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- 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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## A Stickley-Inspired Dining Table



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# A Stickley-inspired Dining Table

*Function and style, true tenets of the Arts & Crafts philosophy, are combined here to create a project that will last for many generations.*



This sturdy and attractive dining table came about after contributing editor Rick White designed and built the Arts & Crafts Dining Chairs at his wife's request. His wife wanted a table that would complement the details in the chairs, so necessity became the mother of invention here. True to its Mission influence, the table features pegged through mortise and tenon joinery and butterfly keys in the top.

### Two Suggestions Before You Start

Throughout this project, you'll be chopping stopped and through mortises to fit the various tenons and plugs. If you don't already own a dedicated mortising machine, or if you plan to build both the table and a set of matching chairs, investing in a mortiser will be money well spent. A mortiser looks like a small drill press but drills square holes. Alternately, you could use a mortising attachment in your drill press. It uses the same hollow chisel bits as a dedicated mortiser to produce square-ended mortises more economically.

Gustav Stickley built most of his furniture from quartersawn oak for good reasons. It's attractive and one of the strongest species in North America. If your budget allows, it's a good idea to use the same lumber for your table. Quartersawn red or white oak yields straight boards with tight, parallel grain — ideal for tables.

### Laminated, Quartersawn Legs

The legs of this table are built up in two major laminations (pieces 1), and the first step in construction is to cut these to the dimensions shown in the *Material List* on the next page. If the wide faces of these boards are quartersawn lumber, the thin edges will be plain sawn. The leg's most visible face after machining and glue-up would be the plain sawn view so, for appearance's sake, it must be hidden.

We will accomplish this step by gluing quartersawn leg veneer (pieces 2) to each leg, after the first two have been milled and glued up.

### Machining the Legs

Each leg is mortised twice for a couple of rails. The dados for the top and bottom rails (pieces 3 and 4) are easily created on the table saw, as shown in *Figure 1*. Both are machined into the leg laminations before they are assembled. Follow the locations and dimensions given in the *Leg Subassembly* and *Half-mortise Detail Drawings* on page 63 to lay out both mortises. After milling, glue and clamp each leg together. Once the glue dries, sand each leg thoroughly and chisel out any excess glue left in the mortises.

Although both of these openings are technically through mortises, you'll cover the top mortise with the leg veneer (pieces 2) to create, in effect, a stopped mortise. The bottom mortise is continued through the leg veneer to expose the chamfered end of the lower rail's tenon.

### Making the Rails Next

After cutting all the rails to the dimensions given in the *Material List*, refer to the *Top Rail* and *Bottom Rail Tenon Detail Drawings* (also on page 63) to lay out and mill their tenons. This is a job for your dado head and miter gauge on the table saw. (Don't forget to chamfer the tenon ends on the bottom rails.)

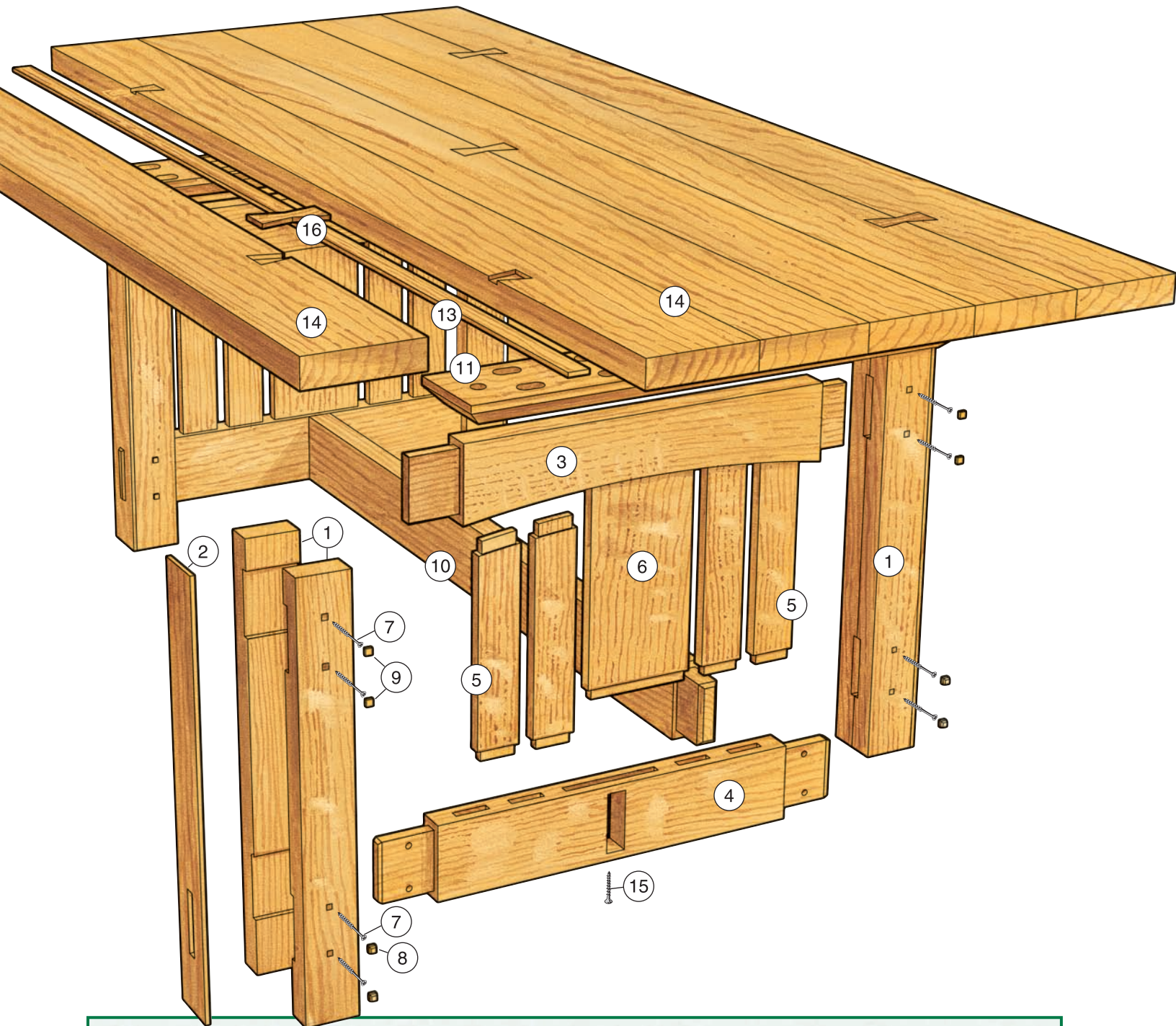
If you decided to invest in a mortising machine, this next step will be your first chance to use it. Refer to the *Face View Drawings* for the top and bottom rails on page 63 to lay out and chop the five mortises in each rail (see *Figure 2*). In the bottom rails, these mortises are a strong  $\frac{3}{8}$ " deep, while those in the top rail are deeper. If you don't own a mortising machine, remove most of the waste on your drill press and square up the mortise walls and ends with chisels. This is also a



**Figure 1:** The leg mortises are formed before the legs are glued up. Simply slice wide dados to form one half of each mortise.



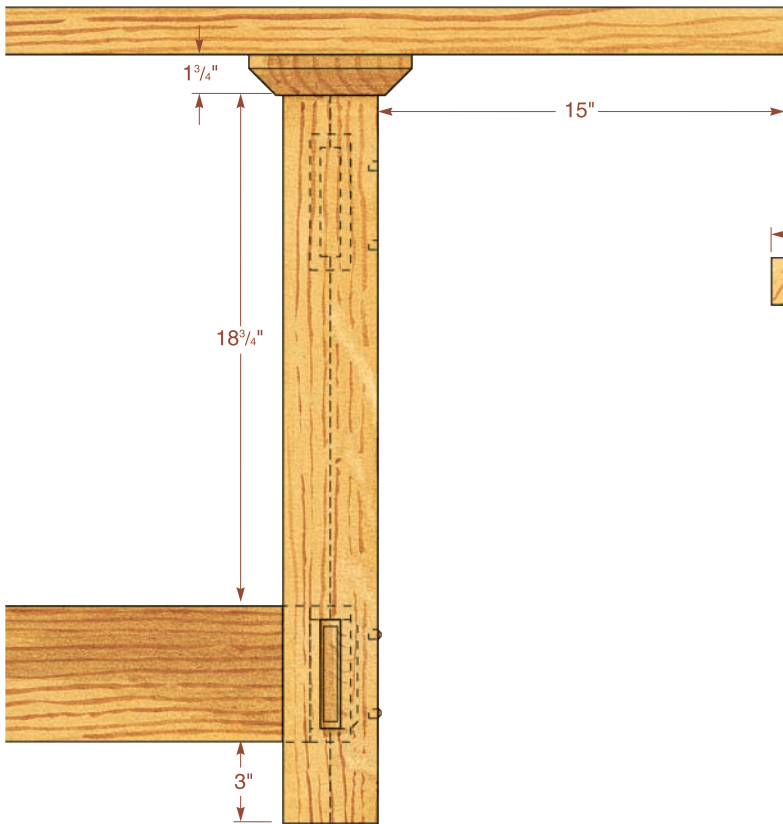
**Figure 2:** A dedicated mortising machine will make short work of the many mortises featured in this project's Stickley-inspired joinery.



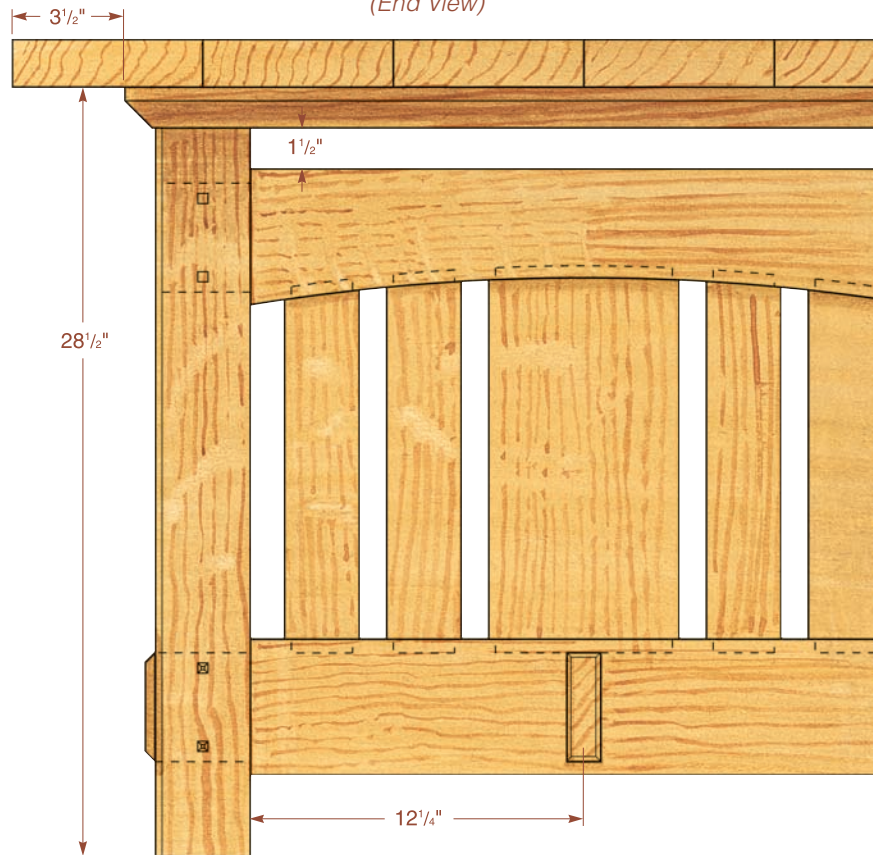
## MATERIAL LIST

	T x W x L		T x W x L
1 Leg Laminations (8)	1 <sup>3</sup> / <sub>4</sub> " x 3 <sup>1</sup> / <sub>4</sub> " x 26 <sup>3</sup> / <sub>4</sub> "	9 Flush Plugs (16)	1/2" x 1/2" x 1/2"
2 Leg Veneer (4)	1/4" x 3 <sup>1</sup> / <sub>2</sub> " x 26 <sup>3</sup> / <sub>4</sub> "	10 Beam (1)	1 <sup>3</sup> / <sub>4</sub> " x 5" x 56 <sup>3</sup> / <sub>4</sub> "
3 Top Rails (2)	1 <sup>3</sup> / <sub>4</sub> " x 5" x 31"	11 Tabletop Supports (2)	1 <sup>3</sup> / <sub>4</sub> " x 6" x 35"
4 Bottom Rails (2)	1 <sup>3</sup> / <sub>4</sub> " x 5" x 32"	12 Support Leg Screws (4)	#12 x 3"
5 Edge Slats (8)	1/2" x 2 <sup>3</sup> / <sub>4</sub> " x 14"	13 Splines (5)	1/2" x 1" x 84"
6 Center Slats (2)	1/2" x 7" x 14"	14 Tabletop Segments (6)	1 <sup>3</sup> / <sub>4</sub> " x 7" x 88"
7 Rail Screws (16)	#8 x 2"	15 Support Top Screws (16)	#8 x 2"
8 Pyramid Plugs (16)	1/2" x 1/2" x 5/8"	16 Decorative Butterflies (5)	1/4" x 2" x 4"

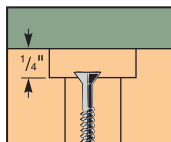
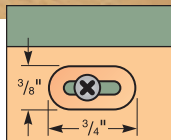
**Table**  
(Side View)



**Table**  
(End View)



**Figure 3:** The glued-up tabletop will expand and contract to a significant degree. Oblong slotted screw holes allow that movement to take place while firmly securing the top to the leg sets.



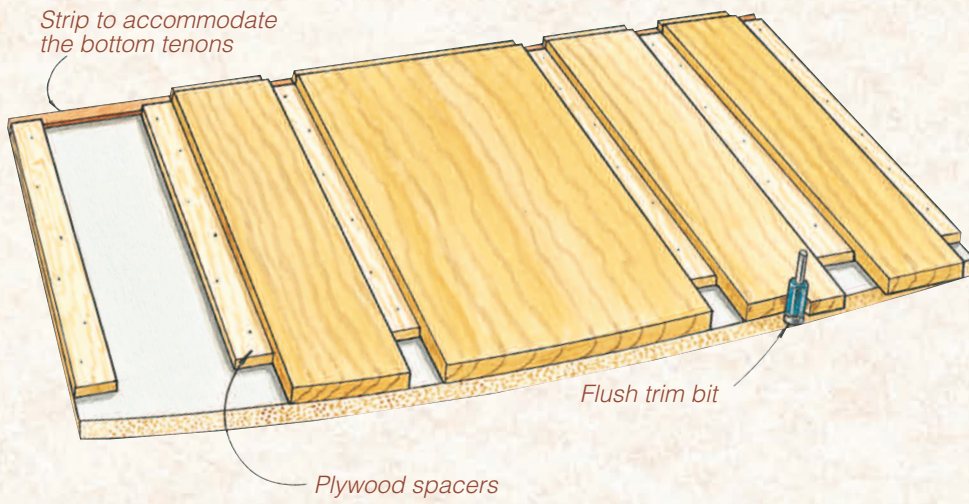
good time to chop the small mortises in the legs for the plugs — the locations and dimensions are on the *Leg Subassembly Elevation* (page 63).

Apply the same technique for chopping the large through mortise for the beam (piece 10) in each bottom rail. Work from the outside so any minor tearout will occur on the inside, hidden face. Then use a strip of 1/4" hardboard flexed in an arc to

lay out and band saw the arches on the bottom edge of each top rail. The deepest point of this arch should be 1 1/4" from the bottom rail edges. Sand these curves smooth.

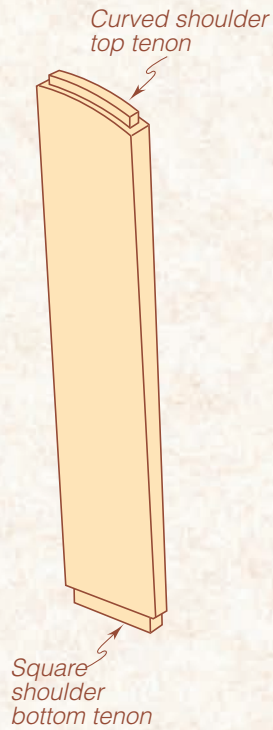
### Completing the Leg Sets

There's just one more task to perform before you can assemble the leg sets: you must make the 10 slats (pieces 5 and 6). Cut all 10 to the dimensions



Making curved tenon shoulders is easy if you use this jig and a bottom-bearing, flush-trimming bit to form the curve at the top of the slats.

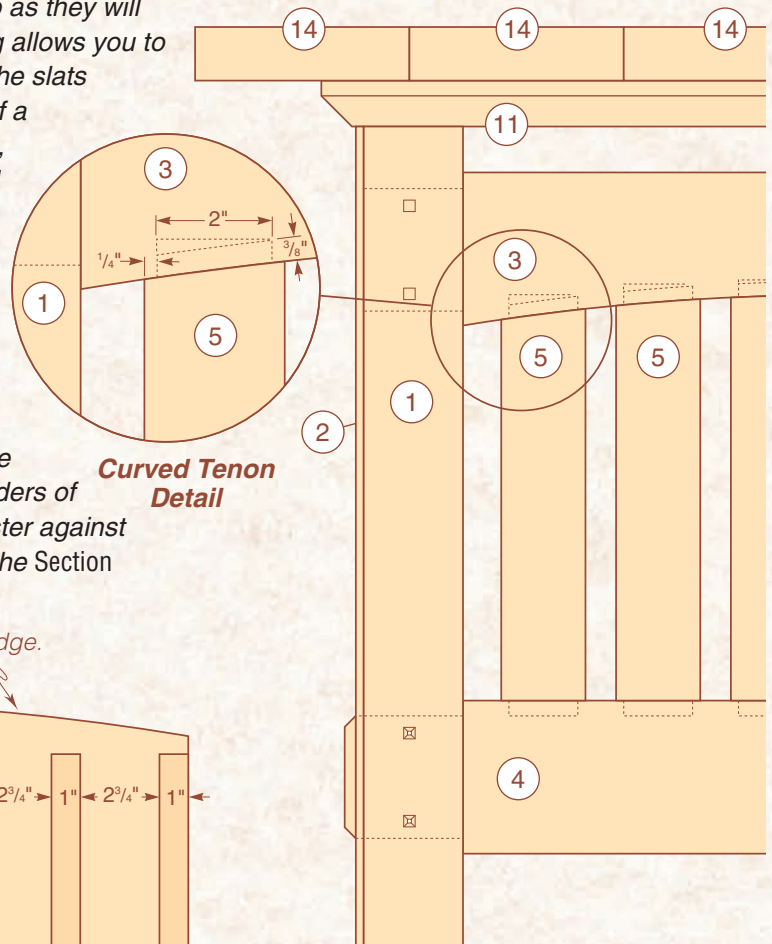
# Using the Curved Routing Jig



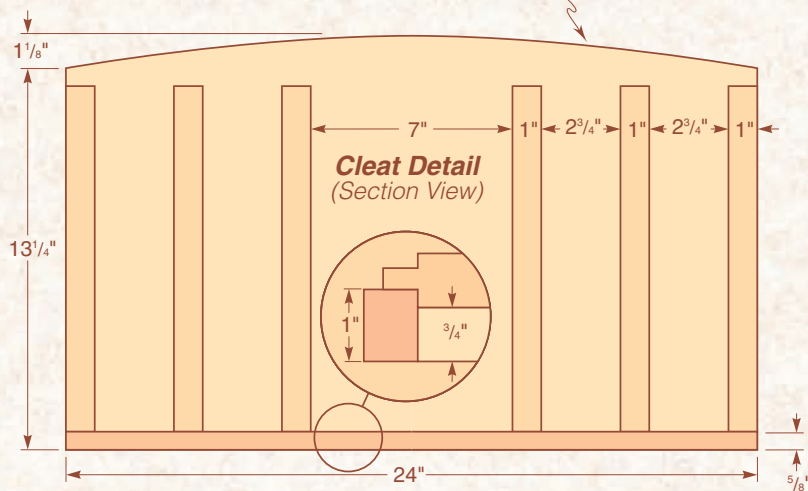
## Routing Round the Bend

Matching the tenon shoulders to the top rail's graceful arc is simple with this shop-built jig. By holding the slats in the exact relationship as they will have in the table, the jig allows you to rout curved ends onto the slats and then, with the aid of a piloted  $\frac{3}{8}$ " rabbeting bit, form the tenons' curved shoulders.

Make the top rails first, then transfer their curve to the jig's top edge, as shown below. The bottom cleat is mounted just proud of the plane of the jig's surface. The shoulders of the bottom tenons register against this cleat, as shown in the Section View below.



Create this curve using the top rail's lower edge.



After you cut the slats to size and machine their bottom tenons, the spacers of this jig will keep the slats properly spaced as you rout the curve onto their opposite ends.

## Cutting Curved Tenons



**Set the slats** in place between the jig cleats and clamp them all in position. Use a flush-trimming, bottom-bearing router bit to shape the gentle curve onto the top end of the leg set slats. Set the bit depth so the bearing rides along the jig's top curve.



**Move to your router table** and use a  $\frac{3}{8}$ " piloted rabbeting bit to form the shoulders of the curved tenons. Cut the cheeks on a bandsaw.

in the *Material List*, then lay out and mill  $\frac{3}{8}$ " long tenons on their bottom ends. Use a dado set on the table saw or a router table and rabbeting bit for this work.

The tenons on the top ends are a little trickier. Rick used a jig similar to the one he designed for the dining room chairs. Details for how to make the jig in this project are shown on the previous page.

Dry-fit the leg sets together and, when everything is fitting well, start the assembly process by gluing and clamping the rails and slats together. Next apply glue and seat the rail tenons into their leg mortises. Pre-drill for the screws (pieces 7) and drive them home. Then cap the bottom ones with glued-in, pyramid plugs (pieces 8, see *Pyramid Plug Detail*, page 63) and the top ones with flush plugs (pieces 9). After the glue dries, sand the top plugs flush.

## Building the Beam

The long, one-piece beam (piece 10) is tenoned on each end to fit the mortises you chopped earlier in the bottom rails. This would be an unwieldy job for the table saw, so use the *Beam Tenon Detail* to lay out the tenons and mill them with a handheld router. Chuck a straight bit in the

router and clamp guide blocks to the beam to keep the cuts straight. When the tenons are completed, switch to a chamfering bit or use a block plane to create a traditional profile for the tenon ends.

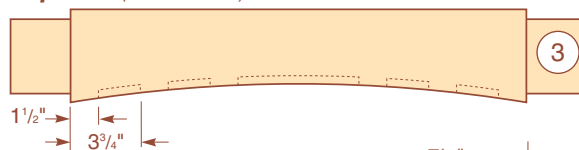
Dry fit the beam in the leg sets, then temporarily clamp it in place. Cut the tabletop supports (pieces 11) to size next, and use your table saw to mill the large chamfer all around both of these pieces (see *Tabletop Support Detail*, page 63). Next, use your drill press to create oblong screw holes in the supports, as shown in *Figure 3*. These allow for wood movement in the tabletop.

Pre-drill for the large screws (pieces 12) used to attach the supports to the legs, then apply glue to the top of each leg, set the supports in place and drive the screws home.

## Gluing Up the Top

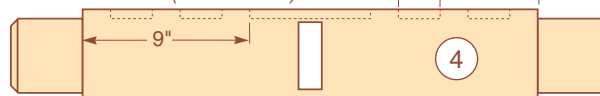
The top of this table is the most critical element, simply because it's the most visible. Choose defect-free, straight, quartersawn boards and cut them a bit longer than their final 88". Equip your router table with a featherboard to machine the  $\frac{1}{2}$ " wide by  $\frac{1}{2}$ " deep grooves in these long, wide pieces, stopping the cuts 2" from each end of your

**Top Rail (Face View)**



After forming the tenons, create the arc by flexing  $\frac{1}{4}$ " hardboard between two endpoints.

**Bottom Rail (Face View)**



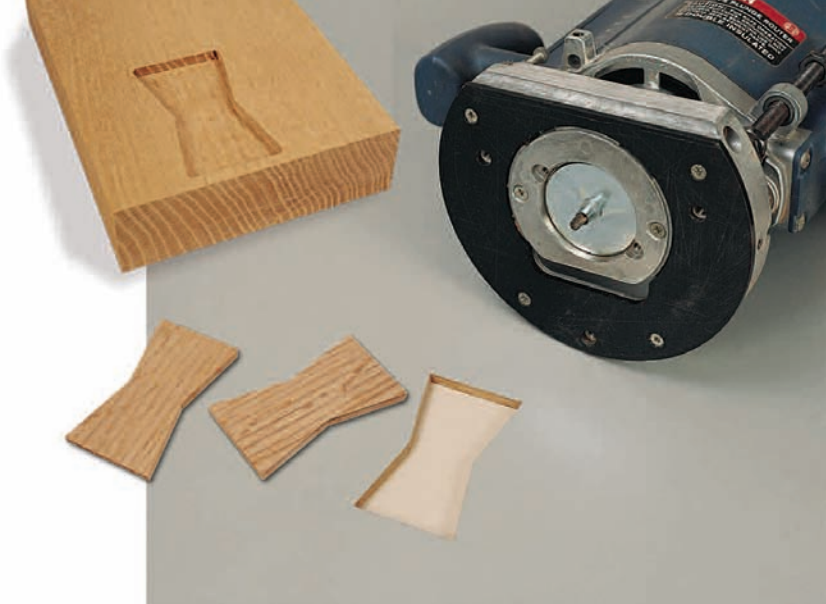
boards. (Mill both edges of the internal pieces, and the inside edge of the outside pieces.) Rip five splines (pieces 13) from oak lumber, and then test fit the top (pieces 14) together. The splines aid in registering these long pieces of lumber during glue-up and add considerably more glue area to the top joints. When everything fits, glue and clamp the top together.

The next step is to smooth the glue joints in the tabletop. You could sand them with a belt sander or take your top to a local cabinet shop and have them run it through their wide belt sander. (Make sure they can handle the 42" width before you haul the top to their shop, and scrape off any excess glue. You don't want to clog up their belts.)

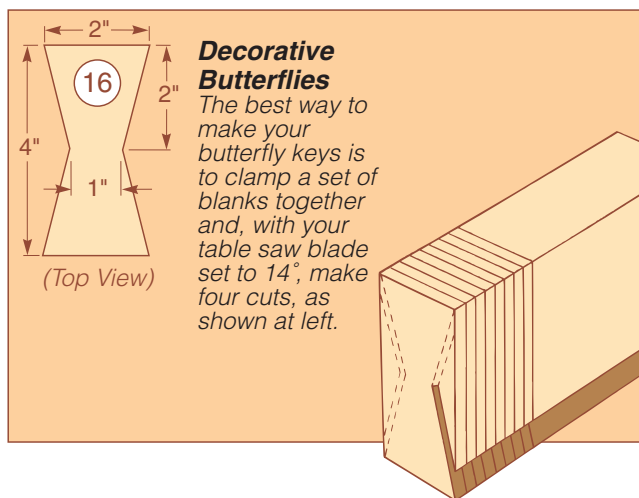
After sanding, trim the ends with a clamped-on straightedge and a straight bit chucked in your router. Then gently break all the edges with sandpaper. Glue and fasten the beam to the leg sets with screws (pieces 15). Center the top on the supports and, after extending the pilot holes through the support pieces into the top, secure the top to the supports with the same screws (pieces 15). Don't glue the top to the supports. Restricting its movement widthwise could cause it to eventually split.

### Making Decorative Butterflies

Aside from the exposed joinery and plugs, the only truly decorative elements in this project are the five butterflies (pieces 16) inlaid into the solid oak top. Before the advent of modern glues, these butterflies would have been cut deeper than the



**Use a template** to rout the mortises for the decorative butterflies. A rub collar mounted in your router, coupled with a 1/4" straight bit, will get you started right. Be sure to test your setup in scrap lumber before you move to the tabletop.



1/4" shown here, and they would also have served to hold the top together. Note the grain pattern of the butterflies is at odds with that of the tabletop. These butterflies are easier to complete than you'd think. Rick's usual approach is to create several at once on the table saw, cutting them to the shape shown in the *Decorative Butterflies Drawing* above. Then he cleans up the edges with files, rasps and sandpaper.

Once the butterflies are made, make a melamine or hardboard template of the butterfly outlines to be used with a rub collar and a 1/4" straight bit in your router. It's important to rout a couple of practice butterfly mortises in some scrap lumber to test the template before you move on to your actual tabletop. Locate the butterfly positions on the tabletop (see the Top

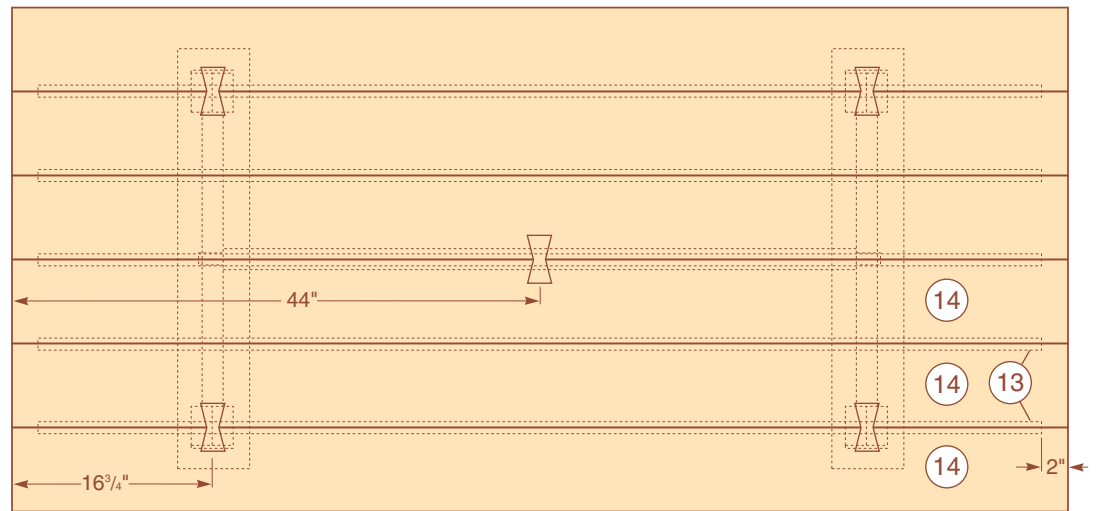
## WOODWORKER'S GLOSSARY

### Mission Style:

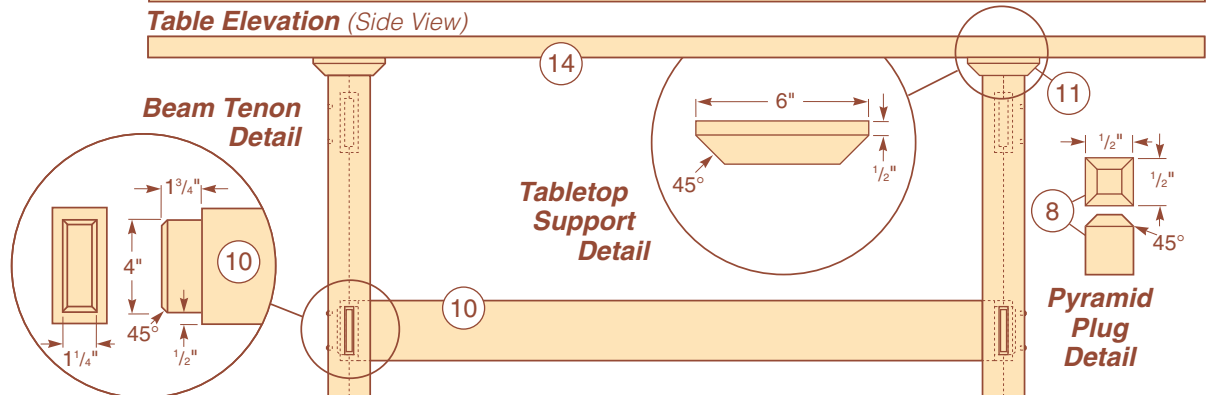
An American version of the Arts & Crafts movement in furniture design created by Gustav Stickley that features the simple and symmetrical designs found in Southwestern missions.



**Table Elevation**  
(Top View)



**Table Elevation** (Side View)

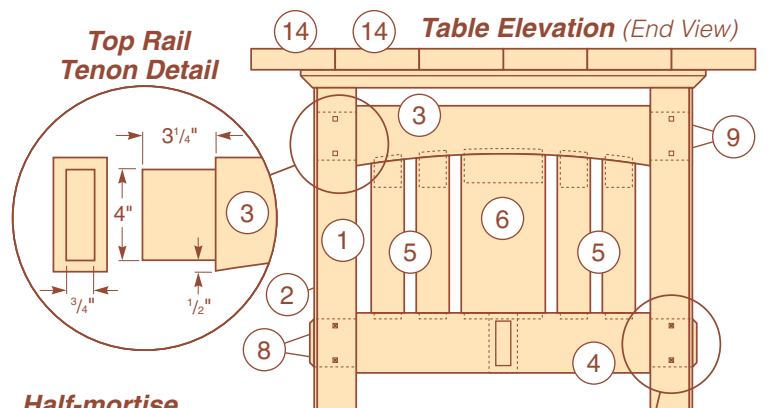


View of the *Table Elevation*, above), and mark each butterfly's outline with a pencil. Use your template to safely remove most of the inlay mortise waste with the router. Make the mortise depth  $\frac{1}{16}$ " shallower than the thickness of the butterflies. Clean up each outline with sharp chisels, then glue the butterflies in place. After the glue dries, simply sand them flush.

### Finishing Up

After thoroughly sanding all surfaces of the entire project, apply the stain of your choice (Rick used Bartley's dark walnut gel stain), followed by several coats of clear satin varnish. As far as durable topcoats go, polyurethane varnish or catalyzed lacquer are the best choices for a tabletop whose primary use is serving food and drink. Apply a couple of extra layers to the top. Remember, a thorough knockdown sanding between coats with 400-grit wet/dry paper is the key to building a great-looking, smooth finish.

**Top Rail Tenon Detail** **Table Elevation** (End View)



**Half-mortise Detail**

