaper convenient and safe to use. For each grit to be used, fold and tear an 8-1/2" x 11" sandpaper sheet into quarters. Then fold each quarter piece longways into thirds. This convenient size is rigid but will bend to the shape of the turning and its thickness will protect your fingers from heat build-up and paper wear-through. Each piece provides three working surfaces and twelve edges to sand in sharp profile areas.

2. Sand the turning. Turn on the Mark V and slightly increase the speed according to the speed chart. Starting with new coarse sandpaper (100 grit), begin to sand the turning using light pressure. Next, go over the piece again with old (used) 100 grit sandpaper.

Finish off the sanding with new fine sandpaper (150 grit) and then old (used) 150 grit sandpaper.

To achieve a smoother surface or to lessen sanding time, dismount the spindle, turn it end-for end and sand it in the opposite direction. When remounting the spindle be sure to put enough pressure on the quill to engage both the drive center and the tailstock center.

To reverse the rotation of a faceplate turning, mount the faceplate and turning on the auxiliary spindle of the Mark V.

Repeat the sanding process until the workpiece is the desired smoothness.

NOTE

If sanding open grain wood such as walnut or oak, wet the wood slightly between sandpaper changes to raise the grain. Allow a few minutes for the water to dry before continuing the sanding.

Finishing

WARNING

If you're finishing a turning that will be used to hold food products, select a **NON-TOXIC** natural oil finish. **DO NOT** mix in a stain.

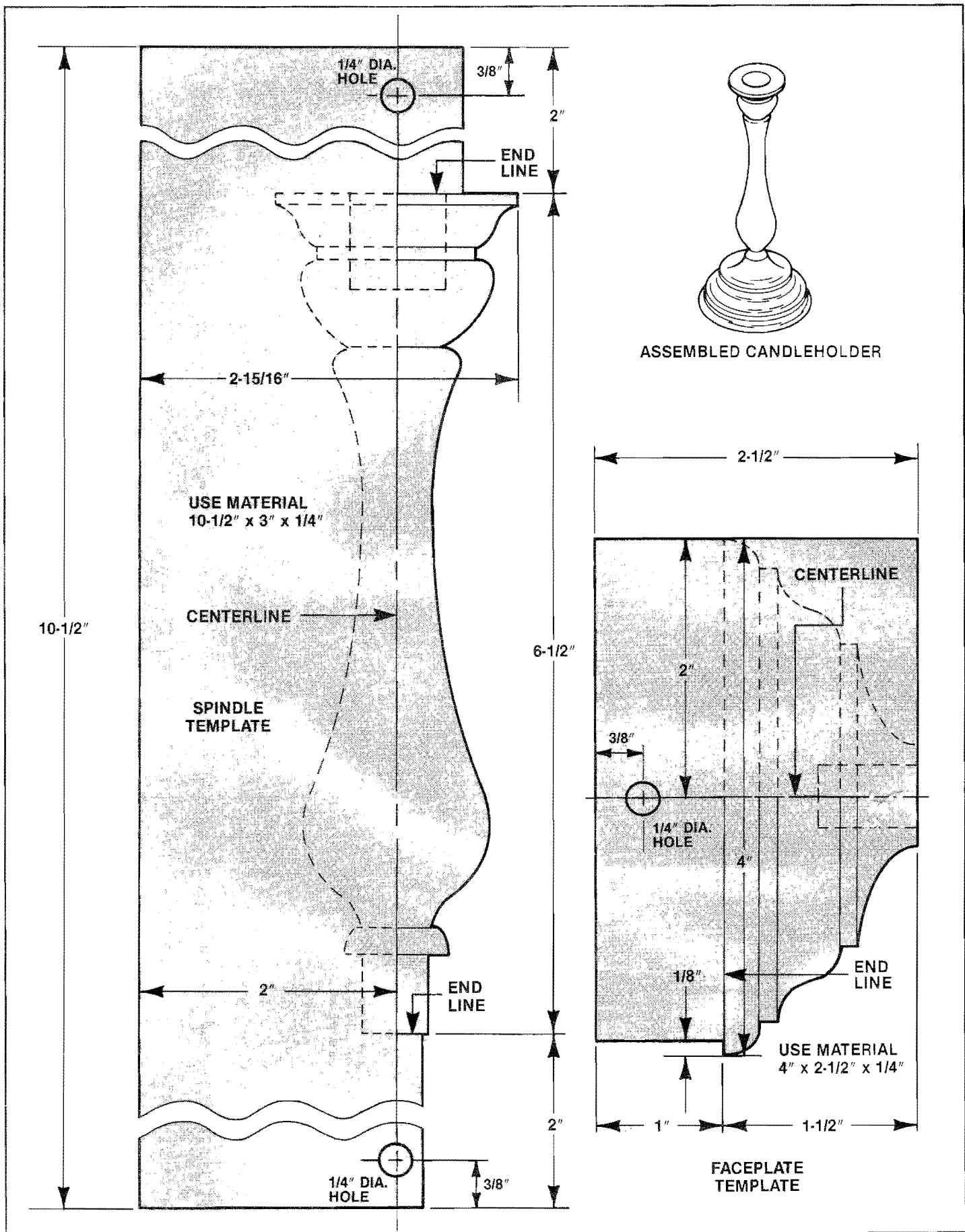
NOTE

- Use a very low speed when applying finish to your turning to prevent the finish from being thrown all over.
- Don't use a polyurethane finish for the technique below because it will dry too quickly to be workable.
- If your turning has areas to be glued to another part of your project, mask these areas with masking tape.

1. Apply the finish. Select a natural oil finish or prepare an oil finish with a stain mixed in. Soak a rag and a piece of slightly used fine wet/dry sandpaper in the finish. Turn on the Mark V. Use the rag to apply the finish to the turning. Then sand the finish. Repeat, adding more finish until a mixture of sanding dust and finish appears over the entire turning. Rub this paste with your hands and let it set for a minute or two until it becomes sticky. Then buff the turning and let it dry. Apply additional coats of finish, but do not sand.

NOTE

This procedure is much like going to the next finer grit sandpaper as the sanding dust in the mixture further polishes your turning while the oil-saturated sawdust fills in and seals the grain.



The Candleholder

Now that you've performed the **Assembly and Setup** and the **Alignment and Adjustment** procedures and read the **Operations** section, you may want to make this practice project. You'll learn how to set up the duplicator, make templates and perform both spindle and faceplate turning.

The following procedures assume that you've assembled, set up, aligned and adjusted the duplicator accurately, and read the **Operations** section thoroughly. Also that the Mark V is set up and aligned properly. All of this is critical for exact duplication.

Preparation

1. Make the templates. Refer to the **Templates** section.

2. Prepare the stock. Refer to "Stock Selection and Preparation."

For the spindle workpiece, use stock 2" x 2" x 7". This is 1/2" longer than the finished spindle in order to keep the cutter from hitting the drive center and to face off the tailstock end of the turning. Use the bandsaw to cut the stock into an octagon.

For the faceplate workpiece, use stock 1-3/4" x 4-3/8" x 4-3/8". Use the bandsaw to cut the stock to 4-1/4" diameter. Use a 3/16" bit to drill the mounting holes for the 3-3/4" faceplate. Then, use 1-1/4" long, #12 screws to mount the stock through the three inner holes in the faceplate.

Turning the Spindle

1. Set up the duplicator for spindle turning according to the following procedures. (See Figure 18.)

- Mount the channel support brackets in the 3rd and 9th hole from the right-hand end of the channel.
- Mount the template support assemblies just to the right of both channel support brackets.
- Mount both of the guard brackets in between the left template support

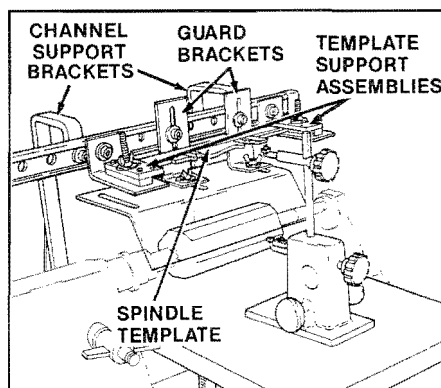


Figure 18. Spindle Setup.

assembly and the right channel support bracket.

d. Attach the guard to the brackets using the center and the right mounting slots.

2. Mount the workpiece. Refer to "Mounting a Spindle Workpiece."

3. Mount the template. Refer to "Mounting a Spindle Template." Align the template over the stock.

4. Turn the spindle. Refer to "Duplicating a Spindle." During rough shaping, be sure to check for the exact diameter of the pin according to the following procedures.

- Turn a cylinder at the pin position. Turn off the Mark V.
- Position the point of the cutter against the cylinder and the follower pointing at the template.
- Measure the distance from the tip of the follower to the template centerline. Double this measurement. Then measure the diameter of the cylinder. Both measurements should be the same. If the cylinder diameter is larger than the centerline measurement, move the template back. If smaller, move the template forward.

Turning the Faceplate

1. Set up the duplicator for faceplate turning according to the following procedures: (See Figure 19.)

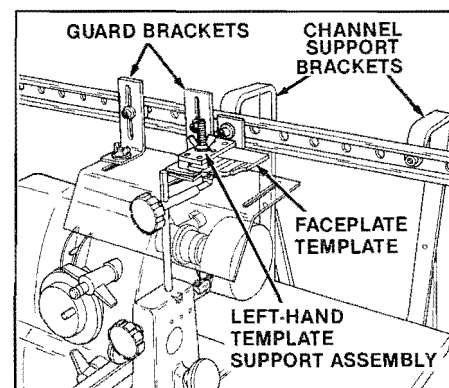


Figure 19. Faceplate Setup.

a. Remove the tailstock and tailstock center from the Mark V and the right-hand template support assembly from the channel.

b. Mount both guard brackets to the left of the left-hand channel support bracket.

c. Attach the guard to the guard brackets using the left and center mounting slots.

2. Mount the workpiece. Refer to "Mounting a Faceplate Workpiece."

3. Mount the template. Refer to "Mounting a Faceplate Template." Extend the quill approximately 1-1/8" to properly align the workpiece under the template. Use the tool rest assembly to align the bottom left side of the workpiece with the left side profile of the template.

4. Turn the faceplate. Refer to "Duplicating a Faceplate Turning." After detail shaping, use the tailstock chuck arbor with the drill chuck and a 1/2" bit to drill the 3/4" deep spindle pin hole.

Sand, Finish, and Assemble

1. Sand and finish the spindle and faceplate turnings on the lathe. Refer to "Sanding and Finishing."

2. Glue the spindle in the base. Let glue dry at least 24 hours, then use the drill press to drill the 3/4" dia. x 3/4" deep hole in the top of the spindle.

Maintenance

Caring for the Lathe Duplicator

Your Shopsmith Lathe Duplicator is designed to deliver years of reliable service with a minimum of maintenance. Like other tools, its components will function better and safer if you maintain them properly.

Cleaning

As you work, sawdust, wood chips, shavings, pitch and resin will accumulate on the duplicator components and this residue can affect your projects.

As needed, clean the duplicator components with your shop vacuum. Use the brush and crevice tool attachments.

Also, remove pitch and resin from the table and guard with a mild soap and water solution.

Waxing

Every 6 months, after a thorough cleaning of the duplicator components, sparingly apply floor or furniture paste wax on the table posts. Buff the wax thoroughly, then use a toothbrush or other stiff brush to remove any wax residue from the rack teeth of the posts.

CAUTION

- Use paste floor wax or paste furniture wax. Do not use car wax or spray furniture polish. The table posts need wax for both protection and lubrication. Car wax offers good protection for metal, but it's extremely hard and has little value as a lubricant. Furniture polish isn't hard enough. Paste floor wax or paste furniture wax protects and lubricates.
- Do not allow paste wax to get on any plastic part. Some waxes will react negatively with plastic.

Cutters

WARNING

The cutters are solid carbide and will stay sharp for a long period of time. In the event that the cutters dull, DO NOT attempt to regrind them. The dust created by grinding the carbide can cause eye and skin irritation as well as respiratory system and internal organ damage. Replace worn cutters with new. They are economically priced.

Storage

Store the Lathe Duplicator components away from unusually humid or corrosive conditions. By loosening the support bracket screws, the channel and support bracket assembly (with the template support and guard assemblies attached) can be folded into a relatively flat unit for storage such as hanging it from two suitable wall hooks. (See Figure 1.)

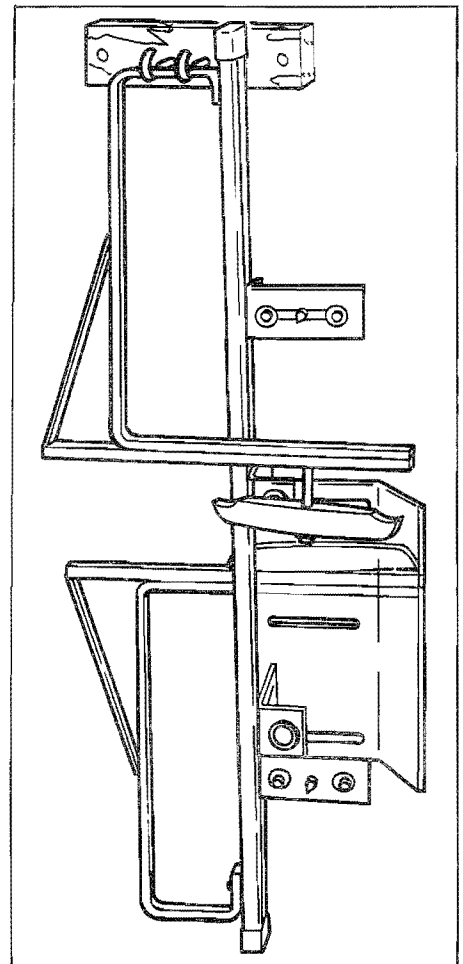


Figure 1. The channel and support bracket assembly (with template support and guard assemblies attached) can be folded and hung on a wall.

Troubleshooting Guide

Lathe Duplicator problems usually have simple solutions—under normal use, you should rarely have to service a component. Most problems can be corrected by maintenance, alignment, adjustment, or a change in work habits.

To help diagnose and remedy any problem that may arise when using your Shopsmith Lathe Duplicator, use this guide:

Problem	Possible Cause	Solution
Quality of cut is poor (rough or torn surface).	Cutter is above centerline of workpiece.	Lower table to bring cutter down to centerline; or down to 1/16" maximum below centerline for certain types of wood.
	Lathe speed too low.	Check speed chart and increase speed.
	Cutter is dull.	Replace the cutter.
	Cutting too aggressively.	Use lighter touch.
Inexact diameters.	Improper alignment of lathe centers to template centers or follower to cutter.	Check alignment and adjust if required.
	Wrong follower used.	Change to follower with same shape as cutter.
	Way tube clamp not positioned correctly.	Check that recessed ends of both clamps engage way tubes properly. Reposition if required.
	Alignment was not checked when remounting duplicator.	Check alignment and adjust if required.
Good cut on one end of turning but poor cut on other end.	Lathe centers not parallel to table.	Check table to lathe centers parallelism. Align if required.
	Way tube clamp not positioned correctly.	Check that recessed ends of both clamps engage way tubes properly. Reposition if required.
Tapered cut.	Template not centered properly or centerline not drawn squarely on template.	Straighten template on centers or redraw centerline on template.
	Way tube clamp not positioned correctly.	Check that recessed ends of both clamps engage way tubes properly. Reposition if required.
Excessive vibration (whip and chatter) when turning thin spindles.	Cutter is below centerline of workpiece.	Raise table so that cutter is on centerline.
	Cutting too aggressively.	Use lighter touch.
Excessive vibration when turning larger spindles or bowls.	Workpiece centers located wrong or wood is unbalanced.	Check for proper centers and balance. Relocate center(s) or cut off stock until workpiece is balanced.

Parts List

Parts List for the Shopsmith Lathe Duplicator—555209

This is a list of replacement parts for the Shopsmith Lathe Duplicator. When you need parts, you can order either the individual parts or the entire assembly, depending on your needs. Call Customer Services for price information and to place your order.

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
—	514716	Template Support Assembly (Incl. 1-8)		35	513904	Table Post	2
1	513600	. Wing Nut, 3/8"-16	2	36	514748	Setscrew, 5/16"-18 x 1/2"	2
2	120394	. Flat Washer, 3/8"	2	37	514713	Tool Rest Base Assembly (Incl. 38-43)	1
3	514747	. Template Center, 3/8"-16 x 3"	2	38	513808	. Label	2
4	514748	. Setscrew, 5/16"-18 x 1/2"	4	39	514698	. Tool Rest Foot (Incl. pressure sensitive adhesive)	1
5	514706	. Template Clamp	2	40	514746	. Cup Point Setscrew, 5/16"-18 x 1"	2
6	514705	. Template Spacer	2	41	514748	. Setscrew, 5/16"-18 x 1/2"	1
7	120393	. Flat Washer, 5/16"	4	42	139367	. Setscrew, 5/16"-18 x 1/4"	1
8	514745	. Socket Head Cap Screw, 5/16"-18 x 1"	4	43	514748	. Setscrew, 5/16"-18 x 1/2"	2
9	514708	Bracket	2	44	514740-01	Follower Adjusting Knob	1
10	514702	Channel Nut, 3/8"-16	2	45	514746	Cup Point Setscrew, 5/16"-18 x 1"	1
11	514744	Socket Head Cap Screw, 3/8"-16 x 7/8"	2	46	514707	Follower Support	1
12	120394	Flat Washer, 3/8"	2	47	514742	Socket Head Cap Screw, #6-32 x 3/8"	1
13	514715	Channel Assembly (Incl. 14)	1	48	514750	Flat Washer, #6	1
14	514701	. Cap	2	49	514699	Followers (Set of 4 shapes)	1
15	514712	Support Bracket	2	50	514709	Follower Upright	1
16	513356	Clamp	2	51	514740-02	Cutter Adjusting Knob with Stud	1
17	120394	Flat Washer, 3/8"	2	52	514238	Handle	2
18	514743	Socket Head Cap Screw, 3/8"-16 x 3-3/4"	2	53	514742	Socket Head Cap Screw, #6-32 x 3/8"	1
19	514744	Socket Head Cap Screw, 3/8"-16 x 7/8"	2	54	514750	Flat Washer, #6	1
20	120394	Flat Washer, 3/8"	2	55	514719	Cutter Guide	1
21	514777	Guard (Incl. 22)	1	56	514742	Socket Head Cap Screw, #6-32 x 3/8"	1
22	514776	. Label	1	57	555211	Triangle Carbide Cutter, 60°	1
23	514744	Socket Head Cap Screw, 3/8"-16 x 7/8"	2	58	514710	Cutter Support	1
24	120394	Flat Washer, 3/8"	2	59	514704	Spacer, 1-1/2" Long	1
25	501633	Special Washer, 3/8"	4	*	513686-06	Allen Wrench, 1/4" Short	1
26	514491	T-Nut, 3/8"-16	2	*	513686-08	Allen Wrench, 5/16" Long	1
27	513600	Wing Nut, 3/8"-16	2	*	513686-09	Allen Wrench, 7/64" Long	1
28	120394	Flat Washer, 3/8"	2	*	PL-5117	Lathe Duplicator Owners Manual	1
29	514708	Bracket	2	*	501359	Mark V Warning Label	1
30	120396	Flat Washer, 1/2"	2	*	513104	Mark V Caution Label	1
31	514749	Carriage Bolt, 3/8"-16 x 1"	2	*	514427	Mark V Lathe Speed Label	1
32	514763	Table Assembly (Incl. 33, 33A)	1	Optional Accessories			
33	514744	. Socket Head Cap Screw, 3/8"-16 x 7/8"	4	—	555210	Round Carbide Cutter, 1/2"	
33A	120394	. Flat Washer, 3/8"	4	—	555212	Square Carbide Cutter, 3/8"	
34	514697	Table Support	2	—	555213	Diamond Carbide Cutter, 35°	
				—	505602	Tailstock Live Center	

*Included with Lathe Duplicator, but not shown.

Parts List

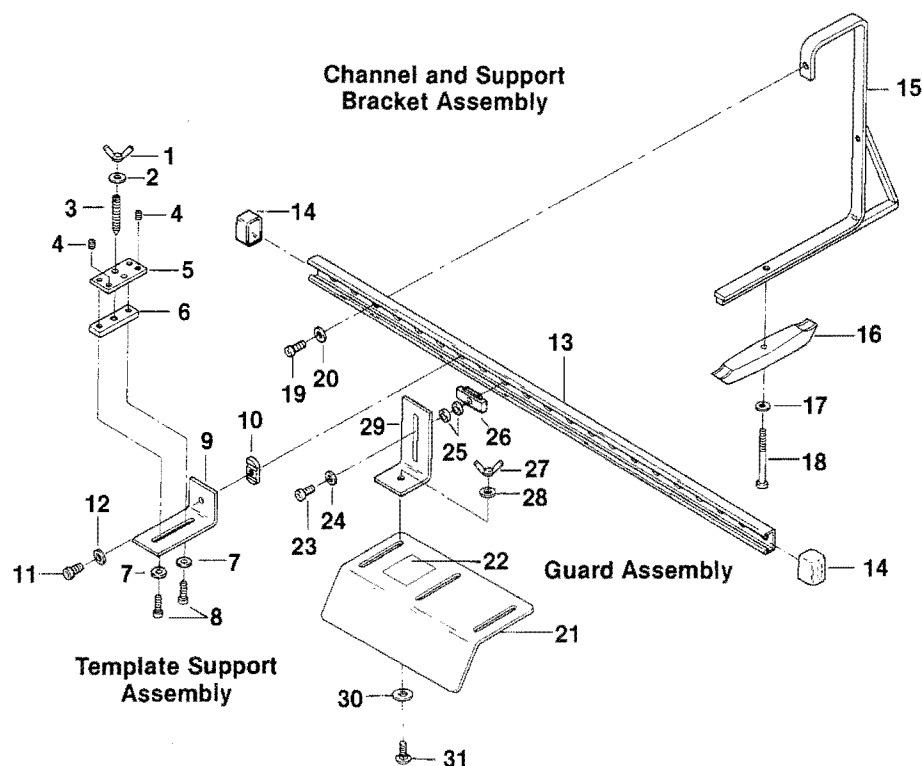
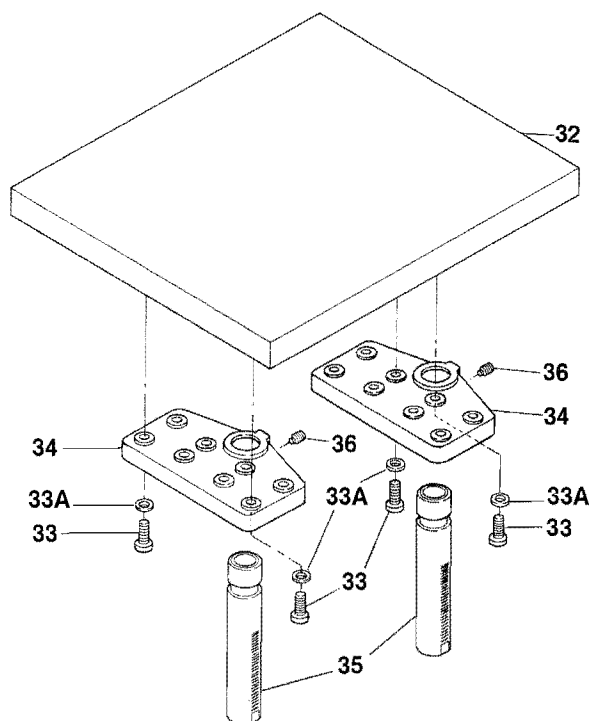
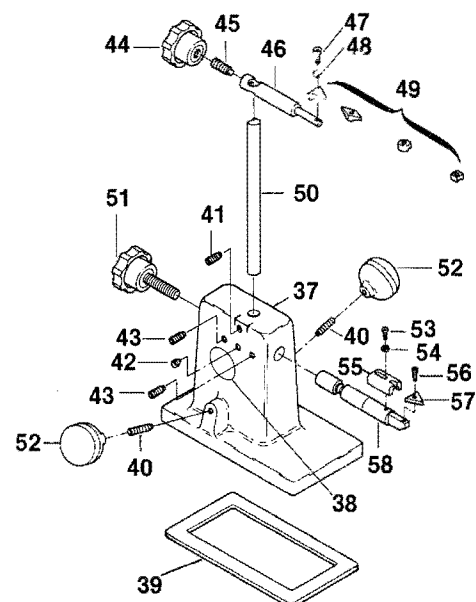


Table and Table Support Assembly



Tool Rest Assembly



Spacer





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