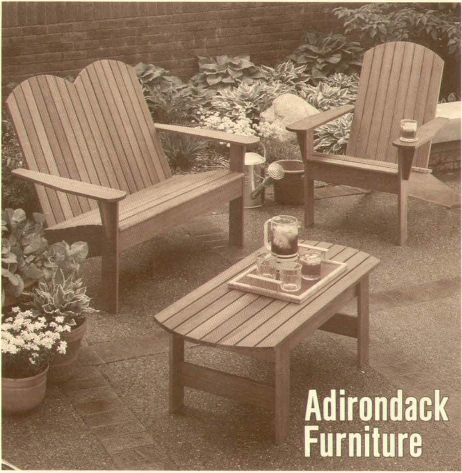
NO. 69 NOTES FROM THE SHOP $3.95

Woodsmith®



No. 69 June, 1990

Woodsmith

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E D I T O R ' S   C O L U M N

Sawdust

Adirondack chairs are hard not to like. They're easy to build. They're great for a patio or deck. And they're certainly classic American furniture that's right at home with lemonade and corn on the cob.

From a woodworking standpoint, they're very straightforward — butt joints that are glued and screwed together. With that kind of joinery it should be easy to design an Adirondack-style chair, right?

Well, it's more involved than I thought. Chairs are difficult design projects — no matter how simple the joinery might be. The two critical features in these Adirondack chairs are the slant of the back, and the shape of the seat.

Adirondack chairs have a "lean back and relax" look to them. So it's easy to design them with a back that has a pretty good slant to it. It's also easy to get too much slant.

I've sat in some Adirondack chairs that look comfortable, but the back slants a little too much. As you lean back, you get to that point where you feel you're going to lose your balance. It happens all the time when you lean back in rocking chairs and recliners. But it shouldn't happen in a lawn chair.

The angle you're looking for is the angle of the back in relation to the seat. That angle can be anywhere from 100° (for upright reading) to 130° (for relaxing and soaking up the sun). But how do you determine the angle you want?

Since this type of chair is used for relaxing and conversation, we started in the middle of this range and built several prototypes. Then we had everyone sit in them to find the angle that felt most comfortable. It's amazing how even small changes in the angle (changes that don't look very important on the drawing board) can make a big difference in how the chair feels.

Once we got a consensus on the angle of the back, we had to determine the *shape* of the seat. Adirondack chairs are typically designed with concave (U-shaped) seats — with the idea that if it looks comfortable, it will probably be comfortable. Not so.

If the seat is too concave, it may look comfortable, but it can make you slouch too much, or it will put too much pressure on your tailbone or right behind your knees. Again, very small changes in the shape of the seat can make a big difference.

The shape that provides the most comfort is a flattened-out S-shape with the front of the seat curved down to allow relief behind your knees. As we played with that shape, we found that it was most comfortable when the seat was shaped so the pressure is distributed evenly along the back of your legs, somewhere along the second, third and fourth slats on the chair seat. This gives support without cutting off circulation to your lower legs.

I'm getting carried away with all the details of building this chair. But it was interesting to see the results of what seemed like small changes.

COMPASS. With all this discussion about Adirondack chairs, you'd think it was my favorite project. Don't get me wrong, I like these chairs. But my favorite project is one of the smallest ones we've featured — the Beam Compass (shown on page 22).

The tendency is to knock out a project like this in a hurry. Grab some scrap wood, nail it together, and don't worry too much about how it looks as long as it works.

But making tools is rewarding work. They become a part of your shop. So I found a nice piece of hardwood, I shaped the parts carefully, and I used brass knurled finger nuts. Thumb screws and pine would have worked just as well. But I've found that I enjoy my shop-made tools more if I put more time and care into making them look nice, too.

TAMBOURS. It's been a long time since we've built a project with a tambour (rolltop). Most of the time I think of tambours as a sliding lid — as on a roll-top desk.

The CD Case (page 6) could have been designed that way, but I wanted to try making a tambour *door*. As with a lot of projects, the key to making it work was a simple jig. This time it was a template that was used to rout the tambour groove.

ARCHIE. *Woodsmith* is a relatively young company, so it seems odd to have our first retirement. Archie Krause has decided to spend more time with his family and do a little more fishing. For the past seven years Archie has done a great job of taking care of our/his building. He has also handled most of the shipping of Back Issues. We all wish him well.

NEXT MAILING. The next issue of *Woodsmith* (No. 70) will be mailed during the week of August 14, 1990.

Don

A LOOK INSIDE

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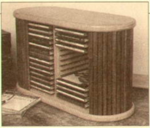
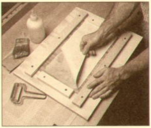
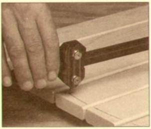






Tips & Techniques

MITER CLAMP

Here's a clamping jig I use to keep mitered corners tight while gluing. It's a method for putting the pressure where it's needed — at the center of the joint and perpendicular to the joint line, see Fig. 1a.

The jig consists of two ¾"-thick blocks C-clamped to the two pieces that are being joined. I cut an angled notch in each block to accept another clamp. (I use a hand screw.) This clamp applies pressure across the joint.

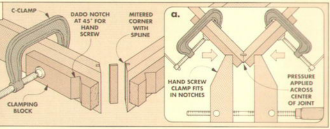
I cut the width of the blocks to match the thickness of the hand screw, and about 6" long. The only tricky part is cutting the angled notches in the blocks.

To do this, I mounted a ¾" dado blade in the table saw and tipped the blade to 45°. Cut the notch close to one end so when the blocks are in place, the tips of the clamps will form a line through the center of the joint. Then when the hand screw is tightened, pressure will be applied directly on the joint, see Fig. 1a.

On a long (tall) miter corner, set up two pairs of blocks: one set at the top and one at the bottom of the joint.

Ray Ayotte
Burnsville, MN

1



VELCRO

I've found all kinds of uses for self-adhesive Velcro strips in my shop. I buy ¾"-wide strips from a hardware store for $1.39 a foot.

Originally I bought the Velcro for keeping pencils within reach. Wrap a small strip around the pencil and stick a strip in a convenient spot above your bench, and the pencil never rolls away.

After the Velcro was in my shop, I found lots of other uses for it. The most obvious uses are for holding tape measures, rulers, and small hand tools.

But I think the most valuable use is when a tool needs to be close to a machine. A push stick on the side of a table saw. Router wrenches near the router table. Or a chuck key on the drill press. All it takes is a strip of Velcro on the tool and a mating strip on the machine. The stuff holds. I've never had it vibrate loose.

Gary Gaither
San Antonio, TX

MORTISING TABLE INDEXING STOPS

After building the Mortising Table featured in *Woodsmith* No. 67, I made one simple addition that makes it even more useful. By adding an indexing system, I can quickly reposition the bit to cut centered mortises in different thicknesses of stock.

I started by assuming that most of the stock I would be mortising would be ½", ¾", or 1" thick. So, to cut a mortise centered on these thicknesses, the center of the mortising bit has to be ¼", ⅜", or ½" above the table.

To index these positions, I drilled holes below the router base plate and inserted a cut-off ⅜" carriage bolt into the desired hole as a stop, see Fig. 1. The pivoting base plate rests on the bolt and positions the bit at the correct location.

To locate the holes, mount a V-groove bit in the router and raise the router until the point of the bit is at the desired height, see Fig. 1a. Then, tighten down the base plate.

Now, hold a ⅜" brad point bit under the base plate and push on it to mark the centerpoint of the stop hole. Then raise the base plate out of the way and drill through the back of the Mortising Table.

One caution: This technique works only if the stock is *exactly* ½", ¾", or 1" thick. It's still a good idea to work with a common (front) face of all your workpieces down against the table.

Don E. Ruhl
Kettering, OH

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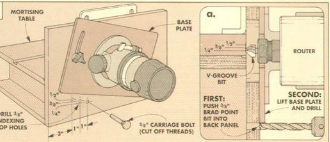

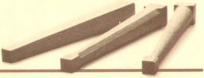

ROUTER TABLE TURNING

■ I've developed a system of "turning" on a router table instead of a lathe. My technique uses two wheels that are screwed to the ends of the workpiece. Then this assembly is run against a straight bit, with the workpiece rotated slightly between passes, refer to Fig. 4.

To make a tapered leg or cylinder, start by cutting a piece of square stock to length. Then drill a small pilot hole at the centerpoints of each end to mount the wheels, see Fig. 1. Now, if you're making a tapered leg, first taper all four sides of the workpiece on the table saw.

The trick to my system comes next — the wheels. I cut these from ¾" stock with an adjustable circle cutter on the drill press so they would be larger in diameter than the ends of the workpiece. If you're "turning" a cylinder, cut both wheels the same size. But if you're "turning" a tapered leg, each wheel should be slightly larger than the end of the leg it's attached to, see Fig. 1.

After the wheels are cut to size, screw them tight to the ends of the workpiece so they *don't* turn. Now you can set up the router table, see Fig. 2.

Note: Since the wheels must always run on the router table and along the fence, the length of your router table and fence limits the length of stock you can "turn." When making legs longer than 11", I made a temporary router table from a long strip of plywood with a straight 2x4 as a fence. Then I mounted my router under the plywood.

To set up for "turning," mount a ½" straight bit in the router table and position the wheel and workpiece assembly on the table so one corner of the workpiece is against the bit, see Fig. 3.

Now raise the router bit until it's slightly above the center of the workpiece at the thick end, see Fig. 3. Then position the fence so that when the large wheel rests against the fence, the bit will cut a ⅛" chamfer into the corner of the workpiece.

Next, to control the length of the turned section, clamp stop blocks to the left and right ends of the fence, see Fig. 2.

To begin cutting, hold the right wheel against the right stop block and push the workpiece into the turning router bit. Then move the assembly from right to left with both wheels against the fence.

The first cut will trim a ⅛" chamfer off one corner. Then rotate the workpiece/wheel assembly 90° and trim off the next corner. Continue around until all four corners are chamfered. *(Editor's Note: This creates an interesting leg and you may want to stop here, see photo.)*

If you want to make the workpiece round, move the fence back ⅛" and make another set of cuts. By repeating this procedure, eventually the bit will have cut around the entire face of the workpiece.

The trick to making the workpiece almost perfectly round is patience. Rotate the workpiece *very slightly* between passes and continue to take stock off each corner. As you rout, you will be creating more corners with each pass, but the corners won't be as sharp, see Fig. 4.

Eventually the workpiece will start to feel smooth and round. Then remove the wheels and hand sand any of the small flat areas left by the bit.

John Grant
Juneau, AK

Editor's Note: To be honest, we were skeptical when we received this letter. So we tried it and were surprised with the results. In about ten minutes we made the tapered leg shown in the photo above. (And the leg hasn't even been sanded yet.)

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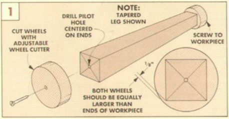

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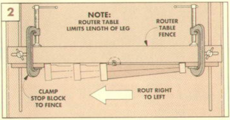

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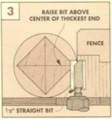

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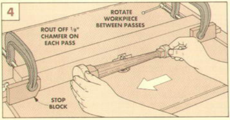


SEND IN YOUR TIPS

If you would like to share a tip or idea, just send it to *Woodsmith*, Tips and Techniques, 2200 Grand Ave., Des Moines, Iowa 50312.

We will pay upon publication $15 to $100 (depending on the published length of the tip). Please include an explanation and a sketch or photo (we'll draw a new one).

CD Case

This Compact Disc Case is a good opportunity to try a tambour with vertical slats. The tambour stretches around to form a flexible door that hides the inner case, which holds 28 individual CD boxes.

I've been wanting to make a project that uses a tambour — but not the typical "breadbox" style with horizontal slats. I wanted to make a vertical slat tambour. This CD (compact disc) case gave me the perfect opportunity to give it a try.

INNER CASE. Actually, this CD case is a case within a case. The inner case is constructed first — it's simply a box with ⅛"-thick dividers. The dividers are used to hold and separate the plastic boxes that CD's come in. I made the case to hold 28 of these boxes.

TAMBOURS. While the inner case is the heart of this project, the most interesting part is the tambour doors on the outer case. Each tambour door is made up of 29 ½"-wide slats. When the doors are closed, the CD's are protected and hidden from view.

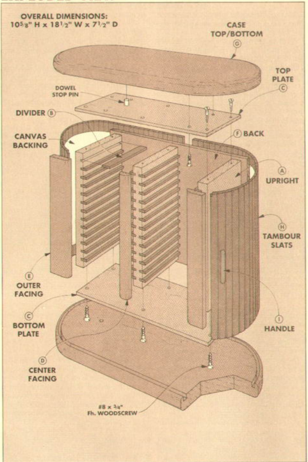
There's nothing tricky about making these doors, they're just wooden slats held together with a piece of canvas. (We talk about tambours and how to make them in an article beginning on page 12.)

The tricky part was routing perfectly matched grooves in the top and bottom of the outer case for the tambour doors to ride in. To do this, I used a template and a guide bushing on the router. Then, to shape the top and bottom pieces so they matched the shape of the groove, I used the template again. But this time with a rub arm on the router table.

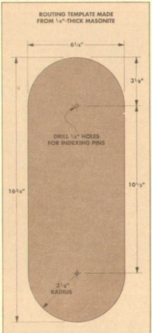
WOOD AND FINISH. To set the tambour doors apart from the case, I made them from contrasting wood. The doors are made out of walnut (same as the dividers) while the inner case, top, and bottom are made from red oak.

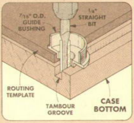
Once the case was constructed, but before the tambours were installed, I applied two coats of tung oil finish, sanding lightly between coats.

EXPLODED VIEW



ROUTING TEMPLATE





MATERIALS

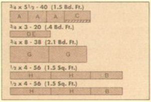
WOOD PARTS

A	Uprights (3)	¾ x 4¾ - 9 rgh.
B	Dividers (52)	⅛ x ½ - 4 11/16
C	Top/Bottom Plates (2)	¼ x 4¾ - 12¼
D	Center Facing (1)	⅜ x ¾ - 9⅛
E	Outer Facings (2)	⅜ x 1¾ - 9⅛
F	Back (1)	¼-Ply - 9⅛ x 13¼
G	Case Top/Bottom (2)	¾ x 7½ - 19 rgh.
H	Tambour Slats (58)	3/16 x ½ - 9 9/16
I	Handles (2)	¼ x ¼ - 2

SUPPLIES

- 4 Board Ft. of ¾"-thick red oak.
- 3.1 Square Ft. of ½"-thick walnut for the tambour slats and the dividers.
- ¼"-thick red oak plywood for the back.
- Medium weight artist's canvas.
- ¼"-thick Masonite for template.
- (16) No. 8 x ¾" Fh. woodscrews
- ¼" Dowel for stop pins
- ½ Pint of tung oil finish.

CUTTING DIAGRAM



UPRIGHTS

I began building the CD case by making the three uprights that are part of the inner case.

UPRIGHTS. To make the **uprights (A)**, start by cutting three-¾"-thick blanks to a width of 4¾", see Fig. 1. Then trim these pieces to a rough length of 9".

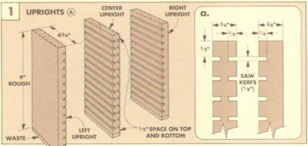
After the upright pieces have been cut to their rough length, the next step is to cut kerfs in all three pieces for the dividers to fit into. (The CD boxes slide on and are supported by the dividers.)

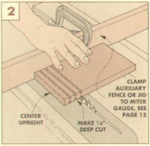
I cut kerfs equal to the width of the saw blade (about ⅛"). The right and left uprights are kerfed on their inside faces *only*. But, the center upright is kerfed on both sides, see Fig. 1.

KERFING THE PIECES. The most accurate way to cut these ¼"-deep kerfs is to use the indexing method shown in Shop Notes on page 15. Another way would be to lay out the spacing for thirteen kerfs along an edge of each upright, then cut to your layout lines.

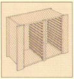
No matter which method you choose for cutting the kerfs, you'll need to mount an auxiliary fence to your miter gauge, see Fig. 2. This fence not only provides extra support, it helps prevent chipout when the saw blade exits the workpiece on the back edge.

Next, I trimmed the uprights to length. To do this, trim the uprights so the space between the outside kerfs and the end of the uprights is ½", making sure each upright has thirteen kerfs, see Fig. 1a. (In my case, the uprights measured 8⅝" long.)





DIVIDERS



After the uprights are kerfed and cut to finished length, the next step is to make the dividers that fit into the kerfs to support the CD boxes.

Making the **dividers (B)** is a two-step procedure. First, ½"-thick stock is ripped into thin strips. Then the strips are cut to their finished length.

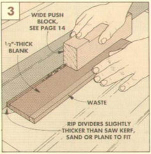
DIVIDER STRIPS. To make the divider strips, I started by resawing two blanks to ½" thickness. Next, I cut the blanks into pieces that measure 4" wide by 16" long.

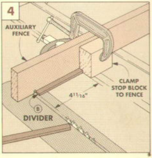
Then these pieces are ripped into thin strips, see Fig. 3. (This method will yield extra dividers, but some won't be usable.) Since I didn't want the saw marks to show on the strips, I cut them a little thicker than the kerf and then sanded them to fit.

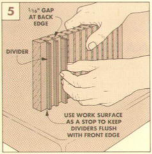
Shop Note: I used a large push block to rip the eleven strips off each blank. For more on this push block, see page 14.

CUT TO LENGTH. To cut all the dividers to length, I clamped a stop block to an auxiliary fence on the miter gauge, see Fig. 4. As for the length of the dividers, I cut them 1/16" shorter than the width of the uprights to allow for expansion and contraction.

GLUING DIVIDERS. Once the dividers are cut, the next step is to glue them in the kerfs. Put a *drop* of glue in each kerf, near the front edge of the divider. (Don't spread the glue in the kerf.) Then set the upright on edge and push the dividers down against the work surface to get them flush with the front edge of each upright, see Fig. 5.







ASSEMBLING THE INNER CASE

After all of the dividers are glued in place, a top and bottom plate are needed to assemble the inner case.

The **top/bottom plates (C)** fit flush with the front and back edges of the uprights — so they're the same width (4¾") as the uprights.

However, determining the length of the plates is a bit of a problem. The problem is the uprights need to be spaced so a CD plastic box (which is 4⅞" wide) will fit between them — with a ⅛" space along the sides.

SPACERS. To get this spacing, I made four 5" x 5" spacers from ½"-thick scrap and inserted them where the CD cases will go, see Fig. 6. Then simply measure across the outside edges of the end uprights to get the length of the plates (12¼").

CUT PLATES TO SIZE. After determining the size, cut the two top/bottom plates (C) out of ¼"-thick stock, see Fig. 6.

ATTACH THE PLATES. Next, drill countersunk shank holes for No. 8 x ¾" Fh woodscrews in the plates to mount them to the top and bottom ends of the uprights, see Fig. 6.

Note: Before screwing the plates in place, drill four more countersunk screw holes at the four corners of the top plate on the *inside* face, see Fig. 6a. These holes will be used later to attach the outer case top.

FACINGS. After the plates are glued and screwed on, I made three facing pieces to cover the ends of the kerfs on the uprights. (The two outer facings also hide the inside of the tambours when the case is open.)

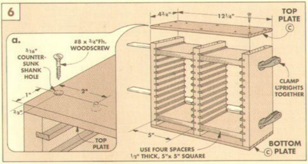
To make the facings, start with a 2½"-wide by 20"-long blank, see Fig. 7. Then rout a ⅜" round-over on three edges, see Fig. 8.

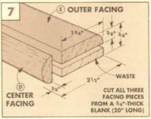
Cutting off the facing pieces is now a three-step process. (Before cutting the facing pieces off this blank, I cut the blank in half to make it easier to work with.)

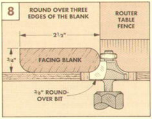
The first step is to trim the **center facing (D)** off one edge, see Step 1 in Fig. 9. The second step is to cut the **outer facings (E)** to a finished width of 1¾", see Step 2 in Fig. 9. The final step is to resaw the outside facings to a thickness of ⅜", see Step 3.

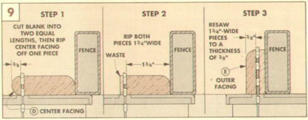
Before gluing the facing pieces in place, trim them so they're flush with the top and bottom of the inner case (9⅛"), see Fig. 10. Then glue the center facing (D) to the front edge of the middle upright. And glue the outer facings (E) to the front edges of the outer uprights, see Fig. 10a.

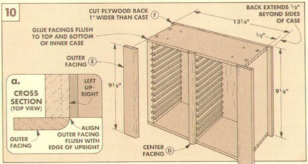
THE BACK. All that's left to complete the inner case is to add the ¼" plywood **back (F)**. Cut the back so it's flush with the top and bottom of the case (9⅛"-wide), but extends ½" beyond both uprights (to hide the tambour backing). Glue the back (F) in place.











CASE TOP AND BOTTOM

In order for the tambour to slide properly it has to run between two grooved pieces. But, making these grooved pieces identical can be a problem.

The solution is to use a template. The template lets you rout identical grooves, and it also helps you make the **case top/bottom (G)** the same size.

THE TEMPLATE. First, lay out the template, see Fig. 11 and the Routing Template on page 7. Then cut and sand it to size, see Fig. 12.

BLANKS. The next step is to make mirrored top and bottom blanks. Simply glue up two blanks to a width of 8" and length of 19".

To keep from getting mixed-up, mark the inside front edge of both blanks, and both sides of the template, see Fig. 13. Now center the template on one blank and clamp it down.

INDEXING HOLES. To keep the template in position when routing, I used two indexing pins. Mark their locations (refer to Template on page 7) and drill holes through the template and 1/2" into the blank, see Fig. 13. (These holes will be hidden by the inner case.)

To locate the holes on the other blank, flip the template over and use the first holes as a drilling guide, see Fig. 13.

INDEX PINS. Once the holes are drilled, put a 1/4" dowel pin in each hole and trim the pins flush with the top of the template.

ROUT GROOVES. With the template in place, the race track-shaped grooves can be routed. To do this, mount a 1/4" straight bit in the router and a 7/16" O.D. guide bushing to the router base. With the bit adjusted to cut a 1/4"-deep groove, start routing on the back edge of the template, see Fig. 14.

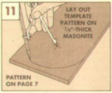
CUT OUTSIDE EDGES. Once the grooves are routed in both blanks, the next step is to cut the blanks to shape. To lay out the shape, I made a small pencil guide from posterboard and ran it along the template, see Fig. 15. Then remove the template and cut 1/8" outside the line.

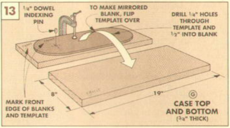
RUB ARM. To trim the pieces to their finished shape, again I used the template — but this time with the router table and a rub arm clamped to the fence, see Fig. 16.

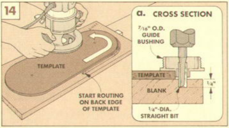
To use the arm, mount a 1/4" straight bit in the router and clamp the rub arm down just above the bit, see Fig. 16a. Then, position the arm so it touches the template and the bit trims 1/16" off the blank, see Fig. 16.

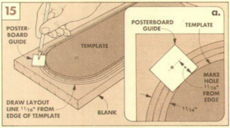
Now, make several passes, moving the rub arm slightly towards the bit between passes until the workpiece is cut to the pencil line.

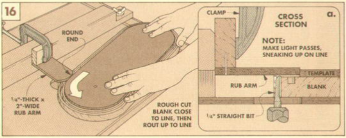
ROUND OVER EDGES. Finally, I rounded over the edges, see Fig. 17.

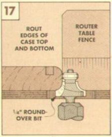












TAMBOUR SLATS

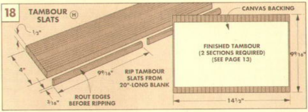
The tambour doors on the CD case are simply slats glued to a piece of canvas, see Fig. 18. But, the thought of cutting and routing all 58 **tambour slats (H)** is intimidating.

THREE-STEP PROCESS. Making the slats is a three-step process. (For more, see page 13.)

Since the slats are trimmed off the edge of a blank, the thickness of the blank must equal the width of the slats (1/2"). So start by cutting four 1/2"-thick blanks 4" x 20". Then rout a 1/8" round-over on all four edges.

The second step is to rip a 3/16" strip off both edges of each blank, see Fig. 18. The third step is to remove the saw marks left on the edge of each blank from the ripping step. Then start all over again.

CUT TO LENGTH. Once you've ripped nine strips from each blank, cut each strip to length (9 9/16") to make a tambour slat (H), see Fig. 18.



FINAL ASSEMBLY

Once I completed the tambours I added handles and door stops before gluing and screwing the case together.

HANDLES. The **handles (I)** are simply a couple of 1/4" x 1/4" pieces, see Fig. 19. I cut each piece 2" long and rounded over the front edges and ends with a file. Next, center the pulls on the length and width of the second slat of each door. Then, glue them in place.

STOPS. Next, to keep the doors from opening or closing too far, I added a front and back door stop in the *top* groove, see Fig. 20. These stops are 3/8"-long pieces of 1/4" dowel glued into holes centered on the length of the case.

Now, file a notch in the top front edge of the first slat of both tambours so they'll close tightly around the front pin, see Fig. 20a.

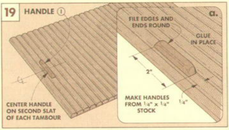
GLUING THE INNER CASE IN PLACE. After the tambours are notched you're ready to glue the inner case to the case bottom.

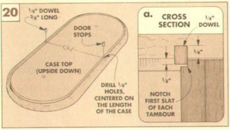
To get the pieces aligned, mark a *light* line centered on the length of the bottom, see Fig. 20. Then, position the inner case so the center upright is centered on the line, and the front of the inner case is 1 1/8" from the inside of the groove, see Fig. 21.

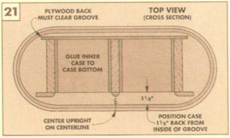
FINISH. Before attaching the top to the inner case, I finished all of the pieces with two coats of tung oil.

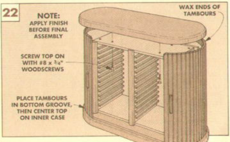
SCREW ON THE TOP. The last step is to screw the top to the inner case. (The top is not glued so it can be removed.)

Start by centering the top on the inner case. Now, using the holes you drilled earlier as a guide, mark and drill four pilot holes for No. 8 x 3/4" flathead woodscrews. Then put the tambours in the grooves and screw the top in place, see Fig. 22.









Tambours

There's nothing magical about a tambour. It's just a sliding door that's flexible. This flexiblity allows the tambour to slide in a curved track.

The way to make a tambour flexible is to join a series of individual slats with some sort of flexible hinge. The most common method of hinging these slats is to glue them to a fabric backing.

But, there's more to making tambours than just gluing fabric to wood. In fact, making the tambour is the easy part — the tricky (and interesting) part is designing it.

• *I've seen tambours with vertical slats that move side-to-side and tambours with horizontal slats that move up-and-down. Is one way preferred over the other?*

As far as construction goes, both of these tambours are made exactly the same way. So the choice between using vertical or horizontal slats in a tambour is determined by the design of the project and the amount of space you have to work with.

DESIGN. The design of the project will often determine the way the tambour moves. For example, if you're making a traditional roll-top desk the tambour typically moves up-and-down. On the other hand, if you're making a cabinet that's wide but not very tall (such as the CD Case on page 6), it looks better if the slats are vertical (the doors slide side-to-side).

SPACE. Another thing to consider when determining which way the tambour moves is the amount of space you have. When you open a tambour door it doesn't just disappear, it has to go somewhere. This means a loss of space inside the cabinet, either on the top, sides, on maybe even the bottom. Also, any interior dividers, shelves, or partitions have to be designed so they won't interfere with the way the tambour operates.

• *It seems that every large roll-top desk that I've seen has a gentle S-shaped curve to the tambour. Is there some reason for this S-shape?*

It has to do with the width of these desks, most of which are four to five feet wide. If the tambour were to angle straight back, its weight would cause it to sag over such a long span. But, by curving the tambour it will resist sagging.

• *Are there any special characteristics of an S-shaped tambour?*

Yes, an S-shaped tambour has to bend forward as well as backward, see Fig. 1. In order for an S-shaped tambour to work, the slats must be designed so they don't pinch together when bending forward. This can be done by cutting the edges of the slats at an angle to create a V-shape between the slats. This allows clearance when the tambour bends forward, see Fig. 1a.

SINGLE CURVE. Making single-curve tambours is easier. (This is the type I used on the CD Case.) With a single curve, the tambour always bends in the same direction — back on itself. So the edges aren't relieved.

• *I need to make a tambour that follows a tight curve (small radius). How do I know the tambour slats will slide through it without binding?*

A tambour is a two-part system — the tambour slats are one part, and the grooves the slats slide in are the other part. The trick is making sure both parts work together.

The simplest way to do this is to draw everything on paper first. Start by determining how wide the groove needs to be. Since the groove will most likely be cut with a router in one pass, the width of the groove is limited to the size of the router bit. So you have to match the size of the slats to the size of the bit (groove).

Design Note: If you need to use thick slats but don't want to make a wide groove, the ends of the tambour can be rabbeted.

After determining the width of the groove, draw the curve that you need the tambour to follow. Now here's where things get interesting. To get the slat to follow the curve, you have three variables to work with — width, thickness, and profile.

WIDTH. The first variable is the width of the slats. While you can make a wide-slat tambour follow a tight radius, it won't move smoothly. The rule of thumb is: the narrower the slat the tighter the curve, see Fig. 2.

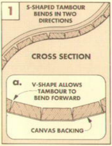
THICKNESS. Once you've determined the width of the slats, the next thing to consider is the thickness of the slats. First, the slats need to be slightly *narrower* than the width of the groove. If they're the same size as the groove they won't fit around the curve, see Step A in Fig. 3.

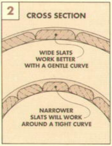
But, if the slats are made too thin they will rattle around in the straight sections of the groove. I've found that if the thickness of the slat is 1/16" less than the width of the groove, it's just about right for most tambours.

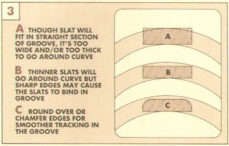
PROFILE. The final consideration for getting the tambour to follow the curve is its profile. Profile refers to the way the slat looks when viewed from the end. This is usually a chamfer or a routed round-over (like on the CD Case).

Without the routed profile, the edges of the slats can bind against the outside wall of the groove, see Step B in Fig. 3. But, by routing a profile on the edges, the same size slat will track smoothly through the groove, see Step C in Fig. 3.

The more I work with tambours, the more I realize the importance of careful planning. Because the challenge is making a tambour look good *and* work properly.







TAMBOUR CONSTRUCTION

■ After you've determined the thickness and profile of the tambour slats (see previous page), the next step is to make them. One method (the one I used on the CD Case) is to rip the tambour slats off the edge of the board. The advantage to this method is that the profile can be routed on the edges of the slat *before* it's cut off the board.

Since I start with a wide blank and then trim the slats off the edge, the *thickness* of the blank should equal the *width* of the slats. (I wanted the slats ½" wide for the CD Case, so I started with a board ½" thick.)

Note: If the slats aren't very long, I rip long strips first and then cut the slats to length from these strips.

ROUT THE EDGES. Once you have a board the correct thickness, the first step in making the slats is to rout all four edges of the blank, see Step 1. (On the CD Case I used a ⅛" round-over bit.)

CUT TO THICKNESS. After the edges are profiled, the next step is to rip the slats from both edges of the stock, see Step 2. To do this, first determine the thickness of the slats using the method shown on the previous page. (In my case this was 3⁄16".) Then rip a slat off both edges of the board.

JOINT OR PLANE EDGE. After the slats have been cut off, there will probably be some saw marks on the edges of the blank. If you have a jointer, simply take a light pass over each edge. Otherwise a hand plane can be used. Then repeat the process of routing, cutting, and jointing until you have enough slats.

There are bound to be some warped or twisted slats, so I cut 20% more than I need.

GLUING UP THE TAMBOURS

Now it's time to glue the fabric backing to the slats. The tricky part here is getting all of the slats to fit tightly together. The secret is to use a jig to hold the slats flat, refer to Step 5.

The jig is made of two hold-down bars and two end blocks screwed to a plywood base.

ASSEMBLY. Screw one hold-down bar (rabbet facing down), to the plywood. Then screw an end block perpendicular to the hold-down bar, see Step 3.

Now, slide one end of the tambour slats (face down) under the hold-down bar and screw the remaining hold-down bar over the other ends of the slats, see Steps 4 and 5.

Then, push the tambour slats against the end block. The slats have to be tight enough so the glue won't seep through. Once the slats are in tight, screw the remaining end block down, see Step 5.

FABRIC. The next step is to glue on the fabric backing. The material I normally use for backing is a light to medium-weight artist's canvas available at art supply stores.

Design Note: You can dye the fabric to match the color of the wood, but the fabric may shrink. So dye it before you cut it to size.

Cut the fabric to fit between the hold-downs and long enough to cover the slats.

GLUE. With the fabric cut to size, apply an even opaque coating of glue to the back of the tambour slats. I use yellow woodworking glue and apply it with a brush.

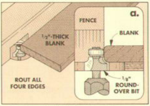
Finally, lay the fabric over the slats, pressing it in place and rolling out any wrinkles, see Step 6.

BREAKING THE TAMBOUR. Once the tambour is dry, you'll probably find that some of the glue has seeped between the slats. For this reason the back of the tambour needs to be "broken." To do this, gently bend the tambour back at the cracks.

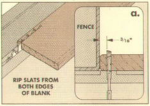
FINISHING

All that's left is to apply the finish. I usually spray on a finish or use a wipe-on finish such as tung or Danish oil.

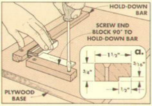
There's one final thing I'd like to mention about finishing — sometimes you can get too much of a good thing. If too much finish is applied to the tambours ends or in the grooves in the case, the tambours won't slide smoothly. (I use a Q-tip to wipe excess out of the groove.) Then, I wax the groove and the ends of the slats with car wax.



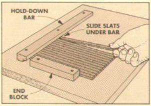
1 *To make the ½"-wide tambour slats, start with ½"-thick blanks. Rout all four edges of each blank using a ⅛" round-over bit on the router table.*



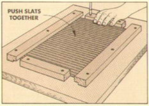
2 *Now rip the slats to thickness (3⁄16") from both edges of the blank. Then plane the saw marks off the blank and start the procedure all over again.*



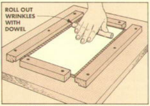
3 *Once the slats are ripped and cut to finished length, I made a gluing jig. Start by screwing an end block and a rabbetted hold-down bar 90° to each other.*



4 *With routed edges face down, place one end of the slat under the bar. Keep adding slats until they're all in place (29 slats for each tambour of the CD Case).*



5 *Next, screw the other hold-down bar in position. Then, push the slats tight against the end block and screw the other end block down to hold them in place.*



6 *Cut the backing material (canvas) so it fits between the hold-down bars. Then, apply glue to the slats and press the fabric in place. Roll out any wrinkles.*

Shop Notes

CORNER BLOCKS

■ The outdoor furniture in this issue could get a lot of abuse. Kids jump on it. It gets dragged around the yard. And the sun and rain cause the wood to expand and contract.

That's why I added corner blocks to strengthen the inside corners and help resist racking.

Although there's nothing difficult about making corner blocks, there are a couple of things to consider.

STOCK. The two most important considerations are the size of the block and the way the grain runs on it. I like to use thick blocks to provide the most gluing surface. On the Adirondack furniture, I made the corner blocks from a 2x4 cut 3" wide, see Fig. 1.

CUTTING THE BLOCKS. The easiest way to make a corner block is to cut a 45° triangle off the *end* of the board. That's the easiest way, but not the best.

The problem is the direction of the grain. When the block is screwed in place, the screws are almost in line *with* the direction of the grain (see Fig. 1a). This means they can split off the corners as they're tightened.

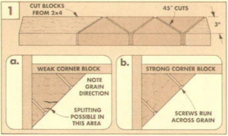
It's better to have the grain run *across* the screw holes. This is done by laying out triangles as shown in Fig. 1. This way the grain runs parallel to the long side of the triangle, see Fig. 1b.

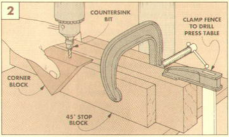
SCREW HOLES. The screw holes are drilled on the long edge of the block, see Fig. 1b.

To drill these holes, I set up a simple jig on the drill press table, see Fig. 2. To make this jig, first miter a piece of scrap at 45° to produce a stop block. Then, clamp the angled stop block to the front of another board (or to a fence). Finally clamp them both to the drill press table.

Now set the corner block against the fence and stop block with the long edge up — and drill the holes with a countersink bit.

GLUE. Since the screws might loosen as the furniture is racked, I glued the blocks on with construction adhesive.





PUSH BLOCK

■ Typically when ripping thin stock, I use a thin push stick, see Fig. 1. But I've noticed a problem with this technique.

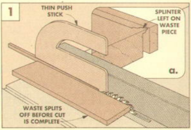
As the push stick moves the workpiece past the blade, the waste side of the workpiece can split off *just before* the cut is completed. This leaves a little triangular splinter of wood on the waste piece, see Fig. 1a.

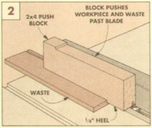
SPLINTER. If you're making a series of thin strips (such as for tambour slats), that splinter can keep the workpiece from going tight against the fence on the next pass. (Or sitting flat on a jointer table if you're jointing between passes.)

Though the splinter can be trimmed off with a pocketknife or chisel, I've come up with a solution that prevents the splinter in the first place.

PUSH BLOCK. I use a push block made from an 11"-long piece of 2x4, see Fig. 2. Cut out or glue on a 1/4" "heel" on the bottom of the block. This pushes *both* the workpiece and the waste through the blade, eliminating the little splinter.

By adding a heel on top of the block too, you can turn the block over if the first heel gets torn up.





CUTTING SPACED DADOES

■ On the CD Case, I ran into a common problem: Finding the best way to cut dadoes (or kerfs) that are *uniformly* spaced.

To solve the problem, I built a jig that clamps to my table saw's miter gauge. It's similar to a box joint jig, but on box joints the distance between the slots is the same as the width of the slots. For the shelves in the CD case, the distance between the kerfs has to be a uniform ½", but the kerfs are only ⅛" wide.

AUXILIARY FENCE. To make the jig, start by clamping a 2½"-wide piece of ¾" stock to your miter gauge, see Fig. 1.

Raise the blade to the depth of the kerf you want (¼" for the CD Case), and make a pass cutting out a notch in the fence.

KEY. Now, unclamp the fence and glue a short indexing key into the notch, see Fig. 1a.

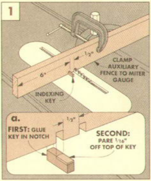
After the glue dries, use a chisel to pare 1⁄16" off the top of the key. This ensures that when the workpiece is placed over the key, it will rest flat on the surface of the saw, not on top of the key.

SECOND NOTCH. Now clamp the fence to the miter gauge again so the distance between the blade and the key equals the desired distance between the kerfs (½" for the CD Case). Then make another pass, see Fig. 1.

USING THE JIG. Now you're ready to start cutting. For the first pass, keep the workpiece flat on the table, with one end against the key, see Fig. 2.

For the next pass, place the newly cut kerf over the key and make another pass, see Fig. 3. This sequence is repeated for as many kerfs as you want.

1



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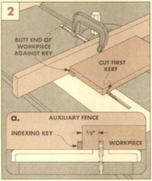

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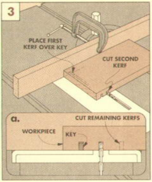


ROUTING SMALL PIECES

■ When routing small pieces on a router table, how do you keep the workpiece from tipping into the large hole in the router table?

AUXILIARY TOP. I faced this problem when routing chamfers on the Beam Compass (page 22). To solve the problem, I added an auxiliary table top of ⅛" Masonite.

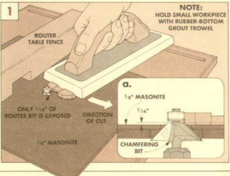
In the center of the Masonite, drill a hole that's slightly larger than the exposed part of the bit you're using. (To rout the 1⁄16"-high chamfer on the Beam Compass, I drilled a ⅞" hole.)

If your router table has a fence, loosen the bolts and slide the Masonite under the fence. Then retighten the bolts to hold the Masonite down on the table.

ROUTING. After the Masonite is in place, raise the bit up through the hole to the desired height. When routing the small chamfer, almost all of the bit is covered by the Masonite. Only the pilot bearing and 1⁄16" of the cutting edge is exposed.

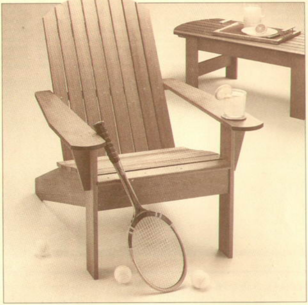
When routing a small piece, (like the trammel heads on the Beam Compass), I hold the workpiece with a rubber-bottom grout trowel. This way I can control the cut without getting my hands close to the bit.

1



Adirondack Chair

Whether it's made from redwood or painted pine, this Adirondack chair is the perfect summer project. Straightfoward joinery and a comfortable design are bound to make this chair a favorite.



It was years ago when I built my first Adirondack chair. The friend I gave it to mentions the chair once in a while, and reminds me of its weak points. (At least the friendship is holding up well.) This time I've made some improvements.

COMFORT. My first chair was designed for someone to sit *on*. When I started this new chair, I wanted it to be comfortable for someone to sit *in*.

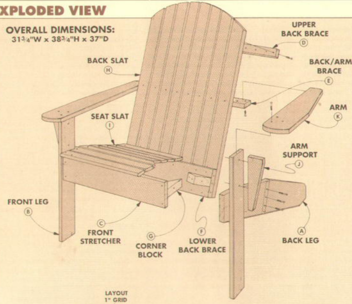
The chair is designed with a contoured seat and slightly angled back. The angle we used lets you rest naturally in the chair. But once you do get comfortable, it's not difficult to get back out.

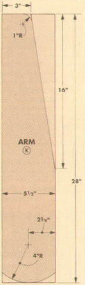
OTHER CHANGES. My earlier chair was made of construction-grade pine and painted white. This time I started with clear pine. But when I saw how nice the chair looked (see back cover), I decided to make an entire outdoor grouping using clear all-heart redwood (see front cover). To let the beauty of the redwood show, I used a clear finish, see Talking Shop, page 29. And to strengthen the leg joints I added corner blocks. I also used glue (actually waterproof construction adhesive, see page 29) on all the joints.

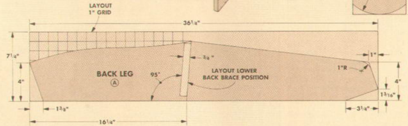
TEMPLATES AND PATTERNS. This is the kind of project that you may want to duplicate in the future. So it might be worthwhile to spend a few extra minutes to make permanent templates out of ¼"-thick Masonite for the contoured pieces (the back legs and arms).

If you'd like a full-size pattern of the contoured pieces, you can order one from *Woodsmith Project Supplies*, see Sources on page 31.

EXPLODED VIEW







MATERIALS

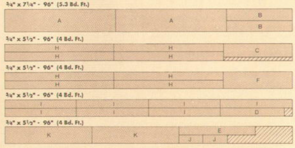
WOOD PARTS

A	Back Legs (2)	¾ x 6½ - 36¼
B	Front Legs (2)	¾ x 3½ - 22
C	Front Stretcher (1)	¾ x 4¼ - 22¼
D	Upper Back Brace (1)	¾ x 2⅜ - 19¾
E	Back/Arm Brace (1)	¾ x 2⅜ - 24¾
F	Lower Back Brace (1)	¾ x 5½ - 20¾
G	Corner Blocks (4)	1½"-thick stock
H	Back Slats (8)	¾ x 2⅜ - 35⅞
I	Seat Slats (7)	¾ x 2⅜ - 23¾
J	Arm Supports (2)	¾ x 2⅞ - 8
K	Arms (2)	¾ x 5½ - 28

SUPPLIES

- (60) No. 8 x 1¼" brass Fh woodscrews
- (28) No. 8 x 2" brass Fh woodscrews

CUTTING DIAGRAM



BACK LEGS

I started work on the Adirondack chair by making the base. The base consists of the front and back legs connected by a front stretcher and a lower back brace, refer to Figure 7.

ROUGH CUT LEGS. The front and back legs can be cut from one 8-foot-long 1x8. To do this, first cut two **front legs (B)** to a finished size of 3½" x 22". Then cut two blanks for the **back legs (A)** to a rough length of 37".

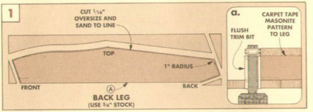
LAY OUT BACK LEGS. To shape the back legs, first draw an outline of the leg onto a leg blank. (Work from the drawing on page 17, or send for a full-size pattern, see page 31.)

CUT BACK LEG. With the outline laid out on the blank, cut off the angled ends at the pencil lines, see Fig. 1. Then trim to within 1/16" of the line for the top edge of the legs, the radius on the back corner, and the wedge on the bottom corner. Now sand to these lines.

SECOND LEG. With the first leg complete, trace its outline onto the second leg blank and cut and sand it to match the first leg.

Shop Note: If you plan to make several Adirondack chairs, or the Settee on page 24, you may want to make a template from ¼" Masonite. Then you can use the template with a flush trim bit in the router to rout all the back legs to identical shape, see Fig. 1a.

ROUND OVER. With a ⅛" round-over bit in the router table, soften all the edges of the front and back legs, except the tops of the front legs and the front ends of the back legs.



BASE ASSEMBLY

The base assembly consists of two mirror-image sides. Each side has a back leg (A) and a front leg (B). The sides are connected by a front stretcher (C) which is installed now, and a lower back brace (installed later).

REFERENCE LINES. Before assembling the legs, mark reference lines on both front legs to indicate where the back legs are attached, see Fig. 2. Also, mark reference lines on the back legs to indicate where the lower back brace will be attached later, see Fig. 2b and the grid drawing on page 17.

SCREW HOLES. Now, to join the legs, drill three countersunk shank holes on the *inside* face of each back leg, see Fig. 2a.

Then drill three shank holes for the lower back brace, see Fig. 2b. Note: Drill the countersinks for these holes on the *outside* face of each back leg.

JOINING FRONT AND BACK LEGS. Begin assembling the sides one at a time. First spread some construction adhesive where the front leg laps the back leg. (See Talking Shop, page 29, for more on using construction adhesive.)

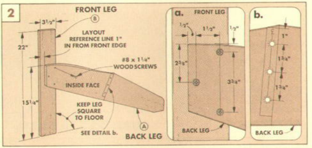
Position the back leg against the pencil marks and drive in one of the screws, see Fig. 2. Then stand the front leg upright on a flat surface and adjust the leg members so the feet of each are resting *perfectly flat* on the table. Now drive in the other two screws.

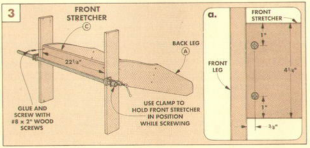
After the first side is assembled, join the other two legs in the same way, so the second side *mirrors* the first side.

FRONT STRETCHER. Once the sides are complete, the next step is to make the **front stretcher (C)** that connects the two sides.

To do this, first cut the piece to length (22¼") from a 1x6, see Fig. 3. Then rip it to final width (4¼"). Now drill two counter-sunk shank holes near each end of the front stretcher, see Fig. 3a.

Next, apply some adhesive to the front ends of the back legs (A), and clamp the front stretcher between the leg assemblies, see Fig. 3. Then screw the stretcher in place to the front ends of the back legs.





BACK BRACES

The last piece needed for the base is the lower back brace (F), see Fig. 7. At this time I also cut the other two braces that support the back slats, refer to Fig. 10.

Begin by cutting the **upper back brace (D)** 2⅜" wide and 19¾" long, see Fig. 4.

BACK/ARM BRACE. Next, cut the **back/arm brace (E)** to a rough width of 2½" and finished length of 24¾", see Fig. 4. Since I wanted the back slats to be angled, this piece has to be beveled along its front edge to support the slats. To cut this bevel, tilt the saw blade to 25°, and rip the back/arm brace (E) 2⅜" wide, see Fig. 4a.

LOWER BACK BRACE. Now cut the **lower back brace (F)** to a width of 5½". To determine its length, measure the distance between the back legs at the front of the assembled base (20¾"), refer to Fig. 7.

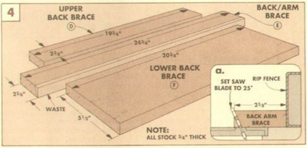
LAY OUT SLAT LINES. After the lower back brace is cut to length, lay out the position of the back slats on it, see Fig. 5.

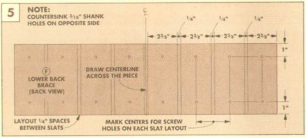
First, draw a line centered on the length of the piece, see Fig. 5. Then, to determine the position of the edges of the *middle* two slats, draw lines ⅛" on either side of the centerline. Now mark the positions of the *remaining* 2⅜"-wide slats, allowing ¼" between them.

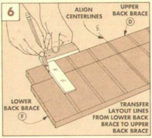
TRANSFER LAYOUT LINES. The next step is to transfer all the lines from the lower back brace to the upper back brace. To do this, mark a centerline on the upper back brace (D) and align it with the centerline on the lower back brace (F), see Fig. 6. Then use a square to transfer the lines.

SCREW HOLES. Next, mark the position of the screw holes centered on the slat positions on each piece, see Fig. 5. Now drill countersunk pilot holes in the lower back brace and the upper back brace at the marks.

ROUND OVER EDGES. With the screw holes drilled, rout a ⅛" round-over on all the edges of the three braces, except the beveled edge on the back/arm brace (E) and the top edge and ends of the lower back brace (F).







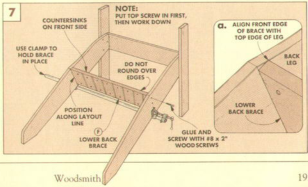
LOWER BACK BRACE

After all three of the back brace pieces are rounded over, the lower back brace (F) can be installed between the back legs on the assembled base, see Fig. 7.

To do this, first apply a bead of construction adhesive to the ends of the lower back brace. Then position the brace so the countersunk holes are facing toward the front of the chair.

Now clamp the piece in position between the pencil marks on the insides of the back legs. The front edge of the lower back brace should meet the top edge of each back leg, see Fig. 7a.

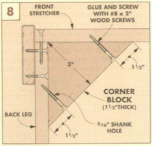
Then use No. 8 x 2" brass Fh woodscrews to screw the piece in place through the holes already drilled in the back legs, see Fig. 7.

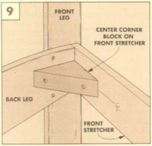


CORNER BLOCKS

I made corner blocks to help strengthen the chair base. Cut the four **corner blocks (G)** from a 2x4 block. First, rip the 2x4 to a width of 3". Then make a series of 45° cuts across the piece. (For more on corner blocks, see page 14.) Next, drill two countersunk 3⁄16" shank holes for screws in each block, see Fig. 8.

MOUNT BLOCKS. Then glue and screw the blocks to the inside corners of the base, see Fig. 9. (Since the lower back brace is angled, the back corner blocks will also be angled.)





BACK ASSEMBLY

Now it's time to make the back slats.

CUT TO SIZE. First, cut the eight **back slats (H)** 2⅜" wide and 35⅞" long. Then soften all four edges using a 1⁄8" round-over bit in the router.

INSTALL OUTSIDE SLATS. Install the two outside slats first, see Fig. 10. To do this, first apply adhesive to the back side of the lower back brace (F). Then align the slats to the reference marks on this brace, and flush with the bottom edge.

After the slats are in position, screw them in place from the front, see Fig. 11.

REFERENCE LINES. Next, draw two lines on each outside slat to indicate the location of the other two back braces, see Fig. 10. Draw the first line 30½" up from the bottom of each slat to indicate the top edge of the upper back brace (D), see Fig. 11.

Then draw the second line 17⅝" up from the bottom of each slat to indicate the top edge of the back/arm brace (E), see Fig. 11. (This reference line should be level with the top of the front leg.)

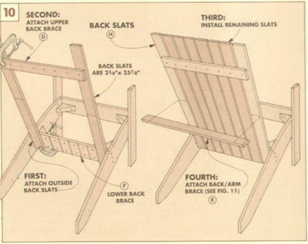
INSTALL UPPER BACK BRACE. Now, glue and screw the upper back brace (D) to the back of the two outside slats, aligning it with the reference lines, see Fig. 10.

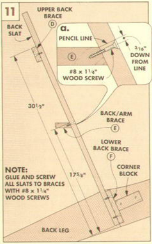
Then glue and screw the rest of the back slats to both braces, aligning them with the reference marks on the braces, see Fig. 10.

BACK/ARM BRACE. Then the back/arm brace (E) is screwed to the back slats, driving the screws from the front of the chair. To locate the position of these screw holes, first transfer the reference lines from the back of the two outside slats around to the front with a square, see Fig. 11a.

Then make a second reference mark 3⁄16" down from the lines you just transferred. Now connect these second reference marks with a pencil line across the front of the slats.

Next, from the front of the chair, drill a series of countersunk shank holes on this line, centering the holes on the width of each slat. Finally, attach the back/arm brace (E) behind the slats, screwing from the front.





SEAT SLATS

Now it's time for the **seat slats (I)**. First, rip six slats 2⅜" wide, and one slat 2½" wide. (Rip this last slat to fit later.) To determine the length of the slats, add 1½" to the width of the base, for a ¾" overhang at each end.

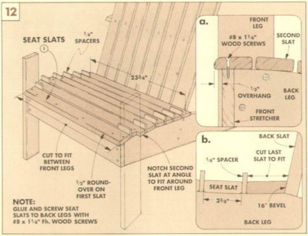
Rout a ⅛" round-over on the edges. (A ½" round-over on the front edge of the first slat.)

SCREW HOLES. Now drill countersunk shank holes centered on the width of each slat, and 1⅛" from the ends, see Fig. 12.

Also drill countersunk shank holes along the front edge of the first slat where it attaches to the front stretcher, see Fig. 12a.

FRONT TWO SLATS. Cut the first slat to fit between the front legs. Then cut a notch in the second slat where it meets the front leg, see Fig. 12.

SPACERS STRIPS. Now install the slats, separating them with ¼" spacers. Bevel rip the last slat so it fits flush against the lower edge of the back slats, see Fig. 12b.



ARM ASSEMBLY

The last step is to add the arms and arm supports. First cut the two **arm supports (J)** to final length (8") and width (2⅞"). Then lay out and cut the angle on the supports, see Fig. 13. Now round over *only* the outside and bottom edges of the supports.

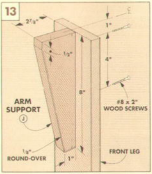
Next, center the arm supports on the outside of the front legs and drill countersunk shank holes from the inside, see Fig. 13. Then glue and screw the supports in place.

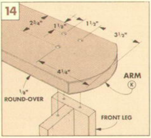
ARMS. Cut the two **arms (K)** to shape as shown in the drawing on page 17. Next drill countersunk shank holes for the screws that attach the arms to the legs, see Fig. 14. Then round over all the edges of both arms.

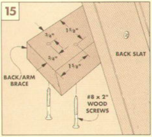
To attach the arms, first spread adhesive on the top of the front leg, arm support, and back/arm brace. Then screw the arm to the front leg and arm support, see Fig. 16.

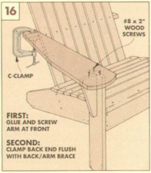
Now adjust the "tilt" of the back slats so the back end of the arm is flush with the rear edge of the back/arm brace. Clamp the arm in place, then drill and screw it to the back/arm support from underneath, see Fig. 15.

RADIUS BACK SLATS. Finally, lay out and cut the 16" radius arc on the top ends of the back slats, see Exploded View on page 17. I used a beam compass (see page 22) to lay out the arc, and a sabre saw to make the cut (refer to Fig. 8 on page 28).

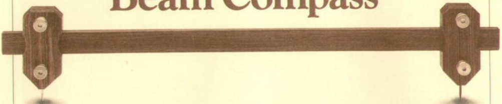








Beam Compass



To draw the arcs for the Adirondack furniture in this issue, I made an adjustable beam compass out of some scraps of hardwood. And to dress it up, I used brass machine screws and knurled finger nuts. (These nuts are available in many hardware stores. You can also order them through *Woodsmith Project Supplies*, see page 31.)

Most of the work on the beam compass is in making the two trammel heads. One of the trammel heads holds a sharp centerpoint (a cut-off nail), and the other holds a pencil lead for marking.

CUT OUT BLANK. All of the pieces for both trammel heads are cut from one blank, see Fig. 1. To make the blank, resaw a piece of stock to 3/8" thick. Then cut it to a rough width of 6" and final length of 2½", see Fig. 1. (Note the grain direction. The blank is wider than it is long.)

DADO. After the blank is cut to size, rout a 1/8"-deep dado across the blank. When the blank is cut to size and the two parts of the trammel point are screwed together, the dadoes form a mortise that pinches around the 1/4"-thick beam. To rout the dado, I used a 3/4" straight bit, see Fig. 1a.

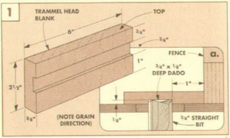
PINCHING ACTION. To create the pinching action, the top inside portion of each trammel head has to be a little thinner than the bottom part. So I trimmed 1/32" off the 3/4"-wide section of the blank, see Fig. 2.

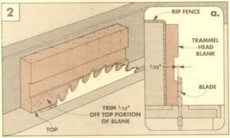
CUT TO SIZE. Next, cut the blank into four equal-size (1¼"-wide) pieces on the table saw, see Fig. 3. Shop Tip: To safely push the small pieces through the blade, I made a small push block from a 2x4. (For more on this style of push block, see page 14.)

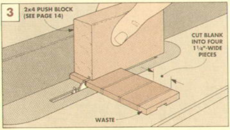
STICK HALVES TOGETHER. With the four pieces cut, stick two matching pieces together temporarily with double-sided carpet tape, see Fig. 4. This lets you cut the finger notches, screw holes, and decorative corner miters in both pieces at the same time.

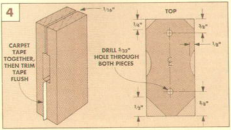
FINGER NOTCHES. Now you can drill the crescent-shaped finger notches. To hold the pieces while drilling, I built a simple jig, see Fig. 5. The jig consists of four 3/4"-thick cleats nailed to a plywood base.

Once the jig is built, set the taped-together trammel heads into the jig and use a 1" Forstner bit to drill the finger notches. The finger notches are only 1/8" wide (at the bottom of the curve), so position the centerpoint of the









drill bit ⅜" from the edge of the workpiece, see Fig. 5. While the pieces are in the jig, also drill two 5/32" holes for the machine screws, refer to Fig. 4.

MITER ENDS. To dress up the trammel heads, I laid out 45° miters at all four corners, see Fig. 4, and cut them off with a band saw, see Fig. 6. (The pieces are too small to cut safely on a table saw.) Cut a little outside the layout lines, and sand or file up to the lines.

CHAMFER. Now pull the pieces apart and rout a slight chamfer around the outside edges, see Fig. 7. (For more on routing small pieces, see page 15.)

ENLARGE SCREW HOLES. Before reassembling the trammel head with screws, enlarge the holes in the *front piece only* so the machine screws slide easily through the holes, see Fig. 7. (Note: The holes in the back piece are smaller so the threads will catch and the screw won't spin when the knurled finger nut is tightened.)

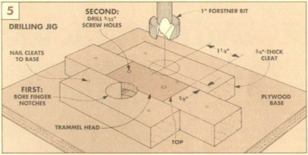
ASSEMBLY. Now the pieces can be assembled with No. 8–32 x 1" roundhead machine screws, washers, and knurled finger nuts. (You could also use wing nuts.)

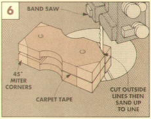
POINT AND LEAD. After the trammel heads are screwed together, drill a 5/64" hole on the bottom of each head to accept a centerpoint or pencil lead, see Fig. 8.

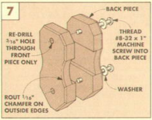
You can cut off a 4d box nail as a centerpoint, see Fig. 9, or we can supply a chrome centerpoint, see page 31. In the other trammel head I stuck a short piece of 6H drafting pencil lead that I got from an art supply store.

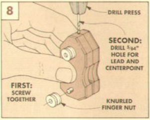
BEAM. Once the trammel heads are complete, cut the beam to width from a piece of hardwood so it slides smoothly in the mortises, see Fig. 9. Finally, I cut the beam to a length of 18" so I could strike the 16" arc I needed for the Adirondack furniture.

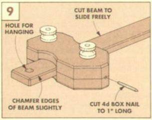
Before finishing the compass with tung oil, you may want to drill a hole at one end of the beam, see Fig. 9. This hole lets you hang the beam compass on the wall of your shop.











USING A BEAM COMPASS

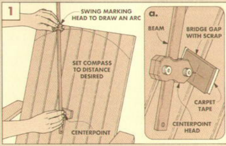
After the Beam Compass is built, it's ready to be used for drawing arcs and circles. On the Adirondack furniture, I wanted the arc to have a 16" radius.

SET THE COMPASS. To set the Beam Compass, first mark two lines 16" apart on a scrap board. Now move the *centerpoint* trammel head to one end of the beam and position the point on one line. Then tighten it in place. Next, move the *marking* trammel head until the lead point aligns with the other line and tighten it in place.

DRAW AN ARC. With the compass set, place the centerpoint in position on the workpiece. Then, swing the marking head to draw an arc.

MAKE A BRIDGE. There's only one problem when doing this on the Adirondack furniture — the centerpoint of the arc falls in a gap between two of the slats.

To solve the problem, I made a "bridge" to push the centerpoint into. The bridge is just a thin piece of scrap held in place over the gap with double-sided carpet tape, see Fig. 1a.



Adirondack Settee

This settee is a wide version of the Adirondack chair shown on page 16. On many projects when you start changing the size of one or two parts, it has a direct effect on other parts. Things start looking out of proportion or pieces won't fit together.

But this settee is different. By adding eight more back slats and a center support, and making a few pieces longer, the chair for one can become a settee for two.

To build the settee, just follow the assembly instructions for the Adirondack Chair (pages 16 to 21), and make the following changes.

CENTER SUPPORT. The only additional part needed for the settee (that's not on the chair) is the **center support (L)**, refer to Fig. 3. It's just a chopped-off version of one of the back legs (A).

I made the center support right after cutting out the back legs (page 18). Start by cutting a blank from a 1x8 to a length of 18".

Then lay one of the back legs on the blank so the bottom edges are flush, see Fig. 1. Now trace the curved top edge and the angled front end from the back leg onto the blank. (Cut the top and front edge now, but wait to mark and cut off the back end until after the base is assembled.)

LONGER PIECES. All of the pieces that run horizontally have to be made longer than on the Adirondack chair, but they're still the same thickness and width. When cutting the front stretcher (C), back braces (D,E,F), and seat slats (I), refer to the longer measurements in the materials list on the opposite page. (But as always, cut the pieces to fit.)

Since the settee has twice as many back slats (16) as the chair, you will need to mark and drill more holes in the upper and lower back braces, see detail drawing on the opposite page.

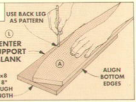
CUT AND MOUNT CENTER SUPPORT. Assemble the base following the same procedure as on the Chair (pages 18 to 19). After the base is assembled, you can get back to the center support (L). The back edge of the center support is cut at a 95° angle to fit against the lower back brace (F).

To do this, lay out a mark for the back edge 14⅛" from the front bottom corner, see Fig. 2. But I didn't cut it on this line at first. Cut it a little long and test fit in the base. If it's long, trim off a little, sneaking up on the final fit.

When the center support fits, mount it by drilling two countersunk holes through the front of the front stretcher (C) and the back of the lower back brace (F), see Fig. 3. Then glue and screw the center support in place. (Note: When the seat slats are added, make sure to screw them to the top of the legs *and* the top of the center support.)

BACK. Assemble the rest of the settee the same way as the Chair. The only change is to cut a double arc on the back, see Plan View. I used a sabre saw to cut both 16" radius arcs.

1



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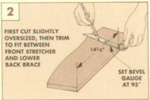

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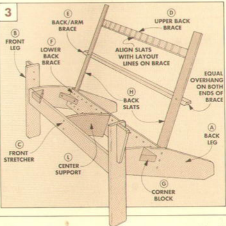
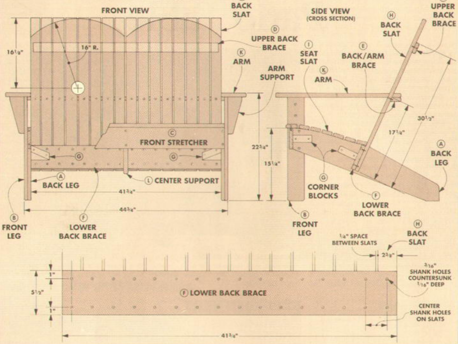


PLAN VIEW

OVERALL DIMENSIONS: 52¾" W x 38¾" H x 37" D



MATERIALS

WOOD PARTS

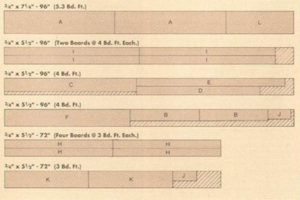
A	Back Legs (2)	¾ x 6½ - 36¼
B	Front Legs (2)	¾ x 3½ - 22
C	Front Stretcher (1)	¾ x 4¼ - 43¼*
D	Upper Back Brace (1)	¾ x 2⅜ - 40¾*
E	Back/Arm Brace (1)	¾ x 2⅜ - 45¾*
F	Lower Back Brace (1)	¾ x 5½ - 41¾*
G	Corner Blocks (4)	1½"-thick stock
H	Back Slats (16)	¾ x 2⅜ - 35⅞
I	Seat Slats (7)	¾ x 2⅜ - 44¾*
J	Arm Supports (2)	¾ x 2⅞ - 8
K	Arms (2)	¾ x 5½ - 28
L	Center Support (1)	¾ x 6½ -18 rgh.

* Longer than Adirondack Chair.

SUPPLIES

- (102) No. 8 x 1¼" brass Fh woodscrews.
- (32) No. 8 x 2" brass Fh woodscrews.
- (1) tube waterproof construction adhesive (see page 29).
- (1) quart spar varnish/tung oil combination, or paint (see page 29).

CUTTING DIAGRAM



Patio Table

After building the Adirondack Chair and Settee, I decided to complete the set by building a small patio table. Like the Chair and Settee, the table is built using simple glue and screw joinery.

The assembly procedure for the slats and the cutting procedure for the arcs is also the same as on the other two projects.

LEGS. The actual building of this table is fairly easy. The tricky part was making the legs *look* right. I wanted them to appear sturdy — without using thick stock. (All of the stock for the Chair, Settee, and Table is ¾" thick, except for the corner blocks.)

To do this, I cut the legs 3½" wide and screwed them to the outside of the aprons. Because they're this wide, when they're viewed from the side you get the impression that they're made from thick stock — maybe from a 4x4. Of course, when the table is viewed from the end you can see they're not that thick. But when stretchers are added between the legs, they're strong enough to easily support the table without any racking.

WOOD AND SCREWS. I built the table from clear all heart redwood (not construction grade) to match the Chair and Settee. But once again, you could use pine and paint the table to match the other two pieces.

To avoid rust stains on the table, I used brass screws and countersunk them slightly below the surface.

FINISH. Finally, I finished the redwood table with two coats of a 50/50 mixture of tung oil and spar varnish. (For more on finishing and painting outdoor furniture, see Talking Shop, page 29.)

MATERIALS

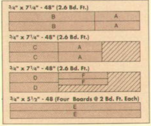
WOOD PARTS

A	Legs (4)	¾ x 3½ - 15¼
B	Side Aprons (2)	¾ x 3½ - 31
C	End Aprons (2)	¾ x 3½ - 17¾
D	Stretchers (2)	¾ x 3½ - 17¾
E	Top Slats (8)	¾ x 2⅜ - 47
F	Cleats (2)	¾ x 2 - 19¾
G	Corner Blocks (4)	1½" Stock

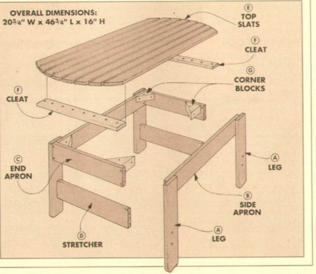
SUPPLIES

- (32) No. 8 x 1¼" brass Fh woodscrews
- (24) No. 8 x 2" brass Fh woodscrews

CUTTING DIAGRAM



EXPLODED VIEW



LEGS & SIDE APRONS

I started building the table by making two side units. Each side unit consists of two legs connected with a side apron, see Fig. 1. Later, the side units are connected with end aprons to form the base of the table, refer to Fig. 5.

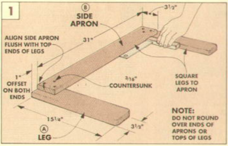
CUT PIECES TO SIZE. To make a side unit, start by cutting the four **legs (A)** to a width of 3½" and length of 15¼". Then cut two **side aprons (B)** 3½" wide and 31" long.

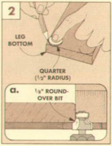
RADIUS LEGS. After the pieces were cut to size, I sanded a ½" radius on the bottom corners of the legs to help prevent the corners from chipping if the table is dragged along a rough surface. (Shop Tip: To mark the ½" radius, trace around a quarter held at the bottom corner of the leg, see Fig. 2.)

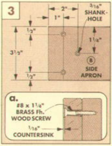
ROUND OVER EDGES. Next, rout a ⅛" round-over on all four edges of the legs and aprons, and on the bottom end of the legs, see Fig. 2a. (Note: Don't round over the tops of the legs or the ends of the aprons.)

SCREW HOLES. After all of the edges are rounded over, the next step is to drill countersunk 3/16"-diameter shank holes on the inside face of the side aprons (B) near the ends, see Fig. 3.

ASSEMBLY. Now, the side units can be assembled. I glued and screwed them together using construction adhesive and No. 8 x 1¼" flathead brass woodscrews, see Talking Shop, page 29. Position the top edge of the apron flush to the top of each leg, and keep the ends of the apron 1" from the outside edge of each leg, see Fig. 1.







END APRONS & STRETCHERS

Once the side units are completed, they can be connected with end aprons and stretchers.

CUT TO SIZE. Begin by cutting two **end aprons (C)** and two **stretchers (D)** to the same size, 3½" x 17¾", see Figs. 4 and 6.

Next, round over the edges (but not the ends) of the aprons and stretchers with a ⅛" round-over bit.

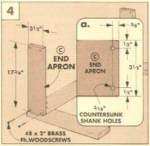
SCREW ON APRONS. Now the end aprons can be glued and screwed to the ends of the side aprons. To do this, first drill two countersunk shank holes near each end of the end aprons (C), see Fig. 4a.

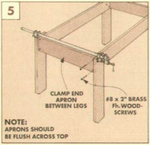
Then begin assembly by laying one of the side units on its side, see Fig. 4. Screw one end apron (C) to the end of the side apron with No. 8 x 2" brass woodscrews and construction adhesive. Check that the pieces are flush across the top. Then screw another end apron to the opposite end of the side unit.

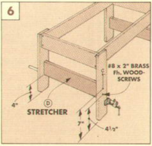
Now stand up both side units, apply adhesive, and clamp them together, see Fig. 5. Check that the aprons are flush across the top, and that the base of the table is square. Then the screws can be tightened into place.

ADD STRETCHER. After the legs and aprons are screwed together, the stretchers (D) can be added. Start by drilling countersunk shank holes 4½" and 7" up from the bottom of each leg, see Fig. 6. Center the holes on the width of the leg.

Then glue and clamp the stretchers between the legs so the bottom edge is 4" up from the bottom of the legs, and the stretcher is centered on the width of the legs. Finally, screw the legs to the stretchers with No. 8 x 2" flathead brass woodscrews.







TOP

After the table base is complete, the top can be made to fit on the base. The top consists of eight top slats (E) held together by two cleats (F) fastened underneath.

SLATS. Start by cutting the eight **top slats (E)** from ¾"-thick stock to a width of 2⅜" and length of 47", see Fig. 7.

To soften the edges of the slats, I rounded all four edges with a ⅛" round-over bit on the router table.

CLEATS. Next, cut two **cleats (F)** from ¾"-thick stock to a width of 2" and length of 19¾", see Fig. 7. Then, round over all of the edges of these with a ⅛" round-over as well.

The cleats are screwed to the bottom of the slats. To do this, first drill $^{3}/_{16}$" countersunk shank holes centered on the width of the cleats at the locations shown in Fig. 7. (These hole locations will center the screws on the slats.)

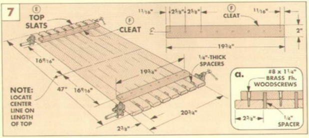
GAPS BETWEEN SLATS. The slats are positioned with ¼" gaps between them. To create uniform gaps during assembly, I placed ¼"-thick spacers between the slats and clamped the whole assembly together with pipe clamps, see Fig. 7.

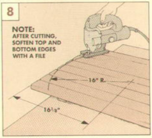
POSITION CLEATS. Now the cleats can be positioned on top of the slats, see Fig. 7. To determine where to position the cleats, set the base upside down on the slats so it's centered on the length of the table top, refer to Fig. 10. Then position the cleats $^{1}/_{16}$" *outside* the legs on both ends.

After the cleats are centered on the length of the table top, center them on the width of the top so there's an even overhang on both sides, see Fig. 7.

SCREW TOGETHER. When the location of the cleats is determined, screw the cleats to the slats with No. 8 x 1¼" flathead brass woodscrews, see Fig. 7a.

RADIUS ENDS. Once the top is assembled, lay out a 16"-radius arc on each end, centered on the width of the table. Then cut the arcs with a sabre saw, see Fig. 8. Finally, soften the edges on the ends of the slats with a file.





CORNER BLOCKS

The final step in assembling the table is to add the four corner blocks. These blocks prevent the base from racking and provide a means for screwing the top to the base.

CUT TO SIZE. The triangular-shaped **corner blocks (G)** are cut from a length of 2x4, see Fig. 9. (Note: For more about making the corner blocks, see Shop Notes, page 14.)

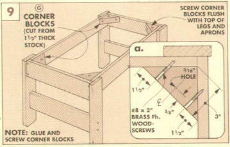
DRILL HOLES. After the corner blocks are cut to size, the next step is to drill three countersunk $^{3}/_{16}$" shank holes in each block, see Fig. 9a. The first two holes are drilled in the long edge of the corner block and are used to screw the block to the table base.

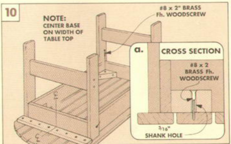
The other hole is drilled through the face of the corner block for mounting the top.

ATTACH BLOCKS. After the holes are drilled, the blocks can be glued (with construction adhesive) and screwed in place to the inside of the table base with No. 8 x 2" flathead brass woodscrews, see Fig. 9.

FINISH. Before attaching the top, I finished it with a tung oil/spar varnish combination. (For more on finishing, see Talking Shop, page 29.)

ATTACH TOP. Once the finish dries, the top can be mounted to the base. To do this, turn the top upside down and position the base between the cleats so the base is centered on the width of the top, see Fig. 10. Then drive woodscrews through each corner block and into the top, see Fig. 10a.





Talking Shop

Since the Adirondack Furniture in this issue will sit outside in the sun and rain, there are some special considerations when building and finishing these projects.

WOOD

The first thing to consider is the choice of wood. I built the furniture shown on the cover from redwood. It's naturally resistant to decay, dimensionally stable, and the heartwood is a beautiful red-brown color. (I used a "Clear All Heart" grade redwood.)

But I also made one chair in the traditional Adirondack style — built from pine and painted white (see photo on the back cover).

There are a number of other good decay-resistant choices for outdoor furniture including cedar, teak, mahogany, cypress, and white oak. (For more on these outdoor woods and screws for outdoor projects, see *Woodsmith* No. 45.)

GLUE

In *Woodsmith* No. 45 we also talked about outdoor glues. At that point we recommended using plastic resin, epoxy, or yellow glue based upon the kind of wood you're using and the weather conditions the project will be exposed to.

CONSTRUCTION ADHESIVE. This time I tried something different and was surprised by the results. I used standard exterior construction adhesive that comes in a tube. It's used in the building industry for gluing decking to floor joists and paneling to walls.

This adhesive is sold in tubes that fit a standard caulking gun. I buy it at a local home center for $2.29 a tube, and one tube was enough to do all of the Adirondack furniture in this issue. There are a number of different brands available, but look for a tube of adhesive that's both waterproof and designed for wood.

JOINT LINE. Won't construction adhesive leave a thick joint line? No, and you don't have to spread it out as you would when using yellow glue. Use a new tube and cut a 1/8" hole in the nozzle of the tube. The adhesive should be creamy, about like toothpaste. Run a small bead or dots on one of the pieces to be joined, staying about 3/4" from the edge. Then, when the pieces are squeezed together, the glue will spread out over the entire joint area leaving a nice, thin joint line.

If some of the adhesive should squeeze out, let it dry overnight and cut it off with a utility knife or chisel. The stuff is incredibly strong, even on an end grain joint.

SCREWS. The adhesive is probably strong enough to use without screws, but it's easier to assemble many projects with screws as well as adhesive. I assembled the redwood furniture with brass screws and countersunk all of the screws 1/16" below the surface. The brass and redwood colors seem to work well together.

FILLER

Since I was painting the pine chair, I counterbored the screws 1/8" deep on this chair and filled the holes with Minwax's High Performance Wood Filler, see Sources, page 31. It's specially-made for outdoor use so it's water and rot resistant and won't shrink or fall out. It also takes paint easily and can be planed or sanded after it has dried 30 minutes.

This filler comes in two parts: a beige-colored polyester resin in a can and a small tube of white hardener. When you mix the two parts together (in the plastic lid provided) you have about 10 minutes working time, so don't mix up any more than you will need. (Follow the directions *exactly*.)

FINISHES

For the redwood furniture I was looking for a satin finish that wouldn't build up, but would still offer protection outdoors. I also wanted something that would soak into the soft redwood and be easy to apply to the small spaces between the slats.

COMBINATION FINISH. To get what I wanted, I made a mixture of 50% McCloskey's Man O' War Satin Spar Varnish and 50% McCloskey's Stain Controller & Wood Sealer. (This is a thinned down tung oil.) For a source of these finishes, see page 31.

Once the spar varnish and tung oil are mixed, liberally brush the mixture on one section of the project and let it soak into the wood. The soft redwood will probably drink up most of the finish, but wipe any excess smooth after about ten minutes.

After it dries overnight, apply a second coat in the same manner. Once you wipe this coat smooth you should begin noticing a slight sheen building up. If you want more gloss, apply a third coat.

One of the advantages of this finish is that you can tell when it needs renewing, and it's easy to do. If next year the finish is dead flat, it's a sure sign that the furniture could use another coat. The color of the wood may change, but if you periodically apply a new coat, the satin smooth finish will be maintained.

PAINT. As for the chair made with pine, I decided to paint it white. If you used a construction grade pine with large knots, it's a good idea to seal all of the knots with a coat of shellac before painting. The shellac will seal the resin in the knots and keep it from bleeding through the coats of paint.

To paint the pine chair, I used Rust-Oleum's new "Wood Saver" enamel. Start by brushing on a coat of Rust-Oleum's light gray Wood Saver Primer with a 1½"-wide bristle brush. The primer dries quickly, so brush out any drips as you go and paint the part that will show the most last.

I waited 48 hours to be sure the primer was completely dry, and then sanded it with 320-grit sandpaper. You probably won't be able to sand out all of the brush marks, but sand it fairly smooth before applying the top coat of enamel.

The top coat can be brushed on or sprayed on. Brushing is considerably less expensive, but it's more time-consuming since it takes time to brush between all the slats. (Shop Note: It may be easiest to paint the edges of the slats *before* assembly.)

I sprayed on two coats of Rust-Oleum's birch white Wood Saver enamel from aerosol cans. It took one can for each coat on the chair, but the finish was perfectly smooth, without brush marks.

No matter which way you choose to apply the paint, you may want to put an extra coat on the most used areas — the top of the chair arms and seat, the front of the back slats, the table top, and the bottom ends of all the legs.

Sabre Saw Table

One of the problems with using portable power tools (like a router or sabre saw) is that they're awkward to control, especially when you're working with small pieces. I'm much more comfortable concentrating on moving the workpiece. So I built a table that holds a sabre saw and lets me use it like a band saw or scroll saw.

BUILDING THE TABLE. To make the table, start with a quarter sheet (2 ft. x 4 ft.) of ¾" plywood. Cut one piece for the top and two pieces for the sides, see Fig. 1. The sides are strengthened by cross-braces in front and back.

BLADE SLOT. To cut a slot for the blade, I drilled a series of overlapping ⅟16" holes centered on the width of the top, see Fig. 2. Then I cleaned up the holes using a fine sabre saw blade.

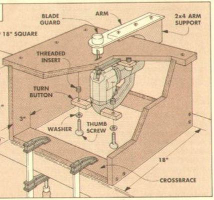
ROUTING A RECESS. The sabre saw mounts in a recess, see Fig. 2. To mark the recess, hold the sabre saw on the underside of the table top with the blade sticking through the slot. Then trace the outline of the saw base.

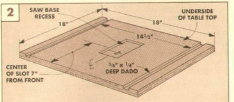
Next, rout the recess slightly larger than the base of the sabre saw, see Fig. 2. The recess should be deep enough so the edges of the base protrude just above the surface of the top itself. This way the sabre saw can be secured with four turn buttons that hold the base tightly in its recess, see Fig. 2a.

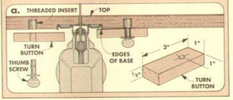
BLADE GUARD. To keep this technique safe as well as useful, I made a guard that covers the exposed teeth of the moving blade. The guard consists of a 2x4 support and an arm made of Plexiglas (or Masonite). At the end of the arm is a plastic canister (a plastic brad container or pill bottle) which acts as a blade guard, see Fig. 3.

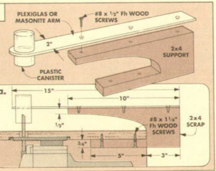
USING THE TABLE. You will discover that the trick to using the sabre saw is keeping the workpiece from jumping up and down while you're sawing.

It helps to hold the workpiece tightly, and to use a sharp blade. Also, don't try to saw workpieces that are too thick (over about 1"). They may "catch" on the tip of the blade and cause the workpiece to bounce up and down.







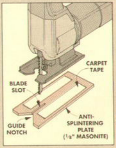


STOP SABRE SAW SPLINTERING

No matter what blade you're using, or what material you're cutting, you'll almost always have splintering along the edges of a freehand sabre saw cut.

To prevent this I made a plate of ⅛" Masonite that attaches to the base of the sabre saw with double-sided carpet tape.

A slot in the Masonite fits tightly against the sides of the blade to prevent splintering. A notch at the front of the plate helps you follow a pencil line, and lets you see the splinter-free cut the sabre saw can produce.



Sources

BEAM COMPASS

All the hardware needed to build the Beam Compass (page 22) is available from **Woodsmith Project Supplies**. Note: The wood is *not* included.

Beam Compass Hardware
- 769-100 Beam Compass Hardware........................$5.95
  - (4) Knurled Brass Finger Nuts
  - (4) #8-32 x 1" Br. Mach. Screws
  - (4) Brass Washers
  - (1) 1" Chrome-Plated Point
  - (1) Tube, 3 Pieces of #6H Lead

PATTERNS

Full-size patterns for the Adirondack chair's back legs, arms, and arm supports are available from **Woodsmith Project Supplies**. Also included is a pattern for the center support on the Settee. These patterns *only* include the parts listed above.

Adirondack Pattern
- 769-200 Adirondack Chair and Settee Pattern...........$3.50

WOOD SCREWS

If you're planning on building all three Adirondack furniture projects shown in this issue, you'll be using almost 300 flathead screws. (Check the supplies list with each project for the exact number and size needed. Always buy extra screws.)

Woodsmith Project Supplies is offering both brass and zinc-plated flathead screws. If the screws are countersunk and left exposed (like we did on the redwood furniture), we recommend brass screws that won't rust. If you plan on counterboring the screws and filling the holes, use zinc-plated screws.

The brass screws all have a Phillips drive. We're offering the zinc-plated screws in Phillips or Recex drive. The Recex screws can be driven with either a Phillips or a square drive bit or screwdriver. (Note: For driving Recex screws, it's best to use a square drive bit. So we're also offering a square drive bit to be used with an electric drill. This bit is for power driving *only*.)

We're offering the screws in bags of 25 and 100. Each bag contains screws of one particular style and size. We cannot mix screw types or sizes in a bag.

Brass Phillips Screws
No. 8 x 1¼", Flathead
- 769-215 (Bag of 25).........$2.95
- 769-210 (Bag of 100).......$8.95

No. 8 x 2", Flathead
- 769-225 (Bag of 25).........$3.95
- 769-220 (Bag of 100).....$12.95

Zinc-Plated Phillips Screws
No. 8 x 1¼", Flathead
- 769-235 (Bag of 25).........$1.00
- 769-230 (Bag of 100).......$2.95

No. 8 x 2", Flathead
- 769-245 (Bag of 25).........$1.25
- 769-240 (Bag of 100).......$3.95

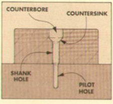
Zinc-Plated Recex Screws
No. 8 x 1¼", Flathead
- 769-255 (Bag of 25).........$1.15
- 769-250 (Bag of 100).......$3.25

No. 8 x 2", Flathead
- 769-265 (Bag of 25).........$1.45
- 769-260 (Bag of 100).......$4.25

Square Drive Bit
- 756-314 Square Drive Bit for Recex Screws..................$1.00

PILOT DRILL KITS

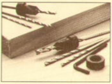
To drill the screw holes for the Adirondack furniture, we're offering a kit of our favorite bits for pilot holes, shank holes, and countersink or counterbores for standard and Lo-Root (deep-threaded) screws. (For a discussion of screws and pilot bit sets, see *Woodsmith* No. 56.)



No. 8 Pilot Drill Kit
- 756-410 Pilot Drill Kit for No. 8 Screws..................$15.95

This kit includes (see photo):
- (1) 11/64" Brad Point Bit (This is for drilling the shank hole for a No. 8 screw. Though a 3/16" bit works, this is the perfect size.)
- (1) 3/8" Countersink/Counterbore (This fits over the 11/64" brad point bit.)
- (1) 3/8" Stop Collar
- (1) Allen Wrench
- (1) 1/8" Twist Bit (For No. 8 standard screw pilot holes.)
- (1) 7/64" Twist Bit (For No. 8 Lo-Root screw pilot holes.)

No. 6 & 8 Pilot Drill Kits
We're also offering another set that adds the bits needed for No. 6 screws (see photo below). This kit includes everything previously listed (for No. 8 screws) *plus* all of the following bits needed to drill holes for No. 6 standard and Lo-Root screws.
- 756-420 Pilot Drill Kit for No. 6 & No. 8 Screws....$26.95
  - (1) 9/64" Brad Point Bit (For No. 6 shank holes.)
  - (1) 3/8" Countersink/Counterbore (Fits over 9/64" brad point.)
  - (1) 7/64" Twist Bit (For No. 6 standard screw pilot holes.)
  - (1) 3/32" Twist Bit (For No. 6 Lo-Root screw pilot holes.)



FILLER AND FINISH FOR OUTDOOR FURNITURE

As mentioned in Talking Shop on page 29, I used Minwax's High Performance Wood Filler for filling the counterbored holes before painting the pine version of the Adirondack Chair shown on the back cover. This filler is available at many local home centers, and paint and hardware stores. If you can't find it locally, it can be ordered through the mail from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374-9514; phone (612) 428-2199.

For finishing the redwood Adirondack furniture, I used a mixture of 50% McCloskey's Man O' War Satin Spar Varnish and 50% McCloskey's Stain Controller & Wood Sealer (for more information, see page 29). These products are available at some local retail stores and home centers, and can also be ordered from The Woodworkers' Store (see address above).

ORDER INFORMATION

BY MAIL

To order by mail, use the form enclosed with a current issue or write your order on a piece of paper, and send with a check or money order. (Include $3.50 handling and shipping charge with each order.) IA residents add 4% sales tax; CA residents add 6.25% sales tax. Send to:

Woodsmith Project Supplies
P.O. Box 10350
Des Moines, IA 50306

BY PHONE

For faster service use our Toll Free order line. Phone orders can be placed Monday through Friday, 8:00 AM to 5:00 PM Central Standard Time.

Before calling, have your VISA or Master Card ready.

1-800-444-7002

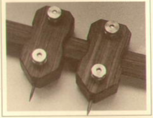
Allow 4 to 6 weeks for delivery.
Note: Prices subject to change after August, 1990.

Final Details

Adirondack Chair

▲ *This traditional painted version of the Adirondack Chair is the perfect place for summertime relaxing. To achieve a clean look, we counterbored the screw holes and filled the counterbores with wood filler. For information on filling and painting, see page 29.*

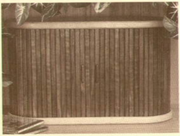
Beam Compass



▲ *Knurled brass finger nuts on this shop-built Beam Compass contrast with the dark wood of the trammel heads. A hole in each head holds a steel point or a drafting lead.*

▲ *To use the Beam Compass, hold the centerpoint and swing the marking trammel head. A thin scrap bridges the gap between the back slats on the Adirondack furniture.*

CD Case



▲ *The walnut tambour doors provide a striking contrast with the oak on this CD Case. These vertical slat tambours give the case a clean, uncluttered look.*

▲ *Opening the wrap-around tambour doors reveals an inner case that holds up to 28 compact disc boxes. Each CD box is separated by walnut dividers.*