

WOODWORKER'S WJOURNAL

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Classic Project

In this plan you'll find:

- Step-by-step construction instruction.
- A complete bill of materials.
- Construction drawings and related photos.
- Tips to help you complete the project and become a better woodworker.

Scroll Saw Door Harp



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Scroll Saw Door Harp

Some projects seem to possess an enduring popularity, even as tastes and styles change. Door harps are in this genre, and there is certainly no lack of designs. From the traditional heart shape, to whimsical shapes, to ridiculous cartoon faces, there is a door harp for every preference.

But if your taste, like ours, runs more toward the classic and traditional than toward the sublime or ridiculous, then we think you'll appreciate this elegant, easy-to-make version. It's from the Round Mountain Woodworks studio of Nicholas Mariana, in Victor, Montana.

Although most woodworking supply catalogs offer several varieties of hardwood plywoods, for a more unique look, this is a good project to practice laying up your own veneer. Buy enough veneer (about 8 in. wide by 10 in. long) to cover the front of the door harp. Then glue up the veneer as described in the Woodworking Basics article (page 5). The photo shows door harps made with three different veneers: padauk, curly maple, and ribbon stripe mahogany. Apply the veneer over a 1/8 in. thick luan mahogany plywood. For this size project, a smaller version of the veneer press shown in the Woodworking Basics article will work fine.

Once you have your veneer laid up, or once you've purchased your pre-veneered plywood, just follow our simple step-by-step instructions to make the door harp. Begin by cutting your stock to size (Step 1). You'll need one piece of 1/8 in. plywood (with a face veneer) for the front, a second piece of 1/8 in. plywood for the back, and a 1 in. thick board for the center section. Cut all three pieces to 7 in. wide by 8 1/2 in. long.

Now transfer the pattern to the front. If you plan on making a number of these door harps (they make great gifts), first make a template from some stiff cardboard. By saving the cardboard template, you'll be able to easily reproduce the design later on. Also transfer the outside profile, as shown in Step 2.

Next, lay out a 5 in. diameter circle as indicated. You could cut out this circle with the scroll saw, boring a starter hole first and then threading the blade through the hole before clamping the blade in the scroll saw.

As we'll see, the entrance kerf is closed when the door harp is clamped up, later on. Be sure to make the entrance cut with the grain, as shown.

Using the scroll saw, now cut out the sound hole. As shown,




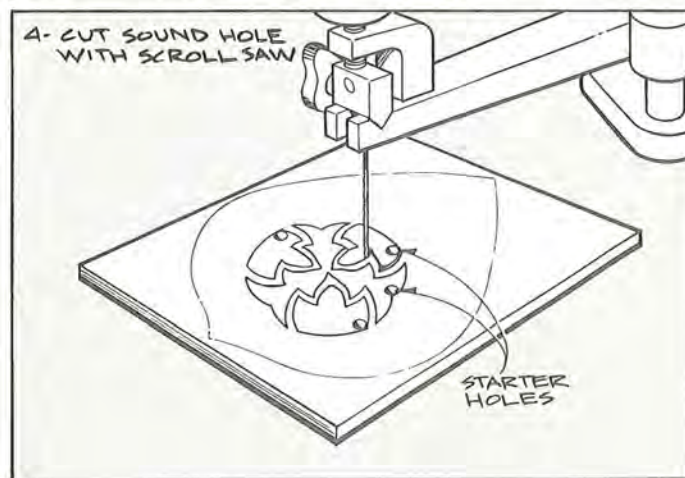
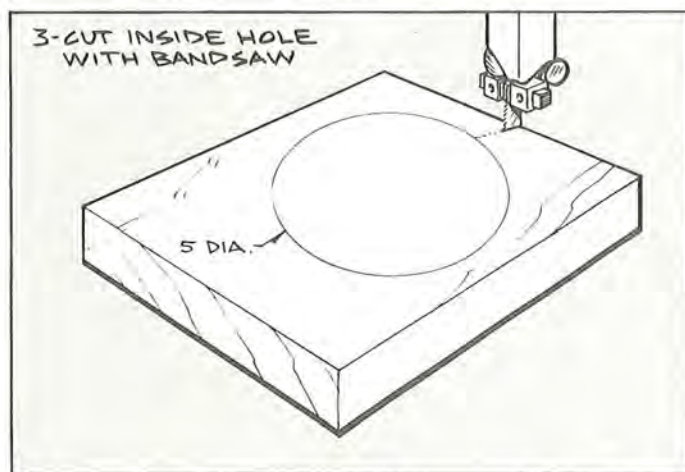
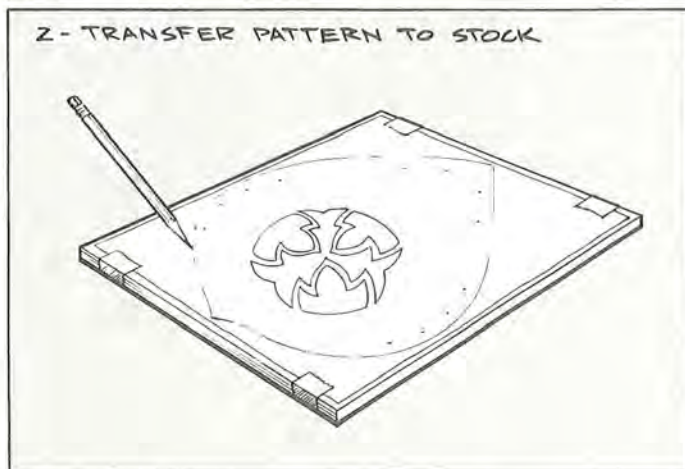
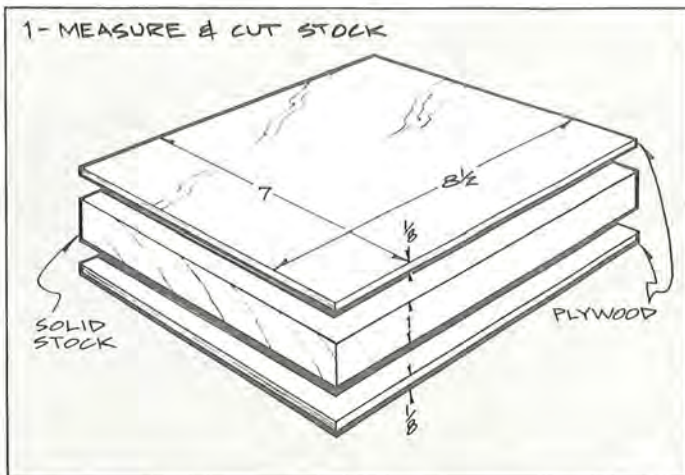
you'll need to make a starter hole for the blade for each of the four interior cuts (Step 4). Sand to clean up any fuzz remaining from the scroll saw cuts. Once your sound hole is complete, glue up the front and back around the center section. Add some glue in the entrance saw kerf of the center section, and be sure to employ clamp blocks to help distribute clamping pressure and so your C-clamps don't mar the plywood (Step 5). Also, apply some side-to-side clamping pressure on the end where the entrance cut was made, to close the kerf.

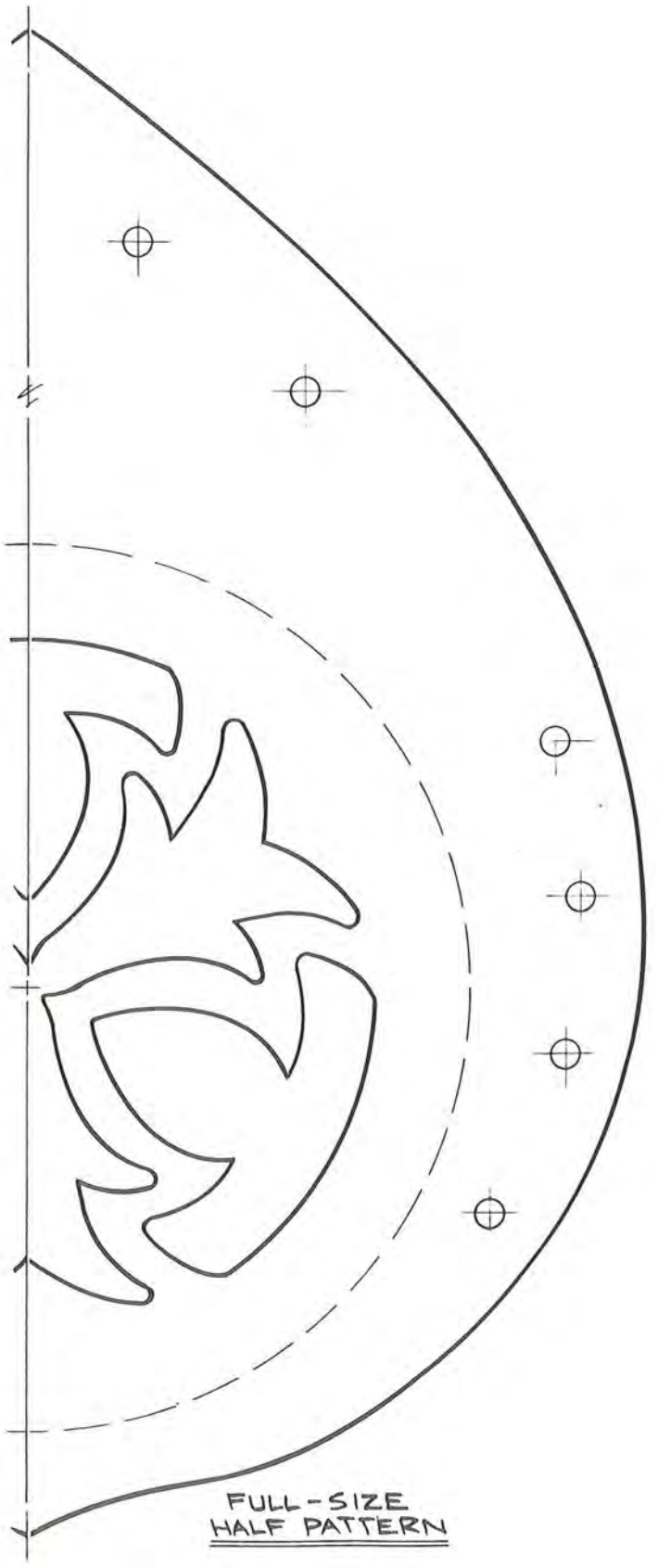
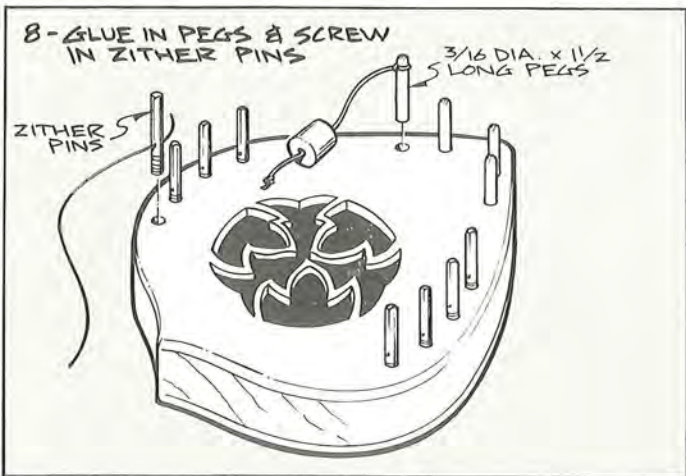
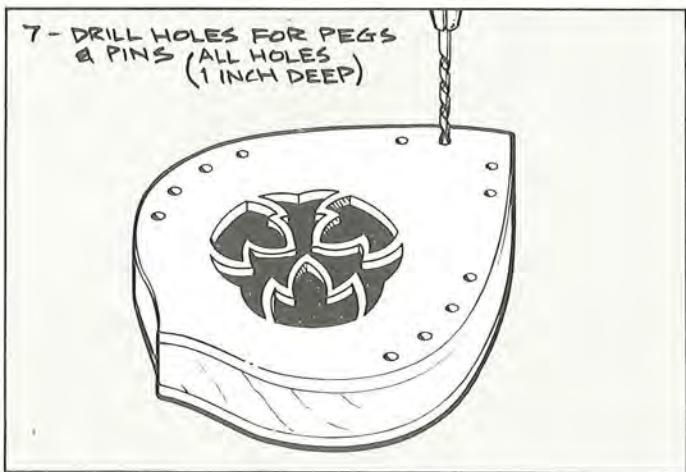
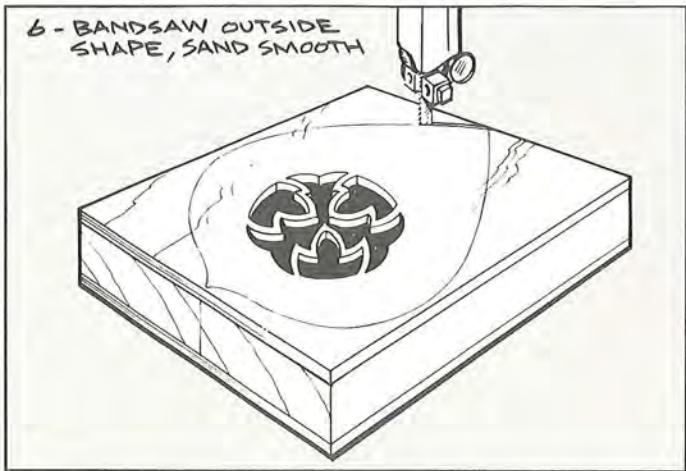
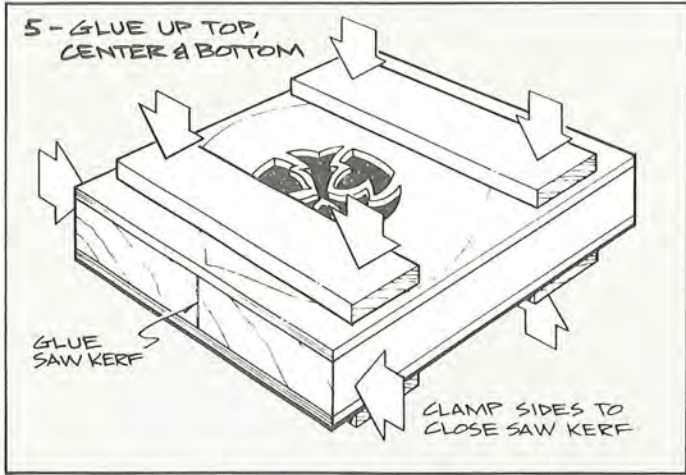
Once the assembly is out of clamps, but before you cut the outside profile, mount a keyhole bit in the router table and rout a keyhole slot in the back to hang the door harp. If you don't have a keyhole bit, just drill an angled hole so the door harp can be hung on a finishing nail. Then, using the band saw, cut the outside profile (Step 6). Sand carefully to clean up any irregularities from the band saw cut. Then apply a finish. Several coats of a clear spray lacquer are recommended.

Next, drill the peg and zither pin holes (Step 7). The hole locations should have been transferred at the same time that you transferred the pattern. Use a $\frac{3}{16}$ in. diameter bit and make the holes 1 in. deep. Glue the wooden pegs in place so they protrude about $\frac{3}{4}$ in.

Mounting the zither pins and the steel strings (Step 8) requires some care. As you'll note from the photo, the steel strings are wrapped around the zither pins so they carry across the tops of the pins. This is needed to make the strings level. The zither pins have a very fine thread, and are screwed into place. Take the four left side pins and screw them in until they have just about bottomed out (the threads should be fully seated). Now screw the four right side zither pins in far enough so about $\frac{1}{4}$ in. of the threads is exposed. Thread the steel strings through the left side pins and turn the pins counterclockwise (unscrewing) the pins about three or four turns. This should wrap the string around the top of the zither pins. Next, thread the other end of the strings through the right side zither pins, and screw the pins in a clockwise motion (screwing in) about three or four turns. The clockwise motion should wrap the string around the top of the four right side zither pins, and both the left and right side pins should be left at about the same height.

Now mount the clappers to their strings, and tie those strings to the wooden pegs at a level that will allow the clappers to strike the steel strings squarely. A dab of epoxy will permanently bond the clapper strings to the wooden pegs. Fine-tune each of the zither pins to get a tone that pleases you, then mount the door harp to the inside of any door that gets regular use. 







Veneering

A Simple Approach

by Roger Holmes

I started out as a committed solid-wood woodworker. Most of the veneered furniture I'd come in contact with was cheap or gaudy, or both. Plastering furniture with thin sheets of splashy veneer seemed somehow dishonest, an attempt to hide poor materials, shoddy construction or ill-conceived design.

I quickly discovered how ignorant I was about veneer. Sure, it can clothe a multitude of mass-produced sins. But it can also open whole new worlds of possibility to a conscientious woodworker. Woods that, in the solid, are too expensive or too difficult to work, are often affordable and malleable as veneer. By gluing these sheets onto a stable material such as plywood or particleboard, you need not worry about expansion and contraction, the ever present demons of solid-wood construction. Freed from concern for wood movement, with veneer you can create designs that would be difficult, disastrous or impossible in solid wood.

Enticing as veneer can be, many woodworkers find the process of applying it daunting. Few muster the courage to lay it by hand with hot hide glue and

veneer hammer. Others are put off by expensive, space-hogging veneer presses. Fortunately, there's a simple alternative. With common white glue and ordinary tools—utility knife, hand-plane, some sturdy clamps—you can do a lot of veneering.

The essentials of the method are straightforward. After cutting the veneers with the knife and jointing their edges with the plane, you tape them together to form large sheets, one each for the top and bottom of the panel. (Veneering both surfaces keeps the panel flat.) Spread glue on the sheets of veneer and the plywood or particleboard substrate and sandwich them together between two pieces of plywood (called cauls). A makeshift veneer press—pairs of heavy wooden bearers and clamps, regularly spaced on the sandwich—squeezes the panel together, the cauls distributing the pressure evenly over the veneered surfaces.

This method can be used for table-tops, carcass sides, drawer and door fronts and many other flat panels. Unlike some veneering methods, there are few restrictions on the size of the job. I once used bearers and cauls to veneer two

horseshoe shaped conference tables whose six, 3 ft. wide tops totaled over 60 feet in length.

Materials: The Veneer and the Substrate

Let's start with something a bit smaller, a panel 18 in. square, the size of a small tabletop, a cabinet door or small carcass side.

Veneer: Most local lumberyards, even those with a decent selection of hardwoods, don't often sell veneer, so you may have to mail order it.

Veneer is commonly $\frac{1}{32}$ in. to $\frac{1}{40}$ in. thick, though $\frac{1}{28}$ in. and $\frac{1}{16}$ in. are sometimes offered. Most of the time, thickness is a given, not a choice.

I think veneer is most useful when bought as consecutive sheets, in the order they were sawn or sliced from the log. (A bundle of consecutive sheets is sometimes called a flitch.) Because veneer is so thin, any sheet in a flitch will look almost identical to the one above and below it. Because of this repeating figure, you can create a great many handsome patterns by arranging (or "matching") consecutive sheets in

different ways. If you're not interested in matching, randomly selected sheets are often a bit cheaper.

When you order, let the supplier know the size of the area you intend to veneer so he or she can make sure you get enough matched sheets to cover; the supplier can also help you determine an adequate allowance for waste. (Smaller suppliers, such as hobby shops, may offer only random sheets.)

Resist the temptation to buy some lovely crotch, blister, burl or other highly figured veneer for your first attempt. The distorted grain that makes these veneers so attractive also makes them difficult to work. Build up your skill and confidence with straight-grain veneers, then tackle the wilder stuff.

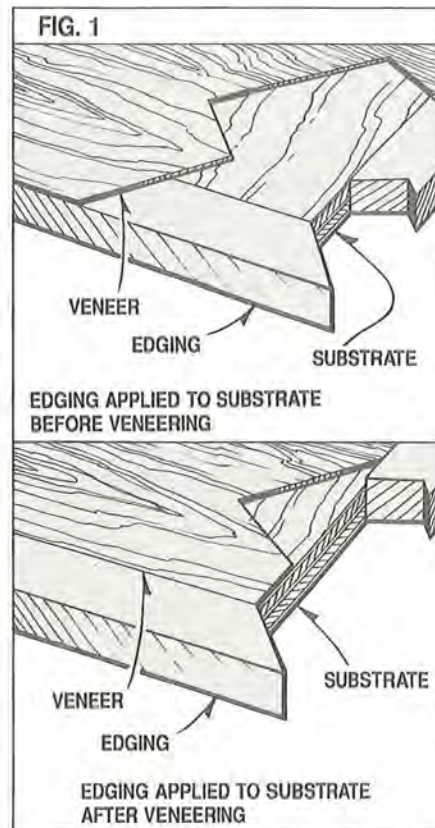
Substrates: Don't skimp on the substrate. Buy good quality hardwood plywood or particleboard, with smooth, flat faces. An expensive, but excellent substrate is medium density fiberboard (MDF), a sort of super particleboard.

Unless the edges of a panel are concealed by a joint, you'll probably want to cover them with wood. It's possible to veneer the edges of a panel, but I think thicker, solid-wood edgings are more durable. These can be added to the panel before veneering, so they show only on the edges. Or they can be added after veneering to form a border around the panel (Fig. 1).

Preparing the Substrate

I chose $\frac{5}{8}$ in. hardwood plywood as the substrate for my small panel, and decided to add a $\frac{1}{4}$ in. wide solid-wood edging before veneering. I cut the plywood so that the overall size of the panel, including edgings, would be about $\frac{1}{8}$ in. larger than its finished dimensions, to allow for clean up after veneering. If you're using a plywood substrate, orient the grain of the surface veneers so it will be at a right angle to the grain of the veneers you're applying. (Even veneer expands and contracts slightly across its width. If the underlying layer moves, face veneer applied in the same direction may develop hair-line cracks.)

Cut the edgings slightly wider than the thickness of the plywood, glue them



in place, and plane them flush with the surface after the glue has set. I sand the faces of the edged panel with 120 paper to ensure they are smooth and flat. Finally, mark center lines on the edges and ends to help you align the veneer when gluing up.

Matching and Cutting the Veneer

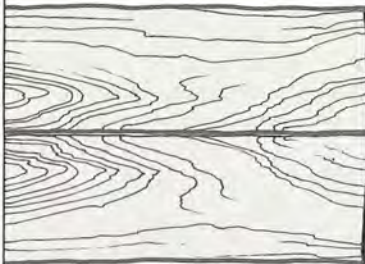
The symmetrical, mirror-image pattern shown in Fig. 2 is one of the most attractive ways to use consecutive veneers. Called bookmatching, it's also one of the easiest, requiring only that you flip every other sheet front to back.

To bookmatch the cherry veneer for my panel, I first had to figure out what part of the sheet would make the nicest pattern. I held a mirror on various possible joint lines to get a sense of what the resulting match would look like (Photo A). I roughed in an outline in heavy pencil on the portion I liked, allowing at least $\frac{1}{4}$ in. over the lipped substrate's dimensions on all sides.

Bookmatching is commonly done in multiples of two—two, four or six sheets and so on—but my veneer wasn't wide enough to cover with two sheets and I

FIG. 2

STACKED SHEETS OF VENEER
AS CUT FROM LOG



TWO SHEETS "BOOKMATCHED"



Photo A

didn't like the pattern four narrow sheets would make. Fortunately the figure was symmetrical down the center of a sheet, so I decided to use three sheets, each of the two side sheets producing a slightly different bookmatched, mirror-image pattern with the center sheet.

To cut the veneers to size, I stacked the three consecutive sheets, aligned carefully along the edges and ends, then cut along the outline with a sharp utility knife and straightedge. Place the straightedge over the material you want to keep—if the knife strays, it will cut only into the waste. Cut the ends, across the grain first (Photo B), then the edges (Photo C). You can cut a number of sheets at the same time. Take numerous light, shallow cuts rather than forcing

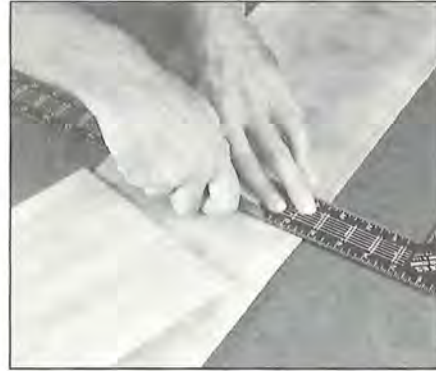


Photo B

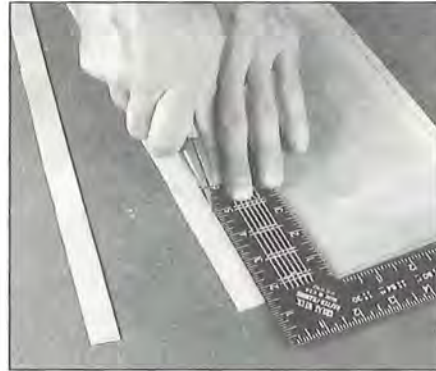


Photo C

deep ones, which risk splintering the veneer.

Veneering both sides of a panel equalizes the forces of expansion and contraction and keeps the panel flat. Because different woods respond differently to humidity, it's safest to use the same species on both sides or, at the least, use veneers of the same thickness. If you're not going to see the panel back, you needn't worry about matching; if you have enough scrap, you can piece it together to cover.

Jointing the Edges

Mating edges of veneer, like those of solid boards, must be straight and at right (or complementary) angles to form a seamless joint. Like solid wood, I edge-join veneer with a hand plane. Veneer, however, is too flimsy to hold in a vise, so I clamp a stack of sheets in a simple straightedge jig (Fig. 3) and plane them as shown (Photo D). Resting the straightedge jig and the plane on the benchtop ensures square edges.

Here are a few tips: When using the straightedge jig, position the bolts near the ends of the veneer for best results. Once jointed, the mating edges should

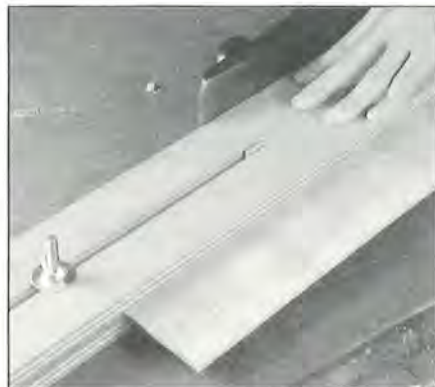
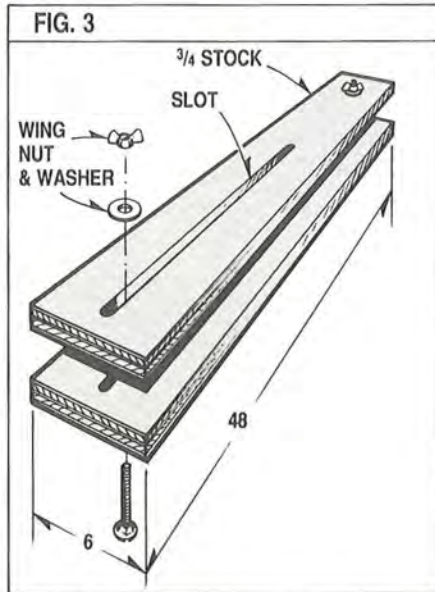


Photo D

be perfectly straight. However, errors can occur. Veneer edges that are very slightly concave in their length can be pulled together with tape; but avoid convex edges—the joint is likely to gap at the ends. It doesn't matter if the last pass of the plane takes a shaving off the straightedges. Before jointing the next batch of veneer, just make sure the straightedges are indeed straight.

Taping

After jointing the edges, you need to tape the veneers together before gluing them to the substrate. Lay the sheets in order on a flat surface. (Remember, the tape goes on the faces that will show.) Draw the edges of the first pair together, checking to make sure the faces of the sheets are aligned to produce the pattern you want. I start taping in the middle, pulling the edges tightly together as I stretch a piece of tape across the joint

(Photo E). Then I apply additional cross-grain strips, working from the center strip out to the ends, spacing the strips from 2 in. to 6 in. or more apart, depending on what it takes to pull the joint snugly together. Place the final strips right at the ends of the sheets. Finally, apply a strip to cover the entire length of the joint (Photo F). Add subsequent sheets to the first pair in the same way.

I usually tape veneer with masking tape. It's somewhat elastic and by stretching a strip as you pull it across the joint, the tape draws the edges tightly



Photo E



Photo F

together. It sticks well and stays put, but can be a pain to remove after the glue has set—what doesn't peel up must be scraped or sanded off. Much easier to remove are the brown paper tapes sold especially for veneering. I've found them difficult to apply the few times I've tried, but you might have better luck.

When the sheets are taped together, mark center lines on the face near the edges and ends to help you align the veneer on the panel when gluing up.

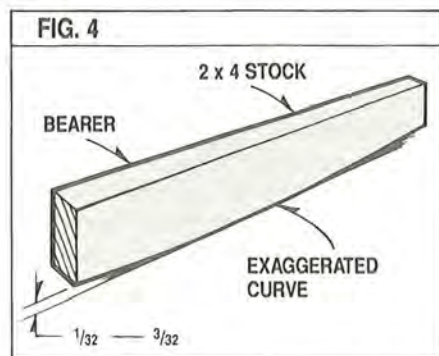
Assembly

At this point, you'll need glue, cauls and clamps. Here are some thoughts on each.

Glue: White or yellow woodworking glues, like those made by Borden or Franklin, are easy to apply, give you a reasonable amount of time to work before setting up and are strong and durable when cured. I don't recommend contact cement for veneer; the bond isn't as strong as with other glues and is prone to fail at the edges and ends of a panel.

Cauls: Make the cauls slightly larger (say $\frac{1}{2}$ in. overall) than the panel being veneered, and as thick as possible. A sheet of $\frac{3}{4}$ in. plywood or particleboard makes an adequate caul; two sheets are even better. The contact surface should be flat and smooth, to prevent damage to the veneer. Don't use cauls that are irregularly bowed or twisted—they can distort the panel.

Bearers: The stouter the bearers, the better. If you're making a set to keep, use poplar, oak, ash or a similar sturdy hardwood, about 2 in. by 4 in. in cross section; 2 ft. lengths will handle many needs. If you don't do a lot of veneering, use what's on hand; 2x4s and 2x6s make perfectly serviceable bearers. As shown in Fig. 4, plane one edge of each bearer slightly convex along its length, between $\frac{1}{32}$ in. and $\frac{3}{32}$ in. or so lower at the ends than the middle. (The longer the bearer, the greater the amount.) When both ends are pulled flush to the panel, a convex bearer applies pressure in the center of the panel.



Clamps: It takes considerable pressure to pull two robust, slightly bowed bearers flat, so choose your clamps accordingly. I prefer quick-action clamps because they're easy to use if you're working on your own. The hefty Wetzler clamps shown in the photos are ideal; lighter clamps will do for small panels and bearers, but they don't pack

enough punch for larger work. Sturdy C-clamps work too, and frequently are garage-sale bargains.

Gluing Up

First, make sure you have ample room to work. If possible, use one worktable for spreading the glue and another, close by, for clamping up. Set up the bottom bearers and caul before applying the glue. I place the bottom bearers on top of a couple of 2x4s to provide room for the clamp heads. Cover the surface of the bottom caul with a sheet of plastic or wax paper to keep squeezed out glue from sticking the panel to it.

Cover both the mating surfaces, ve-



Photo G



Photo H

neer and substrate, with a thin coat of glue, spreading it evenly with a wide piece of wood, plastic or metal. A putty knife or joint compound spreader is ideal (Photo G). Then position the veneer on the panel, flatten the sheet with your hands and align it with the center marks on the panel edges and ends. I fix the veneer in place with one staple in the waste near the centerline at each end (Photo H). Flip the panel over, apply glue to its other face and the reverse side

Woodworking Basics

Continued



Photo 1

veneer and repeat the procedure. Don't forget to add the plastic or wax between the veneer and the caul. If, after both sheets of veneer are in place, they curl away from the edges, I pull them down with a few strips of tape stretched from face to face across the edges.

Clamping

As quickly as possible, position the assembled panel on the bottom caul and

cover the top surface with plastic and the other caul. Then place the top bearers directly over the bottom bearers and begin clamping. Start with the pair of bearers in the middle, drawing first one end then the other snug, but not tight, to the cauls. Position the clamps so the clamping pads are at least a couple of inches in from the edges of the panel. When both clamps are in place, tighten them down. Proceed in the same way with the other bearers, working out from the middle toward both ends, spacing them 5 in. to 6 in. on center (Photo 1).

Clean up

I let the glue cure overnight before pulling off the clamps, bearers and cauls. If all has gone well, the panel should be flat, no lumps or bumps on the surfaces and no gaps at the edges and ends. Cut away the waste veneer overhanging the substrate; I remove the waste along the edges first with a knife, handsaw or handplane, then trim across the grain at

the ends with the tablesaw. Now comes the tedious chore of removing the tape. But revealing the handsome veneer beneath makes the effort worthwhile. By the way, don't worry if some glue has seeped through the veneer, and puddled against the wax paper or plastic. It may look bad now, but once you've sanded to expose the wood, the surface should accept a finish without a problem. 