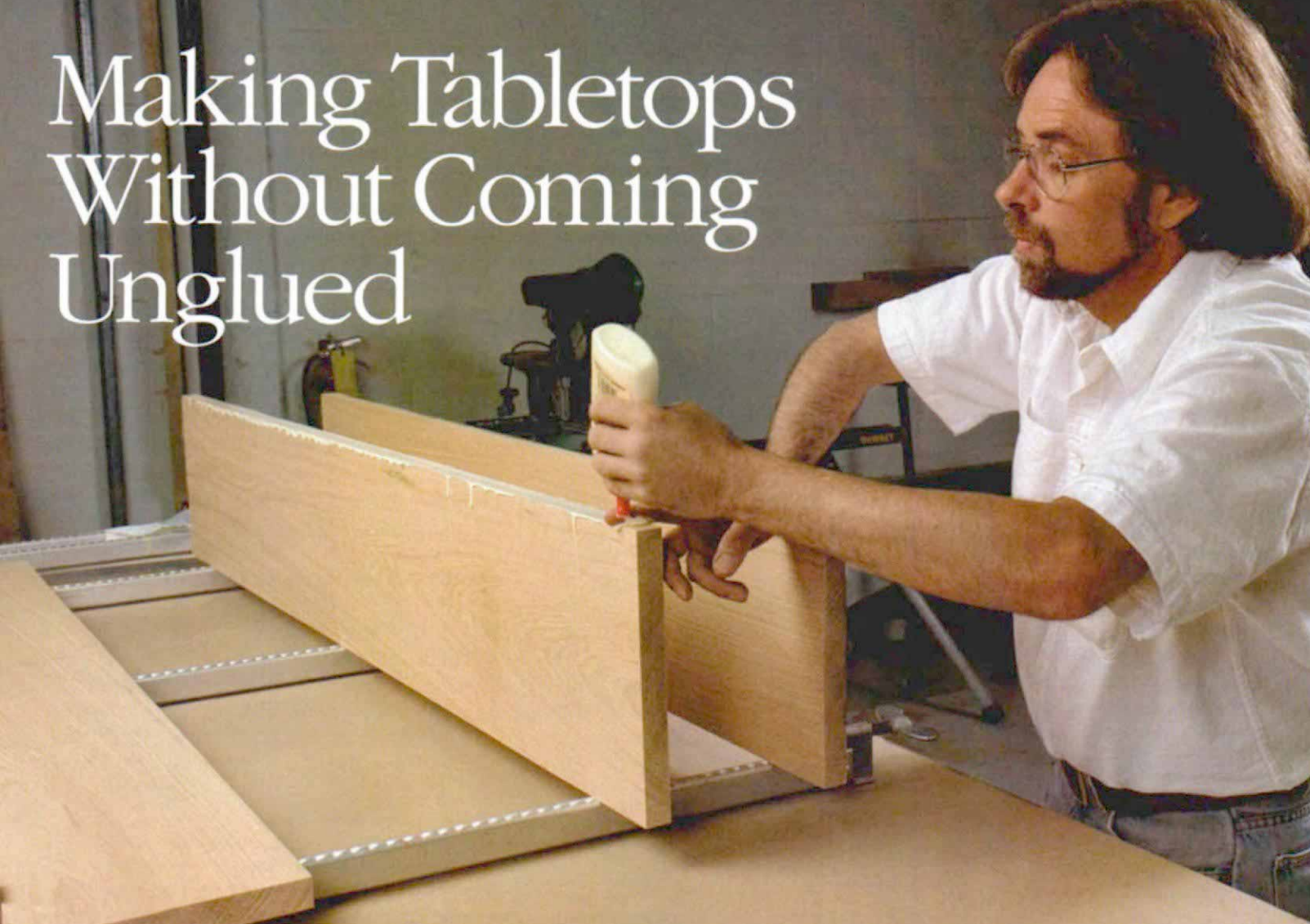


Making Tabletops Without Coming Unglued



How the pros stay sane when gluing up tabletops and large panels

BY ANATOLE BURKIN

Building a tabletop was once as simple as finding an old-growth plank wide enough to serve six. Boards much wider than 12 in. are uncommon these days, and if you do find them at the lumberyard, they often go for a premium price. When a project calls for wide panels, the solution is to glue up several narrower boards to get the width needed.

Making tabletops or large panels seems simple enough: Plane and joint three or four boards, and edge-glue them. But getting a nice flat tabletop with tight joints isn't a snap. You must mill your lumber flat and square. You need a way of registering the boards to keep them in the same plane during glue-up. And you need clamps that will hold them firmly without cupping.

Even if you think you have all that worked out, bad things happen, says Portland, Ore., furniture maker Gary Rogowski. "You can line up your stock and forget to pay attention to the ends of the



Straight from the heart. Bob Van Dyke builds tabletops with all the boards oriented heart-side up. He says the color on the heartwood side is usually better.

Before gluing, examine the panel. Van Dyke stacks boards on edge and uses a straightedge to make sure everything lines up flat.



boards, leaving them offset. Your extra-long boards that you've just glued up into a single panel are now too short in one section."

We all suffer occasional slipups, but success in woodworking is not accidental. I asked a half-dozen woodworkers to share their experiences and strategies for gluing up large panels.

Heart side up or down?

The first step in building up a tabletop involves selecting and matching lumber. Much has been written about edge-gluing panels and how to avoid cupping. Common wisdom says you should flip-flop adjoining boards so their growth rings alternate up and down. Wood usually cups toward the bark side. Theoretically, flip-flop minimizes the amount of cup across the width of a panel. If one board cups up, the adjoining one will cup down, creating a

slight ripple, not one huge cup. (When using quartersawn material, which is more stable, the risk of cupping is greatly diminished.)

To be safe, you can do what most large furniture companies do: Rip everything into 2-in.- and 3-in.-wide planks, flip-flop them and to heck with nicely matched color, figure and grain. Furniture factories mask these problems using dyes and toners.

Custom furniture makers don't rely so much on chemicals to hide badly matched lumber. Most would agree with Garrett Hack, a furniture maker in Thetford Center, Vt., who stresses the importance of making a good match. "I rarely orient boards based on the direction of the growth rings. I'm more interested in consistency of figure and color. I do try to have consistency of grain direction because I handplane to finish the surface. But at the same time, if figure or color or match is better with a board reversed, then I reverse it, and I'll work around it by scraping along the glue line (where opposing-grained boards meet) and plane the boards in their proper directions." He minimizes the risk of cupping by making sure his lumber is dry and acclimated to his shop.

Manchester, Conn., woodworker Bob Van Dyke goes for the heart (see the bottom photo on p. 79). "I generally orient the boards with the heart side up for two reasons. The first is strictly aesthetic. I find the color of the heart-side face is usually a little better than the bark-side face, and any sapwood left in the board will generally only be on the bark face.

"The second reason has to do with the way wood distorts," he says. "Boards generally cup away from the heart face, so if these faces are all presented up, the top will cup down onto the table base instead of cupping up and looking like a Chinese pagoda. Unfortunately, I have glued up some boards that evidently were not aware of the rules and moved the opposite way!"

Biscuits, splines or none of the above

A good edge-joint requires finesse in milling (for more on edge-jointing, see *FWW*#124, pp. 46-51 and *FWW*#130, pp. 82-85). To

THREE WAYS TO KEEP BOARDS FLAT DURING GLUE-UP



Biscuits won't guarantee a perfect glue-up, but they do make it easier to keep boards in alignment.



A continuous spline will also register adjoining boards. The spline should be of the same species, with the grain running in the same direction as the panel.



Lightweight cam clamps can be used to hold boards flat against bar clamps.

check the edge-joints, stack milled boards on edge, and hold a straightedge against them. If there's a bow or light creeping through the edge-joints, go back to the jointer.

After getting the edge-joints right, you need to keep the boards in the same plane during glue-up (see the bottom photos on the facing page). Biscuit joints are a common way to register boards to one another. You can also use a spline joint, or you can skip the extra joinery and register the boards flat against the bodies of the clamps.

None of these methods are foolproof. Biscuit joints may suffer from inaccuracy brought on by slop in the biscuit joiner's shaft and slight operator error (tilting the tool slightly when making the cut). Spline joints are also affected by imperfections in tooling and machining. Clamps aren't foolproof either. They get bent. Or they bow from too much pressure. Often the wood itself is the culprit. When working with long, wide boards, slight movement is inevitable, and the boards rarely expand and contract the same way.

In Rogowski's experience, biscuits aren't always gravy. "For long, wide boards, I use biscuits, but they sure don't line up perfectly, try as I might. For narrower and shorter stock, I just line up the boards on edge and use a dead-blow mallet and pound everything down against flat pipe clamps on a flat worktable."

Sauk Rapids, Minn., furniture maker and restorer Roland Johnson believes in biscuits. "For nice flat wood, I'll place #20 biscuits 16 in. apart. For more unstable wood, I may go as close as 8 in."

Hack usually glues boards edge to edge without extra joints. "The easiest way to prevent misalignment is to glue up the minimum



When clamping a tabletop, apply light pressure first. Run a finger across the edge-joints, and feel for ridges. A tap of the fist or a dead-blow mallet is all it takes to align boards.



T-supports are made of plywood scrap. With the workpiece lifted a few inches off the bench, T-supports make it easy to slide clamps under the boards without lifting them. Duct tape applied to the supports keeps them from sticking to the workpiece.

CLAMPING VERTICALLY REQUIRES LESS SPACE



Garrett Hack glues up tabletops using his bench vise. With one board clamped in the vise, he applies glue and stacks the remaining boards in place. Next he applies bar clamps, beginning at the outboard side of the workbench. At the halfway point, he repositions the panel in the vise, allowing the clamps to rest on the floor for support. The remaining clamps are applied with only about 1 in. of the panel gripped by the vise.

number of pieces at one time: two or three boards. Ideally, I like to make tables out of three boards; if more boards are required, I divide the glue-up into two parts." Pushing or pulling on the boards while increasing clamping pressure is all there is to it.

There are occasions when Hack will resort to a spline joint. "If I'm gluing up a panel that has to be right on, such as when the stock is too thin to thickness plane afterward, I use a spline of some kind. I make it out of the same species as the rest of the top.

"For a $\frac{3}{4}$ -in. top, I make the spline about $\frac{3}{16}$ in. thick and about $\frac{1}{4}$ in. deep on each side, nearly the entire length of the panel, the grain of the spline going in the same direction as the rest of the wood. But when machining the groove, you have to be careful not to introduce additional inaccuracy."

Whatever method you choose, your fingers are a good tool to check boards for alignment during clamping. Lightly tighten the clamps. Then run a finger across two edge-joints, and feel for a ridge. Use your fist or a rubber mallet to move boards into position; then tighten the clamps some more. Use a long straightedge to check the entire panel for flatness. Don't be dismayed if your surface isn't perfect. Additional planing, scraping and sanding

will be required. But care at this juncture minimizes the amount of material that must be removed to smooth the surface.

Any large surface works fine for glue-ups

Most furniture makers use a flat surface such as a bench or a saw outfeed table for glue-ups. If your workbench is small, enlarge it by placing a sheet of $\frac{3}{4}$ -in. medium-density fiberboard (MDF) over it. Hack has a different strategy (see the photos above). "I'll clamp the first board to a bench vise. That way, the board is vertical, at about eye level, and I can see what I'm doing. I apply glue to one edge, and stack one or two more boards on top of the first.

"Next I place clamps on the half of the panel sticking out of the vise, being sure to place clamps on alternate sides to prevent bowing," says Hack. "Then I loosen the vise and lower the panel until the clamp on the outboard side rests on the floor." With the workpiece supported this way, he clamps just one edge to the bench vise and adds the remaining clamps. He lets the panel sit for about half an hour, then removes the clamps. □

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What woodworkers say about clamps

Pipe and bar clamps are by far the most ubiquitous clamps found in small shops. The reasons are simple: cost and durability. Oakland, Calif., furniture maker David Fay prefers bar clamps. "We have Wetzler bar clamps, and I prefer them over pipe clamps because they have big, sturdy flat surfaces."

Gary Rogowski uses Jorgensen pipe clamps but does not outfit them with black pipe, like most woodworkers. "I don't have to worry about black oxidation marks because I use galvanized pipe, which doesn't stain like black iron pipe."

Rogowski registers his panels directly against the pipes. "I check the pipes before gluing with a long straightedge. Any bow or bend and it gets trashed," he says.

Garrett Hack uses bar clamps—he likes the old-fashioned Record brand. The bars are 3/4 in. thick and remain straight under pressure. Bob Van Dyke prefers aluminum bar clamps. "I love the aluminum Universal clamps. They're dead flat, good, medium-duty clamps. They're more than strong enough." Because the aluminum won't react with the glue like iron, you can lay boards flat upon them for registration. Aluminum clamps aren't as stiff as iron pipe and will bow a bit if overtaxed. But they're lightweight, which you'll appreciate the next time you try moving a clamped-up tabletop off your workbench.

From Switzerland comes a glue press that costs considerably more than the average set of bar clamps. After a few months of use, the Piano Press (reviewed in FWW #90, pp. 126) has become a favorite

Unusual clamping system from Switzerland. The Piano Press (\$339 for 49-in. system) includes a rail, which is attached to a wall, and a set of three clamp bars. The bars slide along the rail (length adjustment). Slots cut in the rails lock the lower jaws in position (width adjustment). When the upper jaws are tightened, the bars flatten a panel.



Common clamps (top to bottom): A scissors-style clamp (\$29, from Woodcraft) applies pressure to the edges and top and bottom of a panel. The jaws of the Bessey K-body (\$50 for 50 in.) remain square to the edges of a panel. A Jorgensen clamp (\$10 plus \$5 for pipe) fitted with galvanized pipe will prevent staining along the glue line. The body of a Wetzler I-beam bar clamp (\$38 for 48 in.) can withstand lots of pressure without bowing. Because of their light weight, Universal aluminum clamps (\$24 for 48 in.) are a breeze to maneuver but aren't as stiff as iron.



in the FWW shop. The press consists of adjustable aluminum rails and clamp dogs (see the photos below). You need to buy a basic system consisting of three pairs of bars, clamp dogs and a wall-mounted rail. The system can be expanded.

The Piano is designed to be bolted to a wall, which means you don't need a large work surface to glue up big panels. Also, your press is always stored in one place. But the best thing about the Piano is how it squeezes a panel flat. You don't need splines or biscuits with a Piano. A dead-blow hammer does come in handy to tap balky boards into alignment.

Bessey and Gross Stabil both sell parallel-jaw bar clamps. These are more expensive than standard bar clamps, but they have one advantage: The jaws remain perpendicular to the workpiece. Also, because the screw handles are straight (like chisel handles), you can't exert too

much leverage and bow the panel. The disadvantage is that you can't cinch them extra tight when you have balky lumber.

Another clamp worth considering is the scissors-style screw clamp. Several mail-order companies sell these clamps under a variety of names, but the principle is the same. The clamp applies pressure on four sides: two edges and the top and bottom of the panel. Clamps are sold minus the cauls (a 2x4 ripped in half), which sandwich the panel. One advantage is that you can make the cauls as long as you need.

Overall, the scissors-style clamps work pretty well, but you have to make sure your caul stock is straight. The metal castings of these clamps are thinner than standard 3/4-in. pipe clamps, so I question their durability over the long haul. During the first week of use, the handle fell off the clamp, but it was easy to reinstall with an expansion pin. —A.B.

SOURCES FOR CLAMPS

Adjustable Clamp Co.
(Jorgensen clamps):
(312) 666-0640

Advanced Machinery
Imports (Piano Press):
(800) 648-4264

American Clamping
Corp. (Bessey clamps):
(800) 828-1004

Garrett Wade
(Record clamps):
(800) 221-2942

Gross Stabil:
(800) 671-0838

Universal Clamp Corp.:
(818) 780-1015

Wetzler Clamp Co.:
(800) 451-1852

Woodcraft:
(800) 225-1153

Woodworker's Supply:
(800) 645-9292