

Laying Veneer

Meeting the small shop's pressing needs

by Ian J. Kirby

Furnituremaking with solid wood is like whittling: you chip away at the tree until you end up with the pieces you need. Working veneer is just the reverse: you stick the bits together to build up furniture elements of the exact size and shape you want. This means you have to think about the work in a different way—you have to plan ahead instead of making dimensional decisions as you go along.

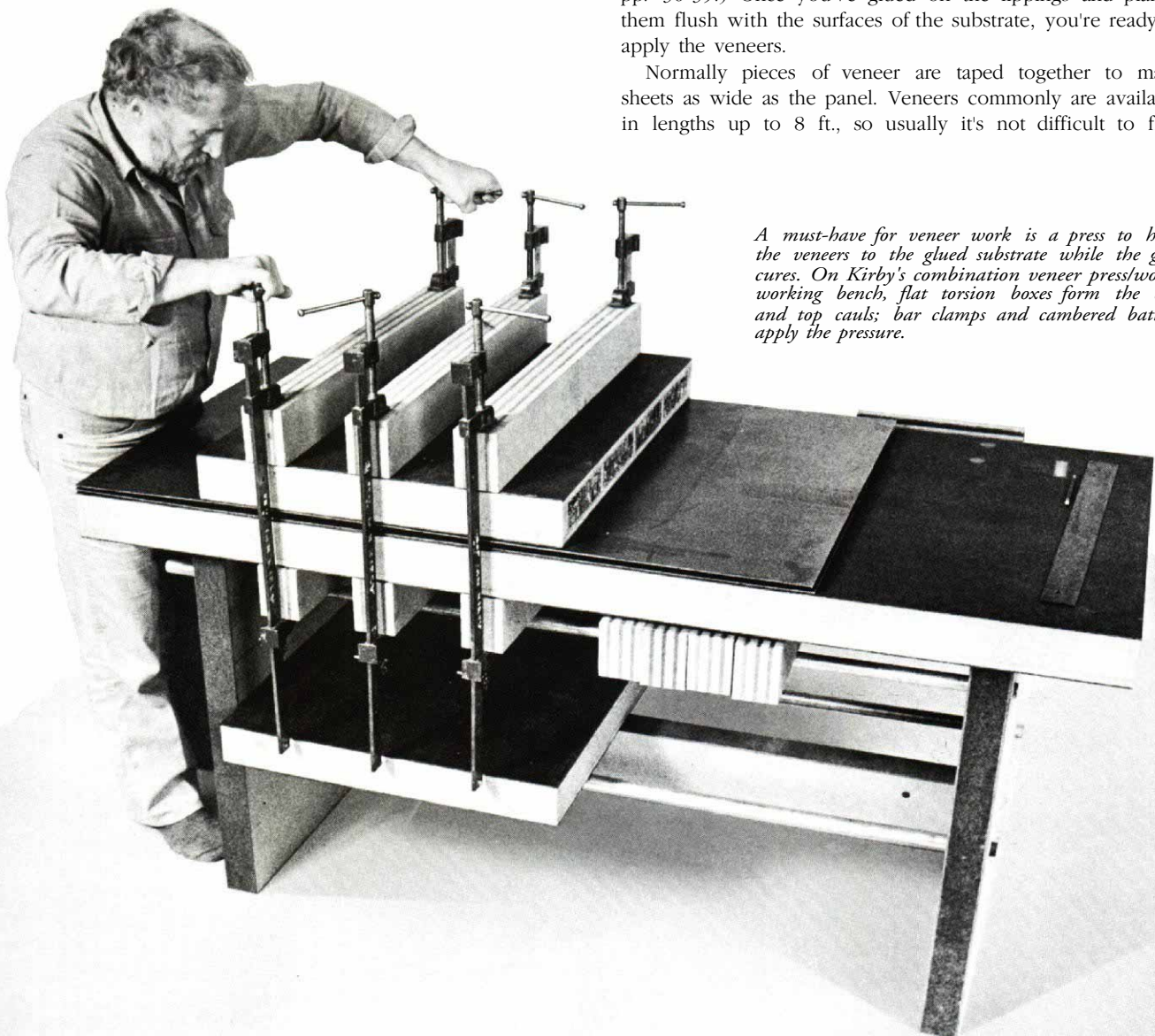
This difference in thinking is in fact the most difficult aspect of veneering. The work itself, the techniques, is well within the skills, tools and budget of the small-shop woodworker. And, you'll find that veneering has three distinct advantages for furnituremaking: you can make panels of any size; you can use woods of rare beauty; and, a design bonus unique with veneered panels based on dimensionally stable

substrates, you don't have to allow for moisture-related wood movement, as you would with solid wood.

Any veneered panel is assembled from three components: a substrate or base material, some lipping or edge treatment, and the veneers themselves. Preparing the substrate is the first step, but this is relatively easy with ordinary woodworking tools and dimensionally stable medium-density fiberboard (MDF) or furniture-grade particleboard. For the photos to illustrate this article, I used a piece of $\frac{5}{8}$ -in. MDF about the size of a cabinet door or small tabletop, and glued a mitered lipping of solid wood onto its edges. This way, the edges can be radiused or shaped in some way, and the finished piece will have the look and feel of solid wood. (For an article on preparing substrates and attaching lippings, see *FWW* #46, pp. 36-39.) Once you've glued on the lippings and planed them flush with the surfaces of the substrate, you're ready to apply the veneers.

Normally pieces of veneer are taped together to make sheets as wide as the panel. Veneers commonly are available in lengths up to 8 ft., so usually it's not difficult to find

A must-have for veneer work is a press to hold the veneers to the glued substrate while the glue cures. On Kirby's combination veneer press/woodworking bench, flat torsion boxes form the bed and top cauls; bar clamps and cambered battens apply the pressure.



pieces as long as your panel. For very long panels or for special effects, you can join several pieces to make strips as wide as the panel, then end-join the wide strips to make one long sheet. Veneers are easy to cut and join, so you have considerable design freedom here. Books on traditional veneering usually illustrate a variety of patterns, such as bookmatched mirror images or herringbone patterns, but these patterns are somewhat old hat and unnecessarily restrictive. You can match and join veneers in any way you like to create any type of pattern that appeals to you. The only rule for joining veneers is visual—what does it look like? Use your imagination. Experiment with combinations of grain directions and angles, with different species, and with bands, circles and other shaped inlays. Try aligning the grain or color of the veneer so that it accents the lines of the piece you're making.

No matter how much cutting and taping is done, the aim is to prepare a single veneer sheet that's no more than $\frac{1}{2}$ in. larger all the way around than the panel to which it will be glued. A bigger overhang would just get in the way. Covering the entire panel at once enables you to make the veneer joints virtually invisible, without having to cope with glue squeeze-out between pieces, and to position the sheet accurately before placing the panel in the veneer press.

Both sides of the substrate must be veneered, usually at the same time; otherwise, the panel will be unbalanced and will invariably cup. The cupping results from a complex interaction of the glue, substrate and veneers, and from the shrinkage of

these components due to moisture changes. You should use a similar species and thickness of veneer on both sides of the panel to maintain a balance. Don't expect a thin, porous veneer to balance a thick, dense one.

For top-notch work, it's common to glue two layers of veneer on each side of the panel. The first veneer, the underlay, is usually an easily worked, mild species such as Honduras or African mahogany. This layer helps prevent the lippings from telegraphing through, and seems to give a richer, more solid feel to the work. Once the underlay has cured and been cleaned, it's covered with a show-wood veneer—anything from a burl or crotch to some exotic species such as ebony. Normally the top veneer is laid with its grain at right angles to that of the underlay veneer. If the top veneer and the underlay are different colors, lip the underlay with a 1-in. to 2-in. band of the top veneer, unless you want this color difference to highlight the edge.

With a fragile material such as burl or crotch veneer, it's common practice to reinforce the delicate material by gluing it onto a thick underlay veneer such as poplar. Those new to veneering should avoid very delicate materials, however, as well as old, cracked or washboard-like veneer, until they have mastered the techniques and gained more experience. There are ways to reconstitute badly buckled veneer, such as pressing it between damp layers of paper to flatten it, then slowly drying it to the proper moisture level, but these techniques can be troublesome and undependable. There are so many types of veneer readily available today, you can save yourself a lot of trouble by buying high-quality, flat veneer to begin with.

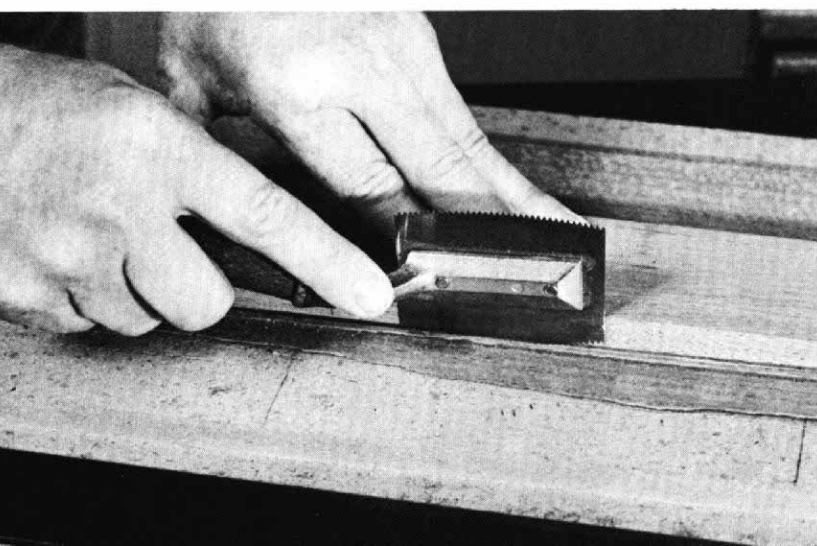
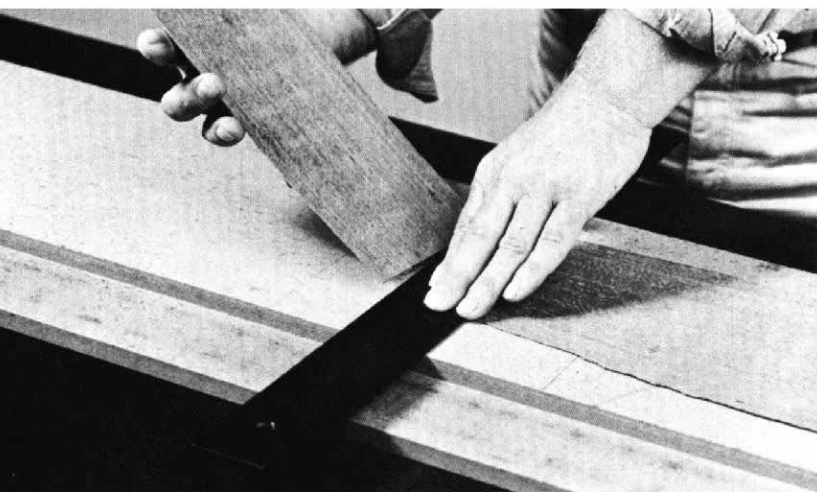
Other than conventional woodworking tools, all you'll need to begin veneering are a veneer press (see box, p. 41), a shooting board (see drawing, facing page), a glue roller and some veneer tape, which is available from most veneer suppliers. You could buy a veneer trimmer, which is a wooden knife-blade holder that looks like a handsaw handle, but a chisel and a knife work well to start with. A sharp knife (a Swiss Army knife is ideal) is good for cutting veneers, but for some hard and tough veneers, you might want a veneer saw, which has a barrel-shaped, serrated blade with no set. Oddly enough, this is also a handy tool for cutting very fragile veneer, such as burl.

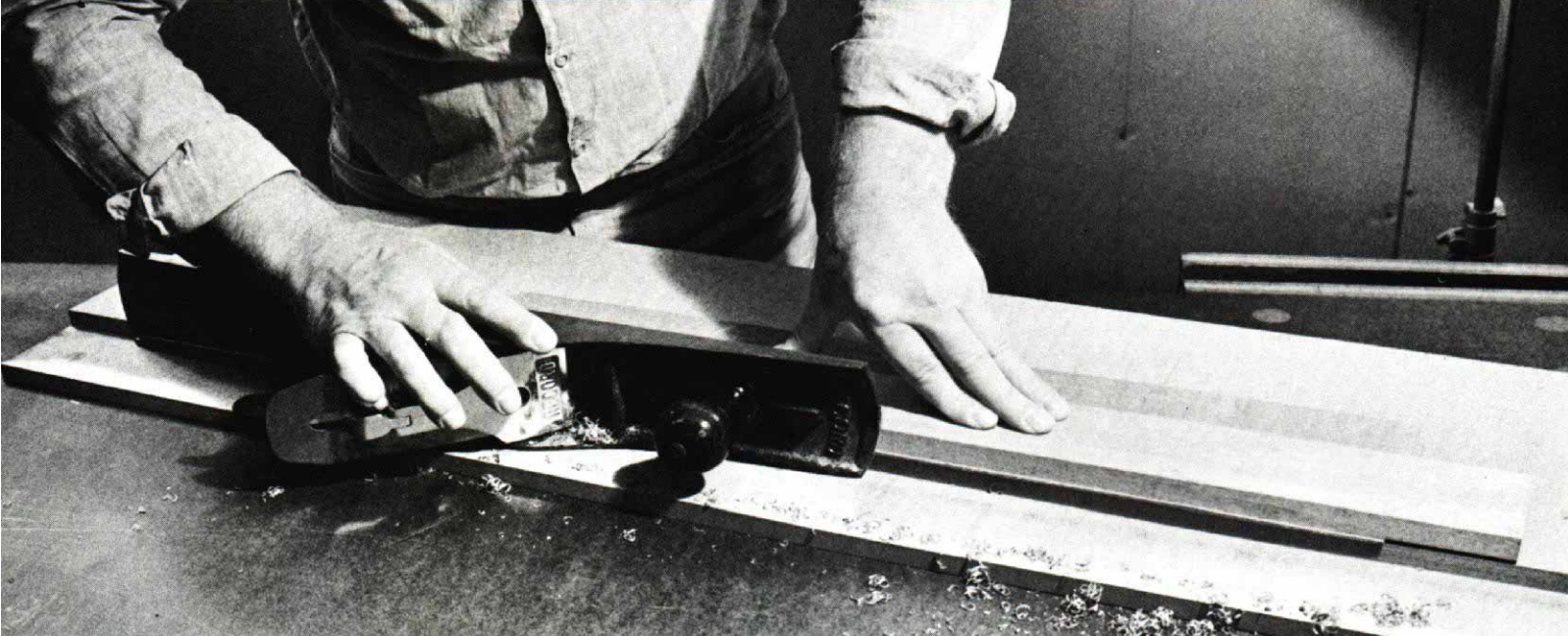
Once you've assembled all your tools, you're ready to select, mark out and cut the veneers. To avoid damaging the workbench, cut on the wide surface of the shooting board. To crosscut veneer, hold the knife firmly against a metal straightedge (use the back for cutting to avoid damaging the accuracy of the chamfered edge), press hard as you cut, and chop down when you get to the second edge to prevent splintering. Make two hard passes, then break the scored veneer along the straightedge. The cut end will be slightly ragged, but that doesn't matter if it will be part of the waste overhang. If you want to join veneers end-to-end, however, knifing all the way through the veneer will produce a good joint line. It's rarely necessary to plane end grain.

When cutting along the grain, knife all the way through. Make light strokes, keeping the blade vertical and tight against the straightedge. These knifed edges are not good enough for a butt joint, so you'll have to true them with a jointer plane on the shooting board before you can tape them together.

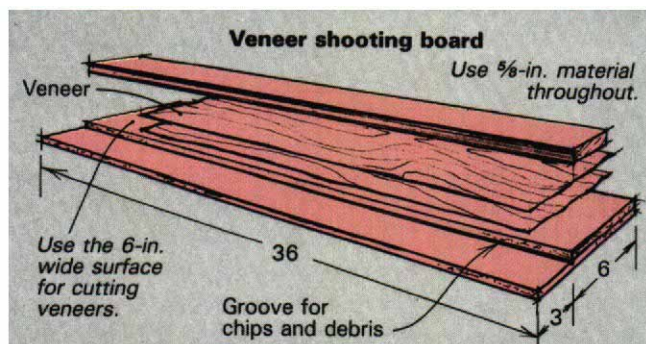
If the veneer is mild and flat, you can plane up to a dozen

When crosscutting veneer, make two hard passes with a sharp knife, then press down on the straightedge while pulling the veneer up to break along the scoring (top photo). A veneer saw, guided against a board, is better for fragile veneers.





For butt joints, the sheets of veneer must be straight-edged. Hold the veneers in place on the shooting board while truing the edges with a jointer plane.



sheets at once; if it's anything but flat, two may be the limit. To use the shooting board, lay the plane on its side and position its sole $\frac{1}{8}$ in. from the shoulder of the rabbet, then move the veneers to the sole. Line up a piece of wood with the rabbet shoulder and hold the veneers down by pressing hard on the top board. You'll be able to see only the top veneer, so you'll have to gauge from the shavings whether you're planing all the sheets. The amount of material removed is small, usually not enough to significantly affect bookmatching or any other pattern you're striving to achieve. When you think you've planed through all the chipouts and wavering edges, split the package apart and check the edges. If there isn't a good edge on each sheet, put the package back together and repeat the procedure.

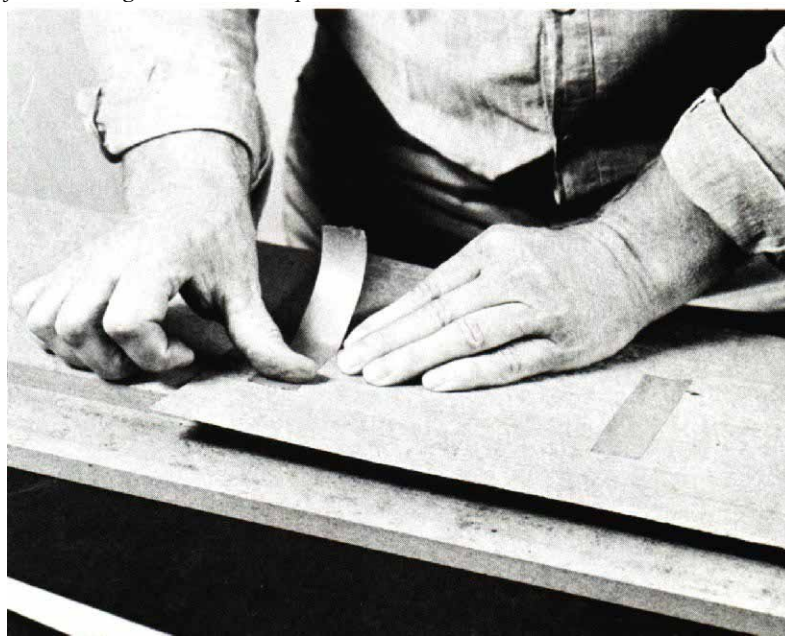
If the edges look true, you can test the joint by putting two veneer edges together and using your fingers to press down the veneers as you check individual points along the joint. The points should come together perfectly, with no gaps. If the joint is tight at each checkpoint, it likely will be tight along its entire length. You may not be able to put the whole joint together at once, as you would with solid wood, because buckles in the veneer can distort the edges once the veneers are released from the shooting board. Pressing the edges flattens them out as they were on the shooting board.

If you're satisfied with the joint, you're ready to tape the veneers together. Veneer tape looks like brown packing tape, but it's much thinner and stronger. Don't use the thicker packing tape or masking tape, which can cause depressions in the veneer when it's pressed. Tape the top or face side only—

never put the tape between the veneer and the substrate, as the tape will show through and it may delaminate.

When taping, the joint is first pulled tight by strips of tape placed at right angles to the joint line. A single long strip placed over the joint helps hold the pieces together and prevents glue from oozing through during pressing. Tear the tape into 5-in. to 6-in. strips, which allows about 3 in. of tape on each side of the joint. Tear the tape—don't cut it—so that you have a feathered edge which is unlikely to mark the veneer. To join flat veneers, place the tape strips 9 in. apart; on buckled pieces, put them 2 in. to 3 in. apart, or as the material demands. First moisten the tape with a damp sponge—warm water on the sponge will make the glue grab a little better, which helps with oily woods such as teak. Attach one end of the tape to the first piece of veneer, pressing hard to make it stick. Then, holding the joint together with one hand, pull hard on the tape to stretch it slightly and attach it to the second veneer. After all the cross tapes are on, put a length of tape over the joint line, leaving the tape about $\frac{1}{4}$ in. to $\frac{1}{2}$ in. short at each end so that you can check if the joint is tight. At this stage you could run a wooden roller over the tape strips to make sure they're secure. I've never found a

To temporarily join veneers into sheets, stretch pieces of veneer tape across the seams on the face side. The tape keeps the veneers from moving around in the press.





Finish the edges of the veneered panel with a jointer plane, after first trimming with a veneer trimmer, router or knife.

roller to be a vitally important tool, but it's something you should try for yourself.

There are two methods of applying veneer to the substrate: hammer-veneering by hand, or by using a veneer press. Hammer-veneering isn't really done with a hammer but with a squeegee-like tool that presses down the veneer onto a substrate covered with hot hide glue. The glue holds when it coalesces, and the trick is to be pressing on the veneer when the glue grabs. This isn't a skill that can be acquired on the first try, or even the second. Dealing with more than a few square feet of veneer compounds the problem—I think you will find a veneer press to be a much more efficient alternative.

If you use some form of press, any of the modern cold-curing glues work well. White PVA glue is cheaper, than yellow glue, and it doesn't set up as quickly, so there is more time to prepare the panels. It will cure in the press in three to four hours, depending on temperature. Urea-formaldehyde glue (such as Weldwood Plastic Resin) can be used, although it takes at least five to six hours to cure at 65 °F. Don't use contact cement—it is absolutely out of the question. Contact cement remains elastic and doesn't harden the way wood-working glues do. It is also more prone to attack by the solvents in some finishes.

With a paint roller, apply a thin, even coat of glue to the substrate only. Don't put glue on the veneer, or it will curl and be difficult to control. On a properly glued panel, only little beads of glue will be squeezed out all around the edges. If you apply too much glue, it will be pressed through the veneer's pores and the surface will be glazed. If this happens, the panel isn't ruined—the glue can be cleaned off, so it won't affect the finish—but it will take a lot of work planing, scraping and sanding to remove the glazing. Gauging the amount of glue required is a matter of experience. You'll find that different substrates will soak up different quantities of glue.

Place one sheet of veneer taped-side-down on the bench, and after covering one side of the substrate with glue, position it on the veneer. Apply glue to the second side of the substrate and place the second piece of veneer on it, taped side up.

If the joint line has to be centered, pencil a centerline on the edge of the substrate before you begin, then align your mark with the joint line. If precise alignment isn't important, position the veneer by gauging the overhang with your fingertips.

The panel must be placed in the press so that pressure first hits along the panel's centerline and then spreads out to the edges. The spreading pressure prevents glue from being trapped in the center of the panel. If excessive amounts of glue remain trapped in the center, the veneer can ripple.

When the panel is taken out of the press, the first thing to do is determine if there are any unglued areas. To check for bubbles, which are usually caused by a lack of glue, tap the panel with your fingernail—there'll be a change in tone where the veneer has lifted. To reattach the veneer, slit into the area with a thin-blade knife, ease in glue with the blade or a syringe, and clamp the section down.

The next step is to remove most of the excess veneer from the panel edges with a veneer trimmer, a trimming bit in a router, or a knife. The greater the excess overhang, the more difficult this process becomes. In any case, what you're trying to do here is to get close; the final edge is achieved by planing. If the edge is to be radiused or shaped, do it now.

At this point, the veneer tape should be removed. One way to do this is to moisten it, give the water about two to three minutes to soften the glue, and pull off the tape. Running an ordinary household iron over the moistened tape also makes it easier to remove. Be careful with water; don't use too much, and try to keep it on the tape so that it doesn't spread onto the veneer. Don't wash off the residual glue left by the tape—blot up excess water with paper towels as soon as the tape is removed and let the area dry before proceeding.

The final cleanup is done by planing, sanding or scraping, or a combination of the three. Careful use of a sharp, finely set jointer plane produces the best surface. Not all veneers will plane, however, and you can't make sweeping generalizations about which species can be planed. You'll have to experiment with each batch of veneer you use. If you sand from start to finish, start with 180-grit, followed by 220-, then

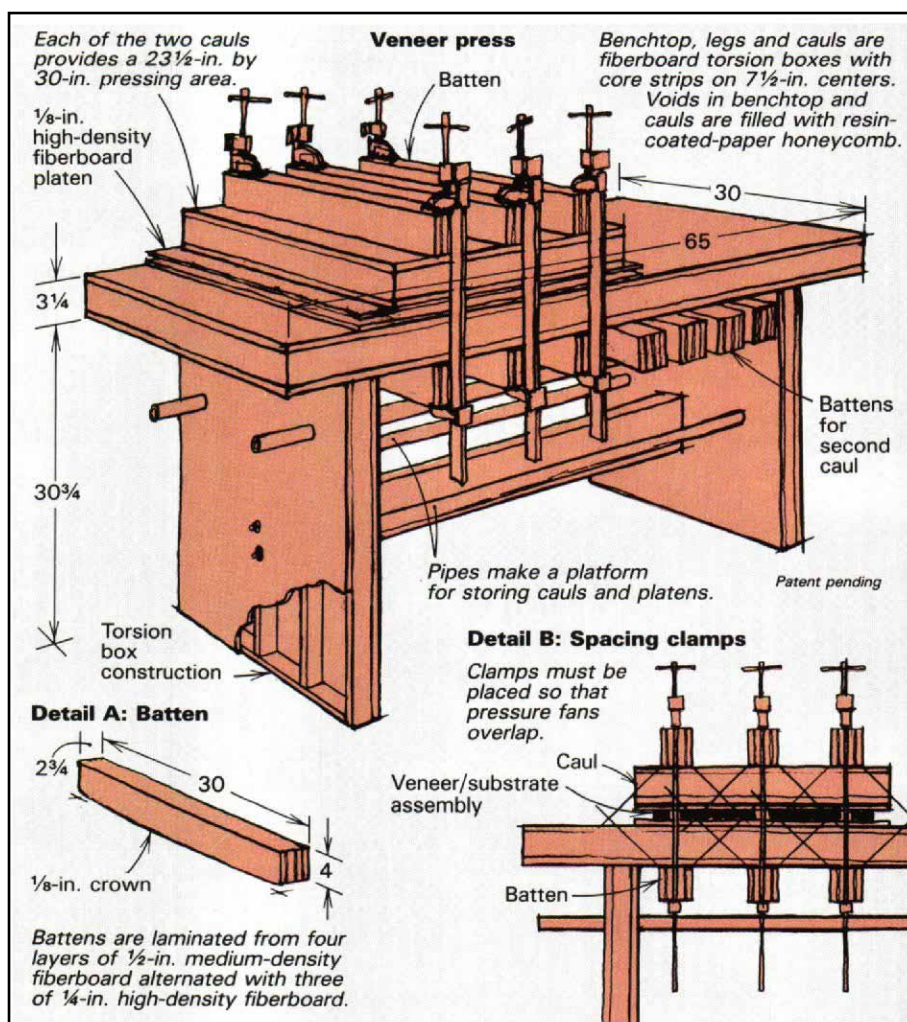
Bench-pressing veneer

A veneer press must have an extremely flat bed and some system for selectively applying pressure to a panel. The press I've designed, and for which I have applied for a patent, uses three torsion boxes: one acts as the bed of the press and the other two are movable cauls that go over the veneer assembly before it's pressed. The torsion boxes are made by gluing fiberboard skins over core strips on 7½-in. centers; the voids between the strips are filled with resin-coated-paper honeycomb. A torsion box is very flat, stable and strong. (For more on building torsion boxes, see *FWW* #32, pp. 96-102.)

Pressure is applied to the veneered panel with a series of clamps and cambered battens (detail A). The cambered side of each batten is oriented toward the panel. One batten is placed on top of the caul, another is placed under the bed, directly below the top batten, and the clamps on each end are tightened. Because the battens are cambered, they transfer the pressure from the center first to the outside edges as the clamps are tightened in unison.

Place the panels in the center of the press on a platen, a ⅛-in. thick fiberboard plate treated with wax so that residual glue can be removed. The veneer and substrate assembly must be in the middle of the platen and sandwiched between it and a second platen. Now add the top caul and battens. It's easy to assess how close to put the battens. As shown in detail B, clamping pressure is diffused in a fan of about 90° from the clamp head. Use enough clamps to ensure that the pressure fans overlap. If both top cauls are used with the bench shown here, ten battens are needed: five on the top and five on the bottom. (For more on pressure fans, see *FWW* #31, pp. 86-89.)

Once the battens are in place, tighten



the clamps enough to put a little pressure on the battens. By looking at the gaps between the battens and caul on each side of the centerline, you can make sure you're applying pressure, equally. Continue to tighten the clamps on each side until you see the battens flatten out over the area being pressed. You can sense the same amount of pressure coming through the clamp bars.

Don't overtighten the clamps, especially if the panel you're veneering is narrow. If overtightened, the caul will

bend around the edges of the panel and leave an area of low pressure or no pressure in the panel center. The glue will migrate to the low-pressure area and the veneer will ripple as it dries. To avoid this washboard center, use a straight-edge to check the top edge of the caul to make sure it doesn't become convex as you tighten the clamps. Also, when pressing narrow panels, place dry spacers the same thickness as the veneered panel on each side of the panel to help prevent the caul from bending. —I.J.K.

300- or 400-grit. Avoid wet-or-dry paper—the dark abrasives can cause unsightly smudges on light woods. Be careful when sanding, especially near the edges. An awful lot of bad things happen when people let loose with a sanding block or a power sander. Check the edges frequently with a straightedge to make sure you aren't softening or rounding the area 1 in. to 2 in. from the edges. Rounding the edges with a sander is the hallmark of the careless. It shows dramatically once the work has been polished as a lack of crispness and cleanness. It's not easy to describe—it's just a sloppy look about the whole thing. The scraper, to me, is the crudest of cutters—it's difficult to scrape without marking the veneer wherever

the scraper is put down or taken off the panel.

Any finish can be used on veneered panels, but the solvents used in the finish may attack the glue. The first coat of finish should be applied sparingly, especially if you're using polyurethane or another material with a great deal of solvent. Applying one or two thin coats creates a barrier against solvents. After the thin coats, proceed as you would with solid wood. □

*Ian J. Kirby is a designer, cabinetmaker and educator. He recently moved his woodworking school from Vt. to Cumming, Ga. Kirby wrote about preparing substrates in *FWW* #46. For more on hammer-veneering, see #10, pp. 52-54.*