NEW CIRCLE-CUTTING ROUTER JIG p. 12

7 Must-Have Turning Tools

ShopNotes®

Vol. 13 www.ShopNotes.com Issue 73

Full-Size Performance in a Shop-Built MINI-LATHE

PLUS: 3 EASY-TO-BUILD OPTIONS p. 16

ALSO:

- SOLVE Clamp Storage Problems Forever
- GET THE BEST Plywood for Your Shop

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EDITOR'S NOTE

Cutoffs

There's an old saying that "a woodworker can never have too many clamps." I certainly find myself adding to my collection with some regularity. However, an expanding clamp collection has a problem — storage.

Most clamp racks are designed to hold a fixed number of clamps of one particular style. There's a rack for pipe clamps, another for bar clamps, and yet another for C-clamps, etc.

Now there's nothing wrong with this approach. The only downside is eventually the rack will be full. Then you usually have a couple of options. Build another rack, or pile the extra clamps in some out of the way place.

In this issue, we feature a third option — it's a new type of clamp storage system that can be adapted to hold more clamps as your collection grows. And it solves many of the problems with clamp racks. It's easy-to-build, expandable, and adjustable.

The key to making this work is a piece of aluminum T-track that's mounted to the wall. To hold the clamps, you simply attach wood blocks to the track. Since the blocks can slide side-to-side, it's easy to create different size openings for a variety of clamps. When your clamp collection grows, just add on a few more blocks. It's a simple solution to clamp storage that will work for years to come.

To find out how to put this project to work in your shop, be sure to check out the article that begins on page 28.

Shop-built Mini-lathe – Speaking of working in the shop, Chris Fitch, one of our senior designers, has been spending some serious time down in the shop fine tuning the feature project in this issue — a shop-built lathe.

Chris came up with an ingenious, compact design that can be built with common hardware. But don't let its small size fool you. It has plenty of full-size features. For starters, there's a bed extension that allows you to turn 42"-long pieces. And you can add a faceplate for bowl turning. There's even a disk sanding table attachment. If you're looking to try your hand at turning, and don't want to spend a lot of money, this is the project for you.

Terry

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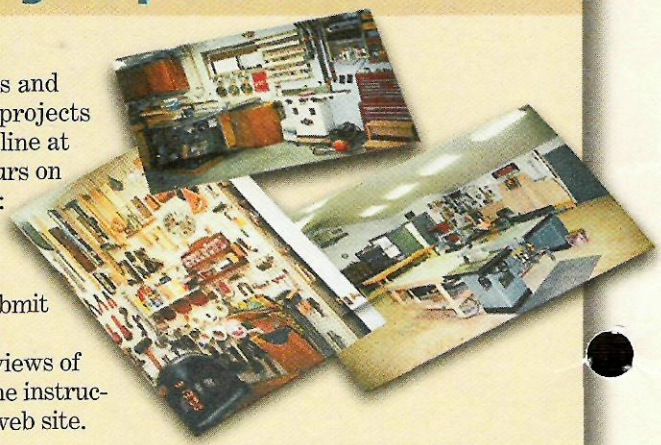

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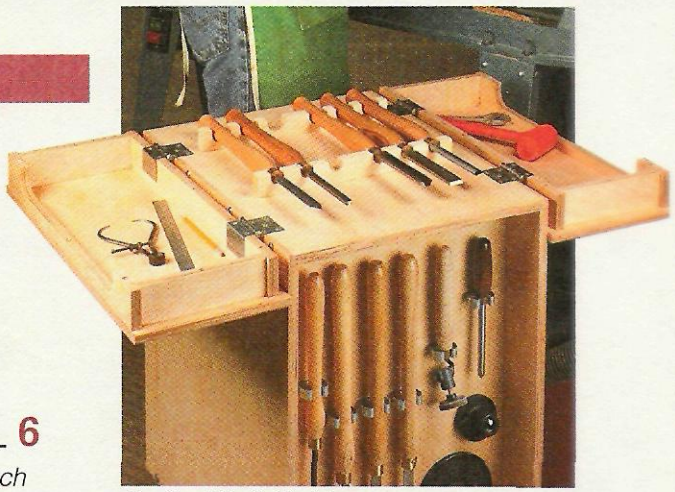
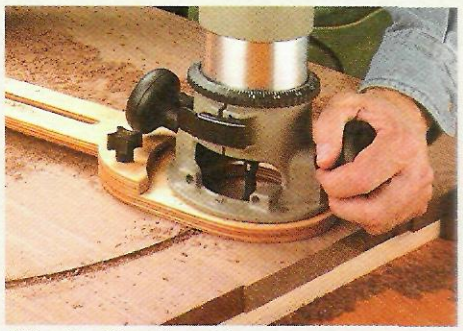


Lathe Tool Cabinet *page 6*



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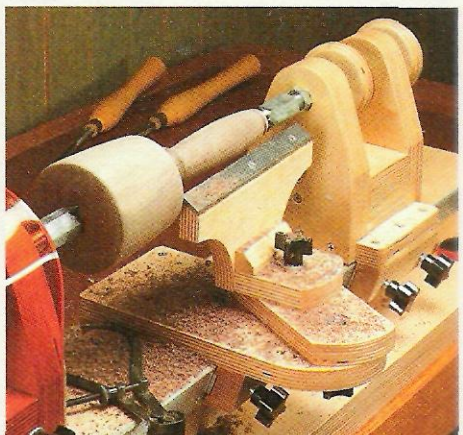

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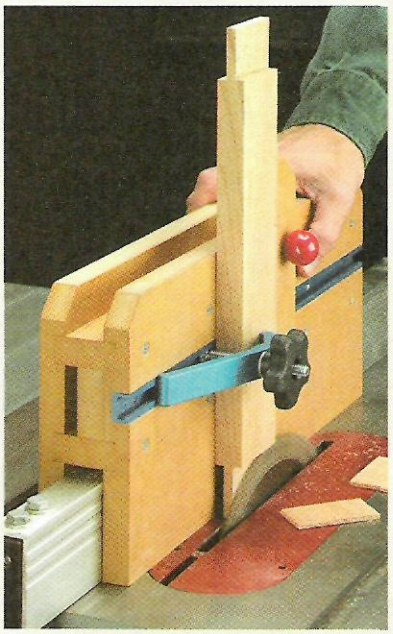
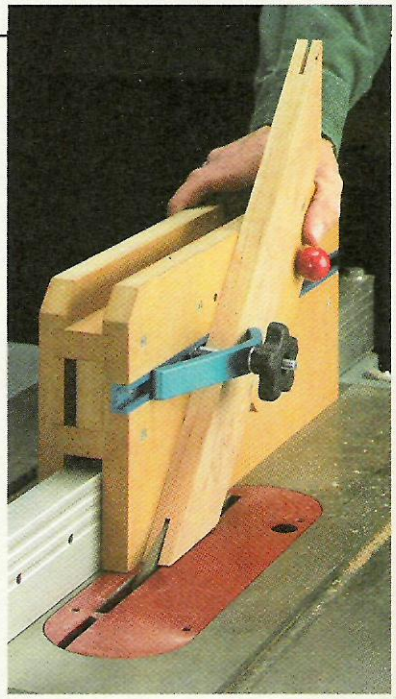
Readers' Tips

Multi-Purpose Fence Sled





■ When it comes to cutting tenons on the end of a workpiece, I usually use the table saw fitted with a dado blade. The problem with this method is that the cheeks of the tenons can end up pretty rough.

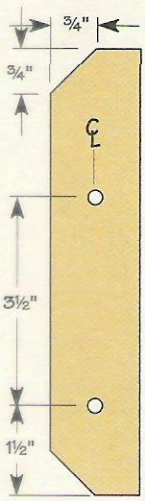
To get tenons with smooth cheeks, you can use a standard blade and hold the workpiece on end. But you need a good way to control the workpiece and keep it from tipping.

To do this, I made a sled that rides on the rip fence, as you can see in the left photo. This sled not only works great for cutting tenons, but I found that it can be used to cut spline grooves in miter joints as well, as shown in the far right photo.

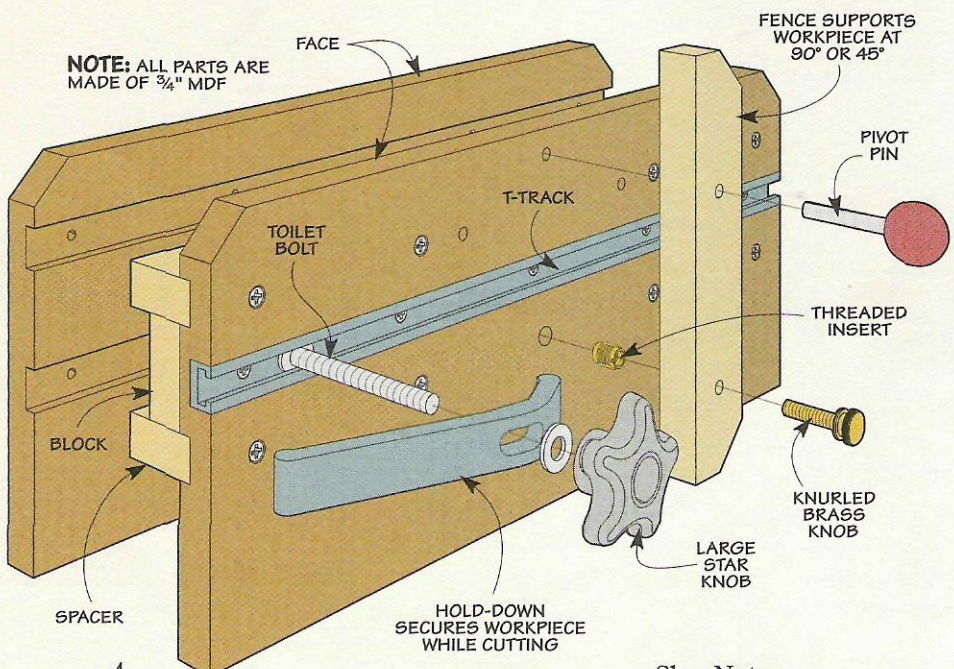
Building the Sled - Best of all, it doesn't take much material or hardware to build the sled. As you can see in the drawing below, the main section of the sled is a pair of ¾" MDF faces that straddle the rip fence. A groove in the front face holds a length of T-track. The two faces are held together by a pair of spacers that are glued and screwed into shallow grooves, as in detail 'a'. I also glued a block behind the front face to give the screws for the T-track something to bite into.

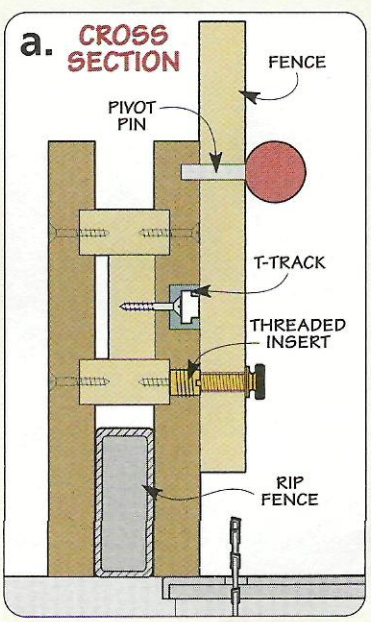
Pivoting Fence - To guide the workpiece, I made a fence out of MDF. It's fastened on the lower end by a knurled brass knob. The top end can pivot to support either straight or mitered workpieces. I drilled three holes to hold a pivot pin. Then to hold the workpiece secure while cutting, I attached a hold-down with a toilet bolt, washer, and knob.

Marvin Robinson
Arlington, Texas



FENCE DETAIL





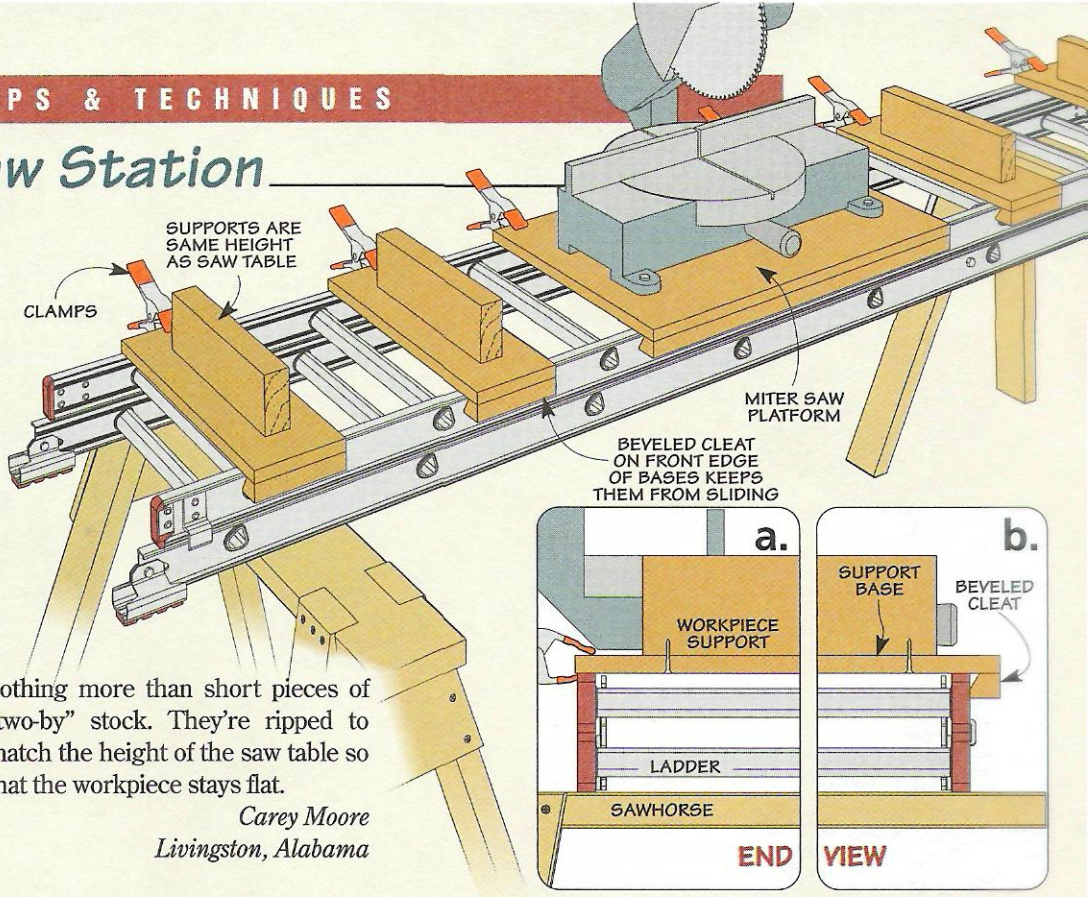
Ladder Miter Saw Station

■ While recently working on an outdoor project, I needed to cut some long stock with a compound miter saw. But I didn't have a way to easily support the stock.

To solve the problem, I turned to my aluminum extension ladder. As you can see in the drawing at right, I set the ladder on a pair of saw horses to form a solid base for the miter saw and some workpiece supports.

Next, I attached the miter saw to a plywood platform that gets clamped to the ladder. To support a workpiece on either side of the saw, I made several supports. Like the platform for the saw, the supports have a small plywood base. On one end of each base there is a beveled cleat to hold it in place. The uprights are nothing more than short pieces of "two-by" stock. They're ripped to match the height of the saw table so that the workpiece stays flat.

Carey Moore
Livingston, Alabama

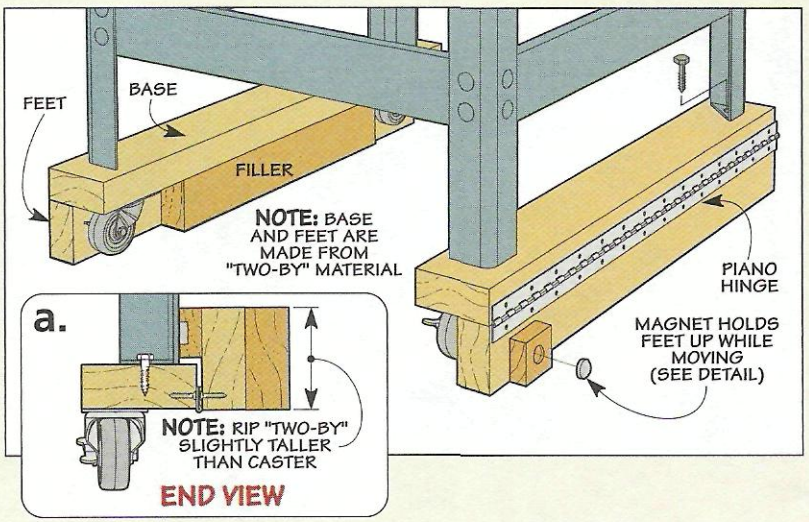


Mobile Base

■ Since my workshop shares space in the garage with cars, my tools need to be mobile. So I made a simple base for each tool.

To build a base, I screwed swivel casters to a 2x4 attached to the legs of the tool, as in detail 'a'. To lock the machine in place for use, I added a pair of flip-down feet attached to the base with piano hinges. Magnets attached to the feet hold them up out of the way when moving the tool.

Irvin Schmidt
Lakewood, Washington



Quick Tips

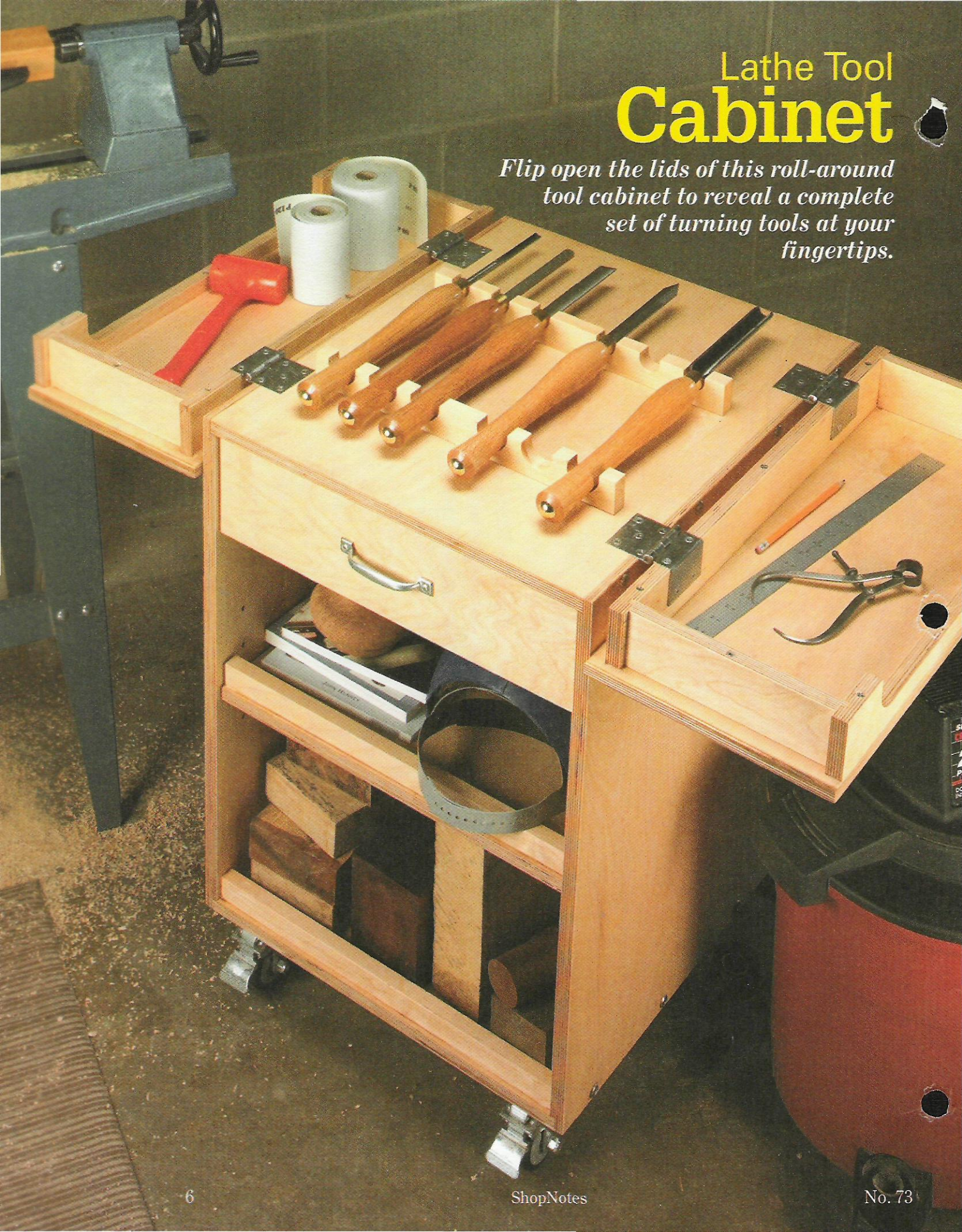
▲ *To hold screws on his screw driver,* **Charles Sturm** *of Vancouver, WA slips a short piece of plastic tubing over the tip of the driver.*

▲ **Orlando Bauman** *of Lakewood, WA glued a washer over the "on" button of his dust collector remote so he can find it without looking.*

Send in Your Tips

To share your original tips and solutions to problems you've faced, send them to: *ShopNotes*, Attn.: Readers' Tips, 2200 Grand Ave., Des Moines, IA 50312. (Or if it's easier, FAX them to us at: 515-282-6741.)

We'll pay up to $200 depending on the published length. Please include a daytime phone number so we can call you if we have any questions.



Lathe Tool Cabinet

Flip open the lids of this roll-around tool cabinet to reveal a complete set of turning tools at your fingertips.

EXPLODED VIEW

OVERALL DIMENSIONS:
21"W x 25"D x 34¼"H

FLIP-OPEN LIDS PROTECT TOOLS WHEN NOT IN USE

TOOL RACKS "CRADLE" TURNING TOOLS

SCREW-TOGETHER CONSTRUCTION MAKES ASSEMBLY GO QUICKLY

HEAVY-DUTY HINGES SUPPORT WEIGHT OF LID

DRAWER PROVIDES STORAGE FOR LATHE ACCESSORIES

FALSE FRONT

DRAWER RIDES ON FULL-EXTENSION METAL SLIDES

¼" SHELF PIN

LID DOUBLES AS TOOL TRAY WHEN OPEN

SHELVES PROVIDE STORAGE FOR TURNING BLANKS AND LARGE ITEMS

RECESSED BACK CREATES STORAGE AREA FOR LARGER TURNING TOOLS

RAIL KEEPS STORED ITEMS FROM SLIDING OFF

LOCKING SWIVEL CASTERS

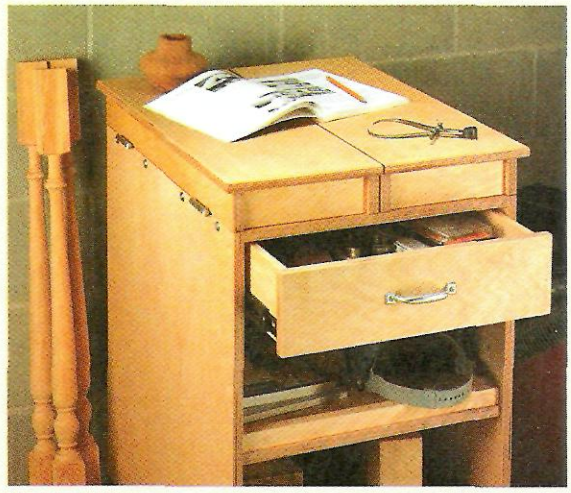
NOTE: CABINET IS CONSTRUCTED OUT OF ¾" PLYWOOD AND SOME HARDWOOD

CROSS SECTION

HINGE

SIZE NOTCHES TO FIT YOUR LATHE TOOLS

SIDE OF LID IS CUT AWAY TO ALLOW LID TO CLOSE OVER TOOL RACKS



▲ *Under Wraps. With the lids closed, the lathe tools are protected and the cabinet can be wheeled out of the way. At the same time, you still have access to the drawer and storage area below.*

Case

As you can see in the photo on page 6, the thing that makes this project unique is the flip-open lid. With the lid open, you have instant access to your turning tools. And by rolling the cabinet right up to your lathe, the tools are always right at hand.

But as interesting as the lid is, when it came to building the cabinet I started by making the case first. Then I added the lid later. And if you're not a turner, you might want to build only the case and then put a plain top on it instead of the flip-open lid (see box on opposite page).

The case is really just an open plywood box with a drawer and a shelf. To build it, you can begin by cutting out the case *top* and *bottom (A)*, *sides (B)*, and *back (C)* from a sheet of ¾" plywood. You can get the dimensions for these pieces by referring to Figure 1.

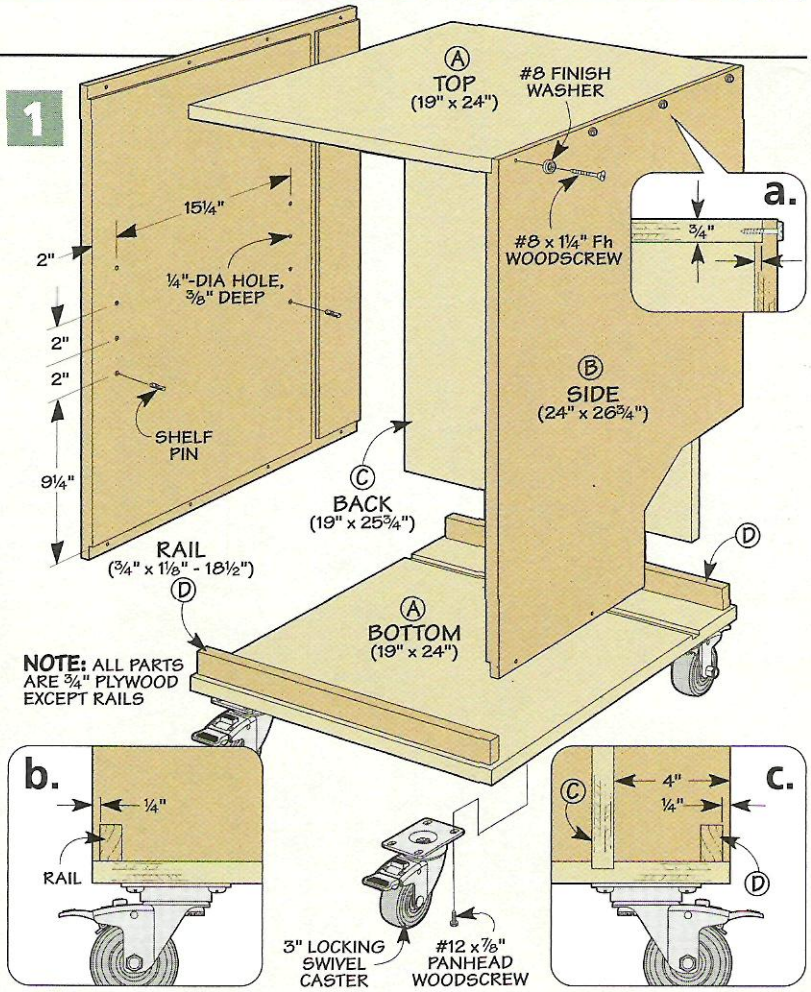
Simple Joinery – The joinery for the case is pretty straightforward — rabbets, grooves, and a few screws. I started by rabbeting the ends of the sides to hold the top and bottom panels (Figure 1a).

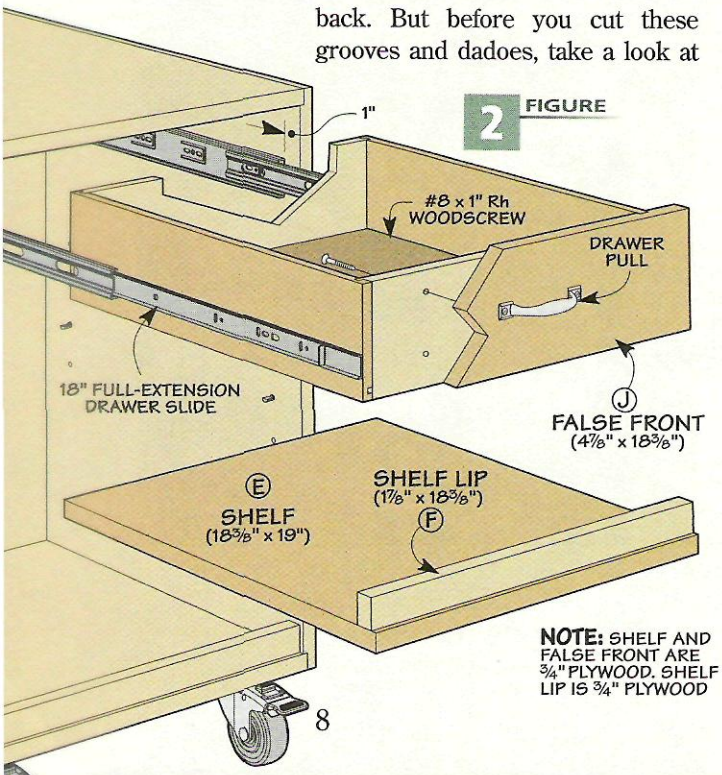
The back panel is captured on all four edges. Grooves are cut in the sides and dadoes are cut in the top and bottom of the case to hold the back. But before you cut these grooves and dadoes, take a look at Figure 1c and you'll see that the back panel is recessed a few inches from the back edge of the cabinet. This creates a shallow storage compartment for additional lathe tools that you might not have room for in the rack on the top of the cabinet (see photo on opposite page).

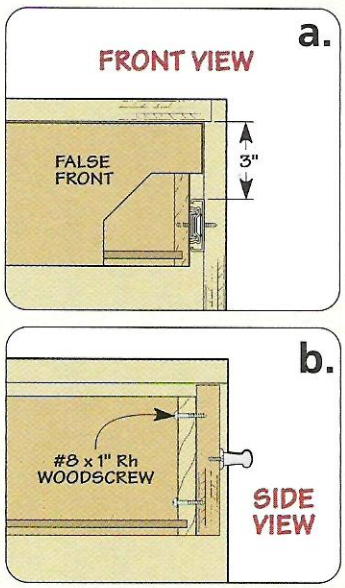
Assembly – Before you start assembling the case, there's just one thing to take care of. In order to mount a shelf that will be added later, I drilled some shelf pin holes in the sides of the case. It's a lot easier to drill these holes before assembly rather than after.

Once the shelf pin holes are drilled, you can assemble the top, bottom, and sides around the back panel. Glue and screws with finish washers will hold everything together (Figure 1).

Rails – After the case was assembled, I measured the inside for a couple of rails. These *rails (D)* are nothing more than hardwood strips that are glued to the bottom of the case (Figures 1b and 1c). They keep small items from rolling off the bottom shelf of the cabinet as it's moved around the shop.





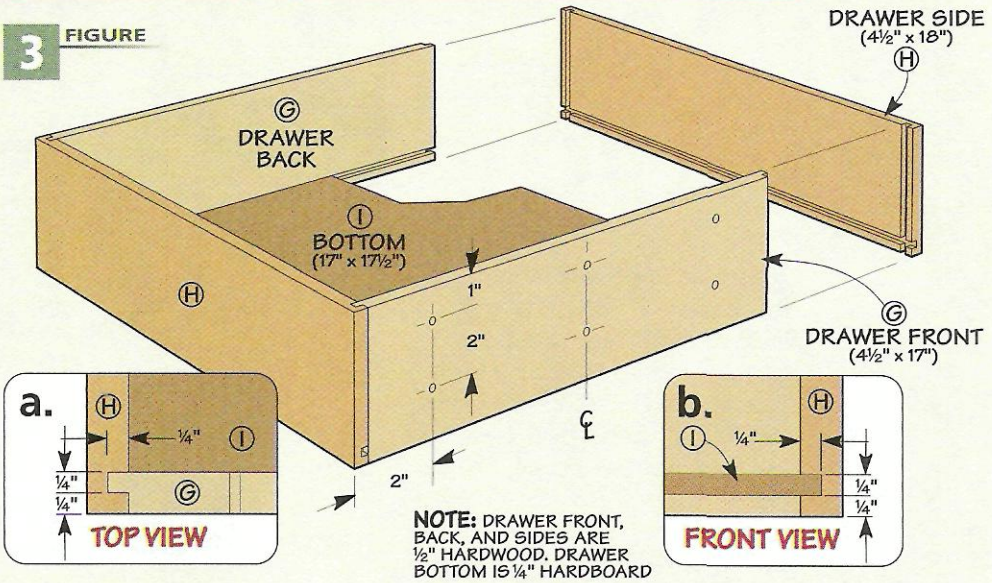


Casters – Speaking of moving the cabinet around the shop, I added a set of locking, swivel casters to the bottom of the case to make it mobile. These are simply screwed in place, as shown in Figure 1b.

Shelf – With the basic structure of the case complete, you can turn your attention to making the drawer and shelf that fit inside it. The shelf is easy to make. It's just a piece of ¾" plywood with a hardwood lip added to the front to prevent items from rolling off the edge. You can see the shelf in Figure 2.

Drawer – The drawer is a little more involved. It's constructed out of ½"-thick hardwood stock with a ¾" plywood false front. As you can see in Figure 3a, the sides of the drawer are joined to the front and back with locking rabbet joints. A groove near the bottom edge of each piece holds a ¼" hardboard drawer bottom.

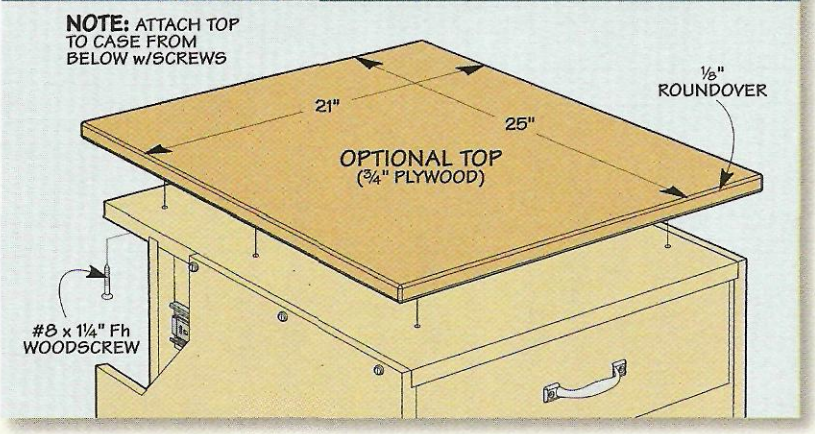
FIGURE 3



The drawer rides on full-extension drawer slides that are mounted to the sides of the case. Once the drawer is assembled and installed in the cabinet, you can center the false front in the drawer opening and screw it in place. Then a pull is added to the front of the drawer.

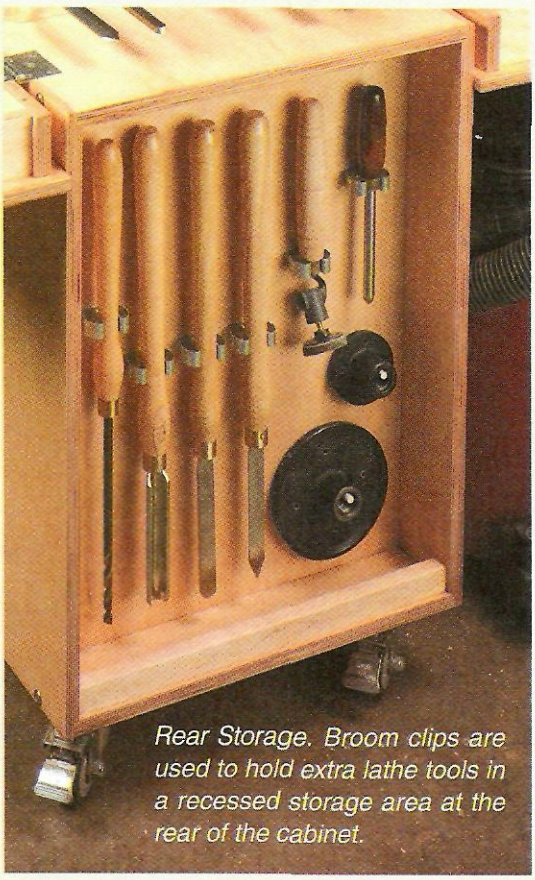
At this point, the case is complete. All that's left now is to add the flip-open lid (see page 10). Or if you prefer, you can make a simple plywood top for the cabinet and call it finished (see box at left).

Optional Top



Materials & Hardware

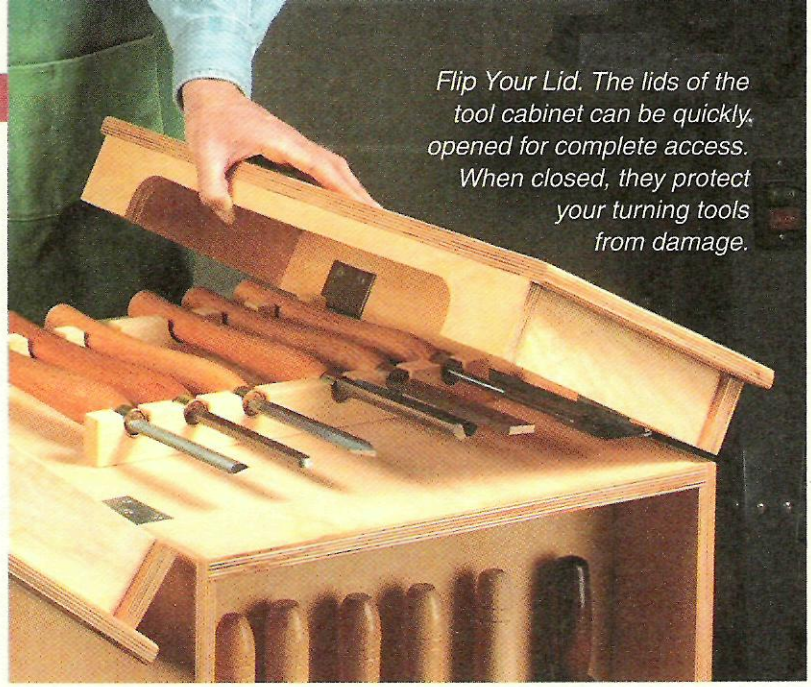
A	Top/Btm. (2)	19 x 24 - ¾ Ply.	• (16) #8 x 1½" Fh Woodscrews
B	Sides (2)	24 x 26¾ - ¾ Ply.	• (16) #8 Finish Washers
C	Back (1)	19 x 25¾ - ¾ Ply.	• (4) 3" Locking Swivel Casters
D	Rails (2)	¾ x 1⅛ - 18½	• (16) #12 x ⅞" Panhead Screws
E	Shelf (1)	18⅜ x 19 - ¾ Ply.	• (4) ¼" Shelf Pins
F	Shelf Lip (1)	¾ x 1⅛ - 18⅜	• (6) #8 x 1" Rh Woodscrews
G	Drawer Fr./Back (2)	½ x 4½ - 17	• (1) Drawer Pull w/Screws
H	Drawer Sides (2)	½ x 4½ - 18	• (1 pr.) 18" Full-Extension Drawer Slides
I	Drwr. Btm. (1)	17 x 17½ - ¼ Hdbd.	
J	False Frt. (1)	4⅞ x 18⅜ - ¾ Ply.	• (14) #8 x 3" Fh Woodscrews
K	Lid Ends (4)	2½ x 9 - ¾ Ply.	• (8) #8 x 1¼" Fh Woodscrews
L	Lid Sides (4)	2½ x 24 - ¾ Ply.	• (4) 2½" Inset Hinges
M	Lid Tops (2)	10½ x 25 - ¾ Ply.	• (36) #8 x ¾" Fh Woodscrews
N	Tool Racks (2)	¾ x 1½ - 15½	



Rear Storage. Broom clips are used to hold extra lathe tools in a recessed storage area at the rear of the cabinet.

SHOP PROJECT

Flip-Open Lid



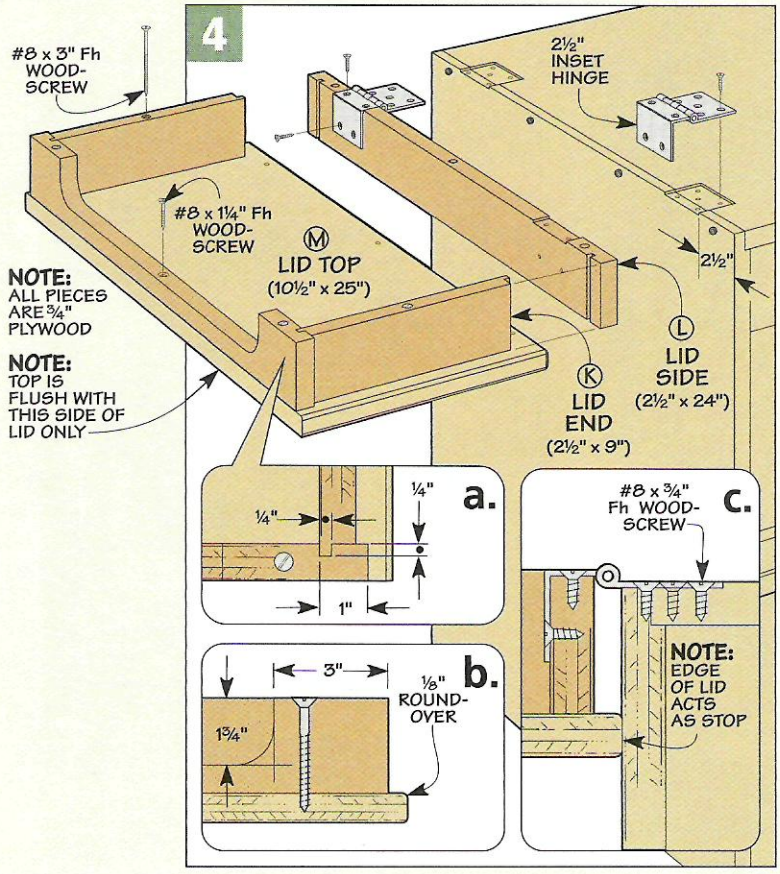
Flip Your Lid. The lids of the tool cabinet can be quickly opened for complete access. When closed, they protect your turning tools from damage.

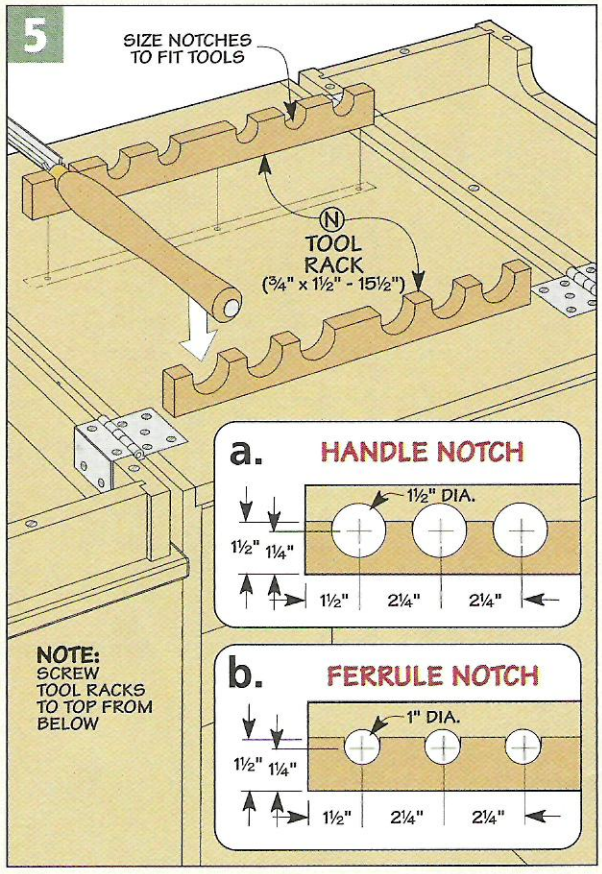
The top of this tool cabinet is not what you might expect. Instead of a single lid that is hinged at the back, this top is actually made up of two separate lids. They're hinged on the sides of the cabinet and open out from the center (see photo). The lids open up to reveal a rack that holds a set of turning tools.

Lids – If you take a look at Figure 4, you'll see that the two lids of the top are really nothing more than shallow boxes. A large cutout on one side of each lid provides clearance for the tool rack that will be added later. And the sides and ends of the lids are joined with locking rabbet joints (Figure 4a).

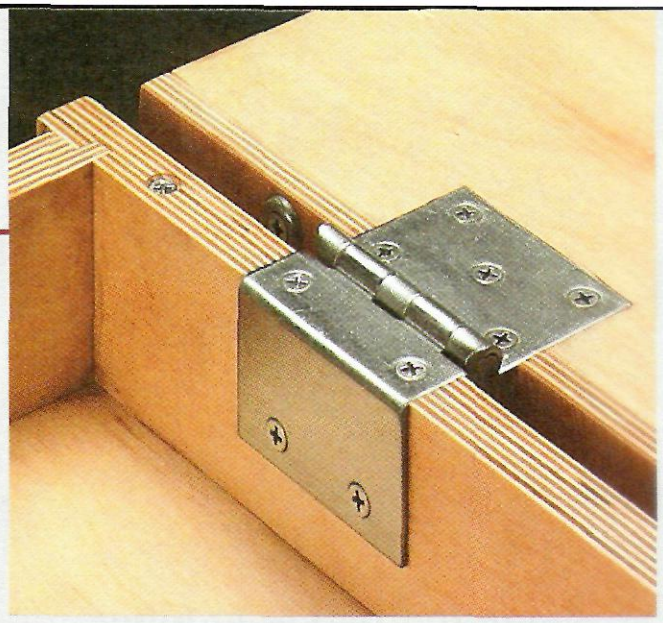
After assembling the framework for each lid, you can add the tops. These are simply screwed in place as shown in Figure 4b. Once this is done, you can install the hinges and add the lids to the cabinet. (For more detailed directions on installing the hinges, see the opposite page.)

Tool Rack – To hold the turning tools, I mounted a tool rack to the top of the cabinet. As you can see in Figure 5, the rack is really just two strips of hardwood with some cutouts to cradle the tools. To make these cutouts, I started with extra-wide blanks for the racks. Then I drilled a row of holes in each blank with a Forstner bit. Finally, I ripped the blanks to width and screwed them to the top of the case. Figures 5a and 5b will give you an idea of the size and spacing of the holes for the cutouts. But you may need to change these dimensions to accommodate your own turning tools.





Installing a Heavy-Duty Inset Hinge



▲ *Inset Hinge. Made out of heavy-gauge steel, these beefy hinges wrap around the side of the lid for extra strength. See page 35 for sources.*

When it came to mounting the lids to the lathe tool cabinet, I was worried that if I used ordinary butt hinges, the weight of the lid would cause the screws to tear out from the edge of the plywood. So instead I used heavy-duty, inset hinges (also called "institutional" hinges). This type of hinge has a leaf that is bent to wrap around the side of the lid, making them much less likely to tear out (see photo). As an added bonus, these hinges are made out of beefy, heavy gauge steel.

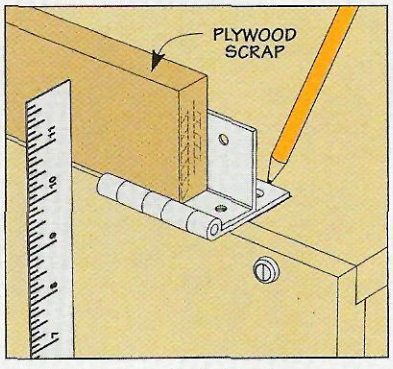
Mounting the hinges isn't too difficult, but the procedure is a little bit different than for mounting an ordinary butt hinge. The flat leaf of the hinge is mortised into the top of the cabinet. But when you're laying out the mortises, the goal is for the side of the lid to end up flush with the side of the cabinet. To do this, use a scrap piece of plywood (the same thickness as the side of the lid) and a straightedge to position the hinges when laying out the mortises, as you see in Step 1.

After the mortises are laid out, you can remove the waste with a hand-held router and a straight bit (Steps 2 and 3). You'll have to clean up the edges and corners of each mortise with a chisel.

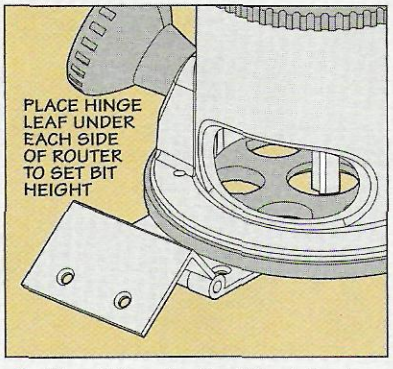
To drill the holes for the screws of the hinge, I used a *Vix* bit. This type of bit has a spring-loaded collar that automatically centers the bit in the screw hole of the hinge (Step 4).

After you've mounted the hinges to the top of the tool cabinet, the next step is to mount them to the lids. To start, set each lid on top of the cabinet and mark out the hinge locations on the side of the lid (Step 5).

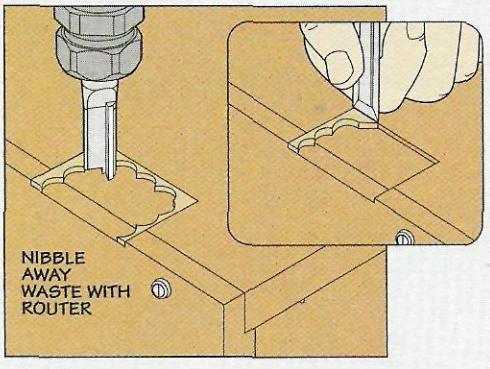
Once this is done, all you have to do is rout a shallow notch along the edge of the lid for each hinge, as you see in Step 6. Then you can drill the pilot hole for the screws and screw the hinges in place.



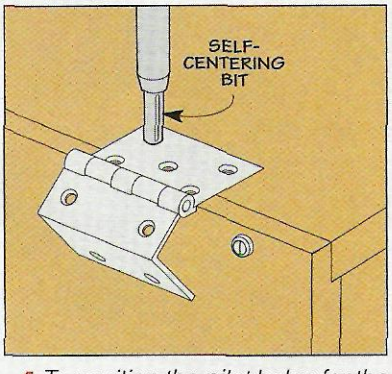
1 *Using a straightedge and a scrap of 3/4" plywood, position the hinge so that the lid will end up flush with the side of the case.*



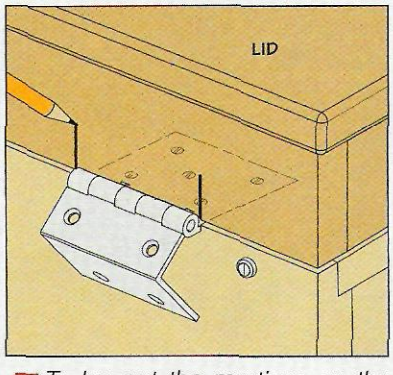
2 *To set the depth of the bit, place a hinge leaf under each side of the router. Lower the bit until it just touches the surface of the wood.*



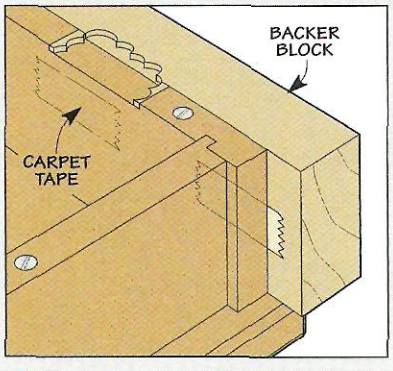
3 *Nibble away the waste from the mortise with the router. Then, using a sharp chisel, square up the edges of the mortise (see detail).*



4 *To position the pilot holes for the hinge screws, place the hinge in the mortise and use it as a template while drilling the holes.*



5 *To lay out the mortises on the lid, set the lid on top of the case so that the sides are flush and mark out the hinge locations.*



6 *Taping a backer block to the side of the lid will help support your router and prevent tearout when routing the mortises.*

Router Circle-Cutting Jig

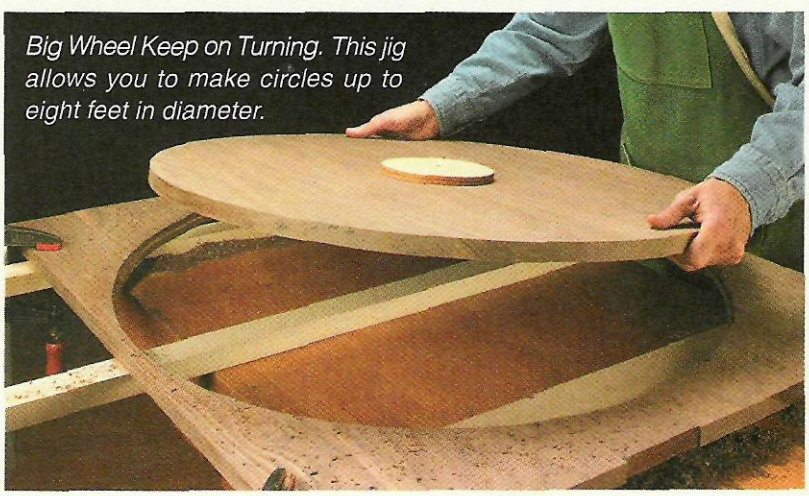
A router and this simple jig are all you need to create perfect circles.

When it comes to cutting circles, there's more than one way to go about it. You can use a band saw or a hand-held jig saw. With both of these methods though, you'll most likely have to sand the edge of the circle to remove the saw marks. But a router cuts a circle with a smooth, clean edge the first time around. And with the jig you see here, using a router to make circles (or large holes) couldn't be easier.

How it Works – The way the jig works is actually pretty simple. The router is mounted to a plywood base that is attached to the end of an arm. The arm pivots on a steel pin that can be positioned anywhere along the length of the arm. By inserting the pin into a hole in the center of your workpiece, or into a pivot plate that is mounted to the top of the workpiece, you can rout a perfect circle every time.

Arms – I began by making the arm of the jig. I actually made two arms — a long one and a short one. Having two lengths of arms gives the jig a greater range. With the long arm, you can cut circles up 8 feet in diameter. For smaller circles (from 20 inches to 4 feet in diameter), the short arm is more convenient to use. And with the exception of the length, the two arms are identical.

To make each arm, I started with a rectangular piece of ½" plywood (24" long for the short arm and 48" long for the long arm). The profile of the arm is laid out on the plywood



Big Wheel Keep on Turning. This jig allows you to make circles up to eight feet in diameter.

according to the dimensions shown in Figures 2 and 2b. But before cutting the arm to shape, there's a couple of things you'll need to do while the blank is still square.

To start with, you'll want to drill the two mounting holes near the end of the arm (Figure 2b). These will be used to attach the arm to the base that holds the router.

Second, you'll need to create the T-slot down the center of the arm. This is a two-step process. First, I drilled a hole at each end of the slot and routed out the waste in between the holes on a router table. Then I cut a groove down the center of the blank, as you see in Figure 2a.

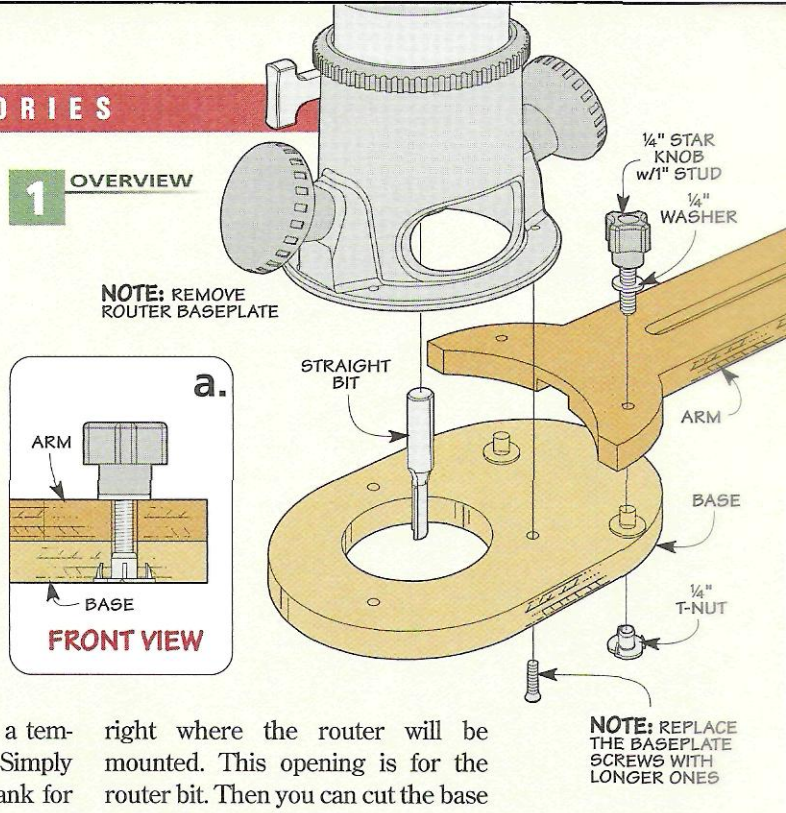
Once you've finished making the T-slot, you can cut the arm to shape. In order to keep the sides of the arm straight and parallel, I used the rip fence to make stopped cuts on the table saw, as you see in Figure 3. Then the curved portions of the arm can be cut on the band saw or with a jig saw and sanded smooth.

Base – As you can see in Figure 2, both the base of the jig and the pivot plate are cut from a single blank. Start by laying out the shapes of both pieces on the blank. The next step is to drill a couple of counterbored holes in the base for a pair of T-nuts that will be used to attach the arm to the base.

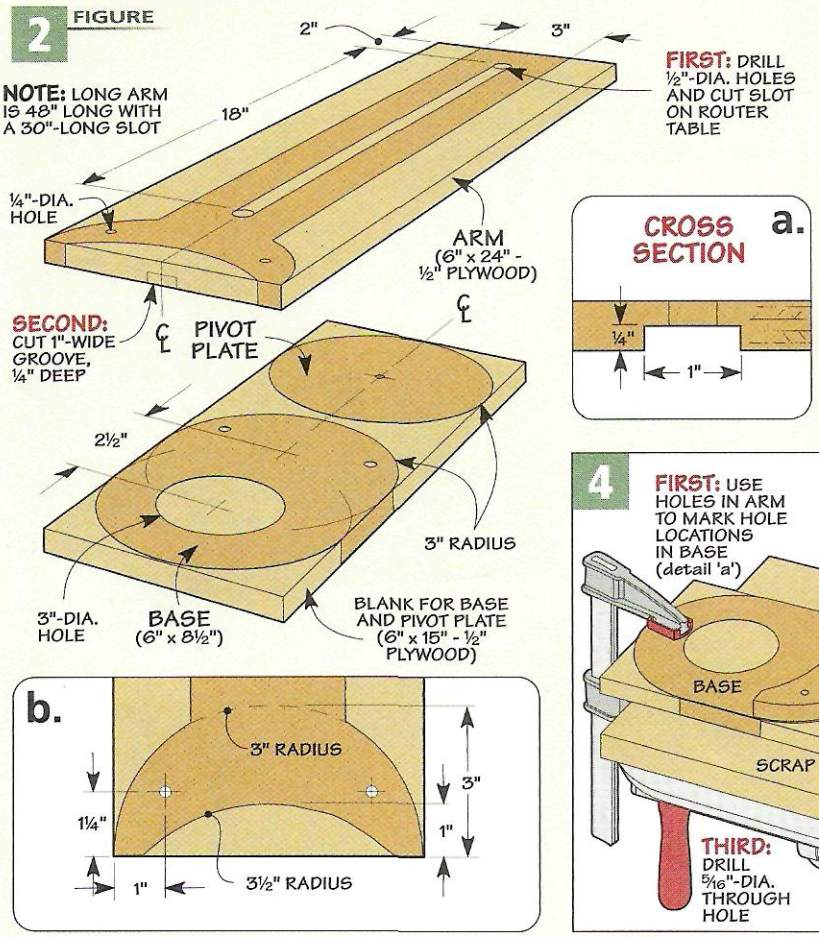
To make sure the T-nuts line up with the holes you already drilled in the arm, you can just use the arm as a template, as shown in Figure 4. Simply position the arm over the blank for the base and use a drill bit to mark out the hole locations. Then drill a shallow counterbore, followed by a smaller through hole (Figure 4b).

When this is done, you can cut (or drill) a 3"-dia. opening in the base right where the router will be mounted. This opening is for the router bit. Then you can cut the base out and sand the edges smooth. Finally, drill some holes in the base to allow you to mount it to the bottom of your router. (You can use the baseplate from your router as a template for drilling the holes.)

1 OVERVIEW



2 FIGURE



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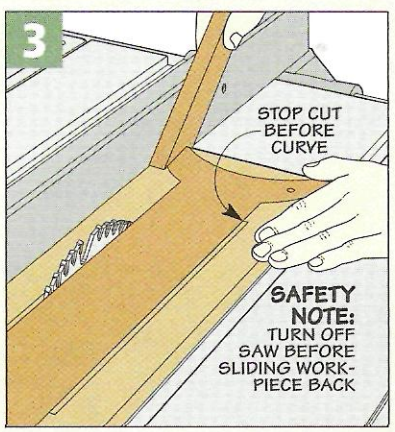

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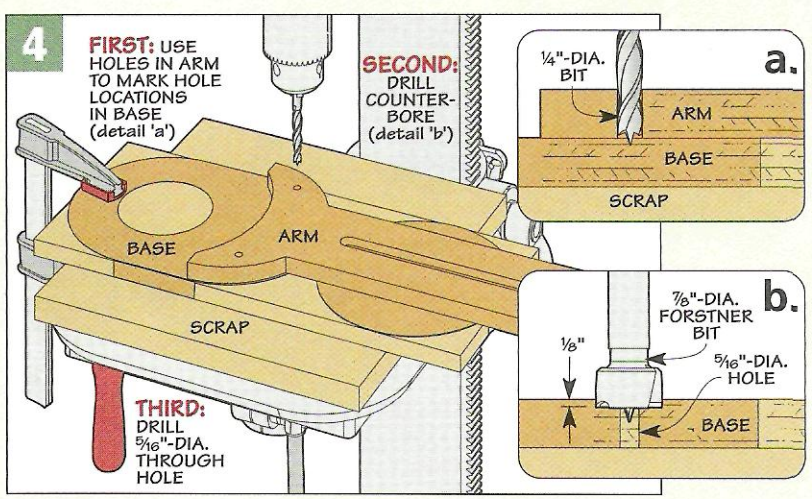


Pivot Plate & Pivot Pin Assembly

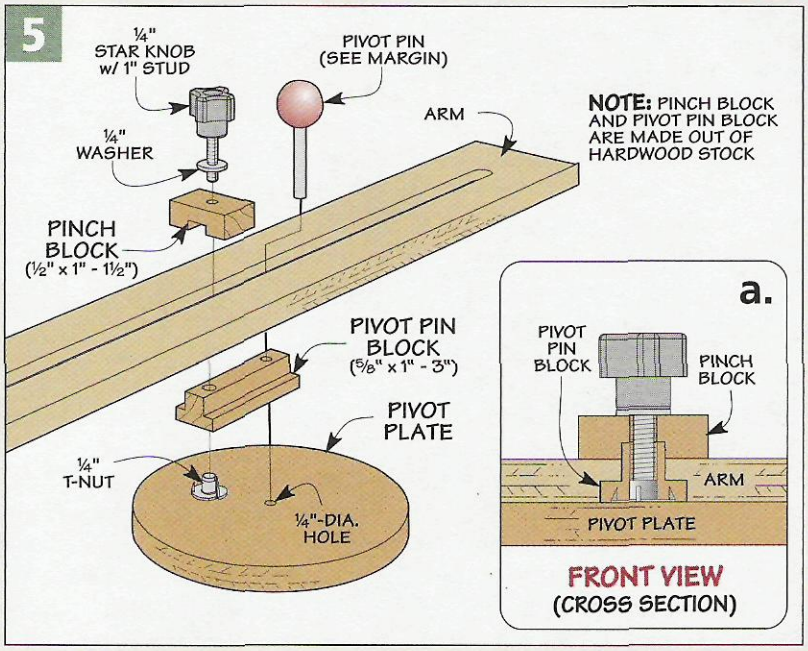
With the arm and the base completed, you can turn your attention to making the remaining parts of the jig. All that's left is the pivot plate and the pivot pin assembly.

Pivot Plate – There's really not much to the pivot plate. It's just a 6"-dia. circle cut from the leftover blank that you used to make the base of the jig. In the center of the plate is a ¼"-dia. hole that will receive a pivot pin that is added later. But for now, you can just set the pivot plate aside once you've finished making it.

Pivot Pin Assembly – Although it's the smallest part of the jig, the pivot pin assembly is really the heart of the jig. The assembly holds a steel pivot pin that will be the centerpoint of the circle (or arc) that you want to cut. To adjust the size of the circle, all you do is simply slide the pivot pin assembly along the slot in the arm.

The assembly consists of three parts — a pivot pin block, a pinch block, and a pivot pin. The pivot pin block fits into the T-slot of the arm and holds the pivot pin. The purpose of the pinch block is simply to lock the pivot pin block in place. Both of these pieces are fairly small. So to make it safer to work with them, I started by cutting the blanks to exact width, but leaving them extra long.

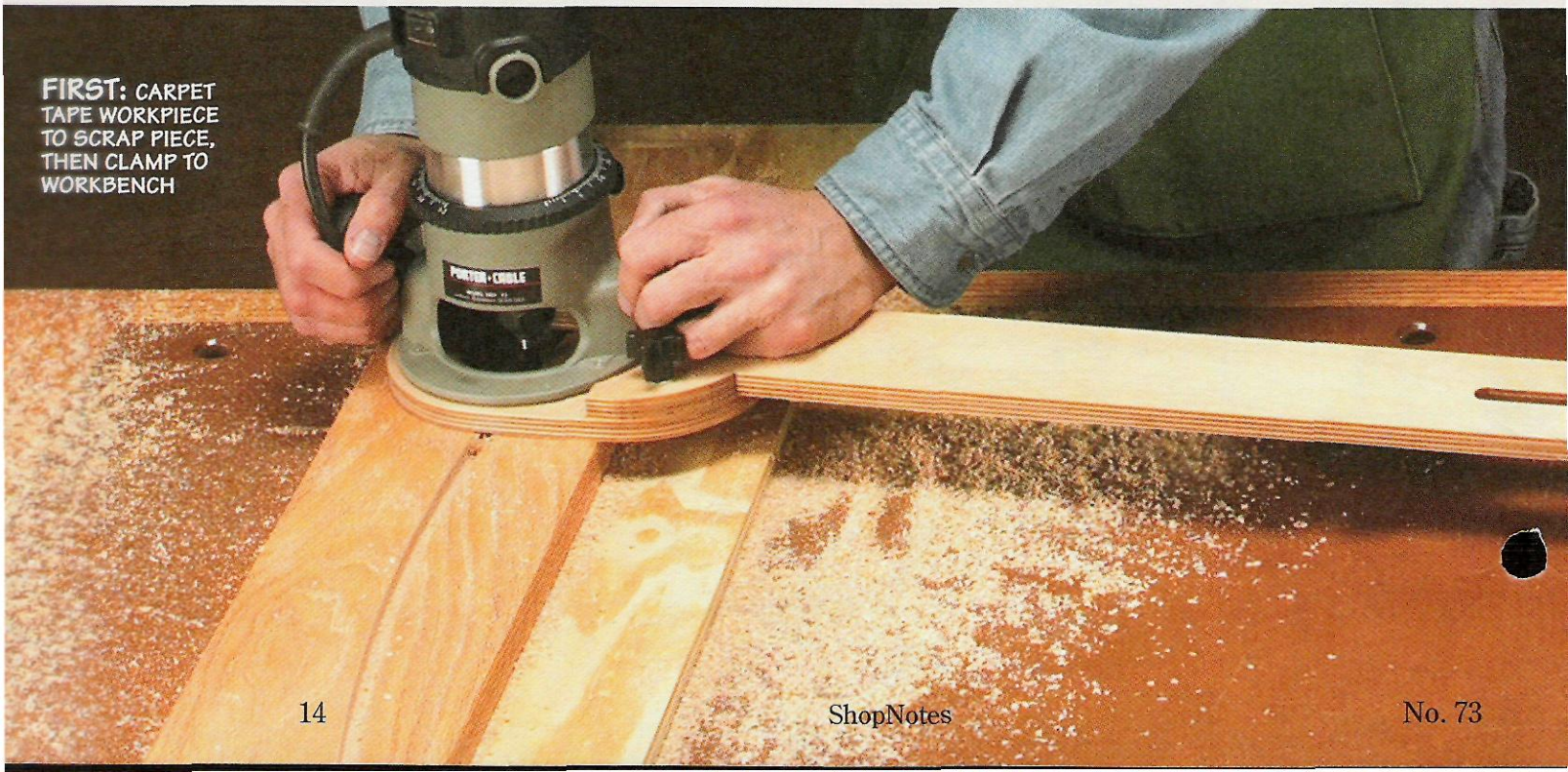
▲ *Pivot Pin. All you need to make the pivot pin is a standard hex bolt and a threaded knob. (See page 35 for sources.)*

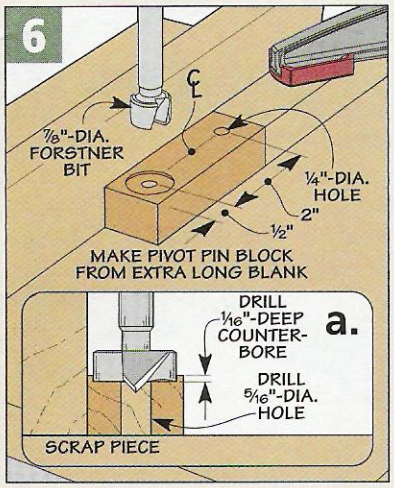


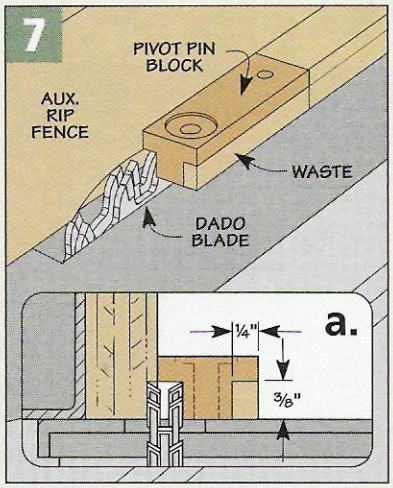
Pivot Pin Block – The pivot pin block starts off as a narrow blank about 12" long. The first step is to drill a centered hole that will hold the pin. Then you'll need to drill a larger, counterbored hole for a T-nut, as shown in Figure 6.

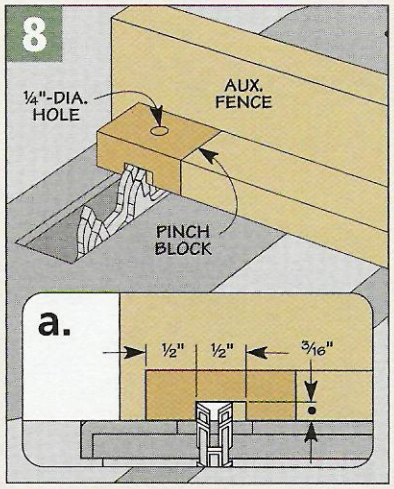
Once the holes are drilled, the next step is to cut a rabbet along each side of the blank to create a tongue that fits in the slot of the arm. Figure 7 shows how I did this. Then just cut the block to length and install a T-nut. That's all there is to it.

Pinch Block – The pinch block is even simpler to make. It's just a short block with a dado cut down









the center to allow it to fit over the pivot block (Figure 5a). After cutting the dado as shown in Figure 8, you'll need to drill a hole near the end of the blank and then cut the block to length. A studded knob and washer are used to assemble the pivot block and pinch block to the rest of the jig.

Pivot Pin – The last part to make is the pivot pin. This is nothing more than a hex bolt with a round knob on one end (see photo in margin at left and sources on page 35).

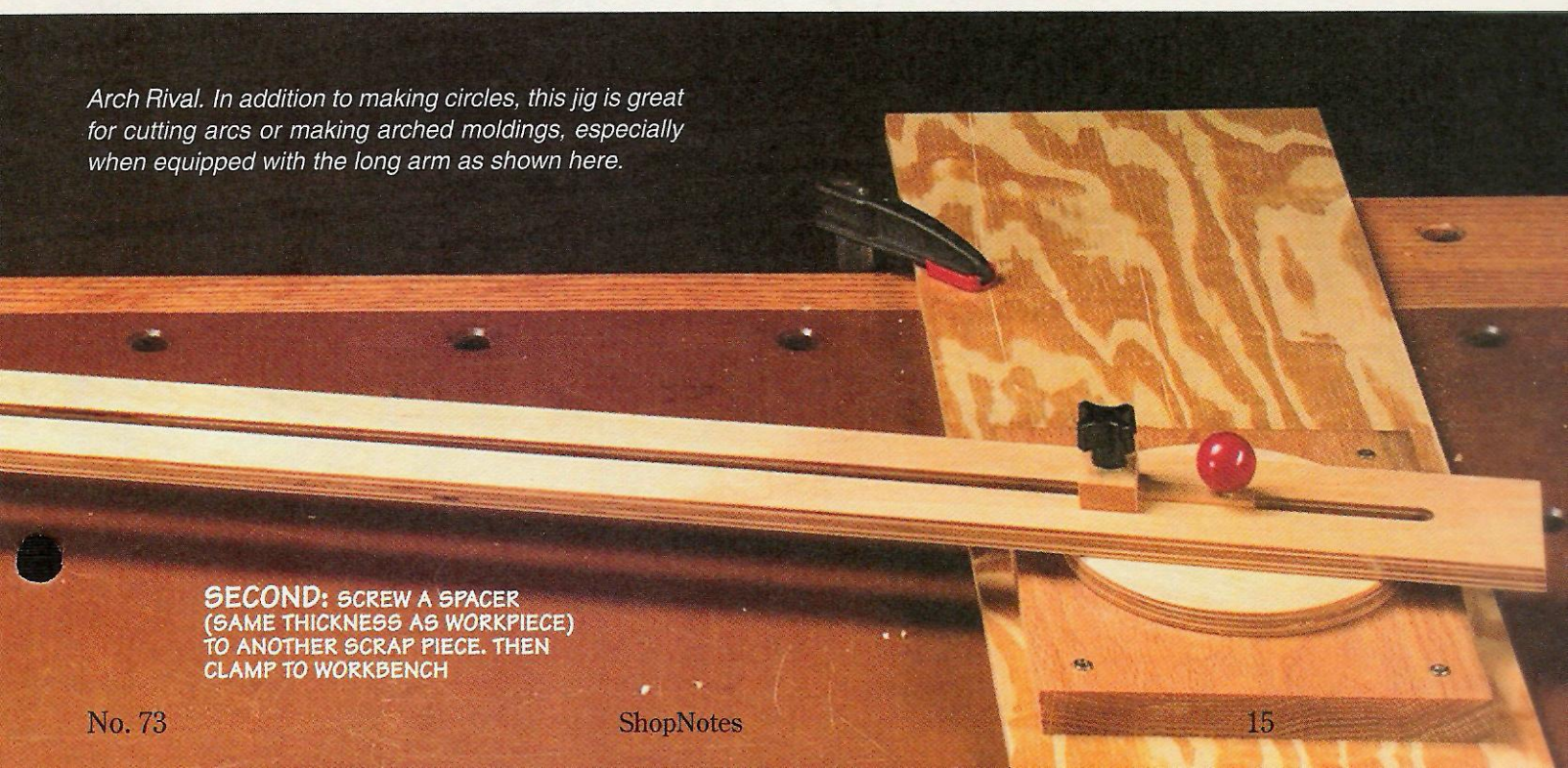
To make the pivot pin, you can start by cutting off both ends of the bolt so that it's about 2⅛" long with only ½" of the threads remaining. Then run a little epoxy on the threads of the bolt and add the knob. Finally, grind a slight chamfer on the end of the pin to make it easier to insert into the pivot hole.

Using the Jig – There's not really much to using the jig. To start with, remove the base plate from your router and mount it to the base of the jig. The next step is to position the pivot pin along the arm of the jig according to the size of the circle you wish to make.

How you attach the jig to your workpiece will depend on your project. If you don't want any holes in the finished circle, you can carpet tape the pivot plate to the top of your workpiece over the center of the circle. Otherwise, just drill a ¼"-dia. hole at the center of your workpiece for the pivot pin.

When it comes to actually cutting out the circle, just remember to take it slow. You'll need to make multiple passes, lowering the bit no more than a ¼" between each pass. And make sure to put some scraps of wood underneath your workpiece before you start routing so that you don't accidentally cut through the circle and into your workbench (see photo on bottom of page 12).

Arch Rival. In addition to making circles, this jig is great for cutting arcs or making arched moldings, especially when equipped with the long arm as shown here.



Benchtop Mini-Lathe

I haven't met too many woodworkers that weren't a little bit intrigued by the thought of turning a project on the lathe. But they always mention the "problem" — spending a few hundred dollars on a lathe just to get started.

Well, if that's the reason you haven't tried your hand at turning, you might want to consider the shop-made mini-lathe shown below. It has all the features you'd expect on a mini-lathe — but instead of buying one, building it might just save you a few bucks.

This mini-lathe is solid and sturdy. So you can be sure it's tough enough to handle a wide variety of turning projects, from pens and table legs, to small turned boxes and bowls. And there's a disk sander and table you can build as an accessory to add even more versatility.

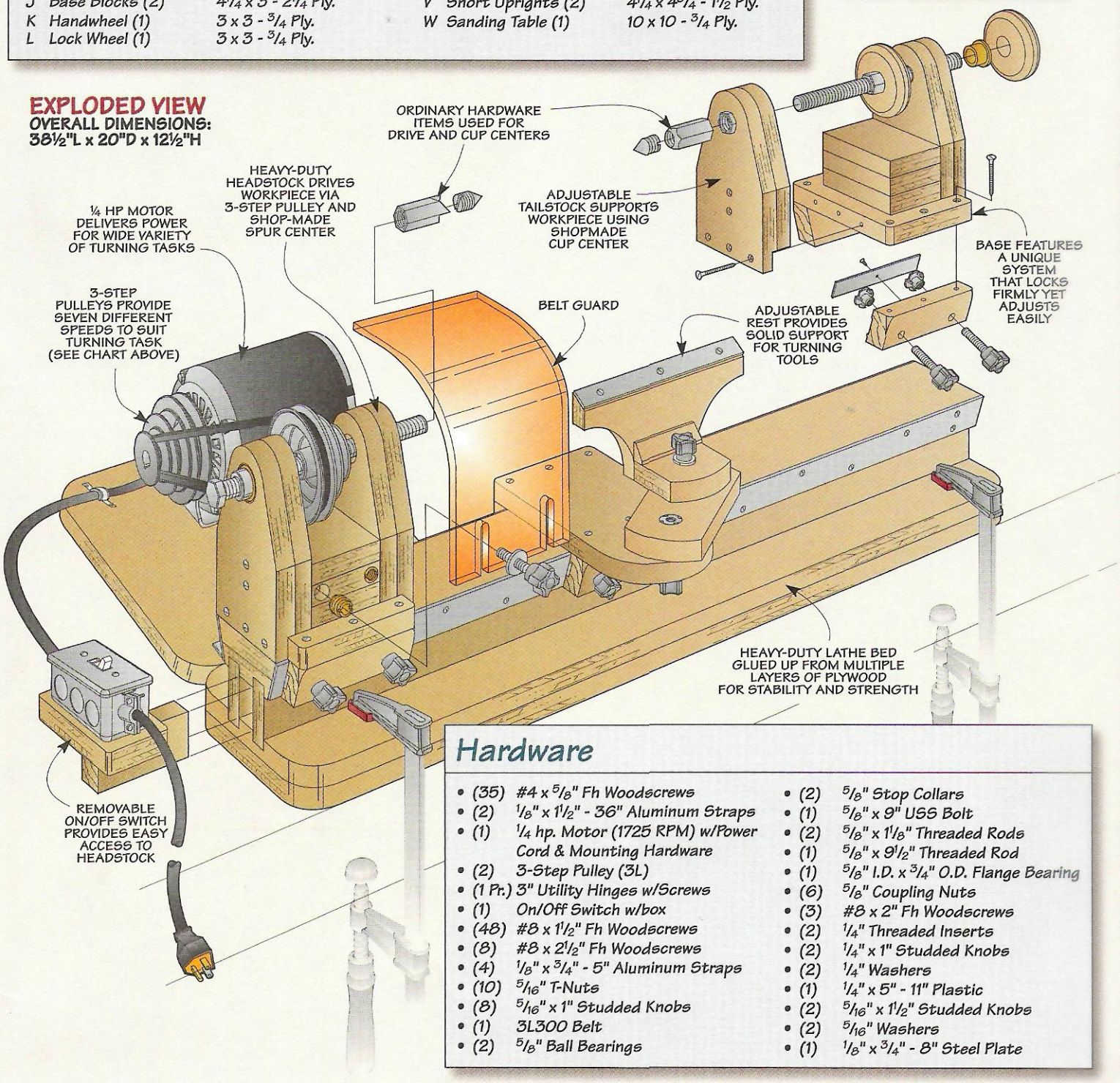
Materials

A	Top (1)	4 1/8 x 36 - 1 1/2 Ply.
B	Bottom (1)	8 x 36 - 1 1/2 Ply.
C	Vertical Supports (2)	2 1/4 x 36 - 3/4 Ply.
D	Mounting Platform (1)	12 x 12 - 3/4 Ply.
E	Switch Mount (1)	2 1/2 x 4 1/2 - 3/4 Ply.
F	Mounting Block (1)	1 x 1 1/2 - 5
G	Bases (3)	5 x 6 1/4 - 3/4 Ply.
H	Locking Strips (8)	3/4 x 1 7/8 - 5
I	Uprights (4)	4 1/4 x 6 3/4 - 1 1/2 Ply.
J	Base Blocks (2)	4 1/4 x 3 - 2 1/4 Ply.
K	Handwheel (1)	3 x 3 - 3/4 Ply.
L	Lock Wheel (1)	3 x 3 - 3/4 Ply.
M	Tool Rest Base (1)	5 x 9 1/2 - 3/4 Ply.
N	Tool Support (1)	3 3/4 x 8 - 3/4 Ply.
O	Support Base (1)	3 x 2 3/4 - 3/4 Ply.
P	Filler Block (1)	3/4 x 3/4 - 3
Q	Pivot Arm (1)	3 x 6 1/2 - 3/4 Ply.
R	Faceplate Body (1)	2 1/4 x 2 1/4 - 2 1/4 Ply.
S	Faceplate (1)	5 x 5 - 3/4 Ply.
T	Sanding Disk Body (1)	3 x 3 - 2 1/4 Ply.
U	Sanding Disk Plate (1)	8 x 8 - 3/4 Ply.
V	Short Uprights (2)	4 1/4 x 4 3/4 - 1 1/2 Ply.
W	Sanding Table (1)	10 x 10 - 3/4 Ply.

LATHE SPEED

MOTOR PULLEY	HEADSTOCK PULLEY	APPROX. RPM
Small	Large	700
Small	Medium	1000
Medium	Large	1250
Large	Large	1725
Large	Medium	2500
Medium	Small	3000
Large	Small	4150

EXPLODED VIEW
OVERALL DIMENSIONS:
38½"L x 20"D x 12½"H



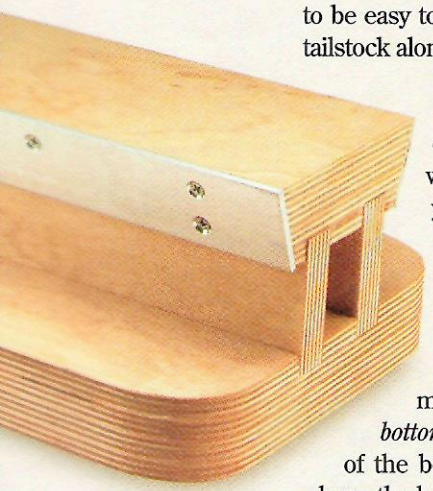
Hardware

- (35) #4 x 5/8" Fh Woodscrews
- (2) 1/8" x 1 1/2" - 36" Aluminum Straps
- (1) 1/4 hp. Motor (1725 RPM) w/Power Cord & Mounting Hardware
- (2) 3-Step Pulley (3L)
- (1 Pr.) 3" Utility Hinges w/Screws
- (1) On/Off Switch w/box
- (48) #8 x 1 1/2" Fh Woodscrews
- (8) #8 x 2 1/2" Fh Woodscrews
- (4) 1/8" x 3/4" - 5" Aluminum Straps
- (10) 5/16" T-Nuts
- (8) 5/16" x 1" Studded Knobs
- (1) 3L300 Belt
- (2) 5/8" Ball Bearings
- (2) 5/8" Stop Collars
- (1) 5/8" x 9" USS Bolt
- (2) 5/8" x 1 1/8" Threaded Rods
- (1) 5/8" x 9 1/2" Threaded Rod
- (1) 5/8" I.D. x 3/4" O.D. Flange Bearing
- (6) 5/8" Coupling Nuts
- (3) #8 x 2" Fh Woodscrews
- (2) 1/4" Threaded Inserts
- (2) 1/4" x 1" Studded Knobs
- (2) 1/4" Washers
- (1) 1/4" x 5" - 11" Plastic
- (2) 5/16" x 1 1/2" Studded Knobs
- (2) 5/16" Washers
- (1) 1/8" x 3/4" - 8" Steel Plate

Lathe Bed

The bed of a lathe has an important function — it needs to provide a strong and solid foundation for all the other parts of the lathe. Plus, it needs to be easy to move the tool rest and tailstock along the bed.

To accomplish this, the bed is built as a double I-beam structure with an angled top, like you see in the margin.



▲ *Solid & Stable.* *Glued-up layers of plywood and a double I-beam design provide a solid support for the mini-lathe.*

Make the Bed – I started on the bed by gluing up a couple layers of ¾" Baltic birch plywood to make the *top (A)* and *bottom (B)*. The extra width of the bottom makes it easy to clamp the bed to a benchtop.

Keeping all the edges of the plywood aligned when gluing up multiple layers can be a hassle. Instead, I cut the plywood oversized (½") in both length and width. Then once the glue is dry, you can trim everything perfectly flush (Figure 1).

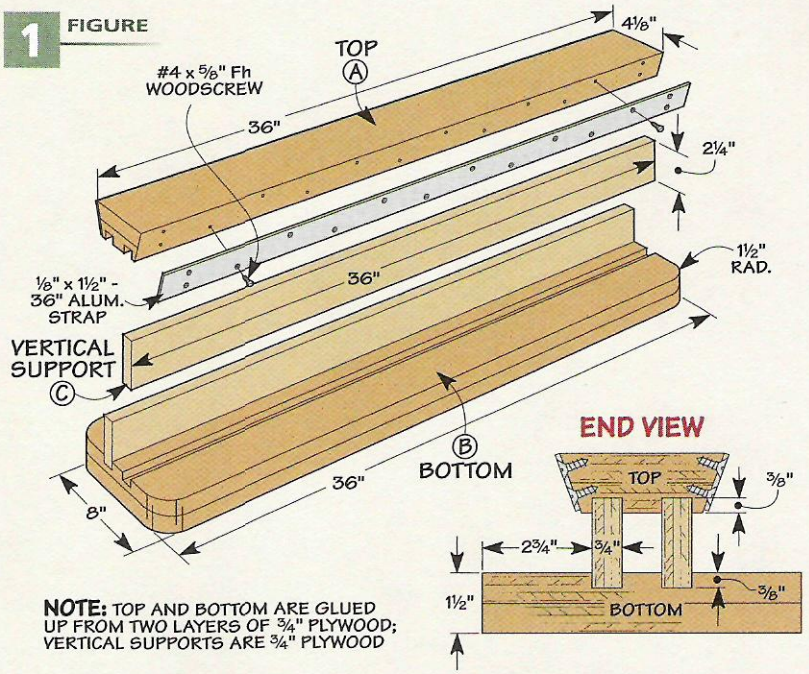
Grooves & Vertical Support – To connect the top and bottom, you'll need to cut a pair of grooves in each piece to accept some vertical supports. So after setting up your dado blade to match the thickness of the vertical supports, adjust the rip fence and cut the grooves in the bottom, as in Figures 2 and 2a.

Like the bottom, there are a pair of grooves in the top to accept the vertical supports. But since the top is narrower, you'll need to carefully lay out the location of the grooves so they align with the ones in the bottom of the lathe bed.

Create the Beveled Top – After cutting the grooves, the next step is to bevel both long edges of the top, like you see in Figures 3 and 3a. Why bevel the edges? The beveled edges provide a connection that interlocks with the headstock, tailstock, and tool rest, yet still allows them to slide easily along the bed.

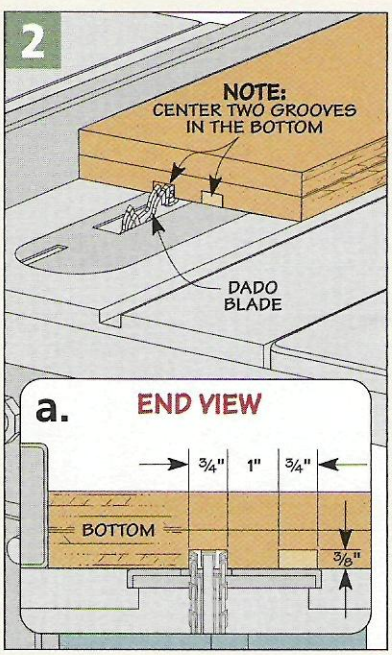
Assemble the Bed – With the top and bottom complete, all that's left to do is cut the *vertical supports (C)* to size and then join the top and bottom, as in Figure 1.

1 FIGURE



NOTE: TOP AND BOTTOM ARE GLUED UP FROM TWO LAYERS OF ¾" PLYWOOD; VERTICAL SUPPORTS ARE ¾" PLYWOOD

2



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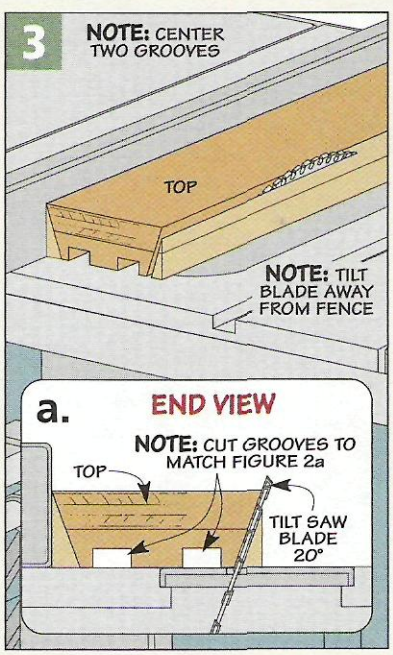

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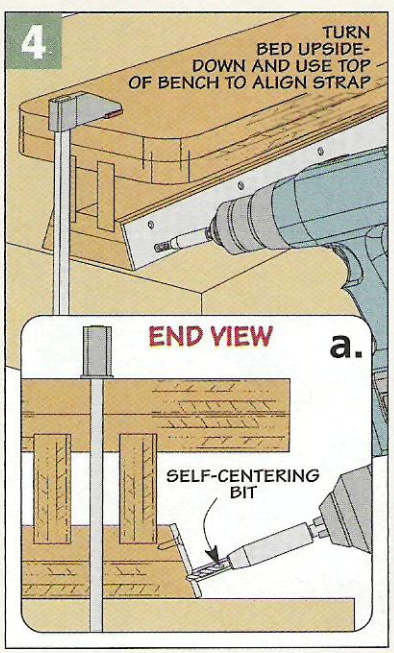
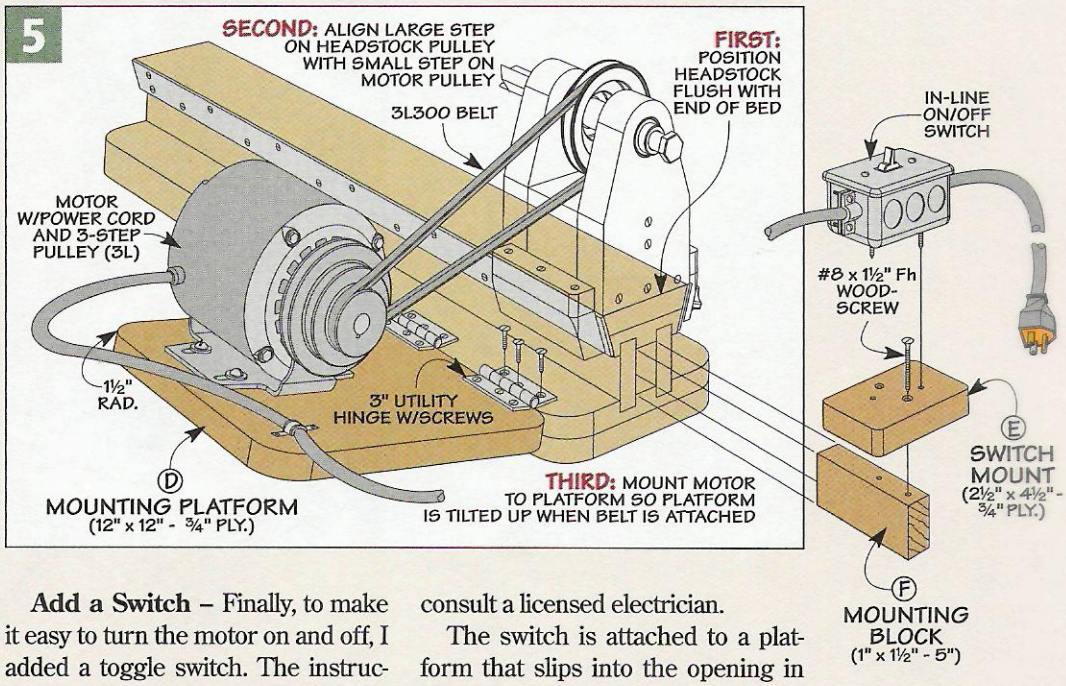


To help strengthen the bed and prevent wear and tear along the edges, I added a couple strips of aluminum to the edges of the top.

I cut each strip from a piece of aluminum angle I picked up at a local home center. And to ensure the strip is flush with the top edge once it's screwed in place, it's best to turn the bed upside-down and clamp it to a bench, as seen in Figures 4 and 4a.

Mounting the Motor – To attach the motor, I used a simple system — a hinged mounting platform. This system makes it easy to change the lathe speed, as you can see in the photo below right.

After cutting the platform to size, you can attach it to the bed with a pair of hinges (Figure 5). But don't mount the motor at this point. Later, when the headstock is complete and the hardware is installed, you can mount the motor as detailed in Figure 5.

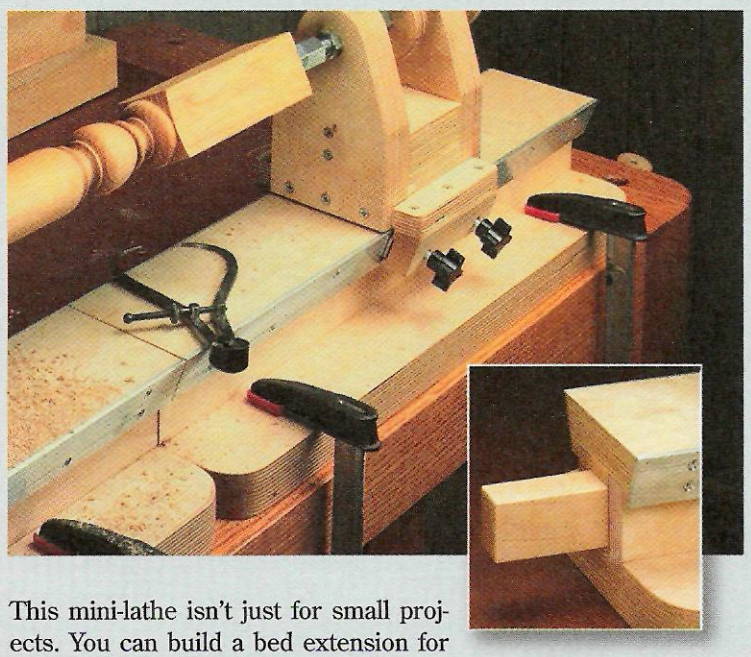


Add a Switch – Finally, to make it easy to turn the motor on and off, I added a toggle switch. The instructions for doing this are included with most switches. If you're uncomfortable wiring a switch (or the motor), consult a licensed electrician.

The switch is attached to a platform that slips into the opening in the end of the bed. In Figure 5 you can see that the mount is simply a plywood pad attached to a hardwood mounting block.

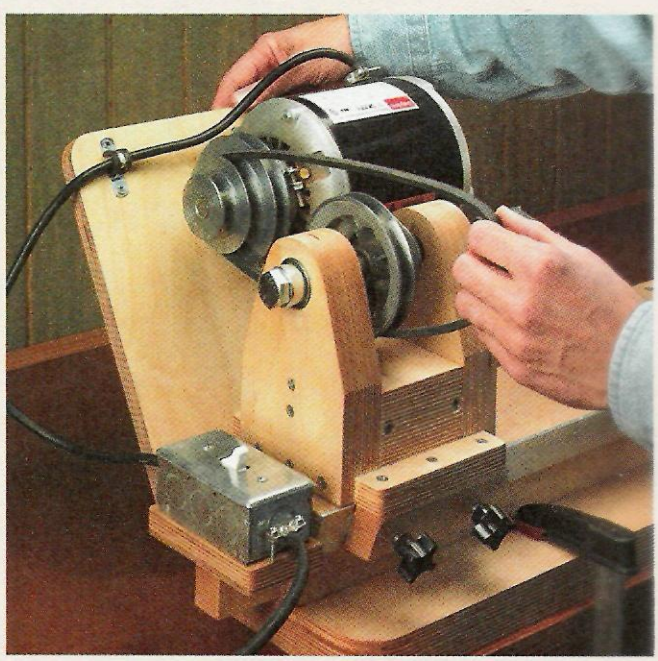
Longer Turnings – One last thing. The mini-lathe will handle workpieces up to 18" long. But if you think you'd like to turn something longer, like a table leg, be sure to check out the box at left.

Lathe Bed Extension



This mini-lathe isn't just for small projects. You can build a bed extension for your mini-lathe that will allow you to handle longer workpieces, like the baluster shown above, or table legs up to 42" long.

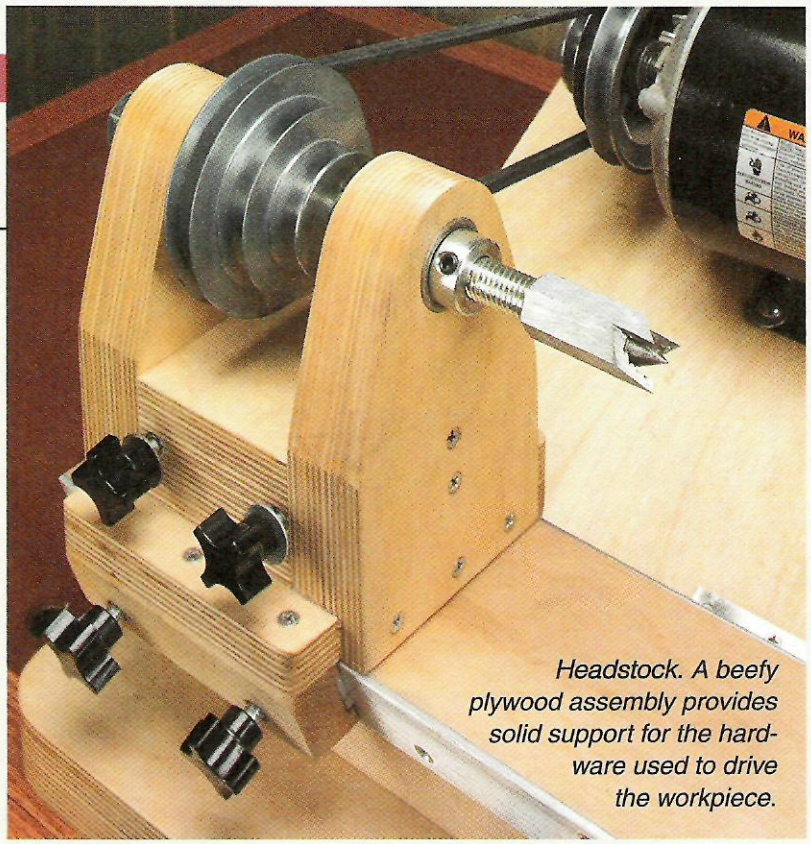
As you can see in the photo above, the 24"-long extension is identical to the main bed of the lathe. If possible, try to build the extension at the same time to ensure the two beds line up exactly. Finally, all you need to connect the extension to the main bed is a mounting block, like the one used for the switch platform (Figure 5).



▲ *Changing Speed. With the motor mounted to a hinged platform, shifting the belt to change the lathe speed is just a matter of lifting the back end of the mount. After adjusting the belt, swing the platform back down to reapply tension.*

FEATURE PROJECT

Headstock & Tailstock



Headstock. A beefy plywood assembly provides solid support for the hardware used to drive the workpiece.

Although the heavy-duty bed provides strength and stability to the lathe, it's the headstock and tailstock that actually support the workpiece you're turning.

Start with the Base – The nice thing about building both these units is the base for each is identical. And the only difference in the uprights that supports the hardware is the size of the holes near the top.

The *base (G)* starts out as a single layer of plywood with a pair of hardwood *locking strips (H)* attached to the front and back edges. These strips are angled to match the beveled top of the lathe.

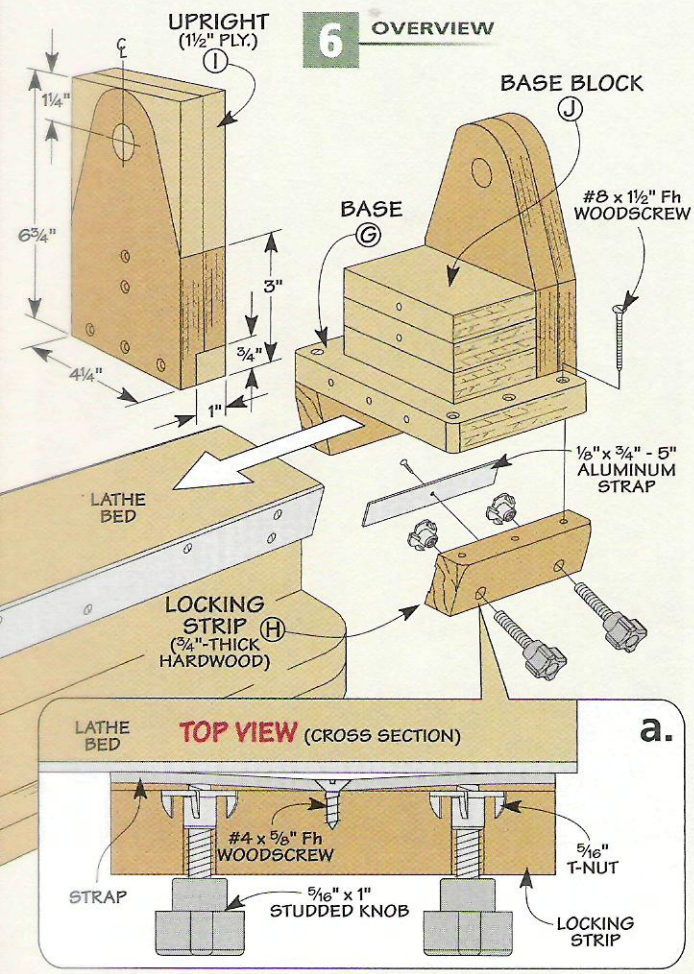
When the knobs installed in the front strip are tightened, they press a locking plate against the top of the bed to "pinch" the base against the bed of the lathe, as in Figure 6a.

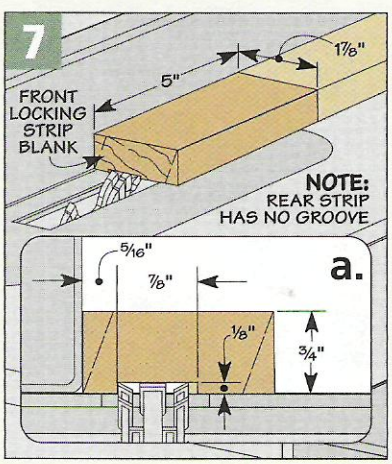
Because the strips are somewhat small, I started with two over-sized blanks, as illustrated in Figure 8. For now you can set one strip aside.

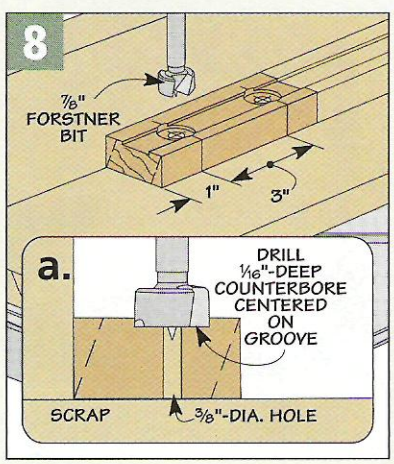
The first step is to cut a groove down the inside face of one strip. This groove is sized to accept the narrow strip of aluminum that locks the base to the lathe bed, as in Figures 7 and 7a. Once that's complete, you can drill counterbored holes in each strip for the T-nuts, as in Figures 8 and 8a.

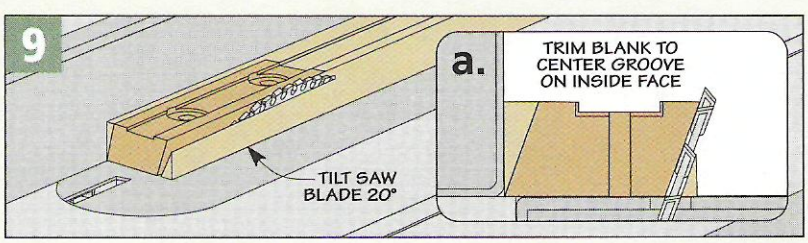
Now all that's left to do is tilt the saw blade and trim both workpieces at an angle (Figures 9 and 9a). Finally, cut the strips to length.

Add the Locking Strap – After cutting the locking strap to size from









a piece of aluminum, you can tap the T-nuts into the counterbores and then screw the strap in place, like you see in Figure 6a.

Attach the Strips – After attaching the front strip flush with the edge of the base, you can turn your attention to the rear strip.

To make it easy to slide the base along the bed, I used a playing card to "build in" some clearance when I attached the rear strip, as illustrated in Figure 10. The strip is glued and screwed to the base and then the corners of the base are sanded to ease the sharp edges.

Make the Uprights – To support the hardware on the headstock and tailstock, there's a pair of heavy-duty uprights attached to each base.

Each *upright (I)* starts out as a rectangular blank glued up from two layers of plywood. You can see this by referring to Figure 6. Then to mate the upright to the base, a large rabbet is cut on one end.

Holes for the Hardware – At this point you need to drill holes for the hardware used to support the workpiece. But it's important that all the holes be aligned.

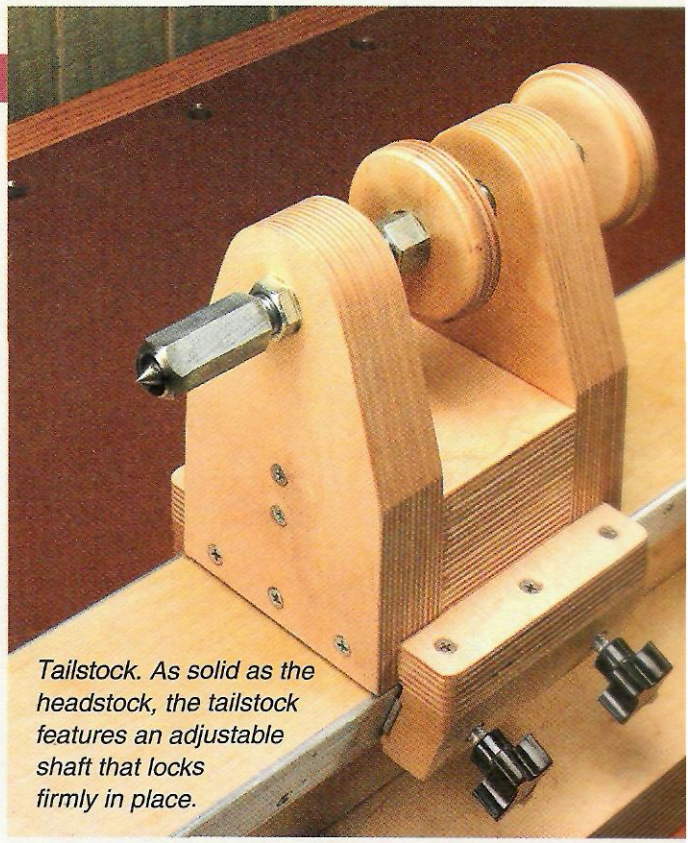
To ensure this, I used a fence and a stop, as in Figure 11 below. The fence ensures that each hole is drilled along the centerline of the upright. And the stop block guarantees that each hole is positioned the same distance from the top.

The uprights for the tailstock have the least work, so I started with them. All you need to do is drill a single through hole in each upright, like you see in Figure 11a.

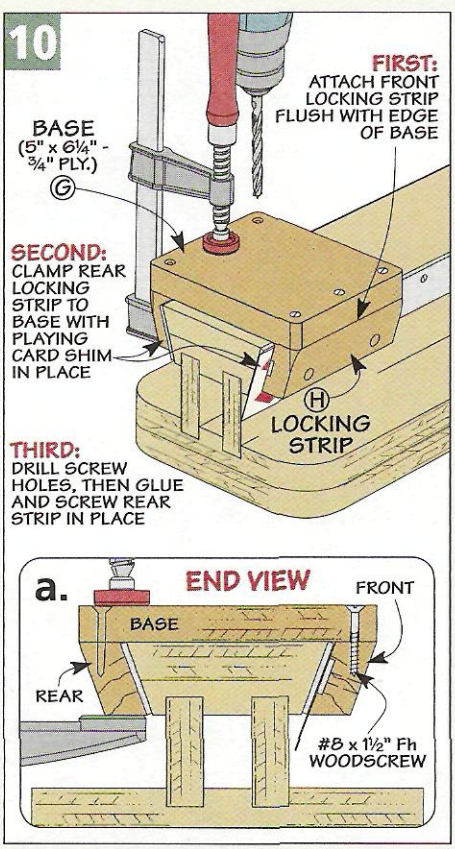
For the headstock uprights you'll need to do a little more work. First, drill a $1^3/_8$"-dia. counterbore on the outside face of each upright (Figure 11). Then complete each upright by drilling a $^7/_8$"-dia. through hole.

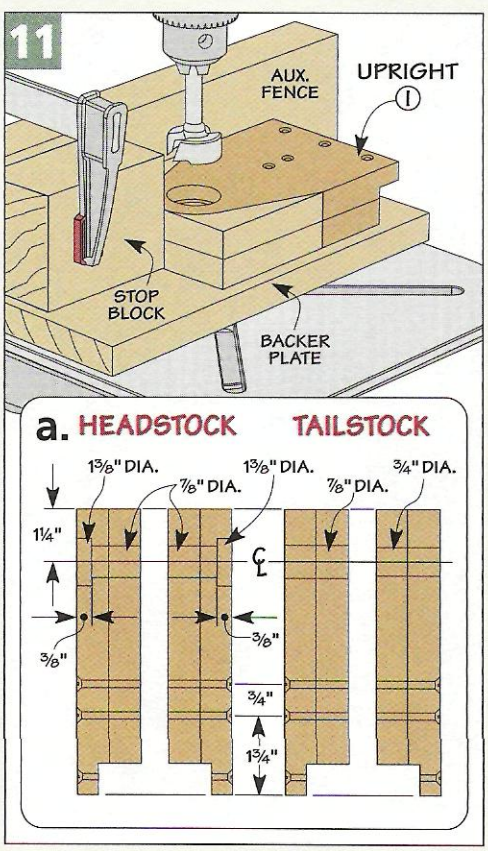
After shaping each upright, glue and screw the uprights to the base. Here again, it's important to keep the holes in alignment. So be sure the front edge of each upright is positioned the same distance from the front edge of the base (Figure 12).

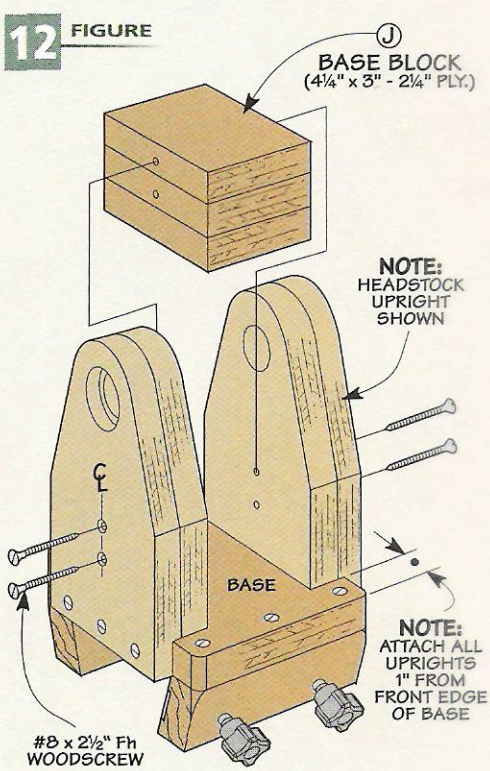
Beef Up the Assemblies – Finally, I reinforced the uprights by adding a *base block (J)* glued up from three layers of plywood. The block is cut to size to fit flush with the edges of the uprights. The block is glued and screwed in place, like you see in Figure 12.



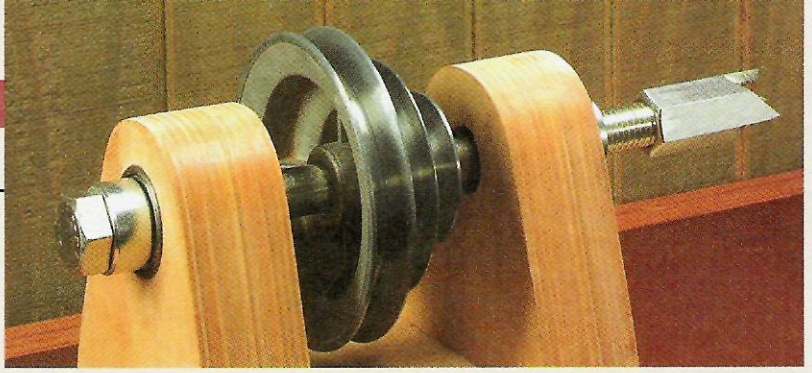
Tailstock. As solid as the headstock, the tailstock features an adjustable shaft that locks firmly in place.

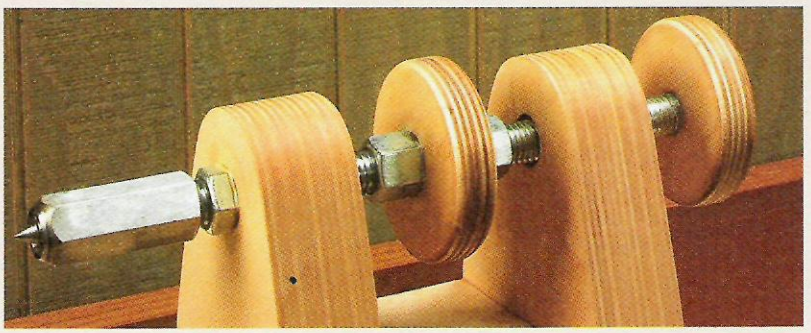






Add Hardware





▲ *Drive Center. A few taps with hammer is all it takes to embed the drive spurs in the workpiece.*

Completing the headstock and tailstock at this point is just a matter of adding some hardware.

Headstock – As you can see in Figure 13, the drive shaft is just a heavy-duty bolt that fits through the headstock bearings. The bearings fit into the counterbores drilled earlier in the uprights. (I used a couple dabs of epoxy to hold them in place.)

The shaft is held in place by a pair of stop collars. The three-step pulley (identical to the one on the motor) is centered between the uprights with the largest diameter on the left.

To ensure the stop collars and pulley lock in place securely, I filed a slight flat on the drive shaft where each set screw made contact.

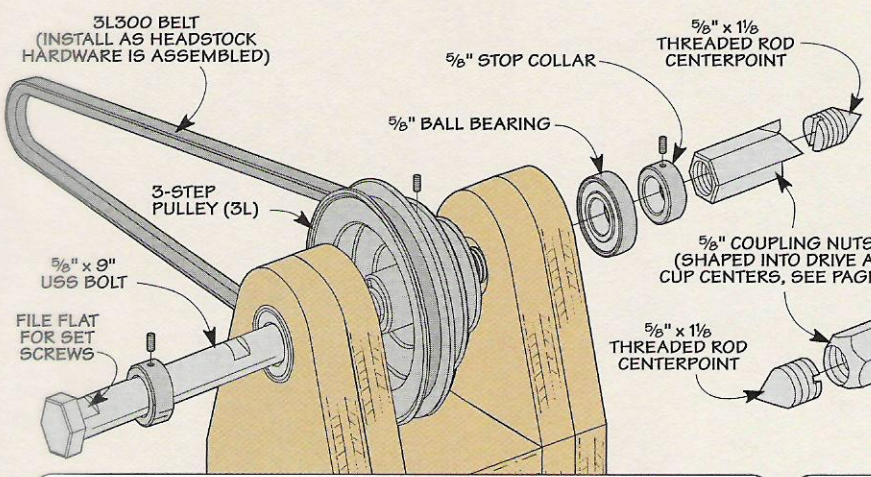
Tailstock – To make it easy to install (or remove) a workpiece, the tailstock hardware needs to be able to adjust in and out easily. To do this, I used a threaded rod attached to a plywood handwheel (Figure 14).

The threaded rod fits through a flange bearing installed in the outside upright of the tailstock. To allow you to turn the shaft in and out, there's a coupling nut epoxied into the other upright. Finally, to secure the shaft when you're turning, I created a lock wheel that fits between the uprights, as in the detail below.

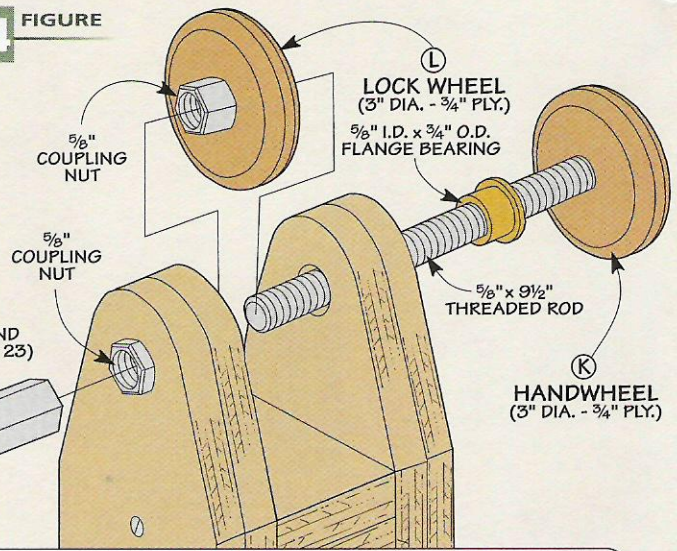
Like the handwheel, the lock wheel is just a plywood disk with a coupling nut epoxied into a hole drilled in the wheel. To lock the shaft, simply "jam" the coupling nut of the lock wheel against the nut in the left upright.

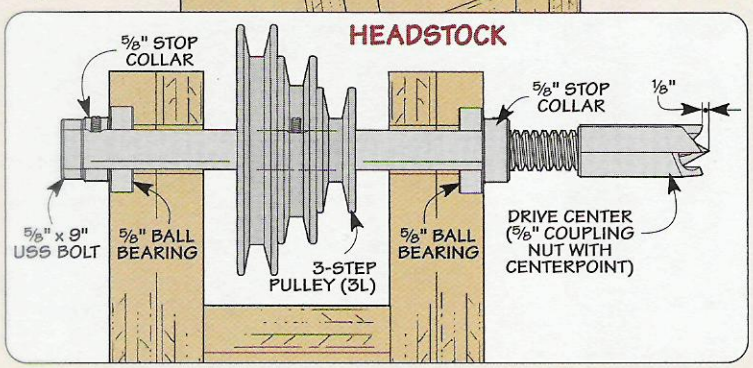
Centers – Finally, you can add the drive and cup centers after checking out the box on the opposite page.

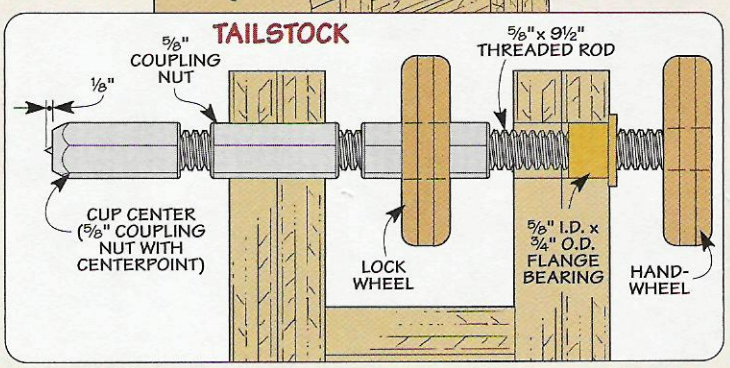
13 FIGURE



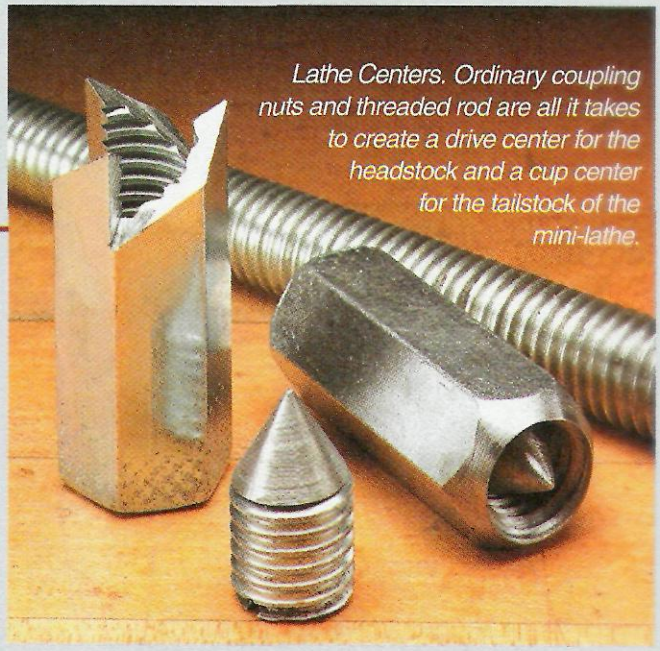
14 FIGURE







Making the Drive & Cup Centers



Lathe Centers. Ordinary coupling nuts and threaded rod are all it takes to create a drive center for the headstock and a cup center for the tailstock of the mini-lathe.

To simplify the centers in the headstock and tailstock that support the workpiece, I turned to common hardware store items — threaded rod and coupling nuts.

As you can see in the photo at right, with just a little work you can turn them into a spur center to drive the workpiece and a cup center to support the workpiece at the tailstock.

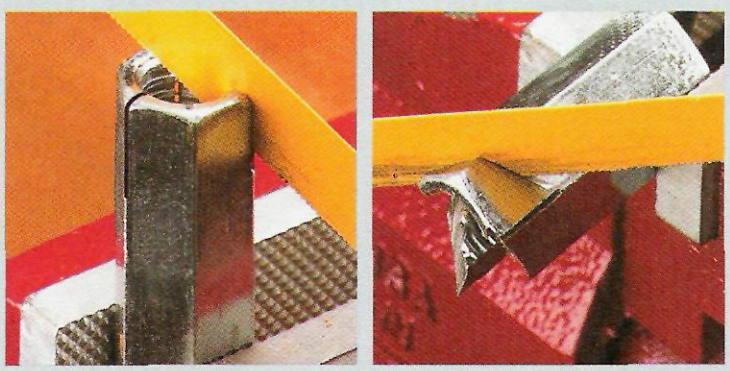
Drive Center – Making the drive center requires the most work, so that's where I started. After clamping a coupling nut in the vise, I made a series of cuts to define the spurs, like you see in Step 1 below.

Once that was complete, I smoothed the spurs with a file to ensure they were all even with each other. All that's left to do to complete the drive center is to add a centerpoint. For that I used a piece of threaded rod that I ground and then filed to a point, as you can see in Step 2. As shown in Step 3, a little epoxy on the threads of the drive center secures the centerpoint in place.

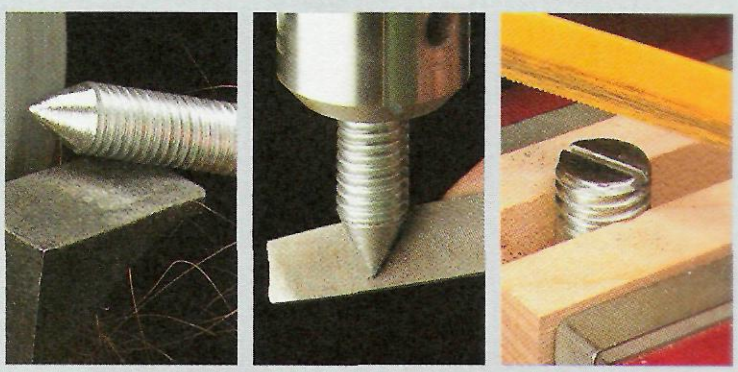
Cup Center – To support the workpiece at the tailstock, I also used a coupling nut. But since it doesn't have to drive the workpiece, I simply ground the outside of the nut smooth and then chamfered the inside edge, as in Step 4.

Here again, I repeated the process in Steps 2 and 3 for adding the centerpoint. What you'll notice is that a small "cup" is formed in the center. Since the center doesn't spin with the workpiece (the workpiece rotates around the center), the cup can be used to hold a dab of grease to lubricate the workpiece as it turns.

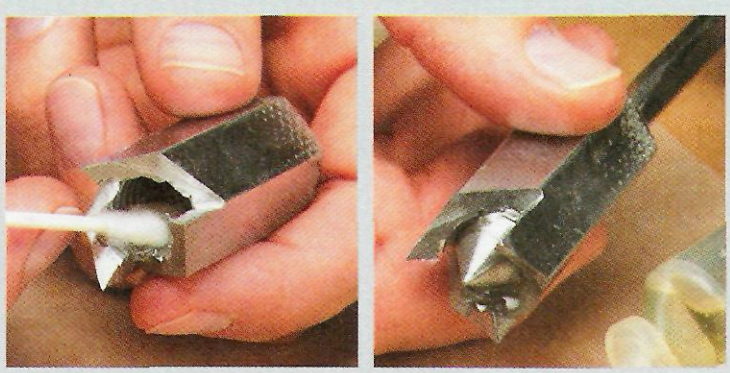
With the drive and cup centers complete, installing them is just a matter of threading them in place on the drive and tailstock shafts.



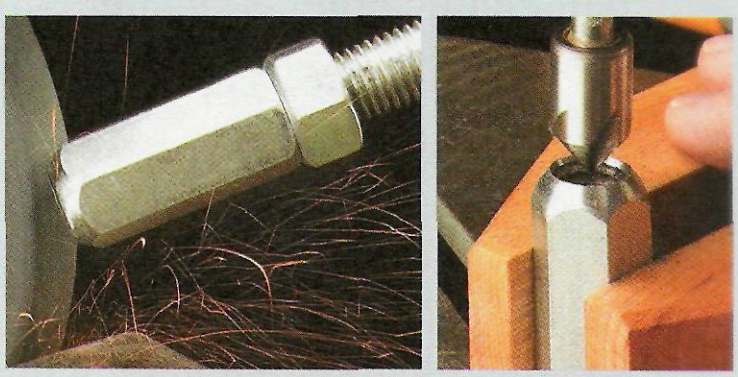
1 *To turn the coupling nut into a drive center with spurs, make a single cut down every other point on the nut, like you see in the left photo. Once that's complete, you can remove the waste by cutting across the nut and then filing the spurs smooth.*



2 *Creating a centerpoint is just a matter of grinding a short length of threaded rod to a point (left). To center the point, file the point while the rod is turning in the drill press (center). Finally, cut the point to length and cut a slot in the end (right).*

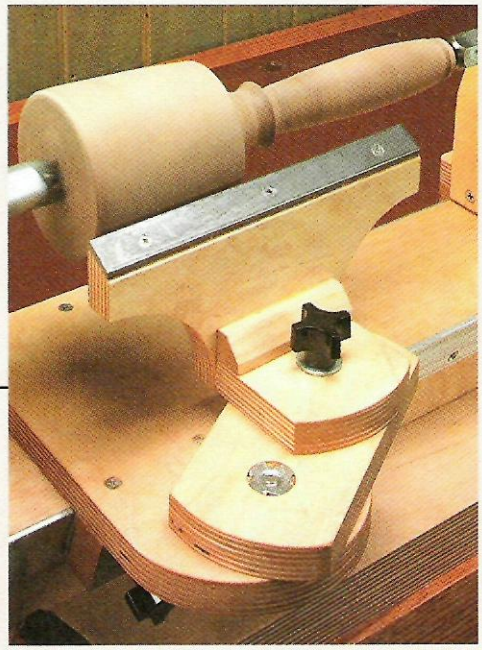


3 *Next, use a cotton swab to dab a bit of epoxy on the threads near the end of the drive center (left). Then turn the centerpoint in until it projects about 1/8" in front of the spurs, like you see in the photo at right.*

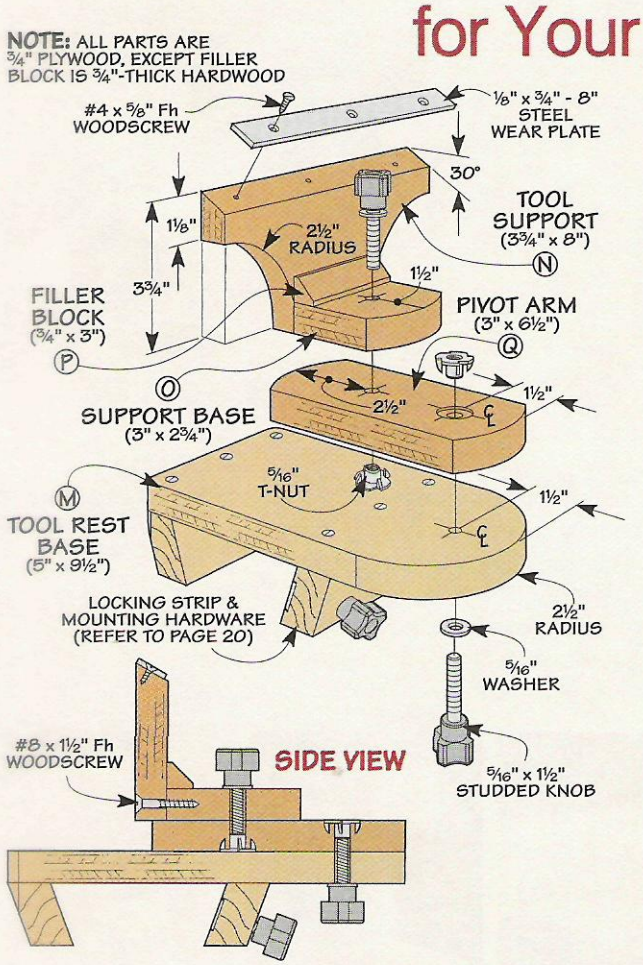


4 *To create the cup center for the tailstock, grind the end of a coupling nut smooth (left). Once that's complete, form a sharp edge using a countersink bit (right). Finally, make a second centerpoint and install it just as before.*

Must-Have Accessories for Your Lathe



Tool Rest



■ A tool rest is a definite must-have for the lathe. Without an easily adjustable tool rest, working at the lathe can "turn" into a chore.

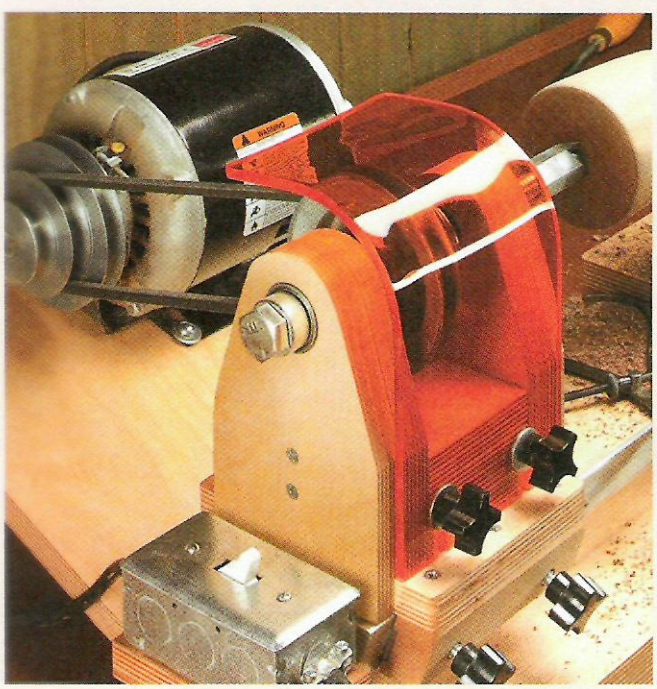
Base – The main part of the tool rest is the sliding base. The only difference between this base and the previous ones is the top extends past the front locking strip to provide for the pivot arm. The pivot arm allows you to adjust the tool rest in almost any position to suit the workpiece and tool you're turning with.

Rest – The rest consists of a tool support attached to a base (see drawing). To reinforce the assembly, I added a hardwood filler block. And a steel wear plate screwed to the top of the rest prevents wear and tear as you turn. (Note: To ensure tools slide easily back and forth, file and sand the wear plate smooth.)

To make it easy to adjust the tool rest to any position, I added a pivot arm between the rest and the base. A pair of T-nuts, washers, and studded knobs lock the rest securely in place.

One last thing. The rest is designed to place the wear strip $1/4$" *below* the centerline of the lathe. Depending on the type of projects you turn, you may find a tool rest that's a different height (or not as long) more to your liking.

Belt Guard

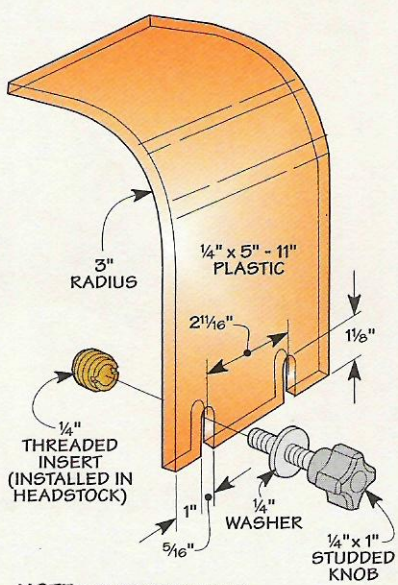


■ Having a belt spinning at thousands of RPM right near your hand can be a bit unnerving, not to mention unsafe. So to provide some protection, it's best to add a belt guard, like you see in the photo.

The guard is nothing more than a piece of plastic bent to wrap around the top of the headstock (see drawing). The tricky part is bending the plastic just the right amount.

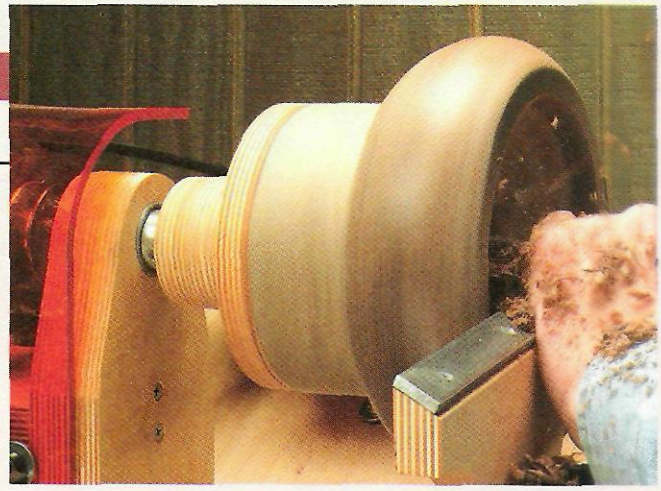
To do that, I used a heat gun to warm up an area where I wanted the bend. Once the plastic softened, a large coffee can provided the perfect radius to match the headstock.

To mount the guard, I added a pair of threaded inserts to the headstock. Washers and studded knobs that pass through slots cut in the bottom of the guard secure it in place.



NOTE: START WITH EXTRA-LONG WORKPIECE. BEND FIRST, THEN TRIM TO SIZE AND CUT SLOTS

Faceplate & Sanding Disk



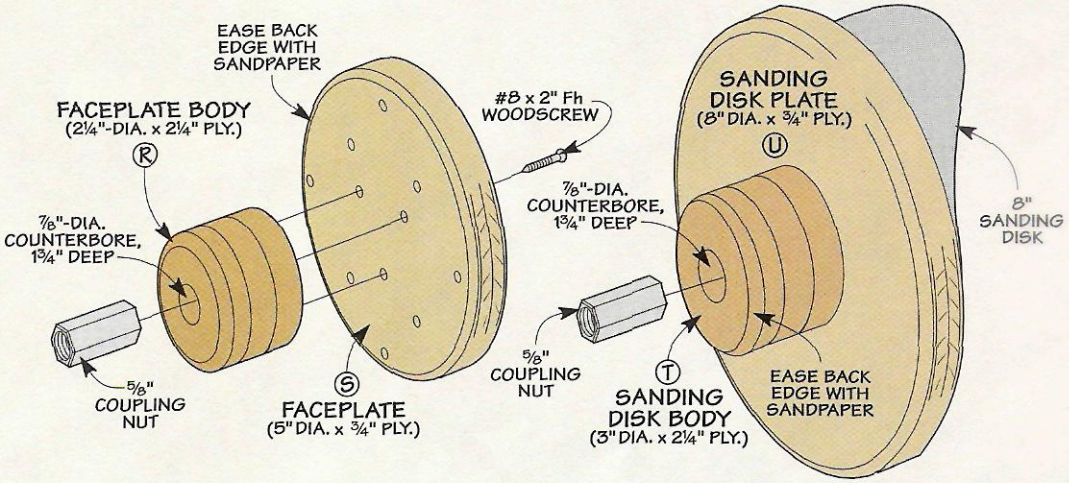
■ To give the lathe more capability, you might want to consider adding a faceplate or sanding disk. Neither one requires much in time or materials to make, but adds versatility.

Faceplate – The faceplate has three main parts: a coupling nut for mounting the faceplate to the lathe, a body glued up from three layers of plywood, and the mounting plate.

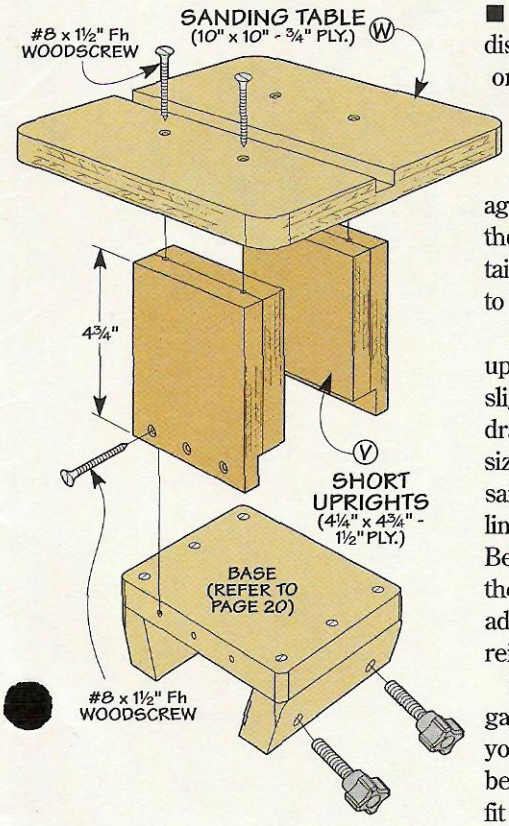
I started by gluing up the body and then cutting both the body and plate to rough size. Once that's complete there are a few holes to drill. In the body you'll need to drill a hole to accept the coupling nut. After gluing it in place with epoxy, you can drill a set of holes for attaching the faceplate to the body as well as holes for mounting the workpiece to the faceplate. Finally, glue and screw the plate to the body.

Sanding Disk – The sanding disk is even easier to make. All you need to do is make a larger body, add the coupling nut, and then glue a large sanding disk in place. I sized my disk for 8"-dia. abrasive disks.

True Up – One last thing. Before using either accessory, mount each one to the lathe and "true it up" so the face is flat and perpendicular to the centerline of the lathe.



Sanding Table

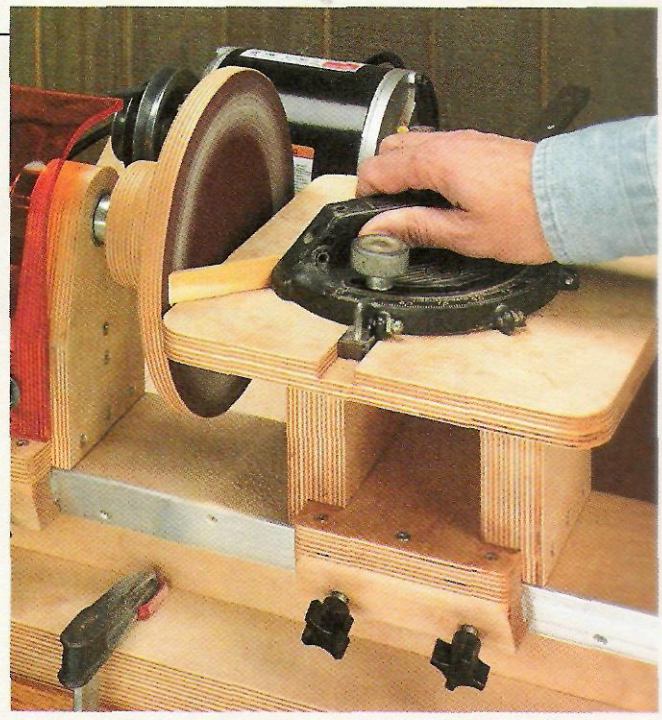


■ To make better use of the sanding disk, I added a sanding table, like the one you see in the drawing (left) and photo (right).

You can start on the sanding table by building a base. Here again, the base is identical to the those made earlier for the headstock, tailstock, and tool rest. (To see how to build the base, refer to page 20.)

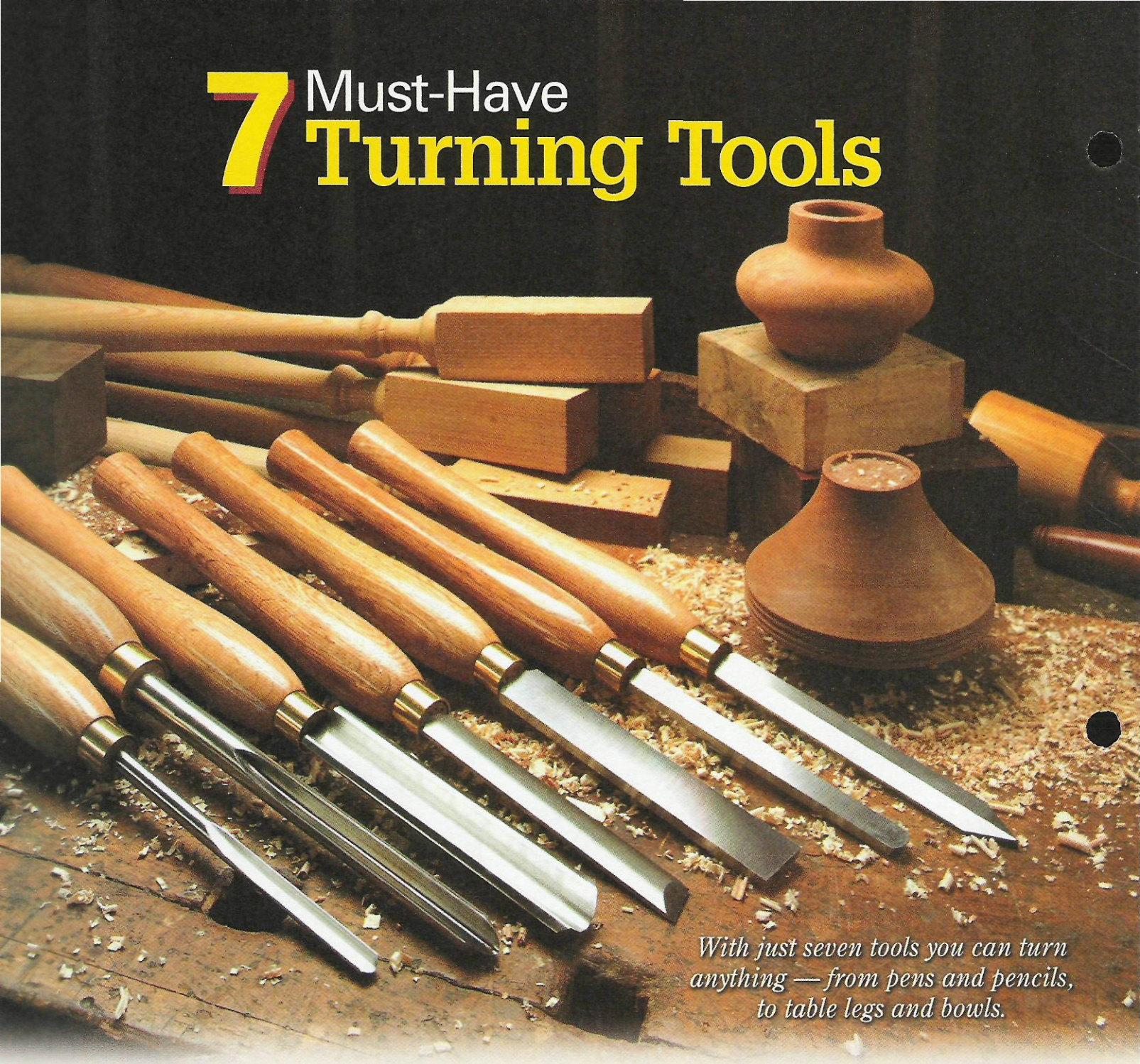
But instead of adding full-size uprights to the base, they're cut slightly shorter, like you see in the drawing at left. The uprights are sized in length so the top of the sanding table is right at the centerline of the sanding disk. Note: Because there isn't much stress on the sanding table during use, I didn't add a base block to the assembly to reinforce the uprights.

To allow you to use your miter gauge to support the workpiece as you sand (like you see in the photo), be sure to cut a groove in the table to fit the bar on your miter gauge.



It's important that the groove be parallel to the face of the sanding disk, so I used a combination square to position the top before screwing it to the uprights.

7 Must-Have Turning Tools



With just seven tools you can turn anything — from pens and pencils, to table legs and bowls.

One of the reasons I think many people don't get into turning is the cost of a lathe and tools. Well, page 16 provides plans for a low-cost mini-lathe. And when it comes right down to it, there's really only a handful of turning tools you need to cover most turning tasks. And that's the seven-piece set you see above.

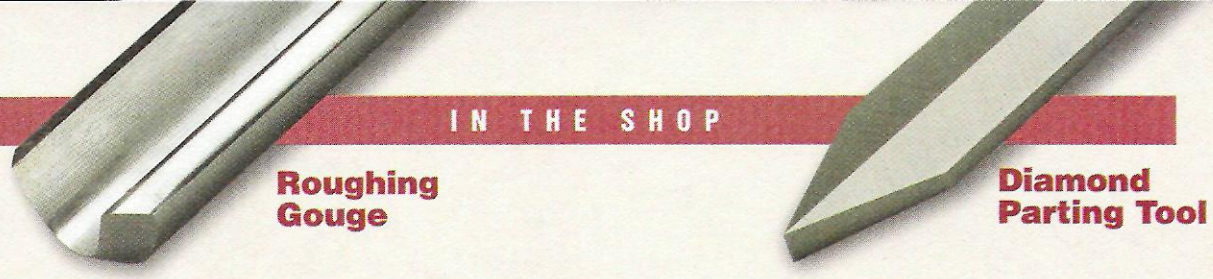
The Starter Set – The set shown features turning tools that will handle most spindle work. So whether you're turning something as small as a pen or as large as a table leg, you can be sure to handle it with nothing more than a roughing gouge (1"), a spindle gouge (1/2"), a skew chisel (1"), and a diamond parting tool (1/8"). For more on these tools, check out the opposite page.

If your interest leans to turning small bowls, you'll want to add a bowl gouge (1/2") along with square-end (1") and round-nose scrapers (1/2"). You can read more about them on the opposite page also.

Price & Availability – There are a large number of suppliers of turning tools. And if you turn to page 35, you'll find a list in the margin.

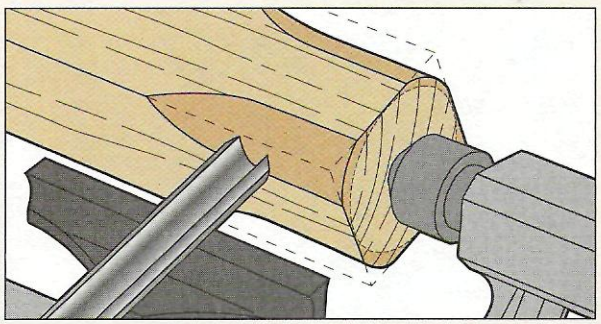
Just be sure to check out the price on sets of turning tools. They often contain most of the tools you'll need at a less expensive price. And if the set is missing one or two, it's a simple matter to just buy those separately.

The basic, heavy-duty set I purchased ($150) contained all the tools shown above except the bowl gouge ($50). Or if all your turning will be small-scale, you can buy a "miniature" set for around $80.



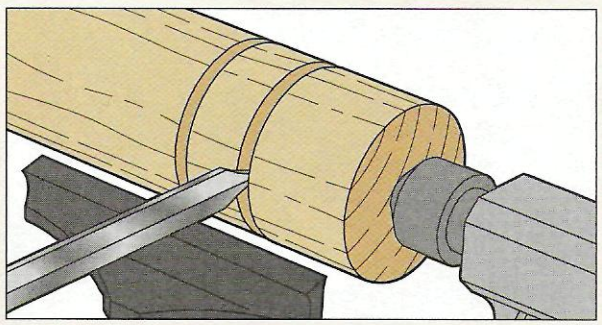
Roughing Gouge

■ One of the first tools I reach for when turning a spindle is a roughing gouge. As you can see, a roughing gouge is designed to be quite stout. This way, you can take some hefty cuts that will make quick work of "roughing" a workpiece into a cylinder (see below).



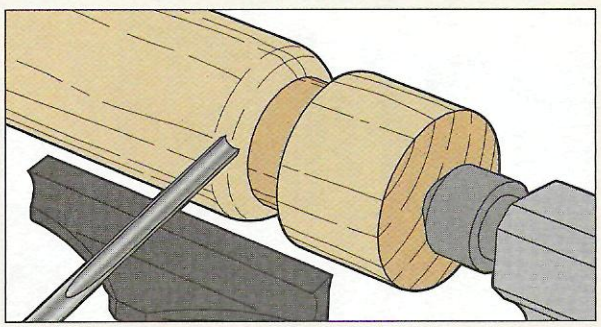
Diamond Parting Tool

■ To set off parts of a turning or remove it from the lathe, I use a diamond-shaped parting tool. The shape provides better clearance and less friction when cutting deep into a workpiece. Plus, a parting tool makes quick work of cutting tenons on the ends of workpieces.



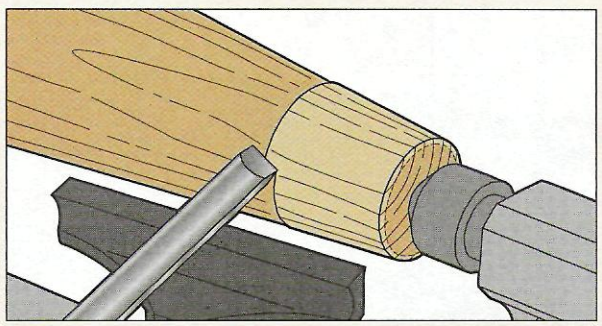
Spindle Gouge

■ A spindle gouge (see margin and drawing below) is the multi-purpose tool of turning. With it, there isn't much you can't do. I've used a spindle gouge to rough out a square blank and then shape it into a graceful table leg refined with delicate beads and coves.

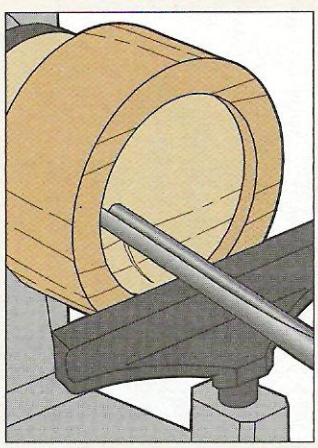


Skew Chisel

■ A skew chisel, like the oval-shaped model in the margin, is the smoothing plane of turning. Like a hand plane, it leaves behind a velvety-smooth surface that's ready to be finished — whether you're turning a cylinder, a graceful taper, or a set of beads.



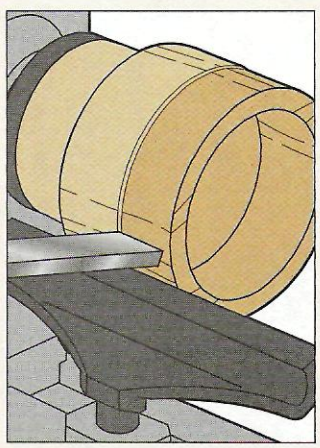
Bowl Gouge



■ When it comes to turning a bowl, a bowl gouge is the tool of choice. While it looks similar to a spindle gouge, it actually has a thicker, beefier body and a deeper, U-shaped flute.

This design helps to quickly remove the large amount of waste necessary to create a bowl, yet produces a smooth chatter-free cut.

Scrapers



■ Finally, you can add a round-nose scraper and a square-end scraper to complete your set of tools (see margin).

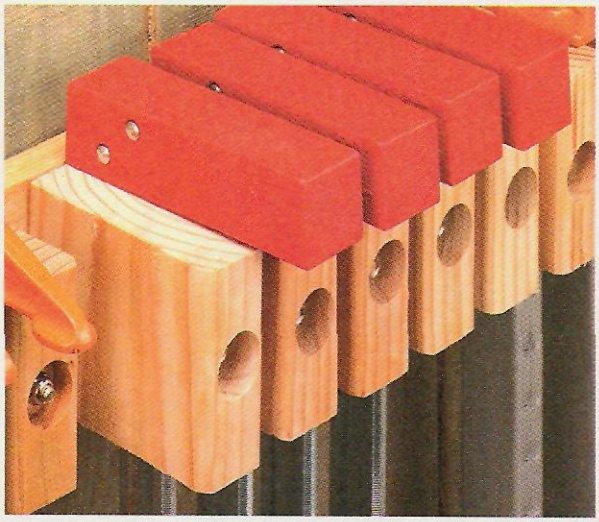
I know, scraping doesn't sound like fine turning. But in many cases, the tiny burr that's formed at the end of the scraper when it's sharpened is often the only way to make a tear-out- free cut in a workpiece.

Clamp Storage System

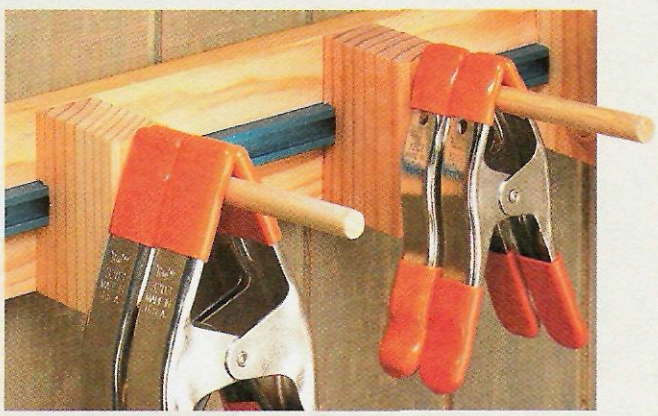
Here's a flexible clamp storage system that's designed to grow along with your assortment of clamps.

With all the different types of clamps available today, coming up with a "one-size-fits-all" way to keep them organized might seem like an impossible task. But this clamp storage system manages to do just that. The secret is in its design. There's really only two basic parts — a track that's attached to the wall and a series of adjustable blocks that fit onto the track. All you have to do is position the blocks to accommodate your particular assortment of clamps. And if you buy more clamps down the road, the system is easily expandable.

▲ **Narrow Blocks.** *The basic block is fastened to the T-track with a toilet bolt, a washer, and a nut. Grouping the blocks together makes slots for holding bar clamps.*



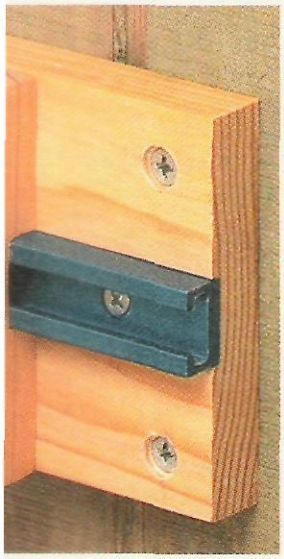
▲ **Wide Blocks.** *To accommodate large, heavy-duty clamps like the parallel jaw clamps shown here, the basic block can be made a little wider.*



▲ **Peg Blocks.** *By gluing a dowel in an angled hole drilled in a block, you can make a handy place to keep spring clamps. Two peg blocks side-by-side can be used to hold C-clamps in place.*

▲ **Lock-Down .** *All it takes to reconfigure the clamp storage system is a ratchet with a 7/16" socket.*

Track



▲ *T-Track. Each section of track consists of an aluminum T-track fastened to a wall plate. The sections are then screwed to the wall studs.*

I began building the clamp storage system by making the track. Each section of track is 48" long and can hold approximately 18-24 bar clamps. It's a good idea to start by determining the number of sections of track you'll need.

Wall Plate – As you can see in Figure 1, there's really not much to the track. It's just a piece of aluminum T-track mounted to a wall plate (a 1x4 board). A shallow groove in the center of the board helps to position the T-track while you're screwing it in place. To center the groove on the wall plate, I used a narrow dado blade and cut the groove in two passes, flipping the board end for end between each pass, Figure 2.

Customized Lengths – The reason I made my tracks 48" long is because this is the longest length of T-track I could find. But you could also make shorter lengths, or you can make a longer track by using two or more pieces of T-track, see the photo on the opposite page.

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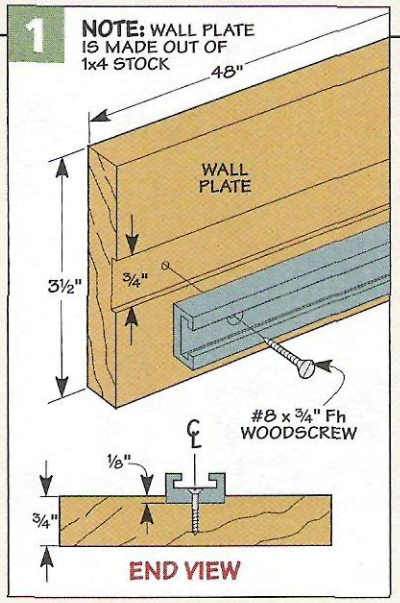

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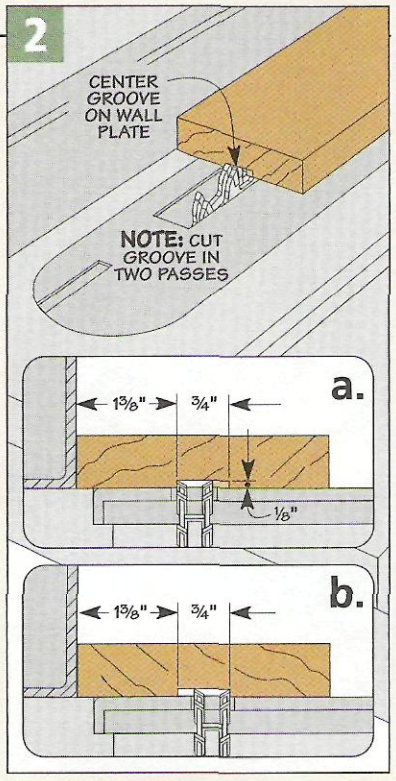


Adjustable Blocks

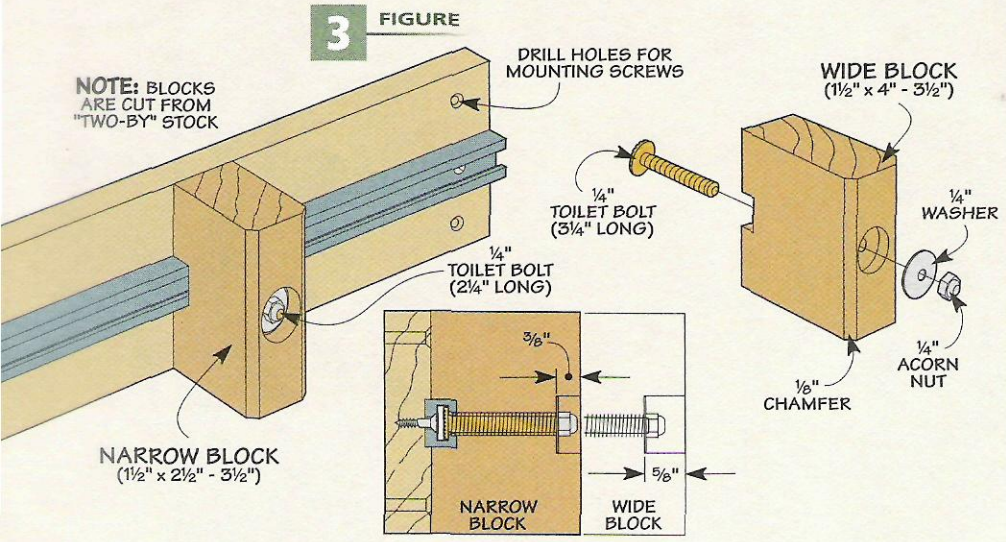
Once you've finished making all your track sections, you can start on the blocks that hold the clamps. Although there are a few more steps involved to making the blocks, they're still pretty simple. And because I had to make dozens of blocks, I came up with a few jigs and setups that will speed things along.

As you can see in Figure 3 below, I made two different sizes of blocks. The narrow block is designed to hold smaller-sized clamps. The wide block is sized for large parallel jaw and heavy-duty bar clamps.

Sizing the Blocks – To make the blocks, start by ripping some strips of 1½"-thick lumber down to width. (I used "two-by" framing lumber.) The strips for the wide blocks are 4" wide and the strips for the narrow blocks are 2½" wide.

After ripping the strips to width, you can cut the individual blocks to length. I did this by clamping a scrap of wood to my rip fence to act as a stop for setting the length of each block. You can see this in Figure 4.

Drill Counterbored Holes – Once all the blocks are cut to length, the next step is to drill a counterbored hole through the edge of each block. This hole receives the toilet

3 FIGURE


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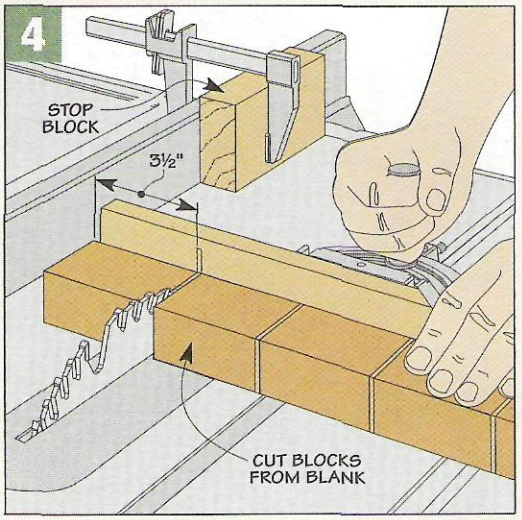


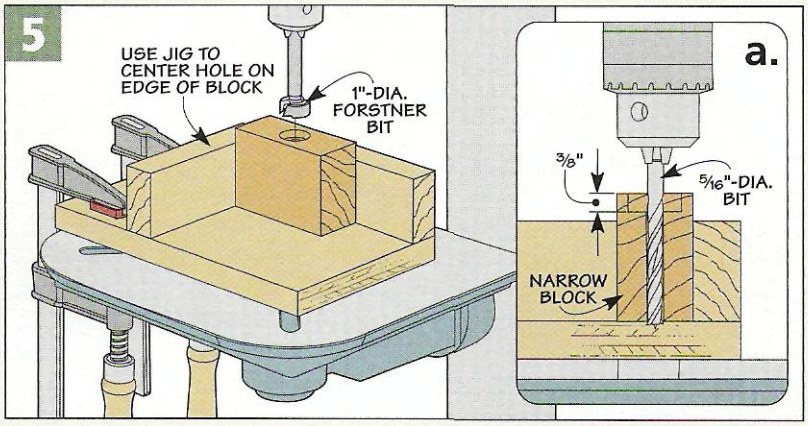
bolt, washer and nut that attach the block to the track.

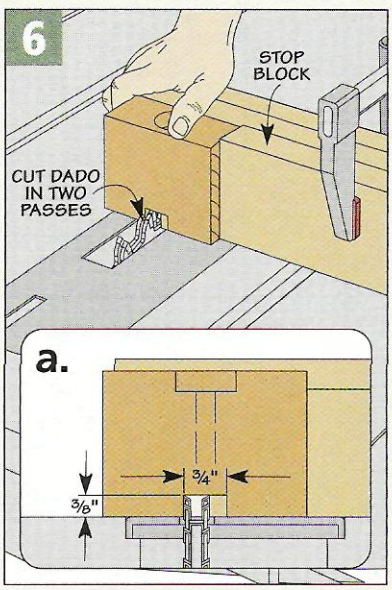
To speed up the process of drilling all these holes, I made the simple jig that you see in Figure 5. It's really nothing more than a scrap of plywood with a couple of fences attached to it. It automatically positions each block so that the hole will be perfectly centered on the edge of the block. Drill all the counterbores first, then switch to a brad-point bit and drill all the through holes, as shown in Figure 5a.

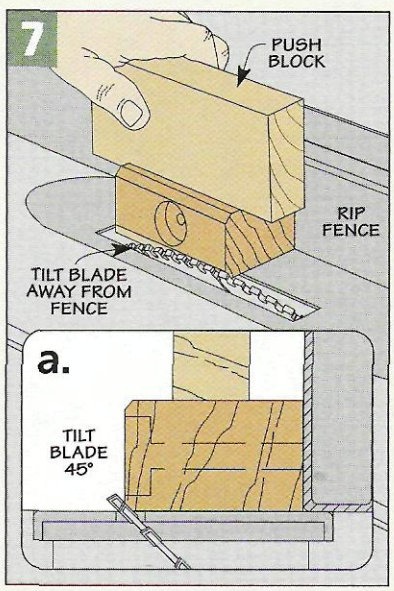
Cutting Dadoes – To allow the block to fit over the T-track, a dado is cut across one edge (the edge without the counterbore). The dado is slightly wider than the T-track so that the blocks will slide smoothly over the track. I used a stop block on the miter gauge and flipped the stock between passes so that the dado ended up centered on the length of the block (Figure 6).

Ease the Edges – To complete the blocks, cut a small (1/8") chamfer along the two front edges. To do this, I simply tilted my saw blade 45° and ran each block over the blade twice, flipping the block in between passes, as illustrated in Figures 7 and 7a.

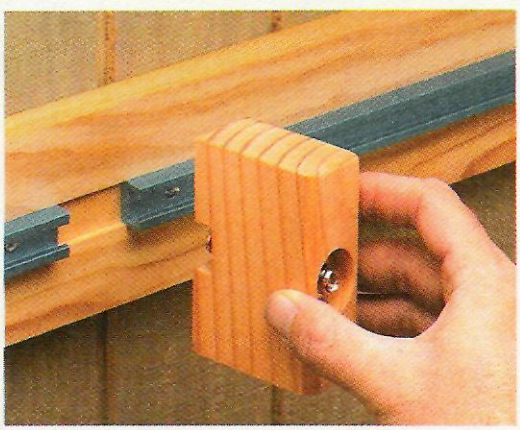
Peg Blocks – To hang up spring clamps and C-clamps, I modified some of the narrow blocks by adding a peg. I did this by simply drilling an angled hole near the top of the block and gluing a wood dowel in place (Figure 8).



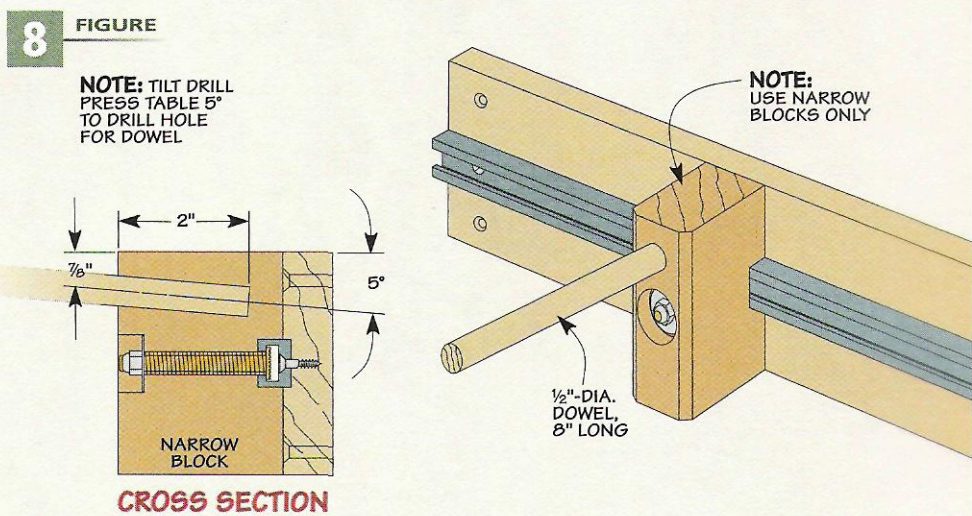




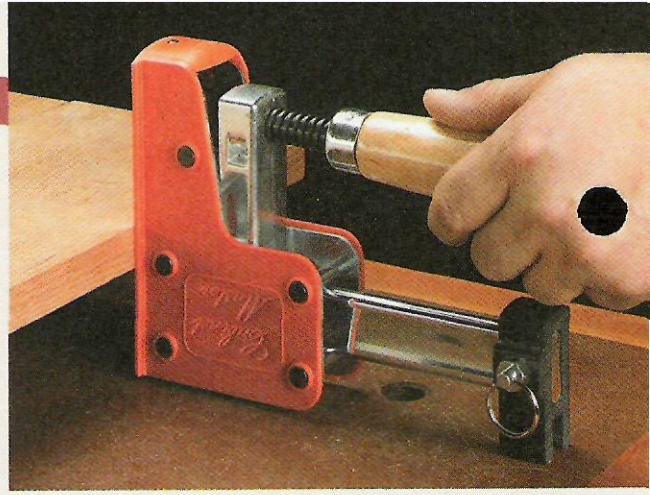
Easy Installation – With all the blocks completed, you're ready to install the storage system in your shop. After mounting the tracks to your wall (be sure to screw into the studs), you can go ahead and add the blocks. Simply slide the block to where you want it and tighten down the bolt to lock it in place. Once you've got all the blocks installed, you can say good-bye to your clamp storage problem once and for all.



▲ *Gap. For extra-long runs of track, you can leave a space in between the aluminum T-tracks to make inserting the blocks easier.*



Parallel Jaw Clamps



Clamps have been around for centuries. So just what is it that makes these clamps so special?

You may have heard the old adage that a woodworker can never have too many clamps. But the *type* of clamps you own is every bit as important as the number. Over the years, I've accumulated quite a few different kinds of clamps — pipe clamps, bar clamps, quick-action clamps, C-clamps, even a few old wooden hand screws. But lately, there's one type of clamp that I find myself reaching for more and more. And that's my parallel jaw clamps.

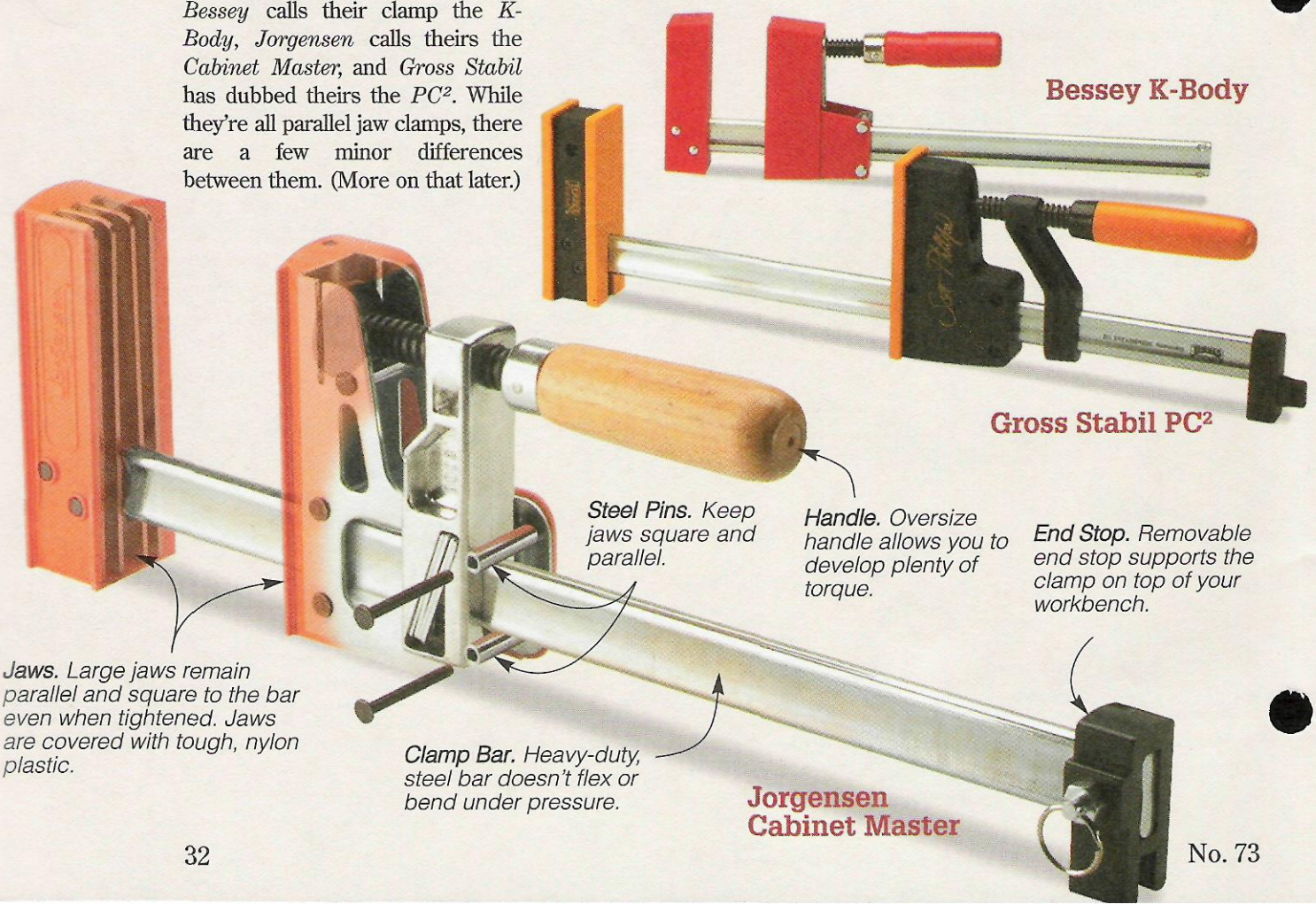
Now you may already be familar with parallel jaw clamps — even if you don't realize it. That's because these clamps are often referred to by their brand names. The three major manufacturers have each given their clamp a different name. *Bessey* calls their clamp the *K-Body*, *Jorgensen* calls theirs the *Cabinet Master*, and *Gross Stabil* has dubbed theirs the *PC²*. While they're all parallel jaw clamps, there are a few minor differences between them. (More on that later.)

Benefits – What makes parallel jaw clamps so great? Well, it all has to do with how they're constructed. If you take a close look at a pipe clamp or an ordinary bar clamp, you'll see that the jaws are tilted toward each other slightly. As you tighten the jaws down, they straighten out somewhat. But the problem is that in doing so, they can pull your workpieces out of alignment, leaving you with bowed panels and cabinets that are out of square.

On the other hand, parallel jaw clamps have jaws that are not only parallel to each other, but also at right angles to the bar of the clamp. So as you tighten the clamps, they actually help to square up whatever is being clamped. This makes them great for gluing up flat panels as well as cabinet or door frames.

But parallel clamps also have some other important features (see photo below). For one thing, they have large, deep jaws. The extra reach of the jaws means that you can clamp up a frame and panel door in two directions at once without having to worry about the clamps getting in the way of each other.

Parallel jaw clamps are also amazingly tough and rigid. Made with heavy-duty steel bars, they are much



less prone to flexing under heavy clamping pressure than pipe clamps or lighter-weight bar clamps. Adjusting the jaws is easy — you simply lift up slightly on the handle and then slide the jaw to where you want it. Then turn the beefy handle to develop 1000 to 1100 lbs. of clamping pressure.

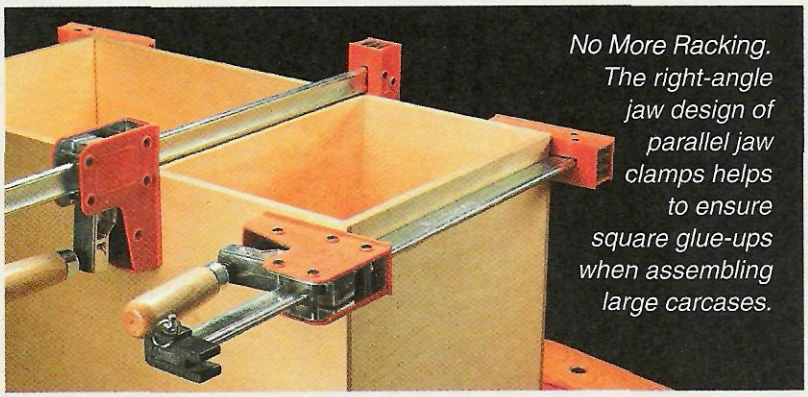
The jaws of these clamps are covered with tough nylon plastic pads — so you don't have to worry about the clamp marring your workpieces. As an added bonus, dried glue doesn't stick to the pads, so it's easy to keep them clean.

End Stop – Two of the brands (*Jorgensen* and *Gross Stabil*) have another feature that I really like — an end stop. This end stop serves several purposes. First, it prevents you from inadvertently sliding the jaw of the clamp all the way off the end of the bar.

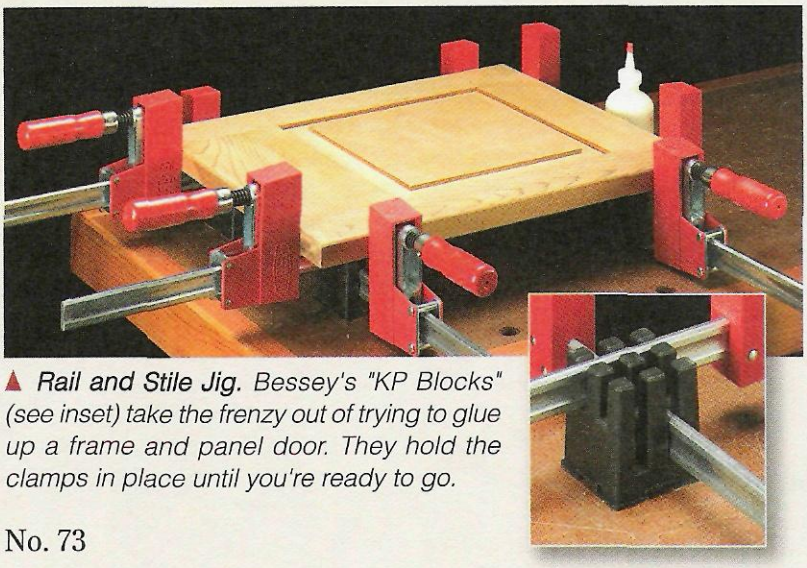
But more importantly, it acts as a "foot" at the end of the bar when using the clamp on top of a workbench. It raises the clamp up just enough so that you can freely slide the jaw along the length of the bar without having to lift the end of the clamp up off your workbench (see upper photo on opposite page). This makes it a lot easier to adjust the clamps when gluing up flat panels.

The end stop is also removable. This allows you to slide the jaw off the bar, reverse it, and use the clamp as a spreader (see photo at right). I'll admit that I don't do this too often, but it's a nice feature to have when you need it.

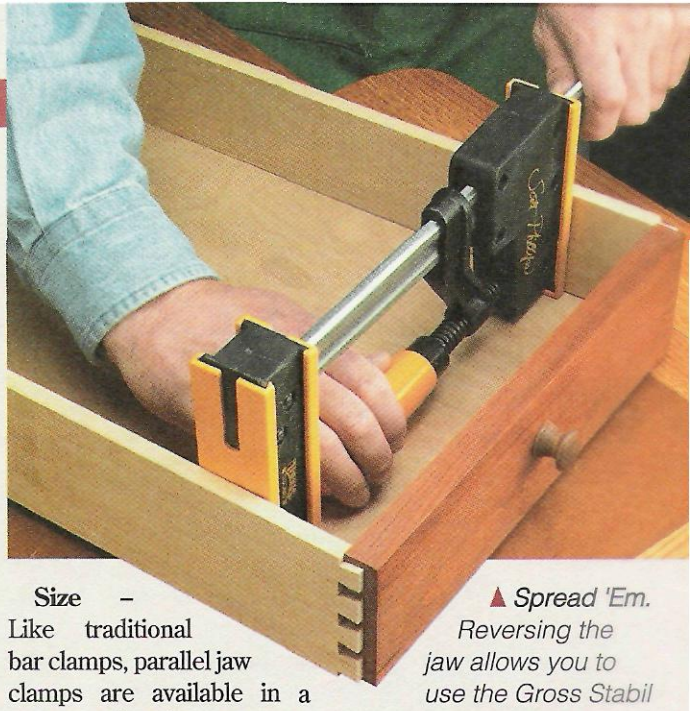
KP Blocks – The *Bessey* clamp lacks the end stop feature. Instead, *Bessey* sells a separate rail and stile jig to hold their clamps while gluing up an assembly. This "jig" is just a set of four plastic blocks with offset slots to hold the clamps at two different heights. The blocks really come in handy when gluing up frame and panel doors (see lower photo below). The blocks will also work with the *Gross Stabil* clamps.



No More Racking. The right-angle jaw design of parallel jaw clamps helps to ensure square glue-ups when assembling large carcases.



▲ ***Rail and Stile Jig.*** *Bessey's "KP Blocks" (see inset) take the frenzy out of trying to glue up a frame and panel door. They hold the clamps in place until you're ready to go.*



▲ ***Spread 'Em.*** *Reversing the jaw allows you to use the Gross Stabil clamp as a spreader. (The Jorgensen clamp also has this feature.)*

Size – Like traditional bar clamps, parallel jaw clamps are available in a variety of lengths, ranging from 12" up to 100". So no matter what you are clamping up, you should be able to find a size that suits your needs.

Brands – When it comes to selecting a brand of parallel jaw clamp, you really can't go wrong. All three brands are excellent. But if I had to pick a favorite, I'd go with the *Gross Stabil PC²*. It has all the features that the other clamps have, plus a couple of added benefits.

For one thing, it's the only clamp with completely replaceable parts. So if the jaw pads get chewed up — or if something breaks — you can just buy new parts. Plus, the jaw on the *Gross Stabil* locks in place until you lift the handle. If you pick up either one of the other two clamps at the wrong end, the jaw can come crashing down on your fingers.

Price – About the only thing that I don't like about parallel jaw clamps is the price. Depending upon the brand, you can expect to pay $30 to $37 for a single 12" clamp (and even more for the longer lengths). For sources, see page 35.

At that price, I'm not about to run out and replace all of my trusty pipe clamps with parallel jaw clamps anytime soon. And the truth is that for many clamping tasks, pipe clamps or traditional bar clamps work just fine. But there are definitely enough benefits and advantages to parallel jaw clamps in order to justify adding a few to your clamp rack.

Why we use Baltic Birch Plywood

Strong, stable, and void-free, Baltic birch is the perfect choice for jigs, fixtures, and shop storage projects.

I like to build projects just as much as the next guy. But one of the things about woodworking I really enjoy is making the jigs and fixtures that make building projects easier, quicker, and more accurate.

Whenever I build a jig or fixture that I know I'll be using over and over, it's important that it be strong, stable, and most importantly, it needs to maintain its accuracy each and every time I use it.

Baltic Birch – The material I turn to for most jigs and fixtures is Baltic birch plywood — a premium, hardwood plywood that's strong and stable. This plywood gets it's name from the birch trees that grow in a number of countries in the Baltic region in Europe.

While that's interesting, what makes Baltic birch plywood a great choice for use in the shop is the number of plies that make up each sheet. The $^3/_4$" plywood you see on this page consists of 13 plies. Typical $^3/_4$" hardwood plywood made in the U.S. has seven plies.

These extra plies give Baltic birch a number of advantages. For starters, it's stronger and more stable. Since it doesn't change much in length or width, it's great for jigs and fixtures where you want to maintain accuracy over the long haul.

▲ *Joinery. Since the plies in Baltic birch are free of voids, traditional joinery and screws make for rock-solid assemblies.*

The added plies also make for clean, solid joinery — whether you're cutting grooves, dadoes, rabbets (see inset above), or even dovetails. Finally, the plies hold screws better than a typical sheet of plywood — whether you're close to an edge, or screwing into "end grain," like you see in the main photo above.

The Baltic birch you'll typically find is graded B-BB. So the face veneer (B) will be a single piece without any patches. The back face (BB) and inner plies may be tightly patched. These patches on the inner plies make it highly unlikely that you'll run across a void or seam, something that's fairly common with other plywood. And since any cut will be "clean," the finished edge looks great, as in the photo at left.

Metric Thicknesses – One thing I like about Baltic birch is that you can buy it in thicknesses listed from $^1/_8$" up to $^3/_4$". But Baltic birch comes from Europe, so it's actually manufactured in metric dimensions.

The reason for this is that each layer of Baltic birch is about 1.5mm thick. (The face veneers are about half as thick.) So the actual thickness is in increments of 3mm. Although this is pretty close to $^1/_8$" thick, each sheet will run thinner (0.04" in the case of $^3/_4$" Baltic birch). I know. That doesn't sound like a big deal. But it's important to allow for that when cutting joinery like dadoes.

Overall Size – You'll also want to be aware of the overall size of the sheet you'll end up buying. Instead of picking up a typical 4' x 8' sheet, Baltic birch is sold in 5' x 5' sheets. (Note: You can often find it in half and quarter sheets.)

Things to Consider – The size and thickness aren't the only things to consider before choosing Baltic birch plywood for your next project.

Although the large number of plies form a very stable product, it is a plywood product and can warp. This is especially true with the thinner sheets. I don't consider that much of a problem since most jigs consist of smaller pieces that are glued and screwed together.

Also, Baltic birch plywood is more expensive. Since higher-quality plies and more work go into assembling each sheet, Baltic birch will cost about twice as much per square foot compared to a typical sheet of plywood.

Availability – You're most likely to find Baltic birch plywood at a hardwood lumber dealer. But if you can't find it locally, there are a number of mail-order sources that carry it in a variety of sizes and thicknesses. (Refer to the margin on the opposite page.)

Still, I think you'll find that Baltic birch is the best choice for making jigs and fixtures you'll be using in your shop for years to come.

◀ *Great Looks. No matter how you cut it, the void-free layers of Baltic birch plywood ensure that you'll have an edge that looks great.*

Sources

Mini-Lathe Hardware

■ The biggest job you may have to tackle when building the mini-lathe on page 16 is rounding up all of the hardware.

You'll be able to find most of the items you need, like the heavy-duty bolt, coupling nuts, screws, aluminum, steel, T-nuts, washers, and stop collars, at a hardware store or home center. If you can't find the studded knobs used throughout the project, check for them at *Reid Tool* (see margin).

Bearings – If you decide to order the knobs from *Reid Tool*, be sure to order a pair of the double-shielded bearings (NB-1095) that support the bolt in the headstock.

Motor & Pulleys – If you already have a motor, you have the biggest expense for the mini-lathe covered. But if you need to buy one, check out the sources in the margin.

We used a $\frac{1}{4}$ hp, 1725 RPM, 115 volt, open motor with a 48Y-style base. (It's basically a belt-drive, furnace motor.)

Ours came without a power cord, so you'll probably need to pick up some wiring materials along with an on/off switch.

To get pulleys that fit a 3L300 belt (which we found ran smoother), we had to order them from a local hardware store. We used a pair of *Congress* model SCA43 pulleys.

Lathe Tool Cabinet

■ You can probably find all of the hardware for the lathe tool cabinet on page 6 at a local home center — except for the hinges.

Hinges – The hinges used on the roll-around cabinet are a little unique.

For starters, we only wanted the hinge knuckle to show with the lids closed. And when the lids were folded open, the hinges needed to provide solid support and attach securely to the narrow edge of the lid.

The solution was a heavy-duty inset hinge. The set of four dull chrome finish hinges (C86026D) we used came from *Woodworker's Hardware*. *Rockler* sells similar hinges (slightly smaller) in bright and antique brass finishes (31573 and 31586).

Casters – Finally, if you have any trouble locating a set of locking swivel casters, give *Rockler* a call (see margin). They carry the casters under part number 31870.

Router Circle-Cutting Jig

■ There's only a handful of hardware required for the router circle-cutting jig featured on page 12.

For the pivot pin, we used a red plastic knob (R-3) with a threaded insert from *Reid Tool*. The 1"-long studded knobs are available from *Reid* and a few of the suppliers listed in the margin.

Clamp Storage System

■ For the clamp storage system on page 28, you'll need flange bolts and a few sections of T-track from *Rockler*. They sell T-track in 2', 3', and 4' lengths.

Because of the number of flange bolts required, you'll want to look for contractor packs. The ones we found at a local home center contained 20 bolts, nuts, and washers. And they were quite a bit less expensive than buying everything individually.

MAIL ORDER SOURCES

Similar project supplies may be ordered from the following companies:

Rockler
800-279-4441
www.rockler.com
Casters, Bessey & Jorgensen Clamps, Hinges, Knobs, T-Track

Dreisilker Electric Motors
800-922-1882
shop.emotorstore.com
Motors, V-Belts

Electric Motor Warehouse
877-986-6867
electricmotorwarehouse.com
Motors

Lee Valley
800-871-8158
www.leevalley.com
Knobs, Turning Tools

Mike's Tools
800-253-0421
www.mikestools.com
Gross Stabil Clamps

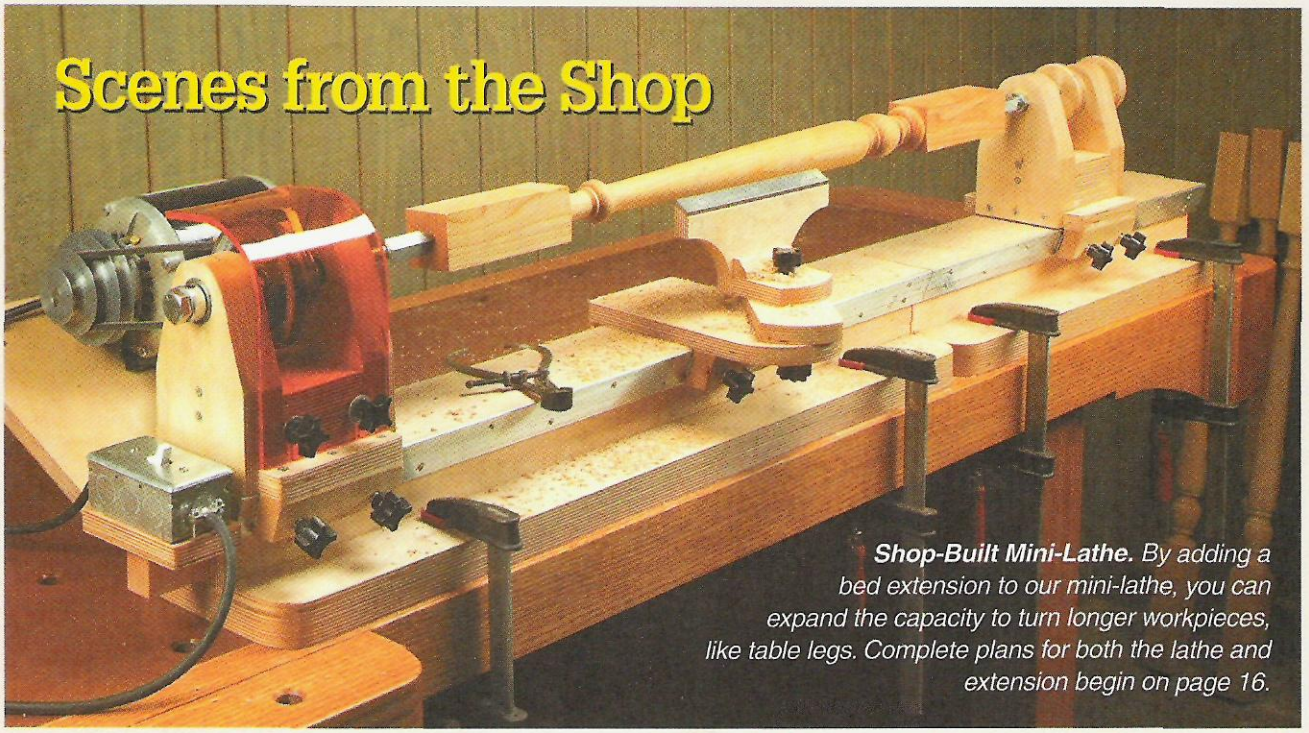
Reid Tool
800-253-0421
www.reidtool.com
Bearings, Casters, Knobs

The Wood & Shop, Inc.
314-731-2761
www.woodnshop.com
Baltic Birch Plywood

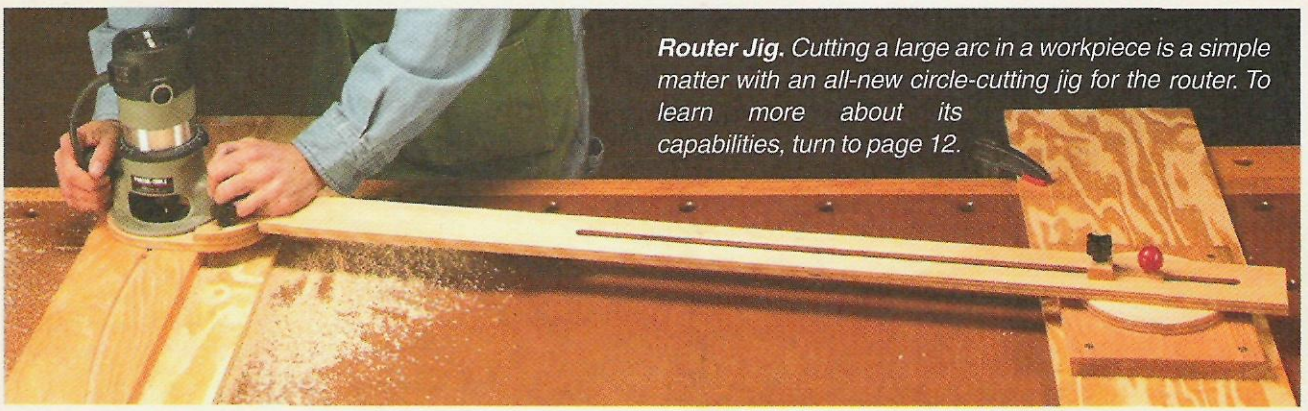
Woodsmith Store
800-835-5084
Baltic Birch Plywood, Casters, Bessey & Jorgensen Clamps, Knobs, T-Track, Turning Tools

Woodworker's Hardware
800-383-0130
www.wwhardware.com
Hinges

Scenes from the Shop



Shop-Built Mini-Lathe. *By adding a bed extension to our mini-lathe, you can expand the capacity to turn longer workpieces, like table legs. Complete plans for both the lathe and extension begin on page 16.*



Router Jig. *Cutting a large arc in a workpiece is a simple matter with an all-new circle-cutting jig for the router. To learn more about its capabilities, turn to page 12.*

Lathe Tool Cabinet. *Convenient access and ample storage make this roll-around storage center a must-have for any shop with a lathe. Detailed plans and instructions start on page 6.*