Craftsman-Style Comfort in a Morris Chair

Mortise-and-tenon joinery looks good and makes it last

by Gene Lehnert

Forerunner of today's recliners, *this Morris chair built in the Craftsman tradition features an adjustable reclining back. The back, which pivots on pegs, rests on removable pins that slide into holes on the inside of the arms. To recline the back, simply move the adjustment pins to different holes in the arms. To make his chair even more comfortable, the author also built a matching footstool.*

Photos: William Sampson

The Morris-style spindle chair is my favorite Gustav Stickley piece. In his popular *Craftsman* magazine, Stickley wrote, "No better or more comfortable and useful chair was ever designed." The chair, which features pinned through-tenon joinery, makes a comfortable, adjustable-back chair in the Craftsman tradition. I worked up this version (see the photo at left) after looking at a lot of museum pieces and studying examples in Stickley's *Craftsman* magazine, books and other magazine articles.

Although Stickley sometimes used other woods, his primary choice was quartersawn white oak, which he darkened by fuming with ammonia. Even in his day, Stickley commented that quartersawing was a wasteful method of woodcutting. Today, the wood is rather difficult to find. However, larger retail suppliers have it for about $5 a board foot. It should be selected for color match and figure. Be extra careful when choosing the stock because variations in wood tone mar color uniformity during the fuming process, a finishing technique I'll discuss later in this article. Sapwood should be eliminated as it tends not to darken when fumed

Building the chair

The legs are composed of a solid core with 1/8-in.-thick veneers glued around them. Veneering this way provides uniform quartersawn figure on all four sides of the legs. The through-tenons at the leg tops are 1½ in. sq. with bevels on the ends, as shown in the drawing on p. 40. I use my motorized miter box set at an angle of 12° to cut the bevels. On the back legs, the tops are both beveled and slanted, using a disc sander, to match the angle of the arms. Note that the shoulders on these tenons are angled to support the arms. Because pinned through mortise-and-tenon joints are Stickley hallmarks, it is important they be properly executed. Also, note the corbels that support the rear arms are angled at the tops.

The bottom side rails are supported also using pinned through mortise-and-tenon joints. I use a hollow-chisel mortiser in my drill press to cut the mortises in the legs and the ½-in. spindle mortises in the rails. The work is held on an angle block clamped to the drill-press table. The slant of the angle block is 1 in. rise to 24¾ in. run. I clamp the same angle block to my tablesaw's sliding table to cut the angled tenon shoulders of the top and bottom side rails and the spindles.

Because of their angles, the upper and lower shoulders on the rails and the front and back shoulders on the spindles must be pared by hand. The tenons for the upper side rails are cut before their top slants are cut. I sometimes cut the tenons using an angled sliding table on my router table. These techniques ensure precisely fitting mortise-and-tenon joints for the legs, rails and spindles.

Making the arms—When you first look at one of Stickley's Morris chairs from the side, you get the impression the arms are sawn from thick pieces of wood. What else could explain the bend at the front of the arm? But upon close inspection, Stickley's ingenuity is apparent. To form the bend on the front of each arm, I follow Stickley's lead and glue a filler block to the underside of the arm board. Then I bevel off the top with repeated cross-grain passes on the radial-arm saw, as shown in the bottom left photo on p. 41 (You could also bandsaw away the waste.) Taking care to match color and grain will make the joint barely discernible. I cut the filler block from the same board to ensure the match.

To hold the arm at the correct angle on my radial-arm saw table when cutting the slope, I use an angle block. The angle is 3⅞ in. rise to 22¾ in. run. I also use this block with the drill-press mortiser to cut the through-mortises in the arms (see the right photo on p. 41).

To accommodate the upper rail, I cut a ⅞-in.-wide, ½-in.-deep groove from one mortise to the other and centered on those mortises. Though it's a tedious process, I use my hollow-chisel mortiser to cut the groove because the bend in the arm prevents me from plowing it all the way through with a router. A router and chisel could be combined to do the job.

Building the back

This part of the chair is perhaps the trickiest. It involves three things—bending the ⅜-in.-thick back slats, cutting long tenons that fit perpendicular to the back posts and assembling the unit so it lies flat.

You can steam the slats in preparation for bending, but I prefer to submerge the slats in boiling water for softening because it's faster and easier. If you do boil the slats, it is a good idea to add a small amount of baking'soda to avoid prematurely blackening the wood. This reaction is characteristic of oak. If blackening should occur, the original color can be restored using oxalic acid, which is readily available at hardware stores (see *Fine Woodworking #86,* pp. 65-67).

The slats have a radius of 23 in. To bend them, I sandwich them in a shop-built form made from two bandsawn blocks that mate to create a 22-in. radius, which overbends the wood a little to allow for inevitable springback. Allow the wood to dry completely in the form to prevent excessive springback.

Before cutting the tenons perpendicular to the back posts, small oak wedges (1 in. by ¼ in.) have to be glued to the back of each slat where the tenons will be cut, as shown in drawing detail C on p. 40. The wedge provides enough stock for cutting the long tenons while keeping them perpendicular to the back posts.

I have to admit that I really enjoy devising machine setups. While creating fixtures and jigs to solve joinery problems initially takes more time, it gives me pleasure and ensures accuracy when working

What is a Morris chair?

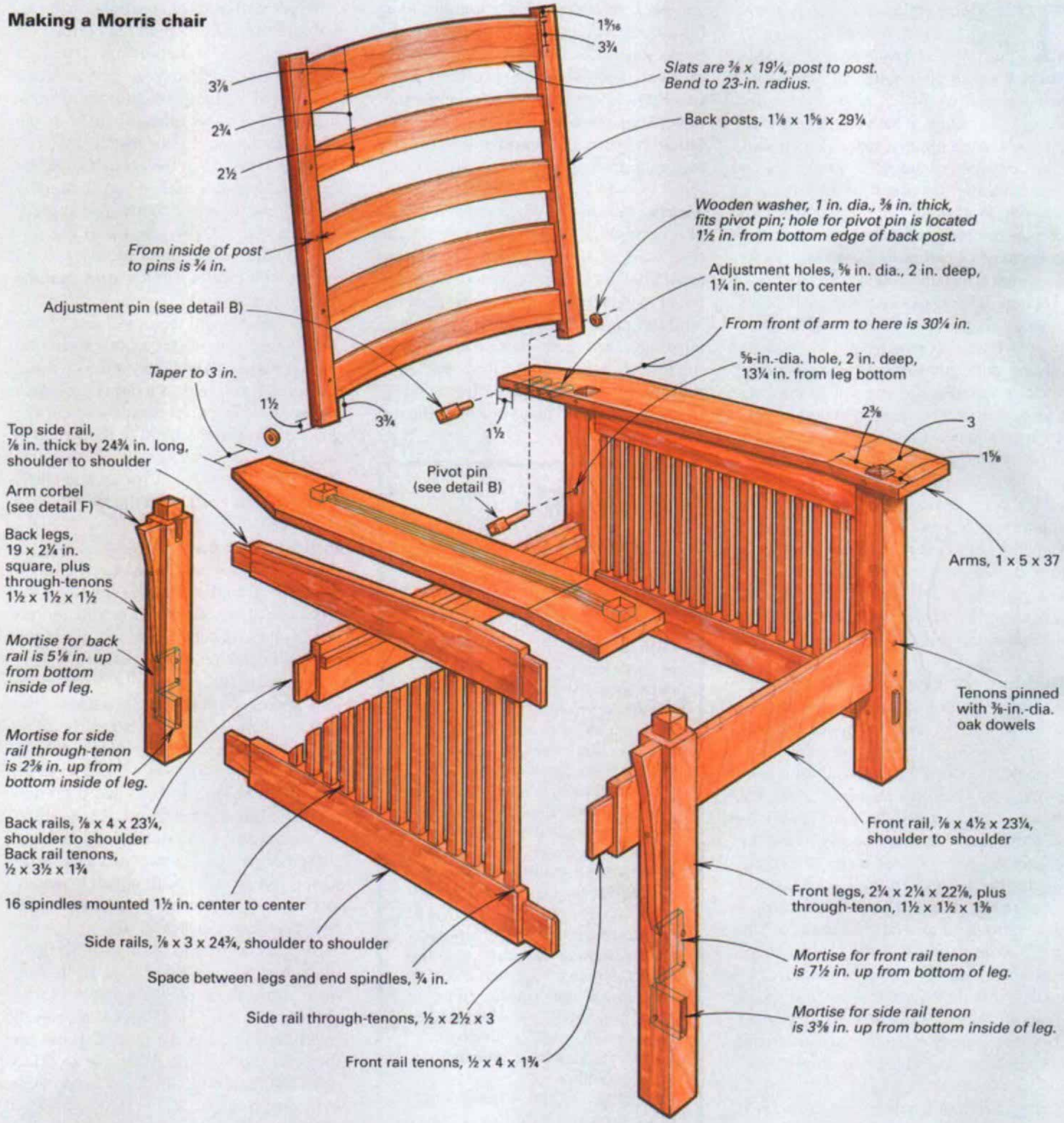
Barbara Streisand melodically asked, "What kind of a chair is a Morris chair?" in her early 1960s recording of "My Honey's Loving Arms." Perhaps some listeners then pondered the answer to this question, but renewed interest in Morris chairs and in other Craftsman-style furniture did not really spark until the '80s.

Gustav Stickley and other furniture builders in the early part of this century produced several styles of chairs that were patterned after the designs of Englishman William Morris. *Morris chair* became a generic term for easy chairs with movable, slanting backs. These chairs were the forerunners of today's reclining chairs. Stickley's spindle chair, introduced in 1905, proved to be the most popular of all. Although the term *spindle* usually refers to turned posts, Stickley and Morris used square spindles.

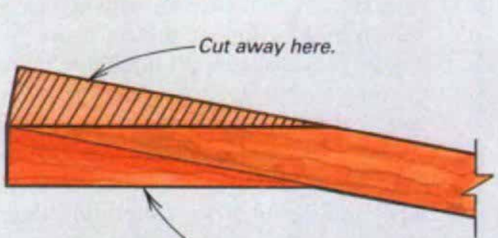
A picture of the original Morris chair appeared in Gustav Stickley's *Craftsman* magazine. He said of it, "This chair has always seemed to be the best of its kind, and one especial advantage is that it harmonizes in structural effect with any good furniture."

Stickley was a successful furnituremaker for a quarter of a century until 1916 when he went out of business. His Craftsman furniture, sometimes called Mission style, is once again gaining great popularity. —*G.L.*

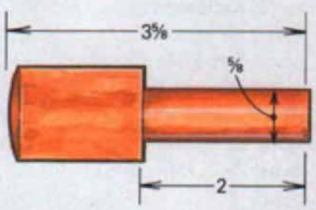
Making a Morris chair



Detail A: Making bent arms

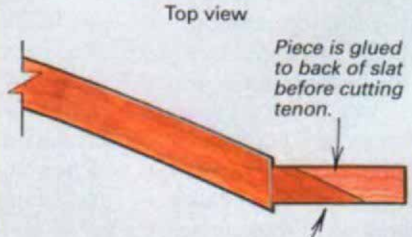


Detail B: Adjustment pins

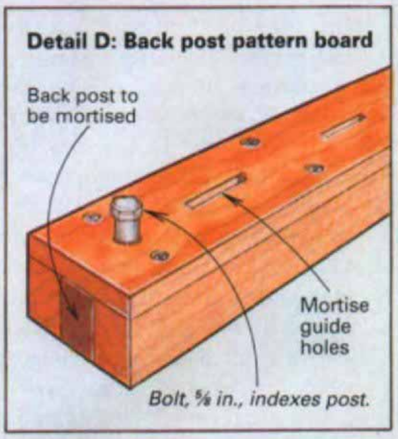


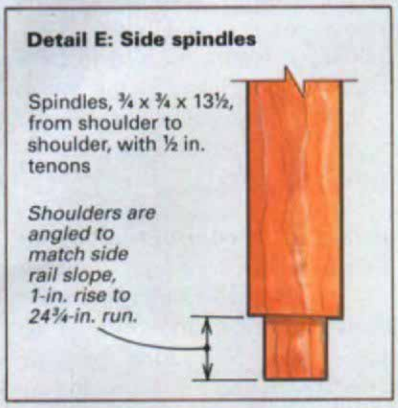
Pivot pins for the back have the same dimensions as the adjustment pins, except the shaft is 3½ in. long instead of 2 in.

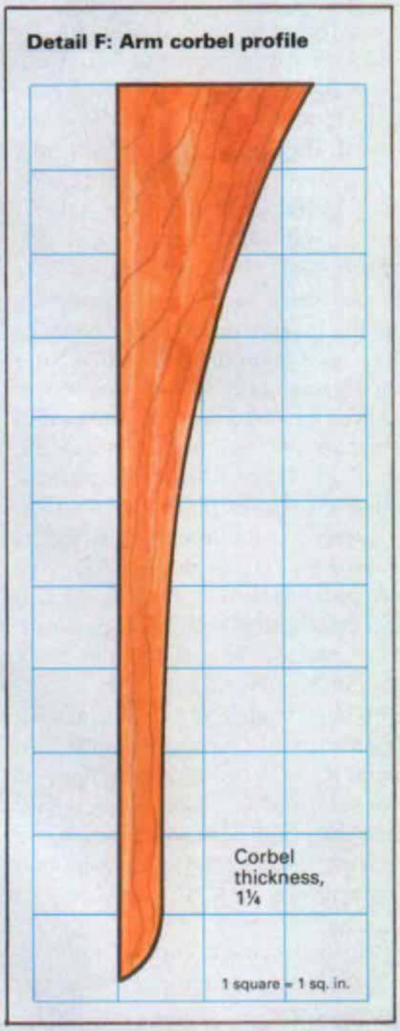
Detail C: Making back slat tenons



Drawings: Mark Sant'Angelo







on multiple pieces. And, once I make the fixture, cutting a complex shape is elegantly simple and fast. That's why I cut the back slat tenons with a shopmade fixture that holds the router horizontally and lets me shear-cut tenons with a spiral fluted bit.

If you don't have an overarm router as an alternative or aren't inclined to devise a fixture, you can cut perfectly good tenons with a handsaw; then plane or chisel them for a good fit. The important thing is not how you cut the tenon; it's getting the tenon perpendicular to the side of the back post it goes into.

I cut the ¼-in.-wide mortises in the back posts (hollow chisel in the drill press again) using a mortising pattern board to hold the posts in position (see drawing detail D). The channel-shaped board has a ⅝-in. hole 1½ in. from one end that corresponds to the hole that will be used to mount the back to the chair. The posts slide into the channel and are indexed to the ⅝-in. holes to ensure uniformity between parts. The same holes also come into play later during glue-up.

Assembling the parts

To glue up the back, I use the fixture shown in the top photo on p. 42 to hold the entire back unit square, flat and in position until the glue dries. The posts are again indexed to the ⅝-in. holes for correct alignment of the back assembly to the back legs. The sides are glued using plywood fixtures to hold them flat and square. I cut holes in the plywood, so I can clean up the glue before it dries.

The rest of the assembly is conventional. The back is attached to the rear legs using turned pins and washer-spacers, as shown in the drawing on the facing page and in the top left photo below. To recline the back, simply move the adjustment pins to a rearward hole. Flat surfaces on the pins allow the back posts to rest firmly. As an alternative system, on earlier Morris chairs, Stickley sometimes used a back support rod that went from one arm to the other and rested in notched supports screwed to the tops of the arms.

Last, drill and pin the tenons using ⅜-in.-dia. oak dowels. The drawing shows the correct dowel placement.

Finishing touches

Stickley used ammonia fuming to add color to his furniture. He discovered the method by noticing that oak stable stalls changed in color over time. He figured that the ammonia in horse manure reacted with the tannic acid in white oak to shade the wood pleasingly.

Back adjustment pegs *(above) fit into holes in the arms. Moving the peg back allows the chair back to recline.*

A radial-arm saw cuts away waste *(below) to form the bend in a chair arm after a block of wood was glued underneath. An angle block holds everything in position.*

Using a hollow-chisel mortiser attachment on the drill press *makes quick work of cutting the through-mortises in the chair's arms to take the leg tenons. The same device also works to cut the groove under the arm to fit on the side rails, as shown on the already-cut arm in the foreground.*

Fuming the wood—I use the fuming tent shown in the bottom left photo. It is made of wood and heavy builder's plastic. Large and small garbage cans turned upside down over the furniture also work well. The chamber should be as small as the furniture put into it allows so as to concentrate the 26% ammonia fumes as much as possible. Ammonia is put in small cups around the items to be fumed. I usually leave the wood exposed to the fumes overnight to achieve the tone I like. But, by monitoring the process every hour or so, the chemical reaction can be shortened for lighter shades.

With some reservations, I am impressed with the pleasing color and grain appearance made possible with fuming. Fuming does not raise the grain. Because the chemical reaction penetrates about ⅛ in., the wood can be lightly sanded after fuming. The method is also quite economical. A gallon of ammonia that costs about $10 could fume a houseful of furniture.

However, even Stickley had some problems with the method. Variations in tannic acid, sometimes present in even the same piece of wood, can cause variations in color shade. There are some things that can be done to ensure success. Select wood for maximum uniformity. If there are light spots after fuming, brush tannic acid and ammonia directly on the wood to touch it up.

I sometimes fume sanded furniture parts before assembling them. If extra parts are made and fumed, they can be mixed and matched for best color before final glue assembly. The chemical reaction from fuming does not affect gluing, and parts marred during gluing can be touched up. Fuming smaller parts before assembly also allows more parts to be fumed in a concentrated space. As a last resort, regular wood stains may be used to touch up lighter spots. Stickley did that quite often.

Industrial-strength ammonium hydroxide (NH4OH 26%) can be obtained from Dietzgen, 250 Wille Road, Des Plaines, Ill. 60018, or from local blueprint companies. Be very careful handling this product, which is much stronger than 5% solution household ammonia. The Material Safety Data Sheet describes ammonium hydroxide as a poison that enters the body through ingestion, inhalation, skin contact or eye contact. Use it outside or in a well-ventilated area. Wear protective clothing, eyewear and a respirator. Follow all safety precautions recommended for it.

As a final finish coat, Stickley in some cases simply waxed the fumed wood. However, he usually coated it with shellac or lacquer. I use varnish and get good results, too.

Back parts fit into a clamping fixture *to keep everything straight during glue-up. Bolts through the back post peg holes not only help align the parts in this fixture, but they are used to index the back posts in another fixture for cutting the slat mortises.*

Using 26% ammonia to fume the wood *gives distinctive color, but rubber gloves, protective eyewear and breathing apparatus are a must. Cups of ammonia are placed inside the plastic-sheet fuming tent with items to be fumed and left overnight.*

Stapling the bottom of a seat cushion, *the author finishes the upholstery work for his Morris chair. Upholstery materials such as the cotton batting (right) or webbing and springs (foreground) are available from local upholstery supply stores.*

Upholstery adds comfort—An upholstered seat and back cushion complete the chair. Stickley used a variety of materials, including leather, to upholster his furniture. I used cloth fabric for mine. Check the Yellow Pages directory in your community for upholstery supplies. The chair seat requires twelve 5-in.-dia. by 6-in.-tall coil springs sewn to 3-in. webbing stretched over a hardwood frame. Make the frame of ⅞-in.-thick, 2-in.-wide hardwood. The springs are securely tied, then covered with burlap, tow and curled hair. One-inch thick foam rubber and cotton can.be substituted for the tow and curled hair.

Pack and shape the materials smoothly to a depth of approximately 2 in. Burlap or muslin is stitched in place over this. After sewing the seat cover and stapling it over the frame, I stapled a section of muslin to the seat frame to cover the bottom (see the bottom right photo). The completed seat slips into the chair frame and rests on cleats screwed to the front and back rails of the chair, so the seat slopes about 2 in. from front to back. The back is a loose cushion filled with cotton floss. Foam rubber 23 in. wide, 28 in. tall and 3 in. thick can be substituted for cotton.

See *FWW* #68 or books available at your local public library for more detailed information about upholstery techniques. If you—or your sewing machine—are not up to doing the upholstery work, you could have a local upholstery shop do the seat and back cushion for you. □

Gene Lehnert teaches vocational cabinetmaking/millwork and builds furniture in La Marque, Texas.