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## In this plan you will be getting:

- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.

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## Outdoor Swing and Arbor



Published in **Woodworker's Journal** "Woodworking Secrets: Essential Methods and Projects for Fine-Tuning Your Shop Skills"



# Outdoor Swing and Arbor

One way to make the most of pleasant summer weather is to wile away the hours in an outdoor swing. Ours is made of lumberyard cedar with ordinary hardware. Arbor framework makes this swing freestanding, so you don't need a porch or big tree. Mortise and tenon joinery adds stability and style to this fun-to-make backyard project.

What could be more relaxing than to while away the summer hours on a cozy porch swing? If you don't have a porch, don't despair; you can build a swing that hangs from its own freestanding arbor and make it the centerpiece of your patio or yard. We made this swing of Western red cedar, an attractive and widely available wood that holds up well in the elements.

If you decide to use pressure-treated lumber instead, use it for the arbor, but choose a chemical-free lumber for the swing, especially if you have young children who will use it. Or, paint the entire swing to seal in the treatment chemicals.

This swing is a sturdy showpiece that is equally comfortable to sit in. The overhanging roof beams lend visual balance to the design and offer a perfect place to hang flower baskets. Your total investment for materials should be around \$500, including finishing supplies and hanging hardware.

This project is large but easy to build, consisting almost entirely of simple mortise-and-tenon joints (see the *Drawings*, pages 68 and 69 as well as 72 and 73) held together with boat-builder's epoxy and polyurethane adhesives. Making mortise and tenon joints

in 4 x 4 stock will give you a sense of timber framing construction. The only metal fasteners are the deck screws that secure the canopy boards and the side cross braces to the arbor. Note: If you use treated lumber for this project, be sure to use deck screws approved for use with the new ACQ chemical lumber treatments to avoid corrosion problems. Stainless steel screws are another good choice.

## Tooling Up

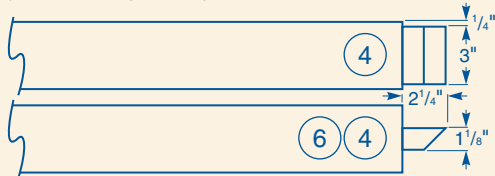
You can build this swing with just a few common power tools—a miter saw to cut pieces to length, a table saw with



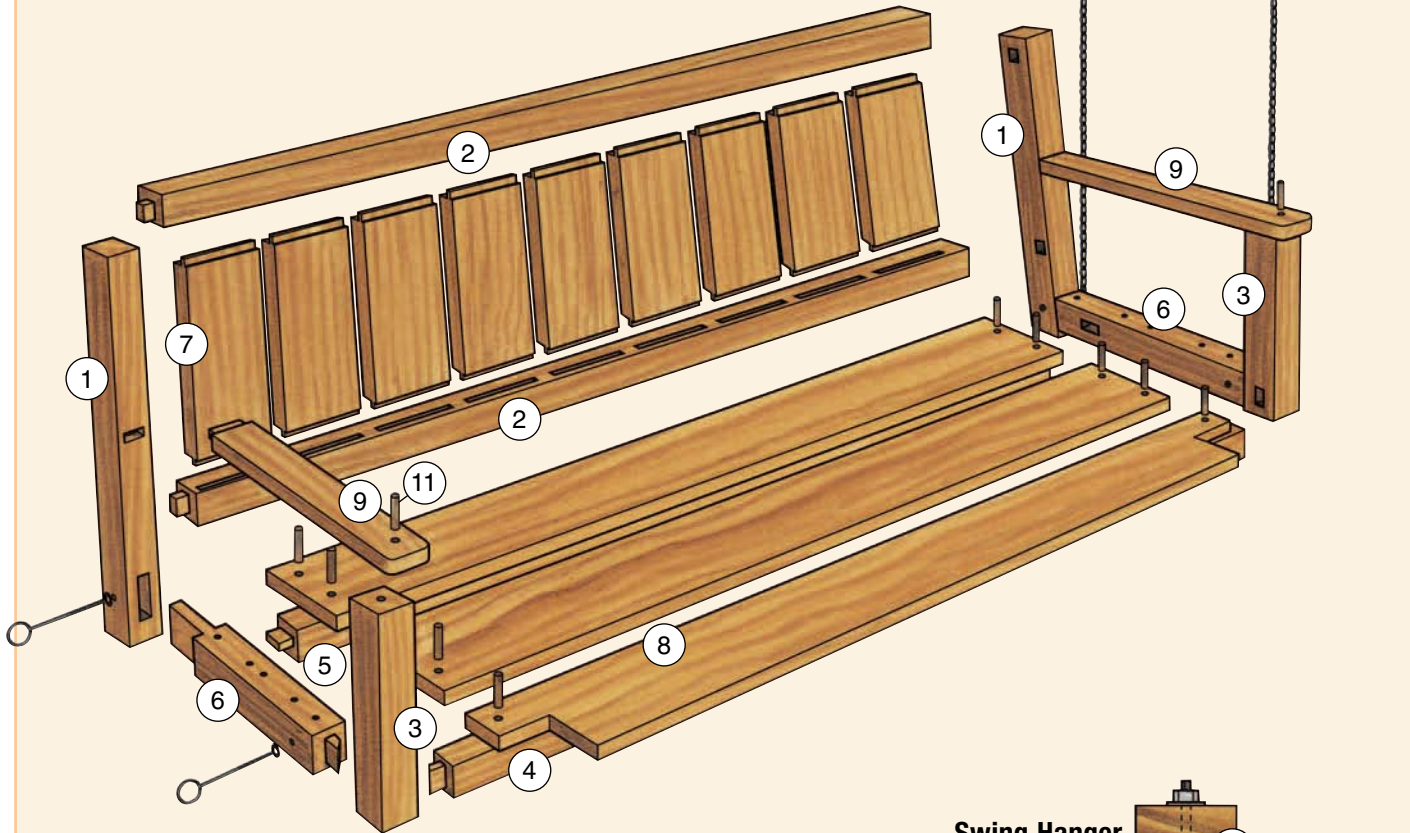
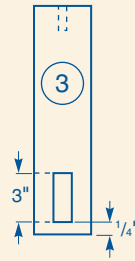
**Figure 1:** Drill out your mortises with a 1/8" Forstner bit, using a fence to keep the holes aligned in the center of the piece.

# Swing Exploded View

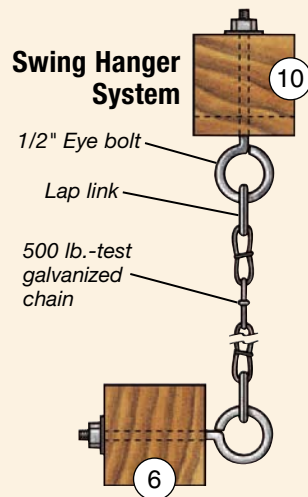
**Front and Side Seat Rails**  
(Back and Top Views)



**Upright**  
(Side View)



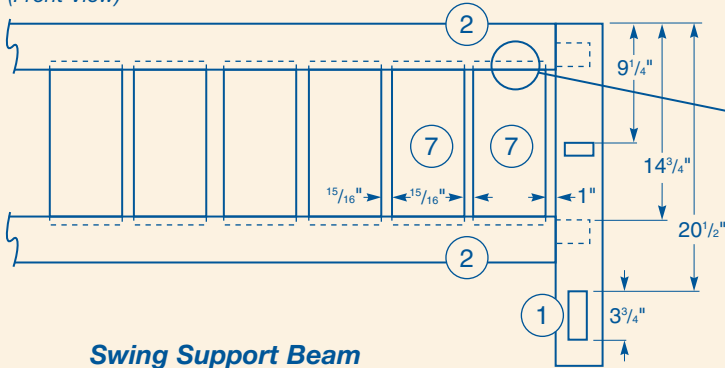
**Swing Hanger System**



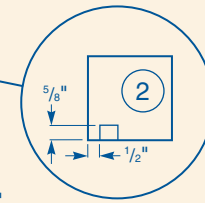
## MATERIAL LIST – Swing

	T x W x L
1 Rear Stiles (2)	3 1/2" x 3 1/2" x 26"
2 Rear Rails (2)	3 1/2" x 3 1/2" x 64"
3 Front Uprights (2)	3 1/2" x 3 1/2" x 14"
4 Front Seat Rail (1)	3 1/2" x 3 1/2" x 63 1/2"
5 Rear Seat Rail (1)	3 1/2" x 3 1/2" x 64"
6 Seat Side Rails (2)	3 1/2" x 3 1/2" x 22"
7 Back Slats (9)	1 1/2" x 5 1/2" x 12 1/4"
8 Seat Slats (3)	1 1/2" x 5 1/2" x 66"
9 Arm Rests (2)	1 1/2" x 3 1/2" x 22"
10 Swing Support Beams (2)	3 1/2" x 3 1/2" x 50"
11 Dowels (12)	1/2" Dia. x 3"

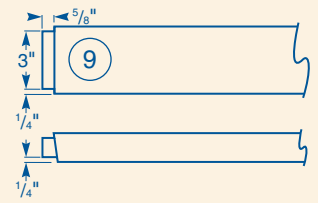
**Swing Back Subassembly**  
(Front View)



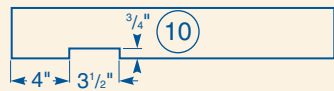
**Rear Rail**  
(Section View)



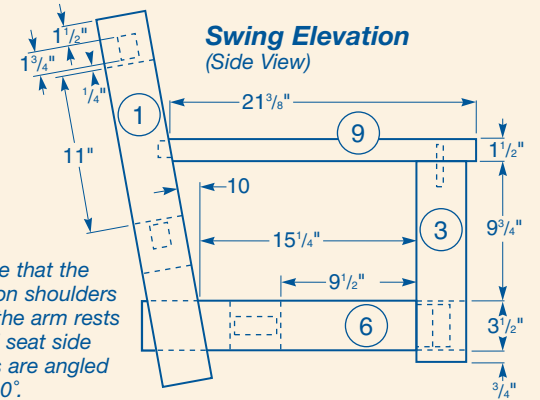
**Arm Rest**  
(Top and Side Views)



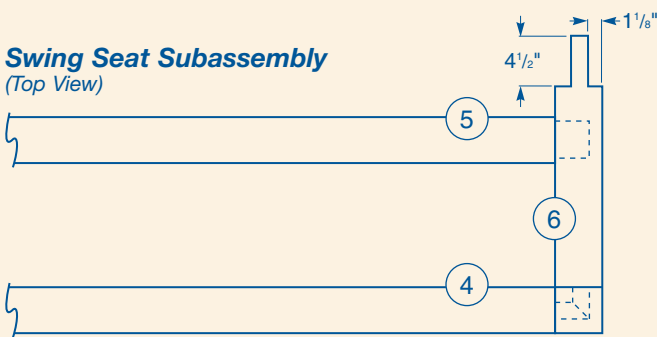
**Swing Support Beam**  
(Side View)



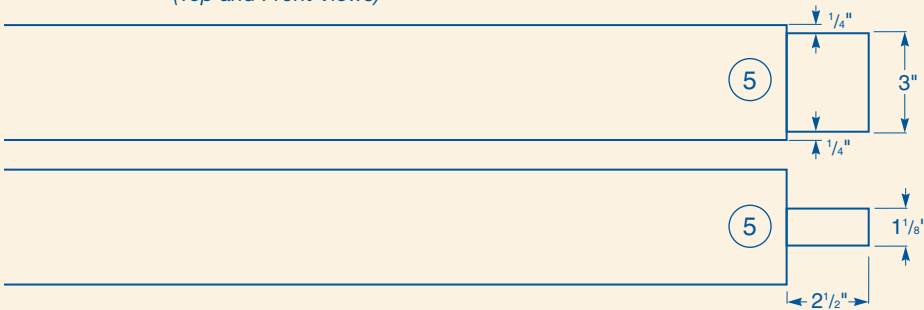
**Swing Elevation**  
(Side View)



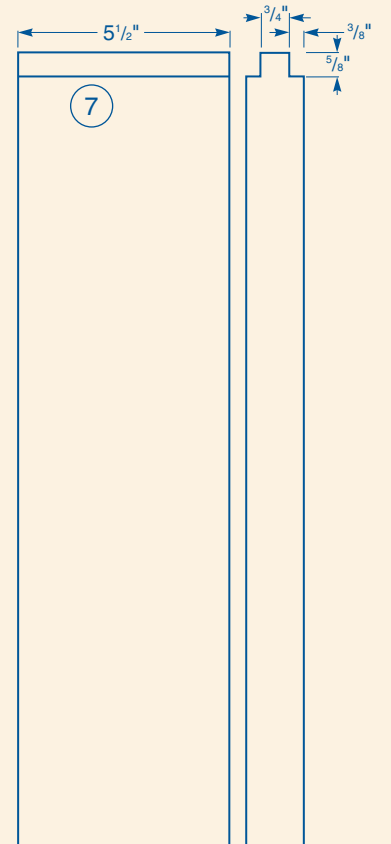
**Swing Seat Subassembly**  
(Top View)



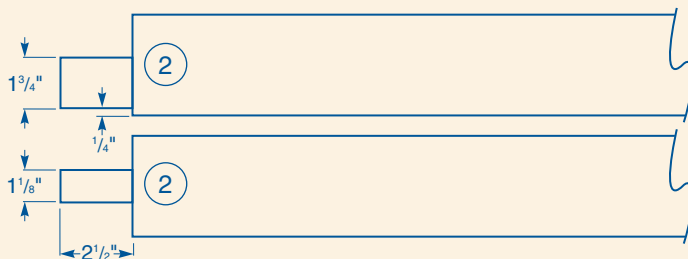
**Rear Seat Elevation**  
(Top and Front Views)



**Back Slat**  
(Front and Side Views)



**Rear Rails**  
(Front and Top Views)



a dado head to cut the tenons and a Forstner bit in a drill press to rough out the mortises. You'll also need a sharp chisel to square the mortises, and a router will help you form the mortises in the seat rails for the back slats.

It's important to remember that this is a rustic outdoor project, not a fancy piece of furniture. We designed it to use standard construction lumber sizes without significant modification. When you lay out your parts, select pieces with as few knots and other defects as possible for the back and bottom rails of the swing itself. These are the most critical weight-bearing parts.

The *Material List* on page 68 includes an allowance for the tenons in the total length of the pieces. After you've cut the lumber to length (pieces 1 through 10), you're almost ready to cut the tenons. But first, to make sure you end up with just the right tenon thicknesses, you'll need to make up a test mortise, so you can check and adjust the fit of the first tenon. In fact, it's best to make a test mortise for each size mortise and tenon in the project. (There will be five, counting those that accept the back slats.)

Most of the mortises in this project are large and deep (see *Figure 1*, page 67), so routers and hollow-chisel mortisers aren't effective options. Instead, here's a time-honored, two-step method: First, drill out most of the waste with a 1½" Forstner bit in a drill press, using a fence to center the mortise on the stock and keep the holes in perfect alignment; then square up the corners with a sharp chisel and mallet. The sides of the holes act as a visual gauge for chiseling the mortise walls and ends (see *Figure 2*, next page.)

The mortises that enter the front face of the rear stiles (pieces 1) are angled at 10°. For that reason the



*Water-resistant (epoxy and polyurethane) adhesives are excellent choices for building this project. To secure the seat slats, we used 1/2"-diameter hardwood dowels and adhesive to peg the boards in place.*

shoulders of the complimentary tenons need to be angled to match. Refer to the *Elevation Drawings* for construction details. To drill the angled through mortises in the backrest uprights, tilt your drill press table to 10°. If your table doesn't tilt, you can build a wedge-shaped auxiliary table instead.

With your test mortises in hand, step to the table saw and dial in the thickness of your tenons by fine-tuning the height of your dado head. Cutting from both sides of the stock assures that your tenons will be perfectly centered and exactly the right thickness. One caution: If there's any variation in the thickness of your 4 x 4s, it's a good idea to plane them to uniform thickness before tenoning, or your tenon thicknesses will also vary.

When you've got the first tenon right, cut all of them (of each size), using your miter gauge (see *Figure 3*) to keep the shoulders square. For the angled shoulders (where the swing seat meets the back) set the gauge to 10°.

After you've cut the tenons to thickness, use the same dado method

to cut them to height (see *Drawings*). Also, note that the tenons that meet in the uprights at the front corners of the swing seat must be mitered.

The final step before assembly is to mortise the back rails and cut the full-width tenons on the back slats to match. Use a 3/4" router bit to rout the 5/8"-deep mortises, then chisel the ends square. Position the mortises so the faces of the slats will be set back about 1/8" from the faces of the rails, just behind the edge roundover.

## Assembling the Swing

At this point, you're ready to glue everything up. Use polyurethane adhesive for the arbor and dowels and epoxy for the swing joints.

Start by assembling the swing back. Insert the slats (don't use glue here) between the two back rails and then glue on the uprights at either end, checking for square. Glue up the seat assembly separately (pieces 3, 4, 5 and 6) and follow up by gluing this subassembly to the back. Add the arm rests and peg them to the tops of the uprights. We used 1/2"-diameter mahogany dowels (pieces 11) for a nice color contrast to the cedar as well as for strength and weather resistance.

The seat slats aren't glued down. Just position them and dowel them into place. (Notch the front slat to fit.)

One nice thing about this design is that the swing can be mounted (with caution to be sure it is strong enough...be sure to hit a joist) to the ceiling of a porch; no arbor needed. But if you want to put the swing out in your yard, the arbor is the next task at hand.

Cut your lumber (pieces 12 through 18) to length using a miter saw as before. Use the same drilling and chopping technique to create mortises in the major structural members (pieces 12



**Figure 2:** Square up the mortises with a sharp chisel and mallet. The sides of the drilled holes serve as a visual guide.



**Figure 3:** Cut the tenons to thickness with a stacked dado head, machining from both sides of the workpiece to keep the tenon centered. Be sure to start with consistently sized stock.

and 13). Form the corresponding tenons to fit and you're ready to start assembly. Glue and clamp each end of the arbor using polyurethane glue. Cedar is soft, so use clamping cauls to avoid marring your wood. Make sure the ends are square. After the glue has cured, lay the long top rails (pieces 13) on a level surface and glue and insert the side subassemblies into their mortises. Use temporary supports clamped to the rails and subassemblies to ensure that they are square as the glue dries. Now use your dado head and miter gauge to notch out the angled lap joints on the front and rear cross braces (pieces 15). With the whole unit still upside down, attach the braces with dowels and polyurethane glue. Allow

the glue to cure. Now get a buddy to help you turn the whole shebang right-side-up.

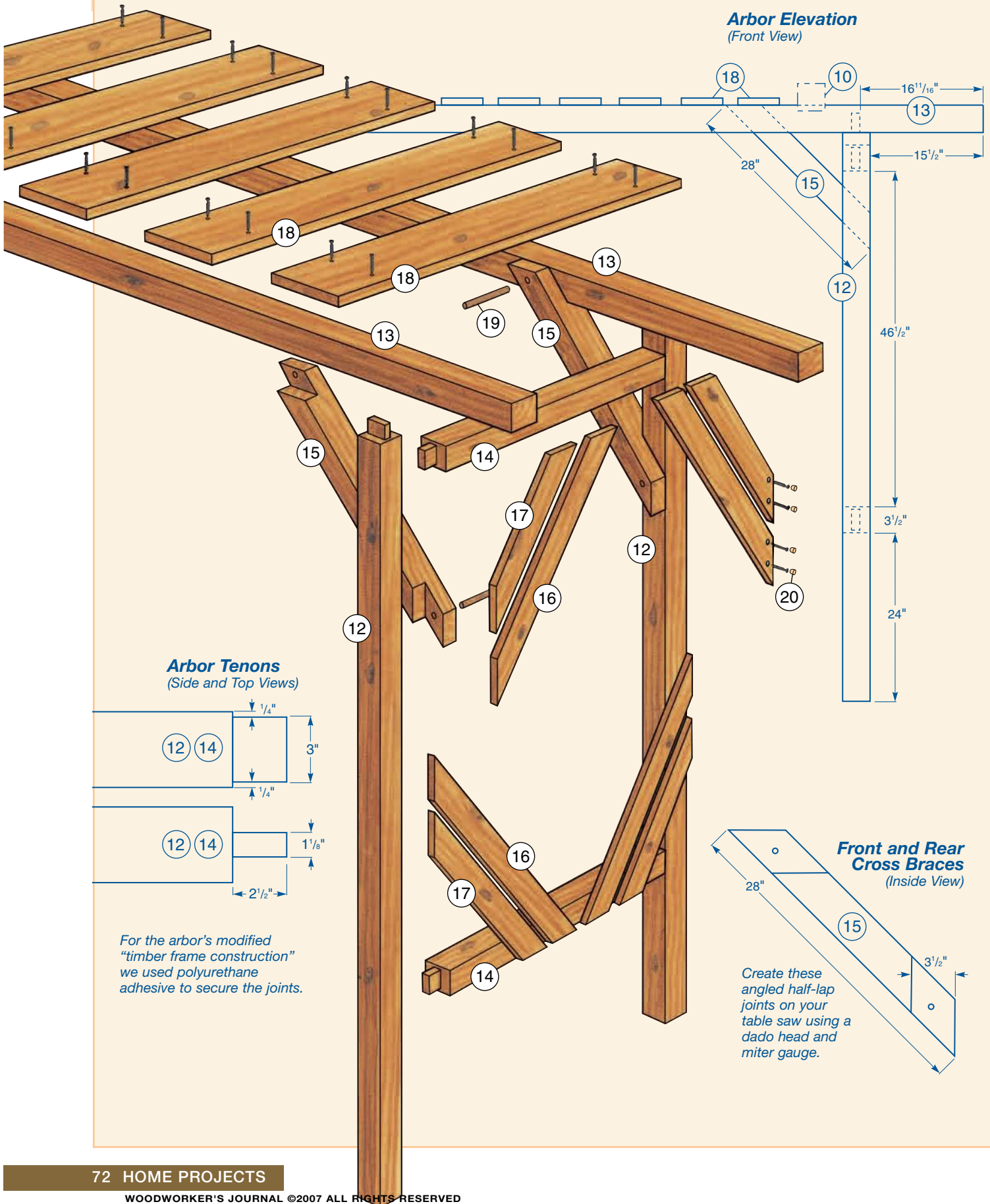
The side cross braces (pieces 16 and 17) are attached next. Mark a center line on the outside face of the side rails (see *Elevation Drawings*). This will help you fit the long cross braces accurately. Pre-drill the ends of the braces for the deck screws, and counterbore the holes to accept the mahogany plugs (piece 20). Secure them as shown in the *Drawings*. Stainless steel deck screws to secure these...the stainless steel screws will not discolor the cedar as it weathers. The last construction step is to attach the canopy boards to the top rails (pieces 18).

## QuickTip

### Preventing Tablesaw Kickback

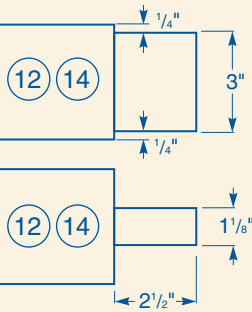
Tablesaw kickback is caused by one or both of the following: an underpowered saw and incorrect blade height. If your saw is heavy and powerful enough, it will keep cutting through a twist, bind or improperly fed piece of stock. If your blade is set too low, the teeth are meeting the wood horizontally instead of vertically. In the latter case, they would force the wood down on the table, but in the former they are pushing the stock right at you. Be sure to check the alignment of your rip fence as well—it should always be kept parallel to the blade to prevent binding.

## Arbor Exploded View



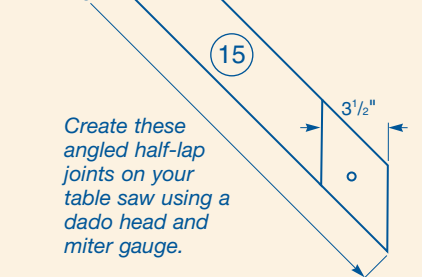
**Arbor Elevation**  
(Front View)

**Arbor Tenons**  
(Side and Top Views)



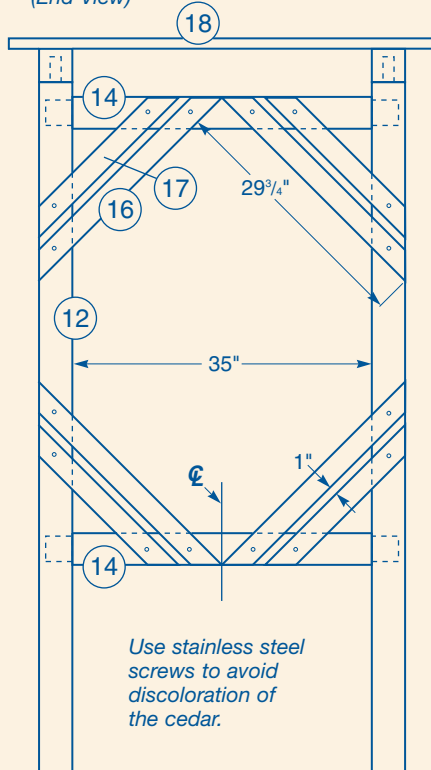
For the arbor's modified "timber frame construction" we used polyurethane adhesive to secure the joints.

**Front and Rear Cross Braces**  
(Inside View)



Create these angled half-lap joints on your table saw using a dado head and miter gauge.

**Arbor Elevation**  
(End View)



Mark a line bisecting the center of the side rails (pieces 14). Locate the mitered ends of the long side cross braces to just touch the center line. The short cross braces are held 1" away from the long braces.

**MATERIAL LIST – Arbor**

	T x W x L
12 Posts (4)	3 1/2" x 3 1/2" x 81 1/2"
13 Top Rails (2)	3 1/2" x 3 1/2" x 120"
14 Side Rails (4)	3 1/2" x 3 1/2" x 40"
15 Cross Braces (4)	3 1/2" x 3 1/2" x 28"
16 Long Side Cross Braces (8)	7/8" x 2 1/2" x 29 3/4"
17 Short Side Cross Braces (8)	7/8" x 2 1/2" x 22 3/4"
18 Canopy Boards (8)	7/8" x 5 1/2" x 46"
19 Dowels (8)	3/8" Dia. x 3"
20 Mahogany Plugs (32)	3/8" Dia.



The swing's arbor not only provides a sturdy framework but also adds softscaping potential to your yard.

**Hanging the Swing**

Technically, this swing is more of a glider, because it is suspended on four separate chains. (Our idea of a "swing" has just two main vertical chains, splitting to two points of attachment on each end.)

We used inexpensive, 500 lb.-test galvanized chain, but you could easily get away with 350 lb. test depending on your requirements. Attach the chain to the swing and the support beams (pieces 10) above with 1/2" eye bolts and lap links. See the *Swing Hanger System* drawing on page 68.

The support beams are notched to fit over the top rails, but they aren't permanently attached. If you leave them movable, you can easily remove the swing from the arbor during the winter months without undoing the chains.

The final step is to sand and stain everything, then sit back and relax in your comfortable new swing and arbor. We used Behr™ "White Cedar" deck sealer to bring out the wet look of the wood with minimal tinting. Like any piece of outdoor wooden furniture, this project will have to be cleaned each year and have its sealer "freshened up" every few years. Or, you could leave the cedar unfinished so it weathers to a silvery gray color naturally.