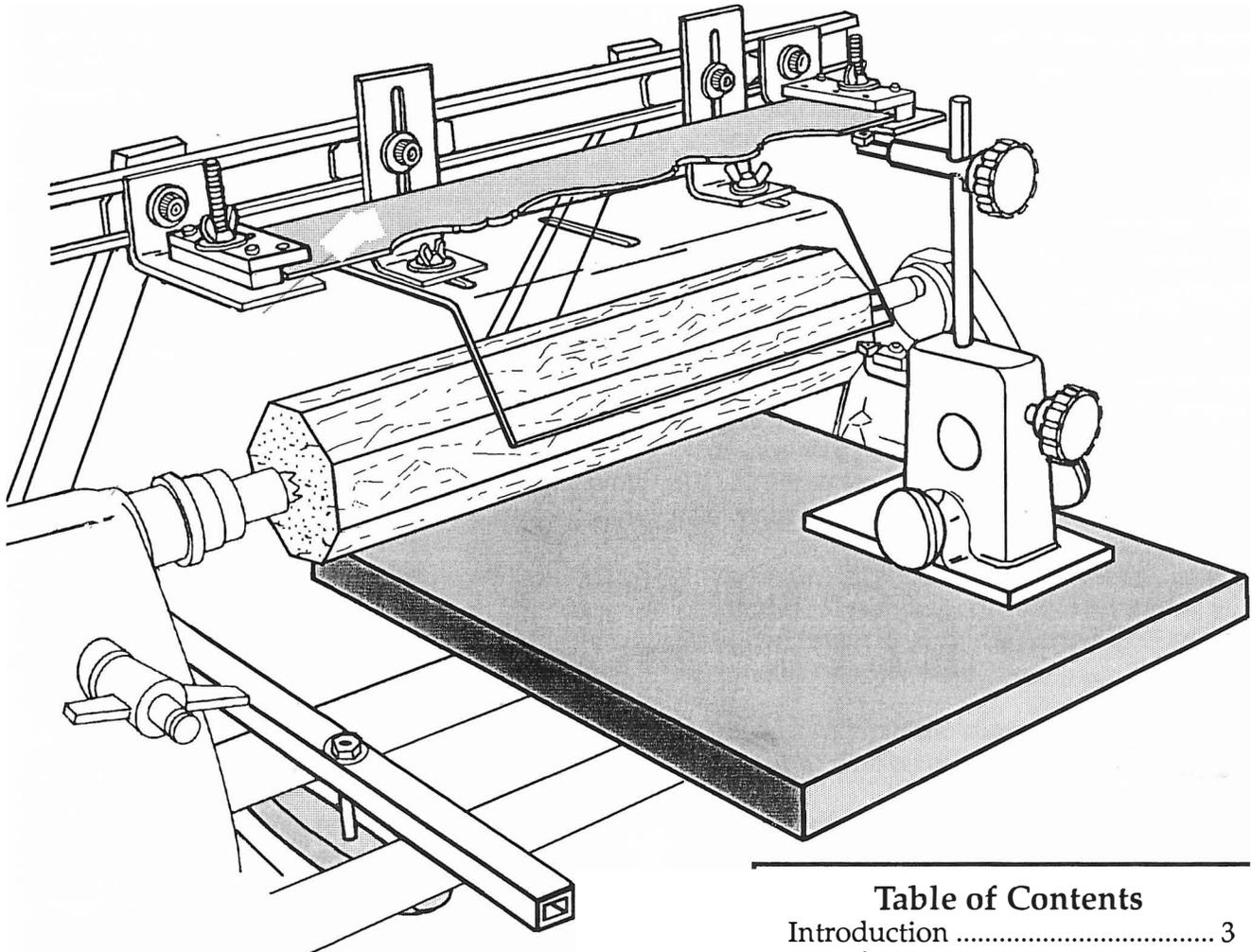




# Lathe Duplicator



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# Introduction

Your Shopsmith Lathe Duplicator uses templates to produce duplicate spindles and bowls. Also, you can work without a template to develop skills in freehand turning.

Rather than using conventional lathe chisels, the Lathe Duplicator features a tool rest assembly which freely slides on a smooth table. You're in complete control as you grasp its two handles and guide its "follower" along a template and a carbide cutter into your workpiece.

Four carbide cutters (one standard and three optional) have an extremely long cutting life without sharpening. These carbide cutters come in four shapes and have different purposes:

- **Triangle/Universal Cutter (standard)** - rough shaping through medium detailing.
- **Round (optional)** - Initial shaping, graceful curves, cove cuts, dishing.
- **Diamond (optional)** - Fine beads, deep intricate details, V-grooves, sharp corners.
- **Square (optional)** - Square corners, grooves, straight cylinders, short dowels and plugs.

## How to Use This Manual

Read through this entire instruction manual before assembling, aligning or operating the Lathe Duplicator. This will give you an overview of what it can do for you. Then review the lathe turning sections of your Mark V (Mark II or Mark VII- depending on the model you own) instruction manual and the Shopsmith text, **Power Tool Woodworking for Everyone**. These publications contain information on lathe turning operations, selection and preparation of stock, finding the center of workpiece, and safety rules.

After reading and understanding all of the above, **re-read** this manual's safety section before you assemble and align the Lathe Duplicator. Again, refer to the safety section before beginning any operations.

## Which Machines to Use

The Lathe Duplicator components are designed to mount on the Shopsmith Mark V Models 500 and 510 as well as on Mark II and Mark VII systems.

- If you received your Mark V prior to November 1985, you own a Model 500.
- If you received your Mark V after November 1985, you own either a Model 500 or Model 510. Check the vent plate, located around the auxiliary spindle, for the model number of your Mark V.

## Specifications

The specifications of the Lathe Duplicator will give you an idea of its capabilities:

### Capacities:

- **Maximum spindle length** - 34" with cup center; 33-1/2" with live center and no spacer; 32" with live center and 1-1/2" long spacer.
- **Minimum spindle length** - 6-1/4" with cup center; 5-3/4" with live center and no spacer; 4-1/4" with live center and one spacer; 2-3/4" with live center and two spacers.
- **Maximum spindle diameter** - 8" with a flat template; 4" with an original spindle.
- **Maximum bowl diameter** - 8" with a flat template.
- **Maximum depth of cut** - 2-1/4" (3-1/4" for light freehand cuts inside bowls).
- **Maximum template length** - 36".
- **Maximum template thickness** - 3/8".
- **Minimum template thickness** - 1/4" (smaller templates only).
- **Weight** - 36.5 lb.
- **Height** - 47" (when mounted on Mark V).

# Safety

The Shopsmith Lathe Duplicator has many built-in safety features. But the effectiveness of these features depends on you. Power tool safety is no more than good common sense.

Throughout this manual, we list WARNINGS, CAUTIONS and NOTES. We advise that when you come to one of these listings, please read and understand it fully. Their meanings are:

## WARNING

A WARNING is given when failure to follow the directions could result in injury or loss of limb or life.

## CAUTION

A CAUTION is given when failure to follow the directions could result in temporary or permanent damage to the equipment.

## NOTE

A NOTE is used to highlight an important procedure, practice or condition.

## General Safety Rules for Power Tools

### WARNING

- To protect yourself from injury: READ, UNDERSTAND AND FOLLOW ALL the information in this Instruction manual WHENEVER you operate, set up, align, adjust, repair and maintain the Lathe Duplicator.
- READ, UNDERSTAND AND FOLLOW ALL the information in the Instruction manual for the Mark V on which the Lathe Duplicator will be mounted.
- Remove adjusting keys and wrenches. Form habit of checking to see that keys and adjusting wrenches are removed from the tool before turning it on.
- Use the right tool. Don't force a tool or accessory to do a job for which it was not designed.
- Use only recommended Shopsmith parts and accessories on your Lathe Duplicator. NEVER use non-Shopsmith replacement parts or accessories.

They are not designed like Shopsmith parts. Using non-Shopsmith parts may create a hazardous condition and will void your warranty.

- Check damaged parts. A damaged guard or part should be properly repaired or replaced before further use. If a strange noise or vibration develops, immediately turn off the power, unplug the machine and correct the problem.
- Do not overreach. Keep proper footing and balance at all times.
- Turn off the tool and wait until it comes to a complete stop before removing workpieces and scraps.
- Disconnect tools. Turn off and unplug tools before changing accessories and setups, making adjustments, and performing maintenance and repair.
- Maintain tools. Keep parts and tools sharp, clean and maintained according to the instruction manual.

## Personal Safety Rules

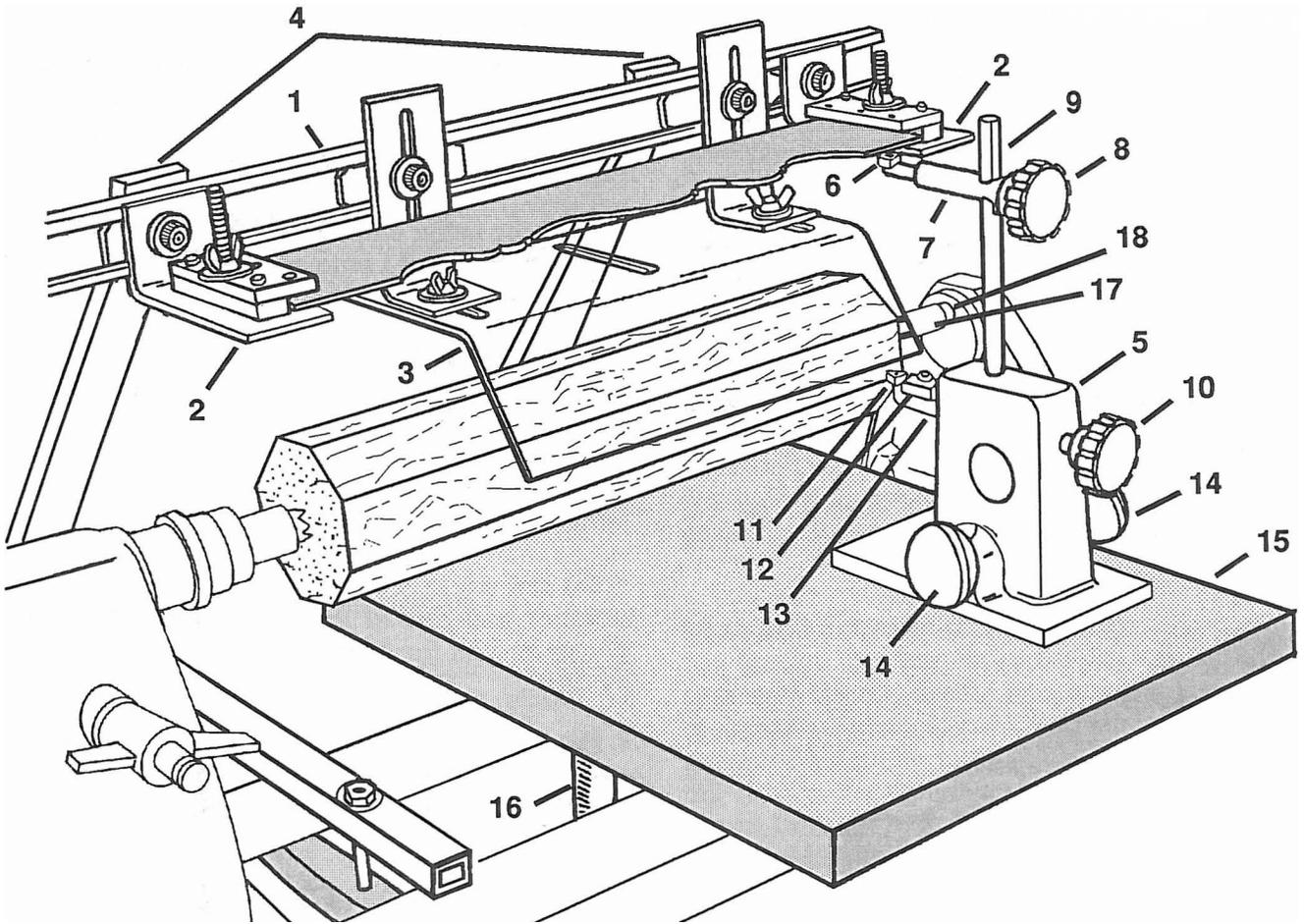
### WARNING

- Always wear eye protection when you use power tools. Use goggles, safety glasses or a face shield to protect your eyes.
- Prolonged exposure to high-intensity noise from high-speed power tools can damage your hearing. Wear hearing protectors.
- Sawdust and chips can be fire hazards, and breathing sawdust can be a health hazard. Sawdust may cause you physical discomfort, especially if you have emphysema, asthma or an allergic reaction. The sawdust from some woods can also be toxic.
- Wear a close-fitting dust mask if a significant amount of dust is released into the air. Clean or replace the filters in the mask regularly.
- Open a window or use a fan to ventilate your shop.

# Safety Rules for the Lathe Duplicator

## WARNING

- Keep your hands, fingers and other parts of your body 2" away from the rotating workpiece until it is rounded. After it is rounded, use caution when you get close to the rotating workpiece. Do not touch the workpiece as it turns.
- Keep the guard in place whenever you're performing turning operations. Position it not more than 1/2" from the workpiece.
- When turning glued-up stock, make sure glue joints are strong. Glue the stock and leave it clamped for at least 24 hours prior to turning.
- Do not exceed recommended speeds. Use the lowest speed setting when starting to turn a new workpiece.
- When mounting stock between the centers, the spurs of the drive center and the cup of the tailstock center must penetrate at least 1/16" into the stock. Do not use a drive center or tailstock center if the point is damaged. The stock could be thrown from the lathe.
- Wax or soap the end of the stock that mounts to a cup center. This lubrication helps keep the center from wearing into the stock and causing the stock to loosen on the lathe. The ball-bearing live center is highly recommended for use with the Lathe Duplicator.
- When mounting stock to a faceplate, use #12 x 1-1/4" long screws. The screws must penetrate at least 1" into the stock. The surface of the workpiece that's against the faceplate must be smooth and true.
- Cut faceplate stock round and spindle stock that's more than 3" square into an octagon. This removes excess stock, minimizes imbalance, reduces vibration and makes turning large diameter stock safer and easier.
- Check the balance of the workpiece. Prior to mounting workpieces more than 3" in diameter, check and adjust the center of balance (dynamic center). Unbalanced workpieces could be thrown from the lathe.
- Do not turn on the power with the cutter or any part of the tool rest assembly against the workpiece. Turn on the machine and let it come up to speed before starting the cut.
- Do not stand in the path of rotation of the workpiece when you first turn on the machine. If the machine is set on the wrong speed or the workpiece is unbalanced or improperly mounted, the workpiece could be thrown from the lathe.
- Feed the cutter slowly into the workpiece. Use both hands to hold onto and control the tool rest assembly.
- Periodically, turn off the machine and check that the workpiece is held securely between the centers or on the faceplate.
- Do not lean across or reach underneath the lathe while it is running.
- Do not try to stop the lathe by grabbing the stock or any part of the machine. Turn off the power and let the lathe come to a complete stop by itself.
- Do not part the stock completely or turn the spindle down to such a small diameter that it snaps on the lathe. This can be extremely dangerous.
- Do not turn stock with splits, loose knots or other defects that could cause the stock to break, splinter or come loose while turning. Never turn secondhand lumber. If you hit a nail or screw, you could be hit by pieces of metal.
- Remove the Lathe Duplicator from the Mark V before sanding or finishing a workpiece on the lathe.
- Do not grind the cutters. 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 Shopsmith cutters.
- Do not allow the cutter to come in contact with the parts of the Lathe Duplicator or Mark V. The cutter will cause damage to the parts and you could be hit by pieces of metal.

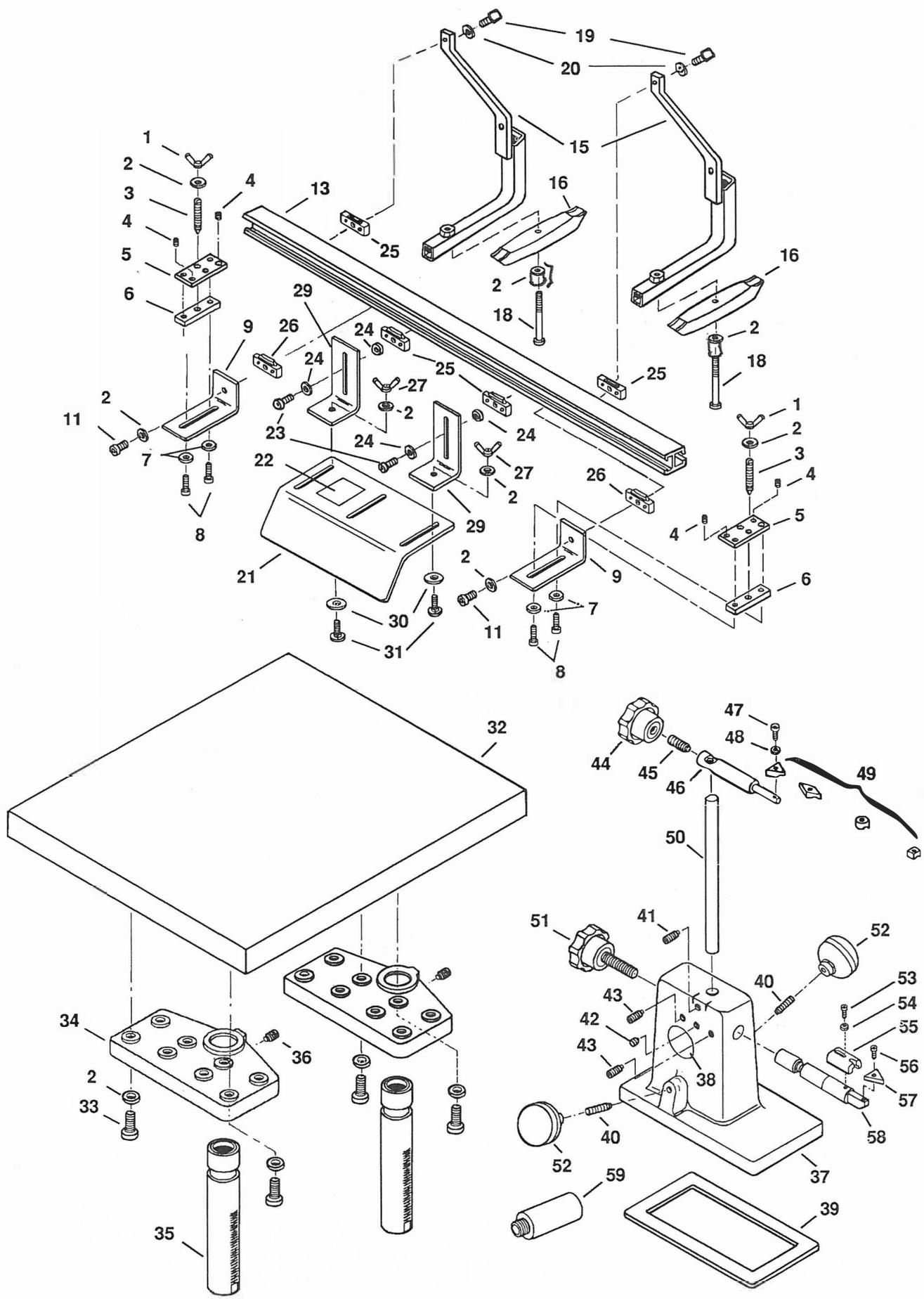


# Terms to Know

Learning the following terms helps you understand the Lathe Duplicator. Refer to this list and accompanying illustration as you read this instruction manual.

- 1. Channel** - Holds the template support assemblies and the guard assembly.
- 2. Template Support Assemblies** - Support either a flat template or an original spindle.
- 3. Guard Assembly** - Serves as both a guard and a chip deflector.
- 4. Support Brackets** - Clamp to the way tubes to support the channel.
- 5. Tool Rest Assembly** - Contains the carbide cutter and follower. It slides on the table surface and is controlled by handles on each side of its heavy aluminum base.
- 6. Follower** - Follows the template or spindle to be duplicated. Must be the same shape as the carbide cutter.
- 7. Follower Support** - Supports the plastic follower and mounts to the follower upright.
- 8. Follower Adjusting Knob** - Permits the follower support to be raised and lowered on the follower upright.
- 9. Follower Upright** - Permits the follower support to be adjusted vertically.
- 10. Cutter Adjusting Knob** - Permits the cutter support to be positioned a controlled amount in or out for alignment with the follower.
- 11. Carbide Cutter** - Cuts the workpiece. Made of solid carbide, it has an extremely long life when cutting wood. It attaches to the cutter support.
- 12. Cutter Guide** - Aligns the carbide cutter and also prevents its rotation during cutting.
- 13. Cutter Support** - Supports the carbide cutter and the plastic cutter guide. Adjusts in or out of the tool rest.
- 14. Handles** - Provide a positive grip that make it easy to guide the tool rest assembly.
- 15. Table Assembly** - Provides a smooth surface for the tool rest assembly.
- 16. Table Posts** - Permit the table assembly to be adjusted vertically in the carriage.
- 17. Spacer** - Attaches to the live center, enabling you to turn the full length of workpieces and to turn short spindles.
- 18. Tailstock Live Center (Optional)** - Not included with the Lathe Duplicator. However, it is recommended because it provides a frictionless center for spindle turning. Mounted in the tailstock, it replaces the cup center. A spacer supplied with the Lathe Duplicator increases the live center's length for turning the full length of workpieces and also for turning short spindles.





# Assembly

Perform the assembly instructions in the order presented, and then perform the alignment instructions. Do these sections before attempting any operation with the Lathe Duplicator.

The assembly and alignment instructions for the "Table and Table Support Assembly" are written primarily for **Mark V Models 500 and 510**.

- If your system is a **Mark II** – follow the instructions specified for **Model 500**.
- If your system is a **Mark VII** – follow the instructions specified for **Model 500** for mounting the table supports and **Model 510** for mounting the table posts.

## Tools and Supplies Required:

- 1/4", 5/16" and 7/64" Allen wrenches (provided)
- 5/32" standard Mark V Allen wrench
- 9/16" wrench
- Straightedge

## PREPARE THE MARK V

### WARNING

Turn off and unplug the Mark V before you begin.

1. Set up and align the Mark V in the lathe mode, according to the instructions in your Mark V manual. Make sure the drive center and tailstock center are aligned both horizontally and vertically.

2. Carefully peel the labels from your Mark V headstock, located as shown in Fig. A-1. Replace each with the Warning (a), Caution (b) and Lathe Speed (c) labels provided with your Lathe Duplicator.

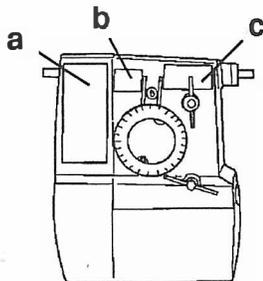
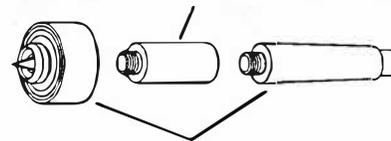


Fig. A-1

## 3. Optional –

If you own a **live center** (a cup center is standard with the Mark V), we provide a spacer, shown in Fig. A-2, for extending the live center. This is needed for turning the full length of a workpiece and for turning short spindles. If the live center is difficult to separate, hold the reduced diameter end of the shaft in a vise and grasp the head with adjustable jaw pliers. Pad the jaws of both the vise and pliers to avoid marring the live center.

Spacer (provided with Lathe Duplicator)



Live center

Fig. A-2

## ASSEMBLE THE TOOL REST

4. Attach the handles (52) to the tool rest base (37), as illustrated in Fig. A-3.

5. Insert the cutter support (58) into the big hole located at the front of the tool rest base (37) until the indicating groove is flush with the front of the base, as seen in Fig. A-4.

6. Use a 5/32" Allen wrench to tighten the middle setscrew (42), as shown in Fig. A-5, then loosen it 1/4 turn.

7. Attach the cutter adjusting knob (51), as shown in Fig. A-6. Adjust it until the knob touches the back of the cutter support.

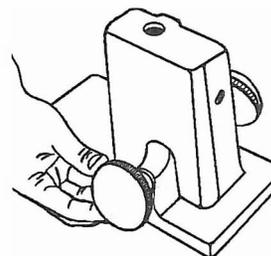


Fig. A-3

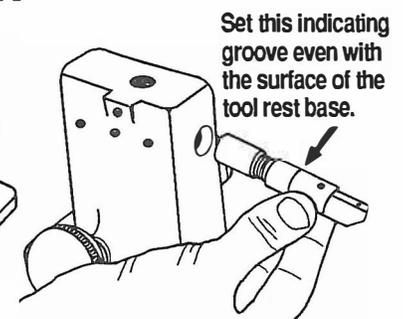


Fig. A-4

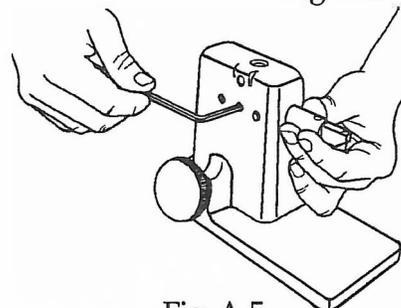


Fig. A-5

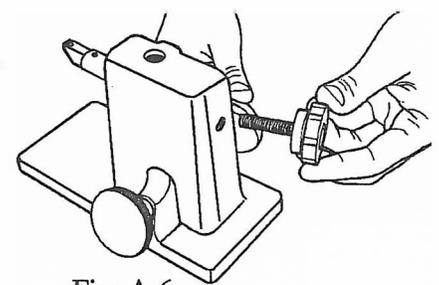


Fig. A-6

8. Insert the follower upright (50) in the top hole of the base (37) until it touches the cutter support (58). The flat surface must be at the top and facing the back of the base. Use a 5/32" Allen wrench to lightly tighten the setscrew (41) against the upright, as seen in Fig. A-7.

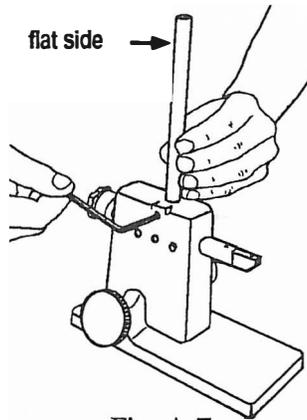


Fig. A-7

9. Attach the cup point setscrew (45) to the follower adjusting knob (44) with the cup point facing out, as shown in Fig. A-8.

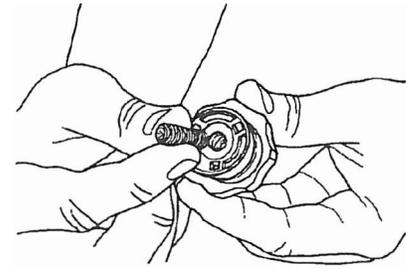


Fig. A-8

10. Install the follower support (46) and thread the cup point setscrew (45) into the follower support, as seen in Fig. A-9. To seat the cup point of the screw against the flat of the follower upright, wiggle the follower support as you tighten the knob.

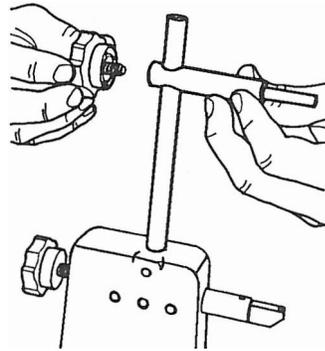


Fig. A-9

11. Use a 7/64" Allen wrench to attach the cutter guide (55) to the support (58) with a 3/8" long cap screw (53) and washer (54), as shown in Fig. A-10.

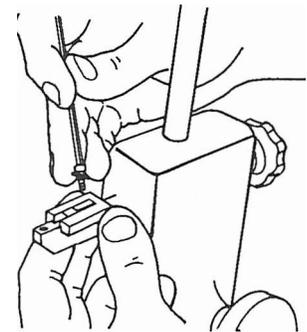


Fig. A-10

12. Place the triangle carbide cutter (57), with the bevel down, on against the cutter guide. Use a 7/64" Allen wrench and a 3/8" cap screw to attach the cutter to the support, as illustrated in Fig. A-11.

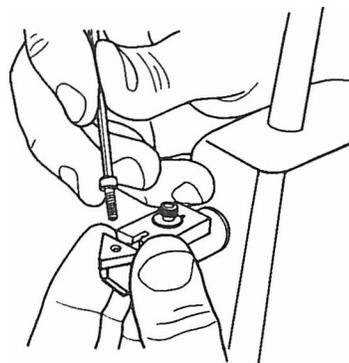


Fig. A-11

**NOTE**

The triangle carbide cutter is provided with your Lathe Duplicator. Three other cutters are also available, and are installed in the same way described in Step 12 above. Fig. A-13 illustrates the different setups for all the cutters and the cutter guide.

Also, for Step 13 below, if you will be using an optional cutter, make sure you install the plastic follower which matches it.



Fig. A-12

13. Detach the triangle follower (49) from the plastic molding strip. **Save the other followers.** Use a 7/64" Allen wrench, 3/8" long cap screw (47) and a flat washer (48) to attach the triangle follower to the follower support (46), as shown in Fig. A-12. Fig. A-14 illustrates the completely assembled tool rest assembly.

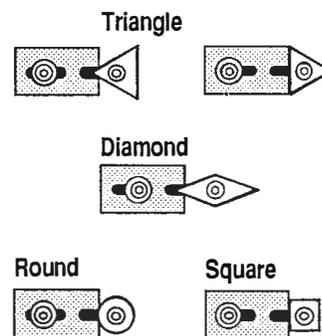


Fig. A-13

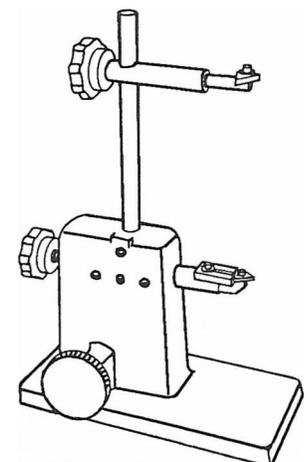


Fig. A-14

## ASSEMBLE THE TABLE

**14.** Turn the table upside down. Orient it so the edge with the screw inserts which are closer to it is to the right.

**15.** See Figs. A-15 and A-16. Place the table supports (34) on the table according to the Mark V model you have.

**16.** Attach each table support with two  $7/8$ " long cap screws (33) and two flat washers (2), as demonstrated in Fig. A-17. Finger tighten. Use a ruler to check the distance from center of each post hole, as seen in Fig. A-18. It should be  $15\text{-}1/2$ " for the Model 510 and 12" for the Model 500.

**17.** Insert a table post (35) in each table support's post holes, as shown in Fig. A-19. Orient the flat side with the teeth toward you, as in Fig. A-19.

**18.** Use a straightedge to align the flat sides of the posts, as seen in Fig. A-20. When aligned, use a  $5/32$ " Allen wrench to tighten the set-screw in the side of each support, as demonstrated in Figs. A-21 and A-22.

**19.** Place the table posts in the Mark V carriage mounting holes, as seen in Fig. A-23. For the **Model 500** the rack teeth face toward the headstock, and for the **Model 510**, the rack teeth face away from the headstock. Gently rock the table until it settles in place and the pinions engage the racks. Raise and lower the table to be sure the carriage and rack mesh smoothly together. Tighten the height lock, as in Fig. A-24. Use a  $9/16$ " Allen wrench to tighten all four cap screws (33) attaching the supports to the table, as illustrated in Fig. A-25.

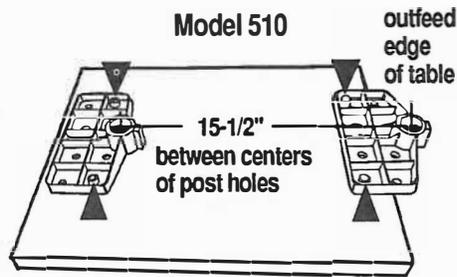


Fig. A-15

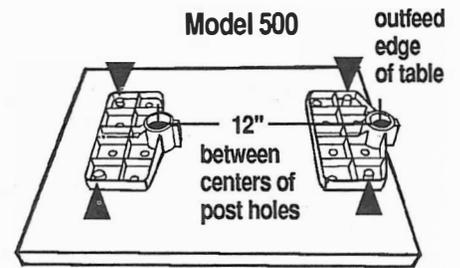


Fig. A-16

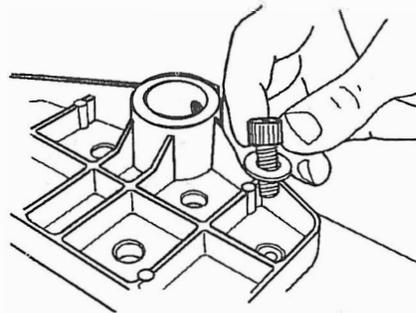


Fig. A-17

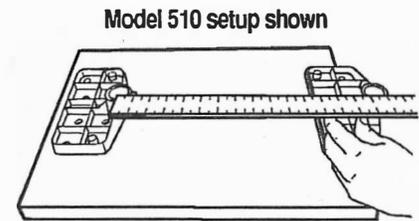


Fig. A-18

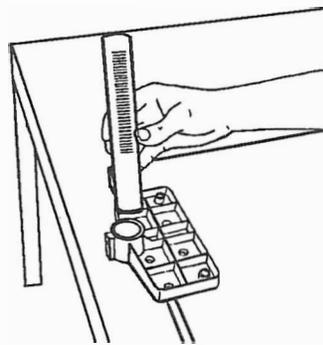


Fig. A-19

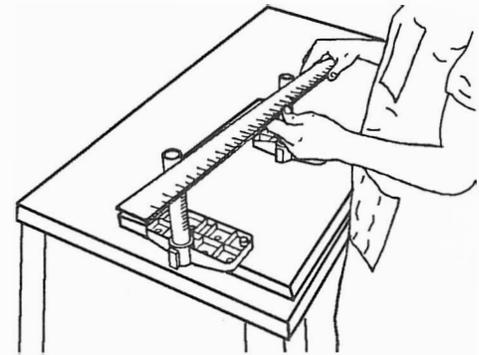


Fig. A-20

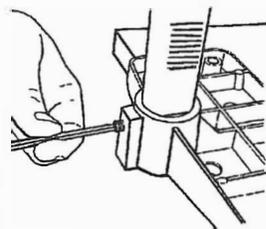


Fig. A-21

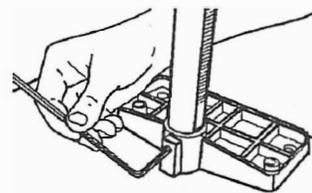


Fig. A-22

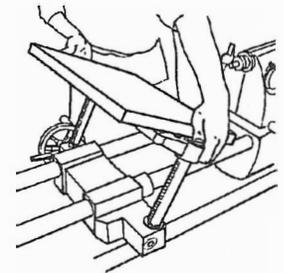


Fig. A-23

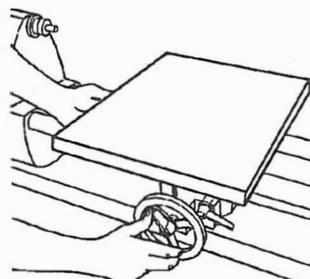


Fig. A-24

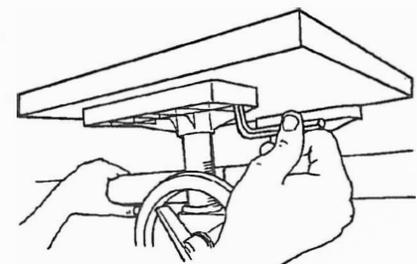


Fig. A-25

## ASSEMBLE THE SUPPORT

**20.** Slide a T-nut (26) in the channel extrusion (13), as shown in Fig. A-26.

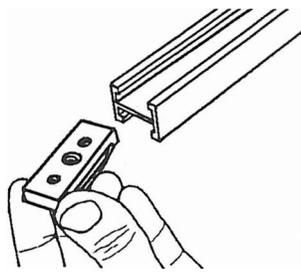


Fig. A-26

**21.** Place a flat washer (20) on a  $7/8$ " long cap screw (19). Thread the screw through the top hole of the support bracket (15) and into the center hole of the T-nut, as seen in Fig. A-27, and finger tighten the cap screw. Repeat Steps 20 and 21 for the other end of the channel extrusion. When done, it should look like Fig. A-28. (Later you will attach the support clamps to the bottom of the bracket.)

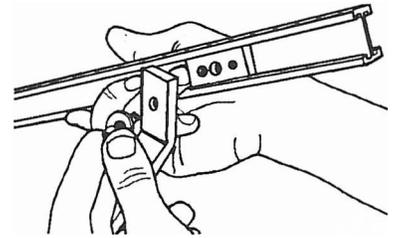


Fig. A-27

## ASSEMBLE THE GUARD

**22.** Place a regular-size flat washer (24) on cap screw (23), and insert the screw through the slot in a bracket (29). Then place two thick washers (25) on the screw and a thread it into the center hole of a T-nut (26), as shown in Fig. A-29.

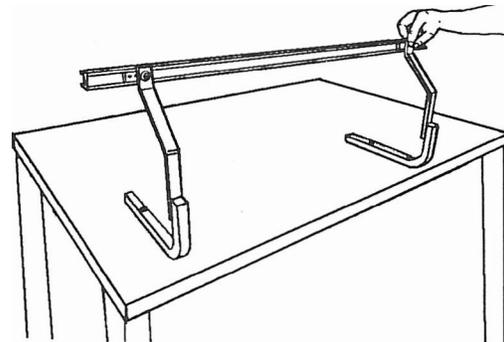


Fig. A-28

**23.** Slip the T-nut into the front slot of the support, as seen in Fig. A-30.

**24.** Repeat Steps 22 and 23 to assemble another guard bracket.

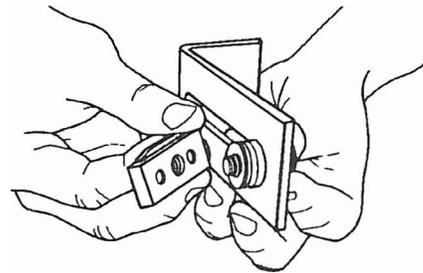


Fig. A-29

**25.** Place a flat washer (30) on a carriage bolt (31) and insert it through the right slot in the guard (21), as shown in Fig. A-31.

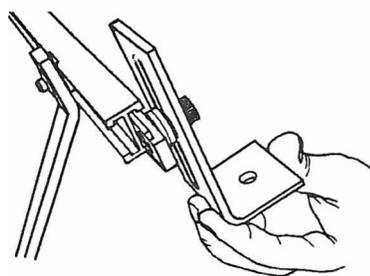


Fig. A-30

**26.** Attach the guard to the bracket with another flat washer (28) and a wing nut (27), as demonstrated in Fig. A-32.

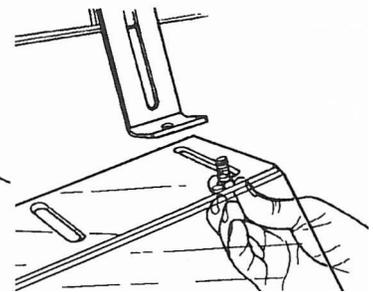


Fig. A-31

**27.** To attach the left side of the guard, repeat Steps 24 and 25. Fig. A-33 illustrates the assembled guard.

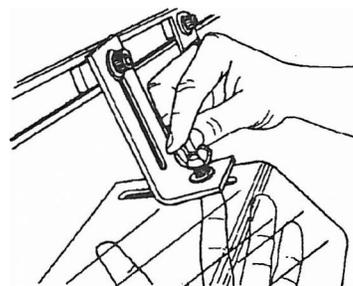


Fig. A-32

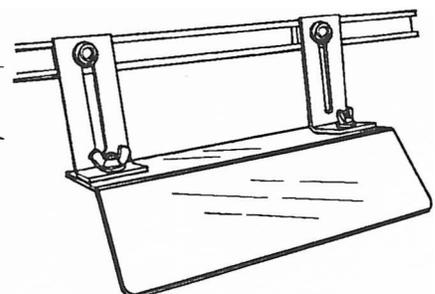


Fig. A-33

## ASSEMBLE THE TEMPLATE SUPPORT

**28.** Place a flat washer (2) on a cap screw (11), then thread the screw through a bracket (9) and into the center hole of a T-nut (26), as illustrated in Fig. A-34. Repeat this step to assemble the other bracket.

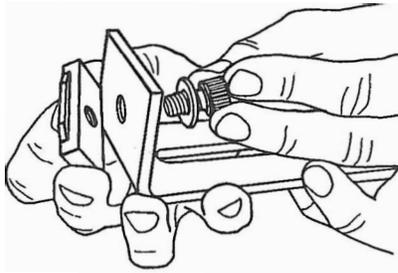


Fig. A-34

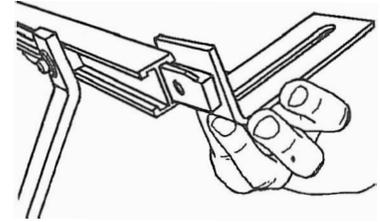


Fig. A-35

**29.** Slip a T-nut in the left side of the support, as seen in Fig. A-35. Do the same for the right side.

**30.** The right and left template support assemblies (1 through 8) come pre-assembled (see Fig. A-36). To attach them to the brackets, remove the cap screws (8) and washers (7) from each assembly.

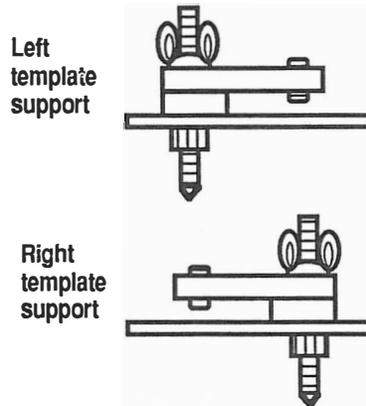


Fig. A-36

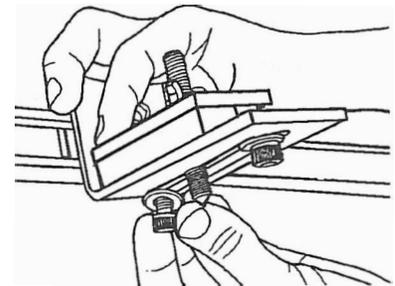


Fig. A-37

**31.** Insert the pointed screw (3) down through a bracket. Re-attach the cap screws (8) and washers (7), as shown in Fig. A-37.

**32.** Thread the tube clamp into the bottom of the support bracket, as seen in Fig. A-38.

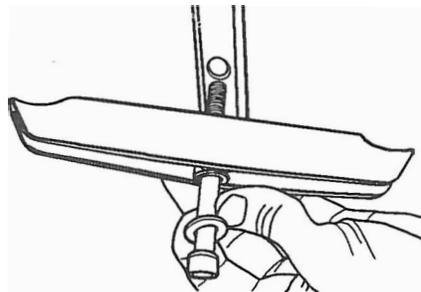


Fig. A-38

**34.** If not already done, move the Mark V headstock all the way to the left. Lift the support bracket assembly in place, as seen in Fig. A-39. Rotate the clamps so the way tubes fit into the clamp depressions.

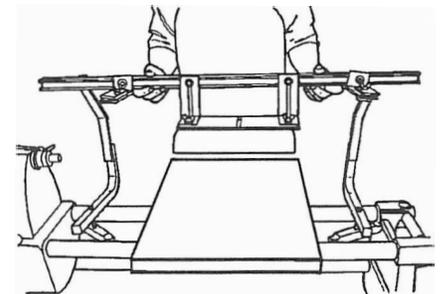


Fig. A-39

**35.** Adjust the support bracket so the channel is parallel to the way tubes, then use a 5/16" Allen wrench to tighten the clamps, as shown in Fig. A-40.

**This completes the assembly instructions. Now proceed to the Alignment section.**

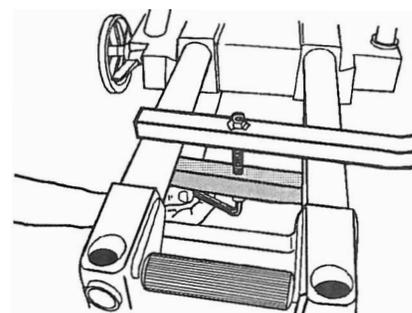


Fig. A-40

# Alignment

These alignment instructions should be repeated each time you set up and use the lathe Duplicator. Follow the instructions below.

## Tools Needed:

- 1/4" Allen wrench
- 5/16" Allen wrench
- 5/32" Allen wrench
- 7/64" Allen wrench
- Precision square
- Straightedge

## ALIGN THE CUTTER

1. Loosen the follower adjusting knob (44), and remove the follower support (46), as seen in Fig. B-1.

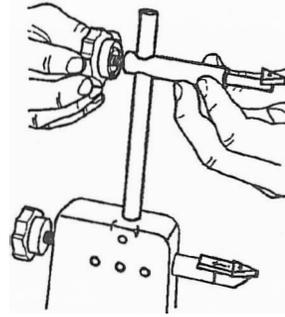


Fig. B-1

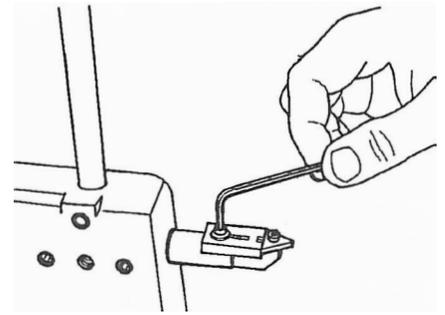


Fig. B-2

2. Loosen the cutter guide's cap screw (53) with a 7/64" Allen wrench, as shown in Fig. B-2, and slide the guide (55) away from the cutter.

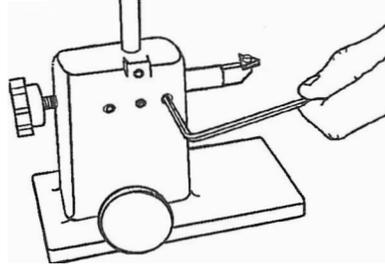


Fig. B-3

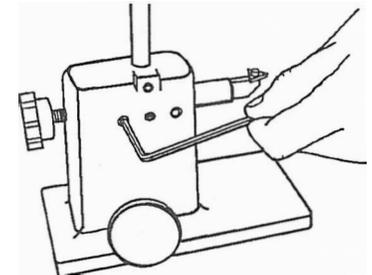


Fig. B-4

3. Use a 5/32" Allen wrench to loosen the two cutter support setscrews (43), as seen in Figs. B-3 and B-4. Then make sure the cutter positioning setscrew (42) is lightly seated in the groove of the cutter support (58), as demonstrated in Fig. B-5.

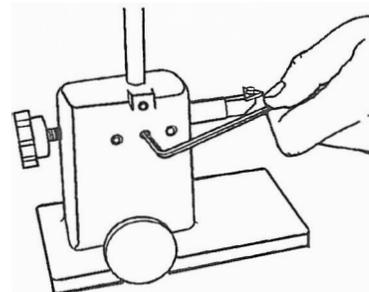


Fig. B-5

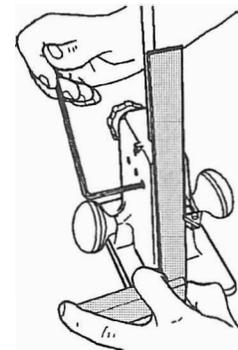


Fig. B-6

4. Place a precision square against the base and the side of the cutter support, as shown in Fig. B-6. Adjust the cutter support so it is flat against the square, then tighten the two cutter support setscrews.

5. Replace the follower support on the follower upright (50). Tighten the adjusting knob (44). Place a precision square against both the cutter support and follower support. Use a 5/32" Allen wrench to slightly loosen the setscrew (41) which secures the upright (50), as seen in Fig. B-7. Adjust the upright so the follower support is aligned with the cutter support, then tighten the setscrew.

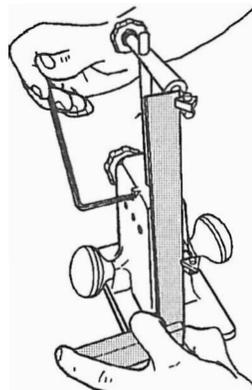


Fig. B-7

6. Move the Mark V headstock next to the table. Raise or lower the table to vertically align the cutter with the lathe drive center. The top surface of the cutter must be the exact height as the tip of the lathe drive center, as shown in Fig. B-8. When aligned, lock the table.

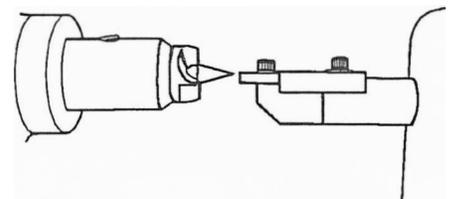


Fig. B-8

# Alignment

These alignment instructions should be repeated each time you set up and use the lathe Duplicator. Follow the instructions below.

## Tools Needed:

- 1/4" Allen wrench
- 5/16" Allen wrench
- 5/32" Allen wrench
- 7/64" Allen wrench
- Precision square
- Straightedge

## ALIGN THE CUTTER

1. Loosen the follower adjusting knob (44), and remove the follower support (46), as seen in Fig. B-1.

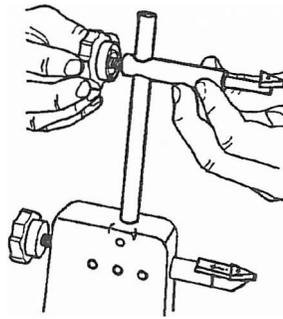


Fig. B-1

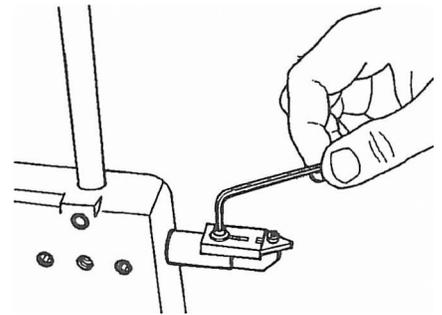


Fig. B-2

2. Loosen the cutter guide's cap screw (53) with a 7/64" Allen wrench, as shown in Fig. B-2, and slide the guide (55) away from the cutter.

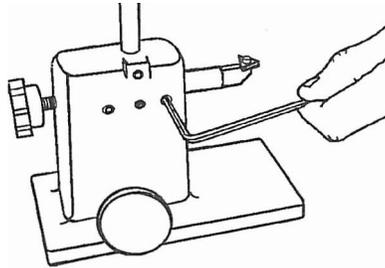


Fig. B-3

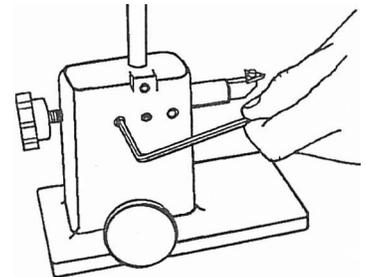


Fig. B-4

3. Use a 5/32" Allen wrench to loosen the two cutter support setscrews (43), as seen in Figs. B-3 and B-4. Then make sure the cutter positioning setscrew (42) is lightly seated in the groove of the cutter support (58), as demonstrated in Fig. B-5.

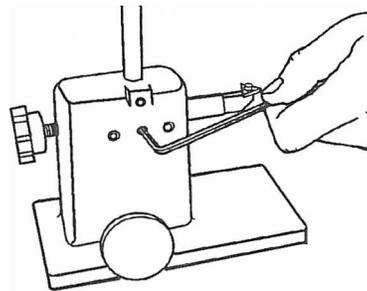


Fig. B-5

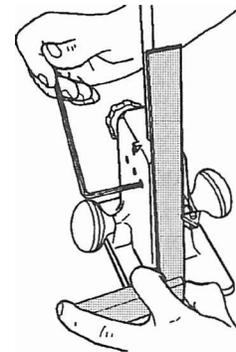


Fig. B-6

4. Place a precision square against the base and the side of the cutter support, as shown in Fig. B-6. Adjust the cutter support so it is flat against the square, then tighten the two cutter support setscrews.

5. Replace the follower support on the follower upright (50). Tighten the adjusting knob (44). Place a precision square against both the cutter support and follower support. Use a 5/32" Allen wrench to slightly loosen the setscrew (41) which secures the upright (50), as seen in Fig. B-7. Adjust the upright so the follower support is aligned with the cutter support, then tighten the setscrew.

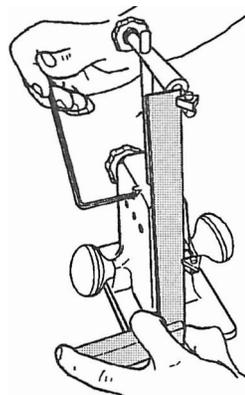


Fig. B-7

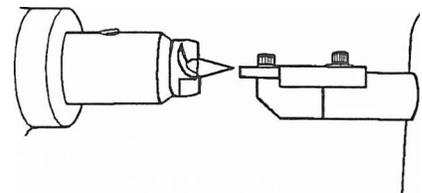


Fig. B-8

6. Move the Mark V headstock next to the table. Raise or lower the table to vertically align the cutter with the lathe drive center. The top surface of the cutter must be the exact height as the tip of the lathe drive center, as shown in Fig. B-8. When aligned, lock the table.

7. Move the table next to the tailstock. The tailstock center's tip must be vertically in line with the cutter top surface, as seen in Fig. B-9. Raise or lower the tailstock until aligned.

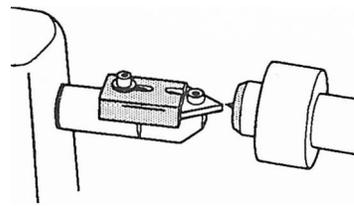


Fig. B-9

### ALIGN THE TEMPLATE CENTERS TO THE LATHE CENTERS

8. If not already done, move the table next to the headstock and lock the carriage. Use a 5/16" Allen wrench to loosen the template bracket screws (11). Rotate the template support brackets their template center points face inward, as in Fig. B-10.

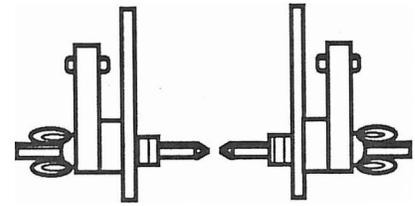


Fig. B-10

9. Use a 1/4" Allen wrench to loosen the two template clamp screws (8). Place a precision square so its front edge just touches the tip of the lathe center. Move the bracket until the template center just touches the front edge of the square. Tighten the bracket's cap screw (11), as shown in Fig. B-11.

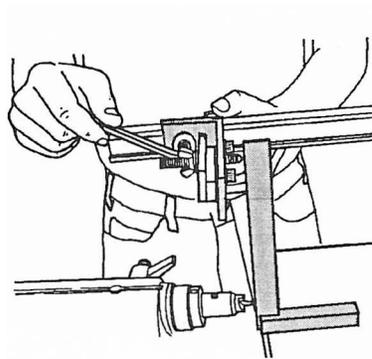


Fig. B-11

10. Move the precision square to the side of the lathe drive center's tip, as done by the left hand in Fig. B-12. Align the template center's tip, then tighten the two cap screws, as seen by the right hand in Fig. B-12. Double check alignment by placing the precision square on the other side of the tips. Re-adjust accordingly.

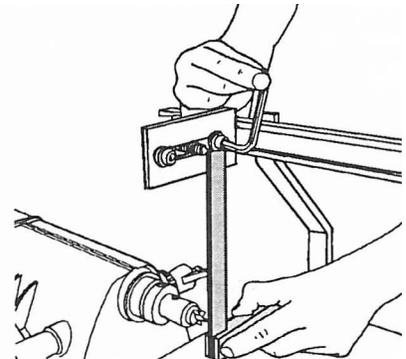


Fig. B-12

11. Unlock and move the table next to the tailstock. Repeat Steps 8 through 10 to align the template center to the tailstock center, as indicated in Figs B-13 and B-14.

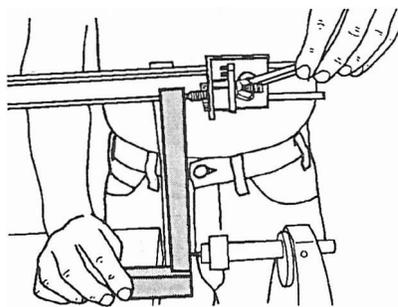


Fig. B-13

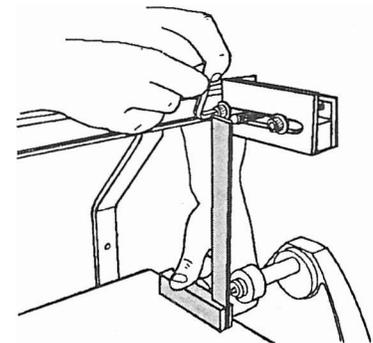


Fig. B-14

### ALIGN THE FOLLOWER TO THE TEMPLATE CENTER

12. With the cutter already aligned with the lathe center, move the cutter and follower assembly so it is tip-to-tip with the lathe drive center, as illustrated in Fig. B-15. If needed, loosen the follower support knob (44) and move the support up or down until the top of the follower is level with the top of the template center. When aligned, tighten the knob.

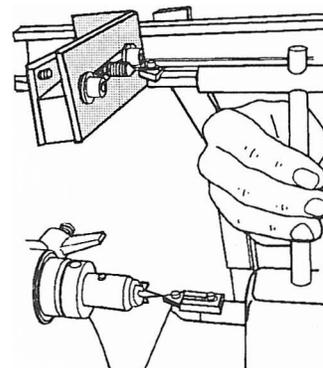


Fig. B-15

# Operations

The quality of the cut in lathe turning is determined by five factors:

1. **The sharpness of the cutter.**
2. **The right type of cutter for the job.**
3. **The lathe speed specified for the operation.** The faster the speed, the better the cut. Do not exceed the maximum rpm recommended.
4. **The aggressiveness of the way you use the cutter.** Use a light touch for initial rounding, a more aggressive touch when rough shaping and a light touch for detailing.
5. **The height of the cutter:**
  - Cutting **above** the stock center line will usually result in a poor cut by tearing the wood.
  - Cutting **on** the stock center line generally gives the best results, especially at the start of each operation.
  - Cutting from 1/32" to 1/16" **below** the stock center line sometimes is better for certain types of wood.

## Lathe Speeds

The correct speed is determined by the size of the stock you're turning; the operation you're performing - whether you're rounding, shaping, sanding or finishing; and the type of wood you're turning. Use faster speeds as you progress from rounding to shaping to sanding. Also use faster speeds with smaller stock. The larger the workpiece, the slower the lathe speed.

## WARNING

Never operate the machine in excess of the recommended speed for the diameter of the workpiece.

## Tips on the Lathe Duplicator

- If you used a thick carbide cutter and you change to a thinner cutter, raise the table slightly to center the thinner cutter on the workpiece center line. Also, lower the follower support to center the follower on the template edge or the original spindle center line.
- 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 has a pin which needs to fit a hole diameter exactly, first turn a trial piece. Check the diameter and readjust the template if necessary. 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.
- Do not push the follower against the template. Use a light touch to follow the template and make final cuts.
- Practice on scrap stock before attempting a project with expensive hardwood.

## Speed Chart for Lathe Turning with the Lathe Duplicator\*

Diameter of Stock	Rounding	Shaping	Sanding
Up to 2" dia.	C (950 rpm)	F (1,300 rpm)	K (2,050 rpm)
2" to 4" dia.	B (850 rpm)	E (1,150 rpm)	J (1,900 rpm)
4" to 6"	A (750 rpm)	D (1,050 rpm)	H (1,600 rpm)
over 6"	Slow (700 rpm)	A (750 rpm)	B (850 rpm)

\*Also refer to your Mark V Owner's Manual for recommended speeds

# Templates

To duplicate turnings, you'll need a template:

- For **spindle turning**, use either a flat template, shown in Fig. C-1, or an original spindle, illustrated in Fig. C-2.
- For **faceplate turning** (bowls or cups, etc.), Use a flat template only. A faceplate template and a side view of its finished bowl are shown in Figs. C-3 and C-4.

It's a good practice to use a detached follower to check your full-size paper pattern to be sure that the cutter will work for all contours. For example, if your template has a deep slot or V-groove, will the cutter point go in far enough? If your workpiece has a square in the design, be sure that your template is designed so that the cutter doesn't contact the rotating corners of the square section.

Use a suitable marking device to draw the full size profile on the template material or on white paper glued or taped to the material. If paper is used, it can be removed after cutting out the template or left on. Each template must have a permanently marked center line and one or two end lines to indicate the ends of the workpiece. The template ends to be clamped should be straight and square.

Cut out your templates on a bandsaw (using the 1/8" or 1/4" blade) or scroll saw. If needed, sand the sawn edges smooth. Your completed turning will be no better than the template that it's copied from, and you won't want rough spots to be duplicated.

To help achieve proper template alignment, drill two 1/4" diameter holes on the center line, 3/8" from each end of a spindle template. And drill one 1/4" diameter hole on the center line, 3/8" from the edge of a faceplate template. See Figs. C-1 and C-3. A 1/4" dowel placed through the hole(s) in the template clamp(s) and into the template hole(s) will align the template exactly, as indicated in Fig. C-5.

SPINDLE TEMPLATE

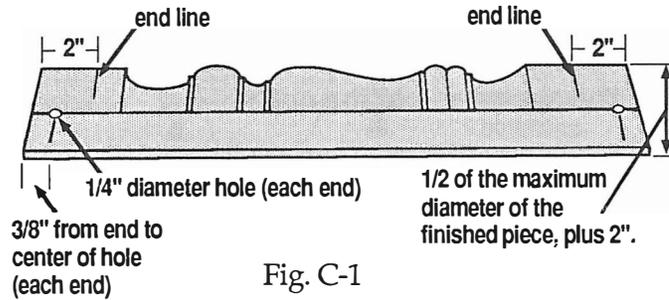


Fig. C-1

FINISHED SPINDLE

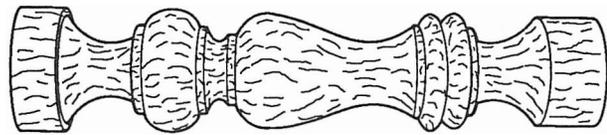


Fig. C-2

FACEPLATE TEMPLATE

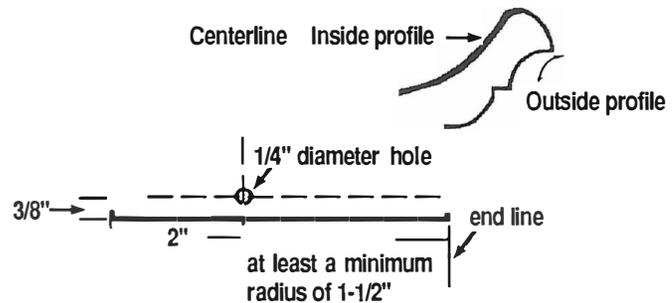


Fig. C-3

FINISHED BOWL



Fig. C-4

SIDE VIEW OF  
TEMPLATE SUPPORTS AND TEMPLATE

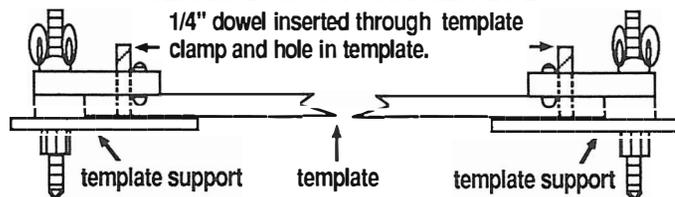


Fig. C-5

## Template Materials

The best materials for your templates are tempered hardboard, thin, closed-grain hardwoods, hardwood plywood and sheet acrylics. Maximum template length is 36". Material thickness may vary from 1/4" for short templates to 3/8" for longer templates.

## 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 below.

## Operating the Lathe Duplicator

Duplicate a spindle or bowl 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. 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.** All five locks - headstock, carriage, table height, quill and tailstock - must be secure. (See your Mark V manual.)

**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 needed.**

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 needed, loosen the follower adjusting knob (44) and lower or raise the follower support. Retighten the knob.

**5. Develop a firm grip on the tool rest assembly.** Before turning on the lathe, determine the best method for you to grip the tool rest assembly.

### 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, as in Fig. C-6. 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.

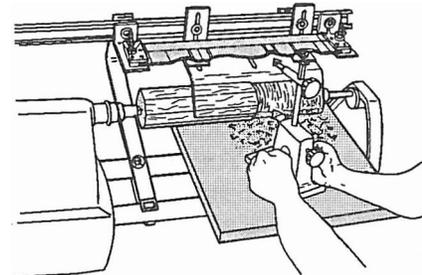


Fig. C-6

After the first area is rounded, cut 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 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 the Alignment 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.

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 and 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 Fig. C-7.

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".

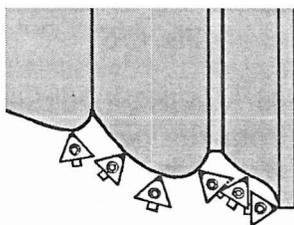


Fig. C-7

**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 contact with all the large contours of the template, rough shaping is completed. 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 re-adjust the cutter support flats according to the Alignment section.

**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

You will need to constantly 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 Fig. C-8. 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 securely before turning on the machine again. When the follower makes contact with all the contours of the template, detail shaping is completed. Turn off the machine and inspect your finished piece.



Fig. C-8

# Spindle Turning

You can turn duplicate spindles by using a flat spindle template, as in Fig. C-9, or by using an original spindle, such as a chair rung or an antique table leg, as in Fig. C-10.

Initial setup of the channel and support bracket assembly was for maximum spindle capacity. For shorter pieces, the left-hand support bracket must be moved to the right to allow movement of the headstock toward the tailstock. The following procedure assumes that a less than maximum-length spindle is to be turned.

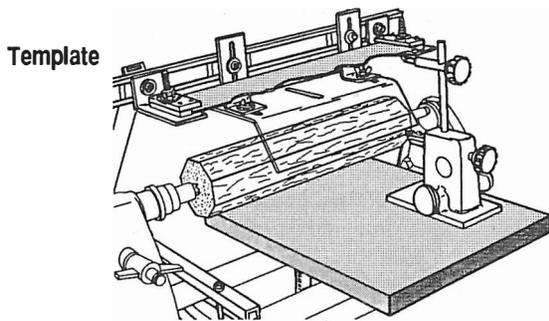


Fig. C-9

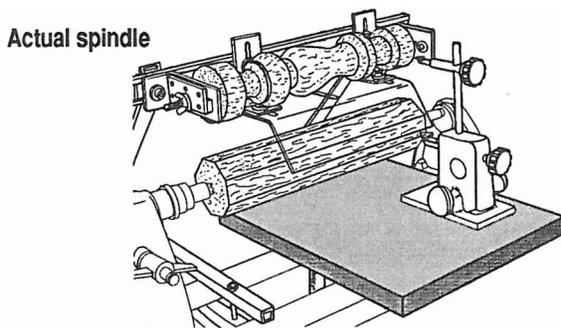


Fig. C-10

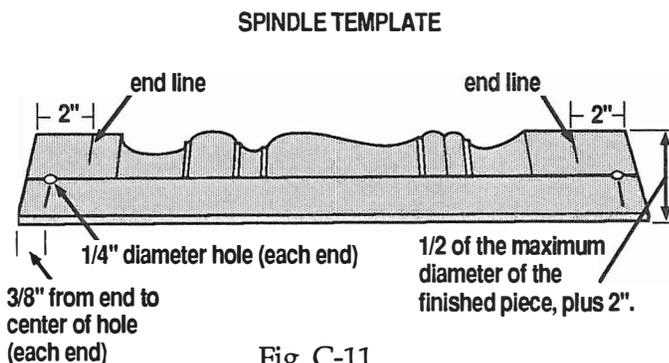


Fig. C-11

## Making Spindle Templates

The spindle template should be 2" longer on each end than the finished product (a 2" extension from each end line), as shown in Fig. C-11.

For spindle diameters of up to and including 4", the width of the template should be half the maximum diameter of the workpiece plus 2".

For spindle diameters over 4" to 8", the back (straight) edge of the template can be no more than 2" from the template center line. The front (profile) edge can protrude 2-4" outward from the center line. Drawing perpendicular lines from the spindle contours to the center line may help you to better visualize the finished spindle profile.

If you're making a template for table legs with a square at the top, be sure to measure the distance from the center of the stock to one corner of the square. This dimension must be incorporated into your template to keep from cutting off the corners. When turning long spindles with repeat symmetrical designs from the ends to the middle, you can get by with a half-template. Just turn one-half of the workpiece, "flip" it end-for-end and then turn the other half.

Pieces longer than lathe capacity, such as bed posts or clothes trees, can be made in sections. Design a template for each section so that the sections will join in an inconspicuous location such as at a V-groove or where two beads meet.

## Set up for spindle turning according to the following procedures:

- 1. Remove the left-hand support bracket assembly.** Slide the guard (21) to the right end of the channel (13). 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. Remove the support bracket assembly and set it aside. Support the left-hand end of the channel with your hand.

- 2. Position the headstock.** Position the headstock so that the centers are about 1" farther apart than the length of the workpiece, and lock the headstock in position.

**3. Remount the left-hand support bracket assembly.** Place the support bracket assembly to the right of the headstock to a position which will not interfere with the final position of the headstock nor with proper positioning of the left-hand template support assembly. Install the support bracket screw (19) and washer (20) finger tight, then properly align and engage the clamp (16) on the way tubes. Tighten the screw (19) securely. Then tighten the other screw (18) securely.

### Mount a Spindle Workpiece

**4. Find the center of the workpiece.**

**5. Seat the lathe centers.** Position the points of the drive center and cup center at the center marks on the workpiece. Then hit the centers sharply with a plastic or rawhide mallet.

#### CAUTION

- To avoid damaging the live center bearing, always use the cup center for this procedure. The hole left by the cup center will accommodate the live center.
- To avoid damaging the centers, do not hit them with a metal hammer. Use a rawhide or plastic mallet.

When properly seated, the drive center will leave a hole and four slots where the spurs bit into the wood. The cup center will leave a hole and a small circle.

**6. Mount the lathe centers on the Mark V.** Mount the drive center on the main spindle and the cup center or live center in the tailstock.

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

**8. Mount the workpiece.** Hold the end of the stock against the tailstock center, then extend the quill and mount the other end on the drive center. 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.

### Mount a Spindle Template

**9. 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, as indicated in Fig. C-12. 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.

**10. 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 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.

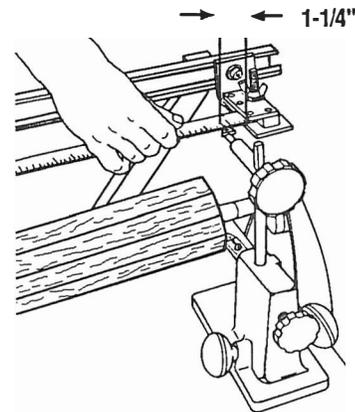


Fig. C-12

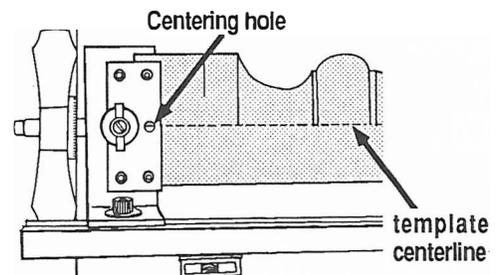


Fig. C-13

**11. Align the template.** Align the template holes with the centering hole in each template clamp (5). See Fig. C-13. 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, as shown in Fig. C-14, such as a chair rung or antique table leg, as a template, mount it according to the following procedures:

1. **Rotate** the template support brackets 90° so that the template centers (3) are in-line with and pointing toward each other.
2. 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.

### 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.

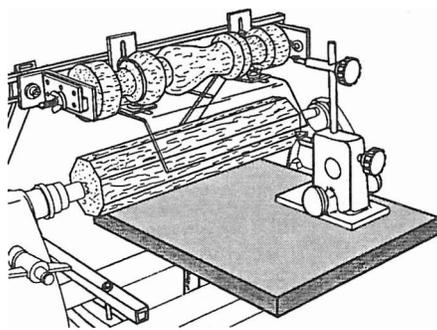


Fig. C-14

## Faceplate Turning

### CAUTION

Be sure that you've performed all the procedures in the **Assembly** and the **Alignment** sections before using the Lathe Duplicator.

### Making Faceplate Templates

As shown in Fig. D-1, the faceplate template has both the inside and outside profiles. Only one end line is required to indicate the outside bottom of the bowl. The 1" dimension from the end line allows for full insertion into the template support assembly. The 1-1/2" and 2" dimensions from the center line allow both template clamping setscrews to secure the template.

For thin-walled (less than 1/4") cups or bowls, you can make a stronger, less fragile template by working from two center lines - one for the outside profile and one for the inside, as seen in Fig. D-2. Another method of making a bowl template is to cut a 1/4" wide section through the center of an existing wooden bowl. When glued to a suitable piece of wood for mounting, it makes an excellent template. You'll lose your original bowl but then you can make as many duplicates as you like.

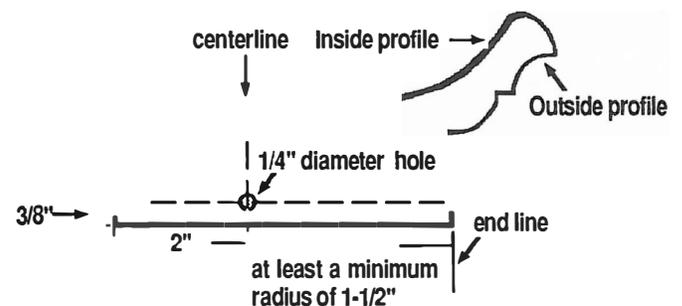


Fig. D-1

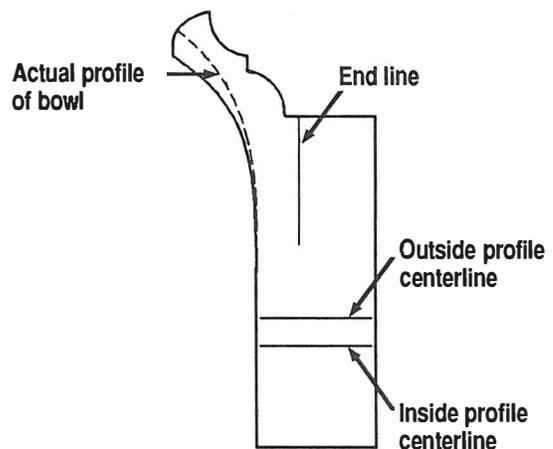


Fig. D-2

To cut both profiles without remounting the stock, there may be times when you'll need separate internal and external templates. This will be determined by your setup, the optional accessories you're using and how the stock is mounted to the faceplate.

When you're ready for mass production of bowls, specialty chucks are available which mount to a pin on or recess in the workpiece. For such work, you'll need a chuck mounting template (to cut the pin or recess) and a profile template. In addition to quick mounting and release times, these specialty chucks allow you to produce thinner-bottomed bowls without mounting screw holes.

## Set up for faceplate turning according to the following procedures:

1. Remove the tailstock assembly.
2. Remove the right-hand template support assembly. Loosen the 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).
5. Move the headstock until it almost touches the table, then lock it in place.
6. Remount the left-hand support bracket all the way to the right. Use a screw (19) and washer (20). Finger-tighten 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.

### **Mount a Faceplate Workpiece**

**7. Find the center of the workpiece.** Use a center finder and pencil to mark two or more intersecting lines to locate the center.

**8. Attach 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.

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

**10. 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.

### **Mount a Faceplate Template**

**11. 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.

**12. Loosen the 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). See Fig. D-3.

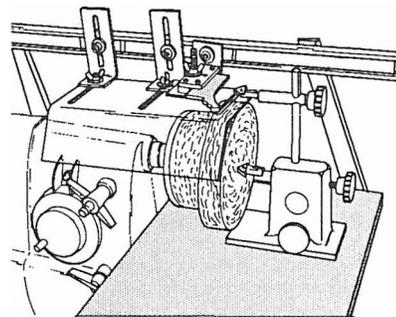


Fig. D-3

## Duplicate a Faceplate Turning

**13. 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.

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

**15. 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.

**16. Develop a firm grip on the tool rest assembly.**

### WARNING

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

**17. 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.

**18. Offset the carbide cutter according to Step 7 on page 19.**

**19. Rough-shape the outside profile first.** See Fig. D-4. 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 contact with all the large contours of the template, rough shaping of the outside profile is completed. Turn off the machine.

**20. Rough shape the inside profile.** If you're using a dual-center line 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. See Fig. D-5. Work on the inside profile from the tailstock end. When the inside profile is rough shaped, turn off the machine.

### 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.

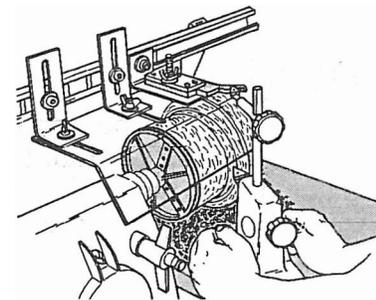


Fig. D-4

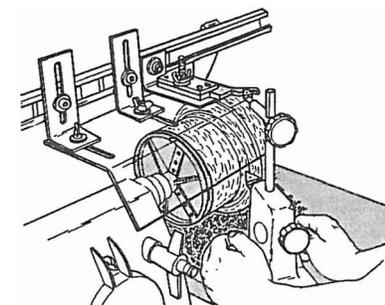


Fig. D-5

**21. Reposition the cutter support according to Step 9 on page 20.**

**22. 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.

## Sanding

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.

## Finishing

Use a very low speed when applying finish to your turning, to prevent the finish from being thrown all over. Some polyurethane finishes 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.

### 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.

## Maintenance

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. Store the Lathe Duplicator components away from unusually humid or corrosive conditions.

## Cleaning

As you work, sawdust, wood chips, shavings, pitch and resin will accumulate on the duplicator components. Remove pitch and resin from the table and guard with a mild soap-and-water solution.

## Waxing

Every six months, after a thorough cleaning of the Lathe Duplicator components, 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 is 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 time. In the event that the cutters dull, DO NOT attempt to re-grind 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 ones.

# 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. Use this Troubleshooting Guide to help diagnose and remedy any problem which may occur with your Lathe Duplicator.

Problem	Possible Cause	Solution
<b>Quality of cut is poor (rough or torn surface).</b>	Cutter is above centerline of workpiece.	Lower table to bring down to centerline; or down to 1/16" maximum below centerline for certain types of wood.
	Lathe speed too slow.	Check Speed Chart and increase speed.
	Cutter is dull.	Replace the cutter.
	Cutting too aggressively.	Use lighter touch.
<b>Inexact diameters.</b>	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.
<b>Good cut on one end of turning, but poor cut on the other end.</b>	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.
<b>Tapered cut.</b>	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.
<b>Excessive vibration (whip and chatter) when tuning thin spindles.</b>	Cutter is below centerline of workpiece.	Raise table so that cutter is on centerline.
	Cutting too aggressively.	Use lighter touch.
<b>Excessive vibration when turning larger spindles or bowls.</b>	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.

## Serving Your Needs

Your Shopsmith equipment is covered by the Shopsmith Gold Medal Buyer Protection Plan. This plan includes a 30-day money-back guarantee, a full one-year warranty, and a lifetime reconditioning program.

### 30-Day Money-Back Guarantee

We guarantee your complete satisfaction! You can try the equipment for 30 days at no risk before you decide whether to keep it or not. Use it to make as many projects as you like. Compare it, feature for feature, with other equipment. Then, if the equipment isn't everything we say, go to your nearest Shopsmith/Woodworking Unlimited store— or call Customer Services and we'll advise you how to return it for a prompt and complete refund. We'll even pay for shipping.

### Full One-Year Warranty

Your equipment is guaranteed against all defects in parts and workmanship for a period of ONE FULL YEAR from the date of receipt. Here are the details:

Shopsmith warrants to the owner of Shopsmith woodworking equipment that the equipment will be free of manufacturing defects in materials and workmanship for a period of one year from the date of receipt. All claims must be submitted in writing within one month after expiration of the one-year warranty period. Shopsmith shall, by repair of, or at its option replacement, remedy any defect or malfunctions covered by this warranty. This warranty excludes and does not cover defects, malfunctions, or failures of your Shopsmith equipment which are caused by damage while in your possession or that of a previous owner or by unreasonable use, including your failure or the failure of any previous owner to provide reasonable and necessary maintenance.

Personal injury or property damage may result if equipment is interchanges with non-Shopsmith brand parts and equipment. Therefore, Shopsmith, Inc. disclaims all liability and excludes all warranties of merchantability and fitness for a particular purpose if this equipment is used with non-Shopsmith brand parts or equipment.

THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IN NO EVENT SHALL SHOPSMITH BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES. Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above limitation of consequential or incidental damages may not apply to you. This warranty gives your specific legal rights, and you may also have other rights which vary from state to state.

### Lifetime Reconditioning Program

Our equipment is designed for years of constant, rugged, uninterrupted operation. However, to ensure the continued usefulness of your unit, we offer a unique Lifetime Reconditioning Program:

If at any time, regardless of the age of your equipment, you can take it to a Shopsmith/Woodworking Unlimited store or send it to us (round-trip shipping at owner's expense), and we'll rebuild it and touch up the paint. We'll replace wearing parts such as bearings, seals and belts.

Your reconditioned equipment will come back to you with a new 90-day full warranty. Reconditioning or repair will be done for a cost that will not exceed one-third of the current list price of equipment at the time of repair. If parts other than normal wearing parts need replacement, and estimate will be submitted to the owner for approval.

### Warranty Service

To repair or replace a part in the equipment while it is still under warranty, go to your nearest Shopsmith/Woodworking Unlimited store or contact Customer Services. They will instruct you where to send the part of your equipment. If the warranty is applicable, the part will be repaired at no charge.

### Out-of-Warranty Service

If your equipment is out of warranty and needs service, see your Shopsmith/Woodworking Unlimited store or call Customer Services for instructions how you can have the part repaired at our store or Factory for a fee. We will

help you diagnose the problem, give you an estimate of the cost, and instruct you where to send the part or equipment for repair.

Shopsmith/Woodworking Unlimited stores carry a limited number of replacement parts and can perform some repairs. Call ahead to see if they can provide the part or service your need.

### How to Order Parts

To order replacement parts, first consult the Parts List for this product. Then write or call for current price information.

### How to Return Parts

Should you need to return the equipment, see your Shopsmith/Woodworking Unlimited store or call Customer Services for packing and shipping information.

### Customer Services

**Where to Write** – Send inquiries to:  
Shopsmith, Inc.  
Customer Services  
3931 Image Drive  
Dayton, Ohio 45414

**Where to Phone** – Shopsmith maintains toll-free telephone numbers during normal business hours.

#### For service, call:

1-800-762-7555 (All U.S. states, Puerto Rico and U.S. Virgin Islands)  
1-416-858-2400 (Canada)  
1-513-898-6070 (Dayton area)

#### To place an order, call:

1-800-762-7586 (All U.S. states, Puerto Rico and U.S. Virgin Islands)  
1-416-858-2400 (Canada)  
1-513-898-6070 (Dayton area)

When you write or call, tell us your Customer Number and the Date Code of your equipment. Your Customer Number appears on the invoice and the mailing labels of the literature we send you, so please write it in below. The Date Code is already stamped below.

Customer No. \_\_\_\_\_

Date Code \_\_\_\_\_

