

This is an excerpt from the book

# **Children's Furniture Projects**

by Jeff Miller

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# CHILD'S ROCKER

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**K**IDS ARE ALWAYS IN MOTION. It's not easy to get them even to sit down in a chair. But this rocker lets them work off energy while staying in one place. And rocking can be just as soothing for children as it tends to be for adults. Kids love it.

The construction is a combination of the typical and the unusual; although there are simple dadoes routed in the plywood panels to align the parts, everything is held together with ¼-in. threaded rods

and cap nuts. This makes it sturdy enough to withstand the typical amount of abuse that kids will dish out but also easy to knock down and store (or ship) flat.

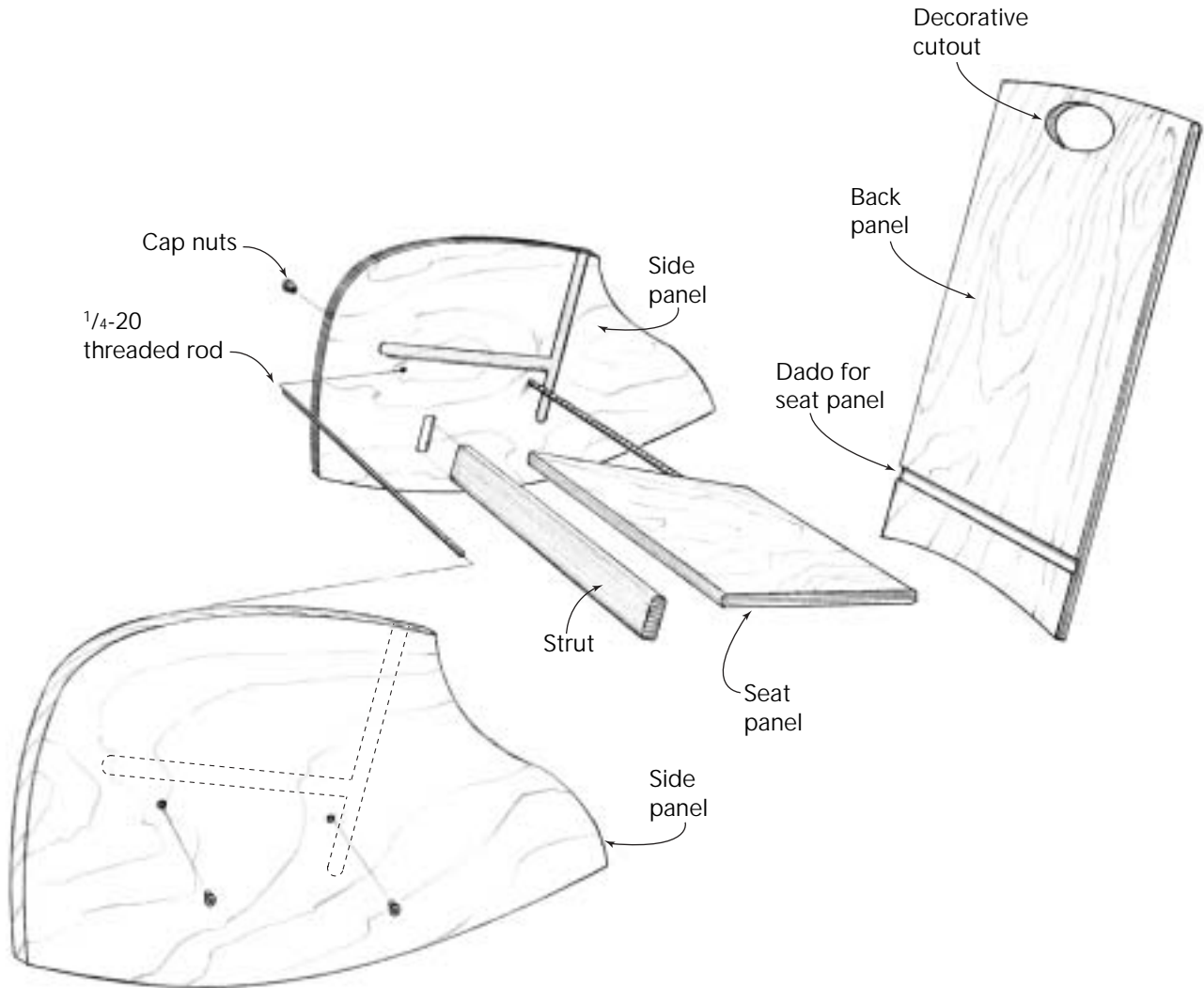
There are lots of ways to finish this rocker to get different results. I've gone with interesting colors as well as a basic oil-and-wax finish. But that doesn't mean you can't come up with your own design scheme, or just let the child decorate it the way he or she wishes.

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# CHILD'S ROCKER

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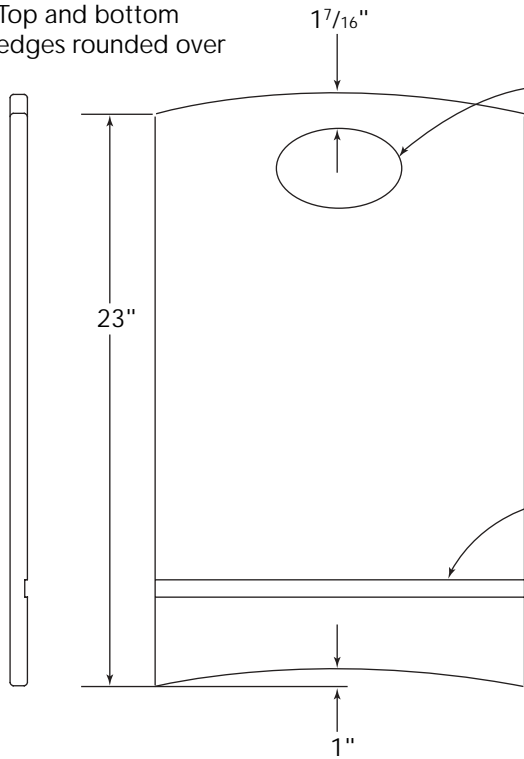
THE ROCKER IS MADE OF FIVE SHAPED pieces of plywood. Shallow dadoes in the plywood sides and back locate the parts in the proper positions, and the whole thing is held together with two threaded rods tensioned with cap nuts.



**BACK PANEL**

All parts  $\frac{3}{4}$ " plywood.

Top and bottom edges rounded over



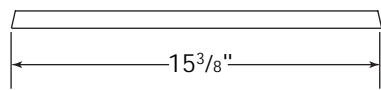
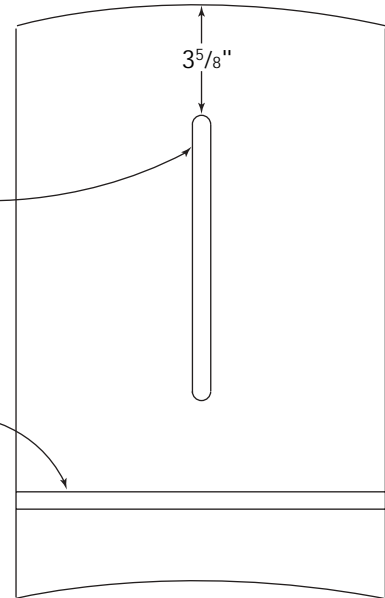
Oval cutout,  $5\frac{1}{4}$ " x  $3\frac{1}{4}$ ", edges rounded over

Slot cutout,  $\frac{3}{4}$ " x 12", edges rounded over

Dado for back of seat panel,  $\frac{3}{4}$ " x  $\frac{1}{8}$ " deep

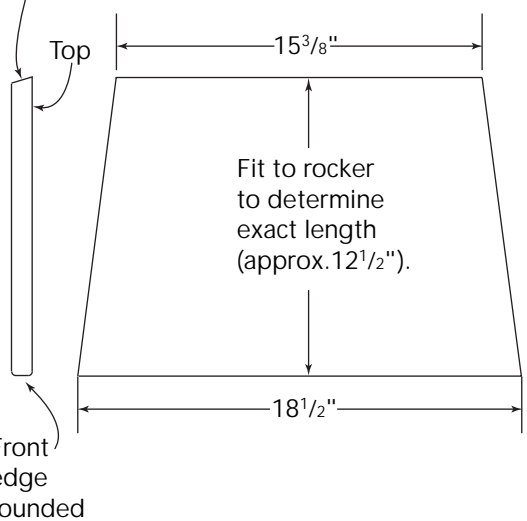
Sides bevelled

**ALTERNATE BACK PANEL**

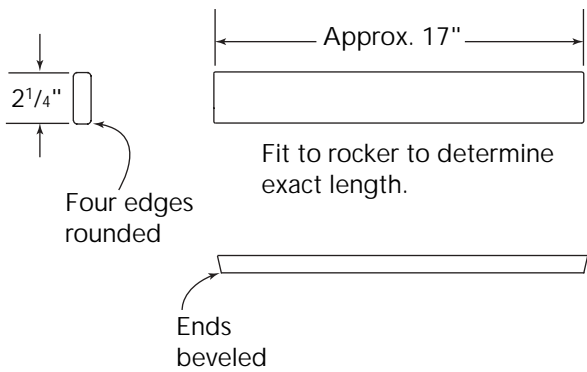


Back edge bevelled

**SEAT PANEL**



**STRUT**



## CUT LIST FOR CHILD'S ROCKER

2	Side panels	$\frac{3}{4}$ " x 16" x 26"*
1	Seat panel	$\frac{3}{4}$ " x 12 $\frac{1}{2}$ " x 18 $\frac{1}{2}$ "
1	Back panel	$\frac{3}{4}$ " x 15 $\frac{3}{8}$ " x 24 $\frac{1}{8}$ "
1	Strut	$\frac{3}{4}$ " x 2 $\frac{1}{4}$ " x 17"

### Hardware

1	Threaded rod	$\frac{1}{4}$ -20 x 36" long**
4	Cap nuts	$\frac{1}{4}$ -20***

### Miscellaneous

	Scrap wood for interim jig	$\frac{1}{2}$ "- $\frac{3}{4}$ " x 8" x 18"
	Plywood for side panel jig	$\frac{3}{4}$ " x 25" x 32"

\*All parts are Baltic birch plywood or equivalent.

\*\*Cut into two pieces based on measurements from completed chair.

\*\*\*Also called connector nuts; typically used with connector bolts.

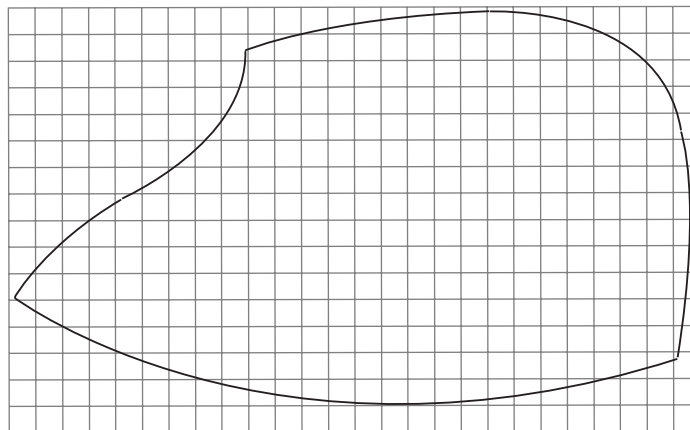
**T**HE FIRST STEP in making the rocker is to make up a jig for locating the dadoes for the seat, the back, and the strut on the side panels. Because the relationship of the seat parts to the curve of the rocker is so important, you'll also use the side panel jig to define the shape and location of the rocker relative to the dadoes and thus to the seat and back of the rocker.

## Making the Side-Panel Jig

Make the jig for the side panels out of a piece of  $\frac{3}{4}$ -in. by 25-in. by 32-in. plywood (see "Side-Panel Dado Jig").

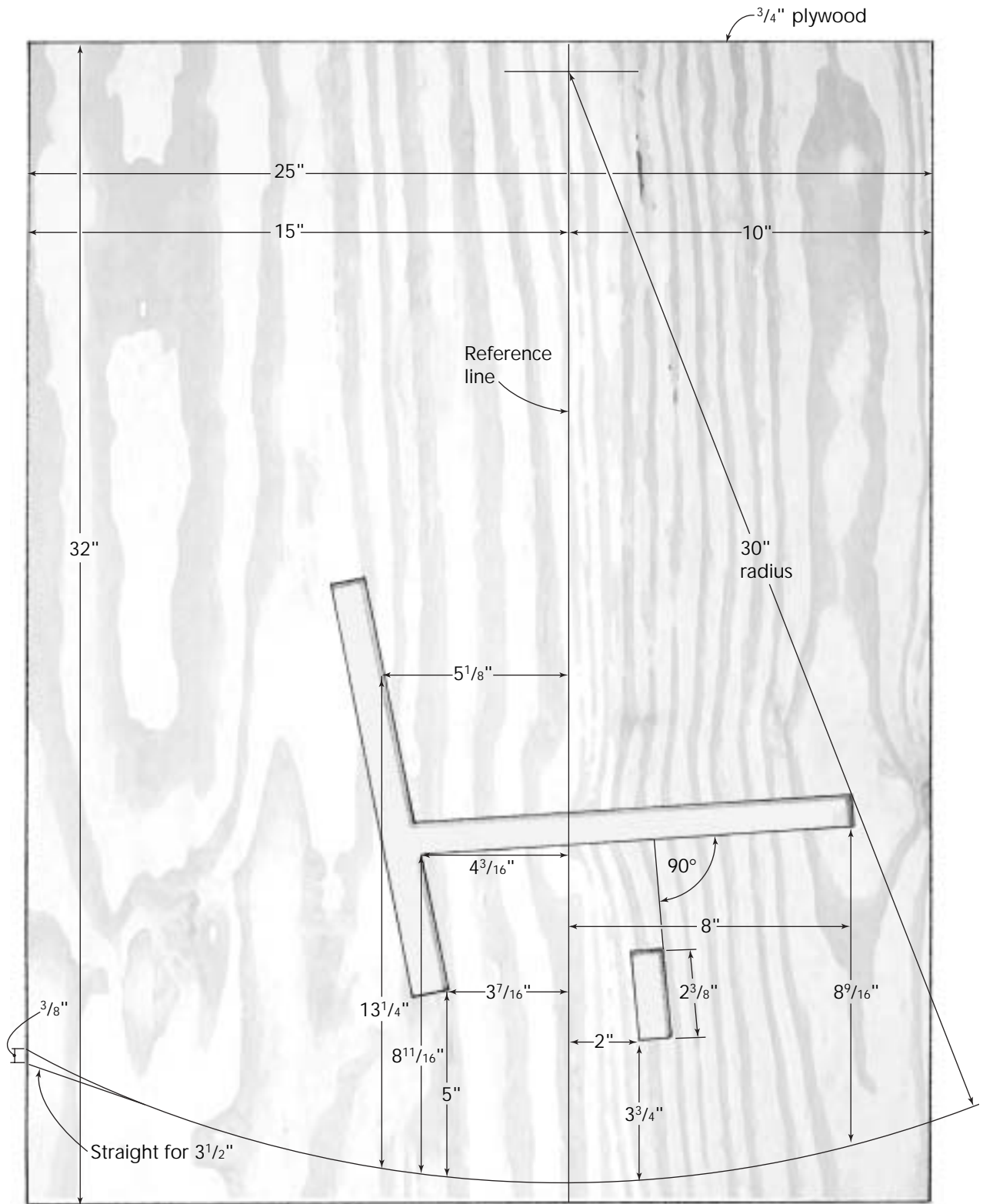
1. Draw a reference line 15 in. from (and parallel to) one of the long edges of the plywood. I measured from the left edge, and that's what is shown here. You will reference off of this edge when routing the actual side panels. Mark it now as your reference edge.

## The Side-Panel Pattern



1 square = 1"

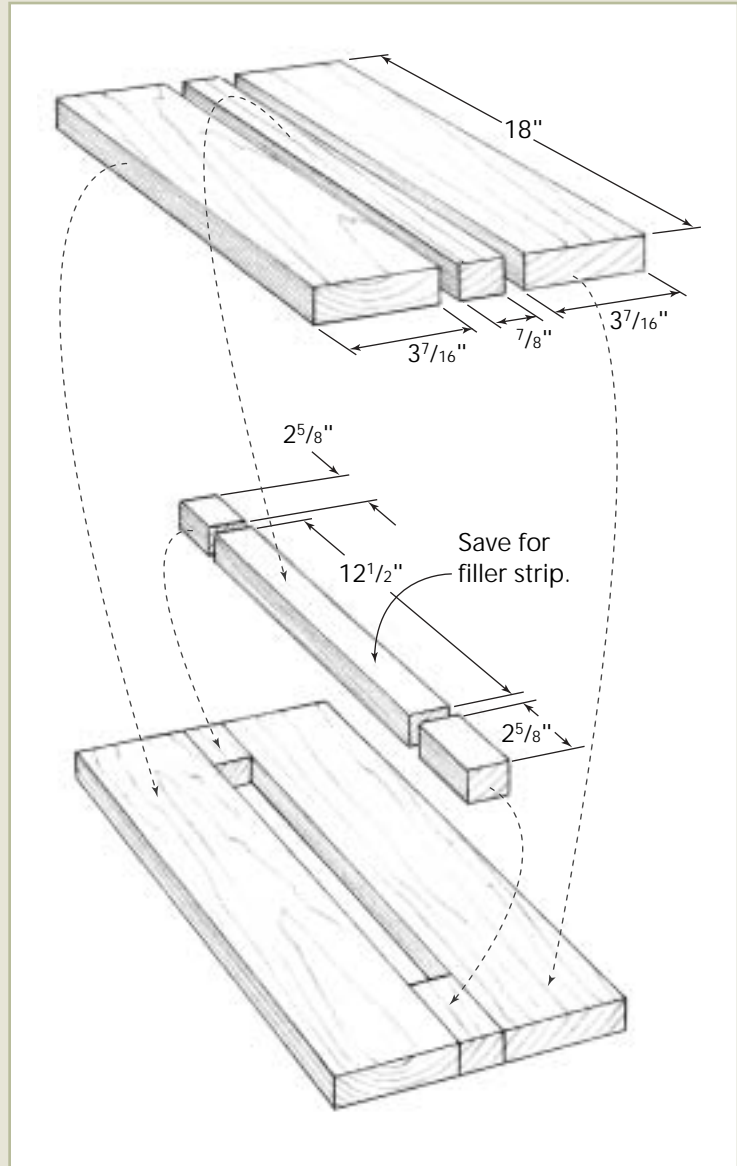
# Side-Panel Dado Jig



## MAKING THE INTERIM SLOT JIG

The interim jig is built up to have a  $\frac{7}{8}$ -in.-wide by  $12\frac{1}{2}$ -in.-long slot down the middle of it. The jig is then used with a flush-trimming bit to cut the slots in the side panel jig.

1. Cut apart a board roughly 18 in. long by 8 in. wide by  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. thick into two  $3\frac{7}{16}$ -in.-wide strips and one strip exactly  $\frac{7}{8}$  in. wide.
2. Crosscut the  $\frac{7}{8}$ -in.-wide strip into three parts; one  $12\frac{1}{2}$  in. long, and two about  $2\frac{5}{8}$  in. long. Set aside the  $12\frac{1}{2}$ -in.-long strip; it will be used later when routing the short slot for the strut.
3. Glue the two  $2\frac{5}{8}$ -in. pieces in between the two  $3\frac{7}{16}$ -in.-wide strips, with the ends of both short and long pieces flush. This should leave a  $\frac{7}{8}$ -in. by  $12\frac{1}{2}$ -in. slot in the middle.
4. Plane the faces of the jig smooth once the glue has dried.



Making a jig to make another jig may seem like a lot of trouble, but the interim jig helps get the slots in the side panel jig located and sized correctly.

2. Next, mark out the curve of the rocker. The rocker is mostly an arc of a circle with a 30-in. radius. Mark the center point of the arc on the reference line, about 1 in. down from the top of the plywood. Using a scrap of  $\frac{1}{4}$ -in. plywood or a long thin scrap of wood, make up a “compass” by drilling one hole for a nail and another hole, 30 in. away, for a pencil point. Scribe the arc across the bottom of the plywood.

3. The back of the rocker will end about  $\frac{1}{8}$  in. away from the left edge of the plywood after it gets rounded over. The front of the rocker extends all the way to the other side of the plywood.

4. Flatten out the back  $3\frac{1}{2}$  in. of the rocker to make it harder to tip the chair over. Measure down  $\frac{3}{8}$  in. from the arc along the back edge of the jig, then draw a  $3\frac{1}{2}$ -in.-long straight line from this point to the arc of the rocker.

5. Now you’re ready to locate the dadoes for the seat, back, and strut. Measure over from the reference line and up from the arc of the rocker to locate the various points shown in “Side-Panel Dado Jig” on p. 95 that will define the locations the dadoes. Make sure all of the lines are perpendicular or parallel to the reference line.

6. The dadoes themselves will be  $\frac{3}{4}$  in. wide, but because you are making a jig that will be used with a  $\frac{1}{8}$ -in. guide bushing and a  $\frac{1}{2}$ -in. router bit, the slots in the jig must be  $\frac{1}{8}$  in. bigger. Mark out parallel lines for the slots,  $\frac{1}{8}$  in. apart, based on the reference points you just created. Mark the ends of the slots as well.

7. The best way to proceed now is to make a very simple jig to help you rout the slots. You’ll use this interim jig to cut the  $\frac{1}{8}$ -in.-wide slots (see “Making the Interim Slot Jig”).

8. Lay the interim jig over one of the marked slot locations on the side-panel jig and clamp it into place. Use a flush-trimming bit in a router to cut the slot all the way through the side-panel jig. Make sure to do this with the jig either propped up off the bench or hanging over the edge so you don’t rout into the benchtop.

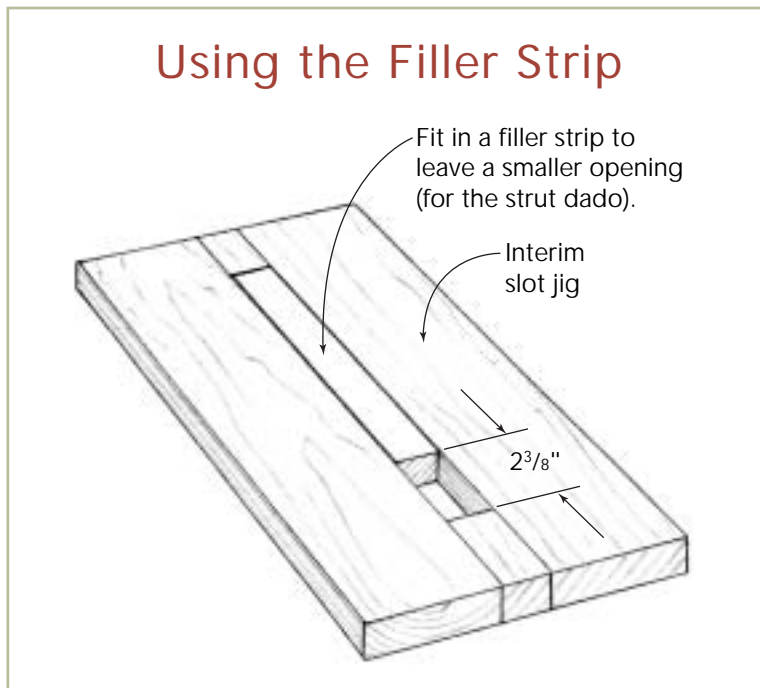


PHOTO A: A filler strip can be inserted in the interim dado jig to rout the short slot for the strut.

9. Don’t worry about the length of the slot for the back of the rocker; it can extend up above where the side panel will end. But you can cut down the  $12\frac{1}{2}$ -in.-long piece you set aside when making the interim jig to use as a filler when routing the dado for the strut

## Cap-Nut Locations

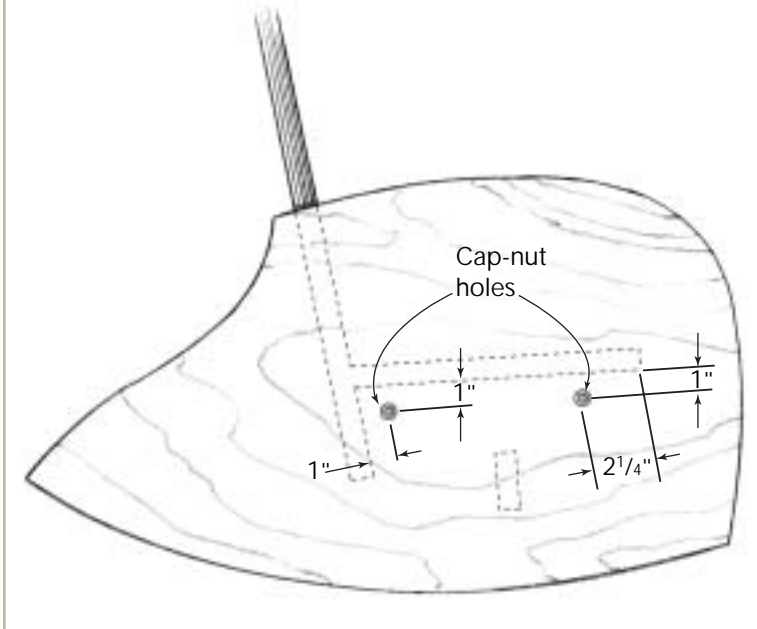
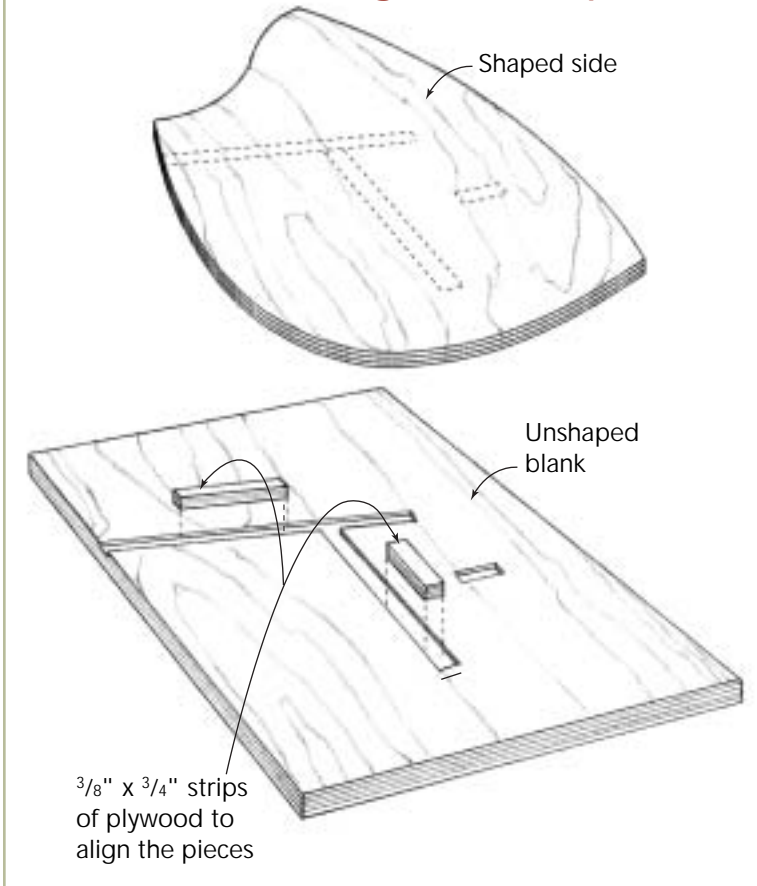


PHOTO B: The dados in the side panels are easy to rout, and they come out in exactly the right place if you use the dado jig.

## Transferring the Shape



underneath the seat. This dado should be exactly  $2\frac{1}{4}$  in. long; cut the filler strip so it will make a slot that is  $2\frac{1}{4}$  in. long in the side-panel jig— $\frac{1}{8}$  in. will be lost when you rout the dados (see **Photo A** on p. 97 and “Using the Filler Strip” on p. 97).

**10.** Locate and drill two holes which you will use to transfer the positions of the cap-nut holes (see “Cap-Nut Locations”).

**11.** Now cut and smooth the shape of the rocker that you marked originally. I sawed the shape on the bandsaw and sanded the curve smooth and fair. The jig is now finished. Time to move on to making the rocker.

## Making the Side Panels

**1.** Cut the side panel blanks to rough size as given in the cut list.

**2.** Clamp a panel blank underneath the side-panel jig so that it is flush with the reference edge of the jig. The bottom of the blank should be sticking out beyond the jig about 1 in.

**3.** Rout the dados using a router with a  $\frac{3}{8}$ -in. guide bushing and a  $\frac{1}{2}$ -in. straight bit. The dados should all be the same:  $\frac{3}{8}$  in. to  $\frac{1}{4}$  in. deep. While the boards are still clamped

together, mark the curve of the rocker and the cap-nut hole locations onto the blank (see **Photo B**).

4. Now flip the side-panel jig over and clamp it with the same reference edge flush with the edge of the other side-panel blank. Rout the dados on this blank. You do not need to mark the rocker curve on this blank, since you will later transfer over the shape of the first panel.

5. Draw a grid of 1-in. squares on the routed side of the first side panel blank.

6. Create the shape of the upper part of the side panel by working square by square from “The Side-Panel Pattern” on p. 94 until you are satisfied with the overall look.

7. Cut the side panel to shape and smooth carefully to the lines. The rocker should be smooth and even, with no bumps or flats.

8. Now transfer the shape over to the other side-panel blank. Use a couple of narrow rippings of 3/4-in. plywood fit into the corresponding dados to align the two halves before drawing the lines (see “Transferring the Shape”). This will ensure symmetry to the sides. Cut and smooth the second side panel.

9. Round over the edges of both panels with a 1/4-in. roundover bit.

10. Drill the two 1/2-in. holes for the cap nuts in each side panel at the locations marked from the side-panel jig.

## Making the Seat

1. Cut the seat blank to dimensions given in the cut list. Measure 1 1/8 in. in from both sides of the blank to get the dimensions of the back of the seat. Then draw lines from these marks to the front corners.

2. Bandsaw the sides of the seat to the lines.

3. Rout the front edge, both top and bottom, with a 1/4-in. roundover bit.

4. The back edge of the seat needs a bevel, but this must wait until you are working on the back.

## Making the Back

Both sides of the back are beveled at the same angle as the seat taper. The back also



PHOTO C: The seat can be used to set the angle of the table saw blade for all of the bevel cuts on the rocker.

has a dado for the back edge of the seat to slip into as well as some decorative shaping.

1. Set the bevel angle for the back on the table saw using the seat itself as a guide (see **Photo C**).

2. Bevel only one edge of the back for now.

3. You need to determine the location of the dado that will accept the back edge of the seat. The first step is to round over the bottom edges of the back with a 1/4-in. roundover bit.

4. Hold up the back with the beveled edge in the back dado of the appropriate side panel (the back should lean toward the back of the chair). Slide the back to the bottom of the dado. Now mark where the seat dado intersects the back (see **Photo D** on p. 100). This marks the location of the seat dado in the back panel.

5. Cut the dado in the back for the seat. Although this dado should be angled, the saw blade on my table saw tilts the wrong way, and it seemed rather cumbersome to set up the cut. So I cut the dado with the blade at 90 degrees and checked the fit of the seat in the dado. No problem. It hardly matters at all that the angle isn't there. And it is easier.

6. Hold the back up in the same side panel as before. Take the seat and hold it up in

PHOTO D: Locate the dado in the back panel with the panel held in position on the side panel. The dado goes where the seat dado intersects the back.

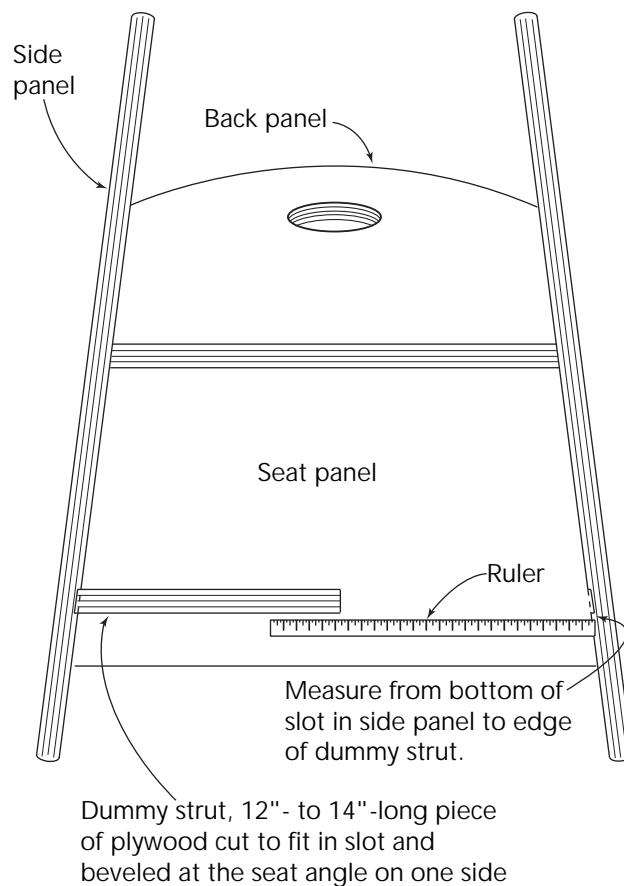


place as well. Take note of how much wood must be removed from the back edge of the seat so it will fit into place, then mark the back edge.

**7.** Cut the back edge of the seat with the blade reset to the angle of the seat taper (use the seat as your angle reference once again). Set up for the cut carefully so that the top of the seat ends up longer than the bottom.

**8.** Now you need the exact width of the back. Hold the seat up in the dado in the back. Align the beveled edge of the back with the edge of the seat. Mark the opposite side. Cut the bevel on this side of the back. Be sure that the bevel angles the correct way. The back panel tapers toward the rear; the edges are not parallel.

## Determining Strut Length



9. Mark and cut the curves on the top and bottom of the back. Both of these curves are the same: a 30-in. radius. You can use the bottom of one of the side panels as a pattern to mark them out.

10. Rout an oval or a slot in the back panel for decoration. Note that the oval makes a very convenient handle for dragging the chair around. I made up a jig for the oval cutout from a scrap of plywood with a 5½-in. by 3¾-in. oval cut in it. The slot can be cut with the interim jig you made earlier. Cut either decoration with a router with a ⅝-in. guide bushing and a ½-in. straight bit.

## Making the Strut

The strut makes it possible to assemble the rocker with a threaded rod and cap nuts. It is simple to make.

1. Cut a strip of plywood to the dimensions given in the cut list.
2. You'll have to clamp all of the other parts of the rocker together to determine the exact length of the strut. Clamp across the back of the chair above the seat. Then measure the distance from the front of the slot on one side to the front of the slot on the other. A 12-in. ruler and a 6-in. ruler used together can get the length. You can also make up a dummy strut from a 1¼-in. by 12-in.- to 14-in.-long scrap of plywood with the seat angle cut on one end. Fit it into one of the strut slots and measure from the end of this piece to the bottom of the dado opposite. Add the two lengths to get the measurement (see "Determining Strut Length").
3. With the saw still tilted (or reset to the seat angle), cut the ends of the strut at the same angle used for cutting the sides of the back.
4. Round over the long edges of the strut with a ¼-in. roundover bit.

## Putting It All Together

There is no glue used on this chair. Instead, the chair is held together with two lengths of threaded rod and four cap nuts (see **Photo E**). The cap nuts are usually used in conjunction with connector bolts, but they work perfectly well with ¼-20 threaded rod.



PHOTO E: This combination of hardware used to hold the rocker together is unconventional, but I found it all at my local hardware store.

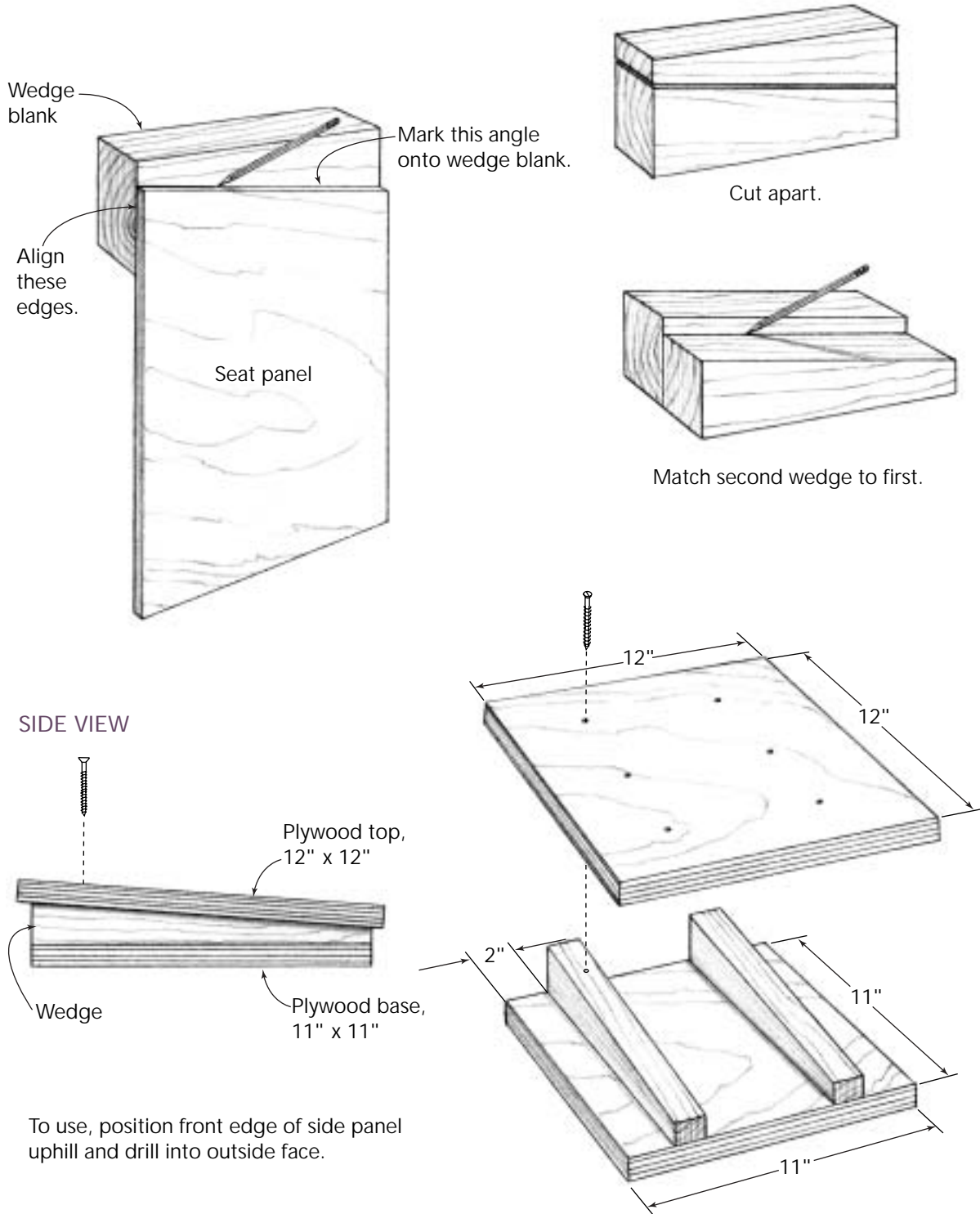
Tension from the rods and cap nuts holds the seat and back panels securely in the side panels (see "The Threaded Rods" on p. 103). The only complication to this otherwise simple solution is that the rocker side panels are not parallel. The holes (with shallow counterbores) for the connector nuts need to be drilled at an angle so that they can be tightened onto the threaded rods. The process starts with drilling these holes.

### Drilling the angled holes

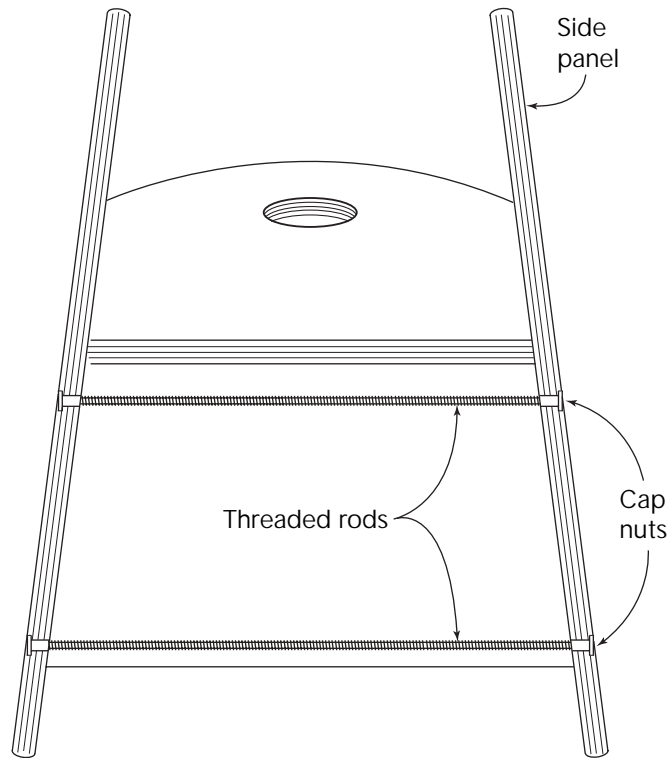
The first step in drilling the angled holes is to make a simple angled drilling platform (see "Making the Angled Drilling Platform" on p. 102).

1. The seat angle provides the angle needed for the drilling platform. Make two identical wedges for the platform out of a piece of wood, roughly 1 in. thick by 3 in. wide by 11 in. long. Align the front edge of the seat panel with the end of this wedge blank and trace the angle of the side of the seat panel onto the blank.
2. Cut a wedge out of the blank, smooth the sawn edge, and use this wedge to mark out a second wedge. Cut and smooth this wedge to match the first.
3. Screw a 12-in.-square piece of ¾-in.-thick plywood to the two wedges.

# Making the Angled Drilling Platform



## The Threaded Rods



Use an angled platform to drill angled holes in the side panels to accommodate the cap nuts.

4. Attaching a piece of plywood to the underside of the wedges will make it easier to clamp the angled platform to the drill-press table.
5. Clamp the angled platform to the drill-press table with the angle running sideways.
6. On the outside of each of the side panels draw a line through the two marks for the cap-nut holes. This line should remain parallel to the edge of the angled platform when drilling the holes in a side.
7. Drill a shallow  $\frac{3}{8}$ -in. counterbore for the flange of each of the cap nuts first. Drill only until you have a complete hole; it will still be very shallow on one side. Then drill a 9mm or a  $\frac{3}{8}$ -in. hole through the center of the counterbore for the body of each of the nuts (see **Photo F**).



**PHOTO F:** With the angled platform clamped in place on the drill press, it's easy to drill the holes for the cap nuts at the proper angle. Note that the line through the cap-nut holes is parallel to the edge of the angled platform and that the front of the side panel is uphill.



PHOTO I: Slip the threaded rod with one of the cap nuts all the way through the holes in one side and mark where the rod comes out the counterbore on the other side panel of the rocker.



PHOTOS G AND H: Assembling the rocker can be frustrating without help. It makes sense to do it on a blanket or a piece of cardboard in case something slips apart.

### Cutting the threaded rod to length

1. Put the rocker together. You may want an assistant or a clamp or two to help hold things together while you measure for the threaded rod (see Photos G and H).
2. Thread one of the cap nuts all the way onto the end of the rod, and insert it into a hole on one side and then through the hole in the other side. Mark where the rod comes out of the hole, flush with the bottom of the counterbore (see Photo I).
3. Cut the rod  $\frac{1}{4}$  in. shorter than the length you marked. File the rough edges and check to be sure you can thread the nut onto the cut end.
4. Repeat the same process for the other set of holes, using the remaining section of rod.
5. Now assemble the chair with the threaded rod in place.



PHOTO J: Tighten up the cap nuts with a pair of Allen wrenches.

**6.** Tighten the cap nuts (see **Photo J**). The rocker should hold together tightly (if not, check to see if you need to cut a little more off of the threaded rods). You can test the chair now if you want.

## Finishing

I chose an oil-and-wax finish for a natural look on one of the rockers and brightly colored paint for the other. Lacquer or shellac is also a good option, although paint, lacquer, or shellac on the bottoms of the rockers will probably rub off as the chair is dragged around. Sand all parts thoroughly, especially the edges, before applying any finish. Wait for the finish to dry completely before reassembling the rocker. Then put it into use.

### TIP

It's easy to cut threaded rod with a hacksaw. It's also very easy to mangle the threads so they are unusable. Remember that you need good threads on only the last  $\frac{1}{2}$  in. of either end of the rod. Clamp somewhere else when you're cutting.