

# Clamping cauls: The secret to great glue-ups

BY HENDRIK VARJU

**W**e woodworkers spend a lot of time cutting accurate joinery. Yet even the most accurately cut joint won't be perfect if you glue it together incorrectly. Not only must you put the right amount of glue in the right places, but you also need to do the same with the clamping pressure. Some joints, such as dovetails, need pressure only in isolated spots, while others, such as thin edge-banding, need even pressure over the whole area. The answer is not fancier clamps or specialized jigs; it is shopmade clamping cauls. Quick to make and easy to use, cauls not only pull a joint tight and keep it at the correct angle, but they also protect the workpiece from direct contact with the clamp jaws.

## Flat tabletops start with cauls

Let's start with the simplest cauls. When edge-gluing boards to make a solid-wood panel such as a tabletop, I use hardwood cauls about 1 in. thick by 2 in. wide by up to 30 in. long. I use them in pairs to sandwich the boards together and keep them flush while other clamps apply the main pressure to the boards' edges.

Some woodworkers recommend putting a slight convex curve on the clamping faces of the cauls. For this job, I've never found it necessary. After all, no great force is being applied; you are only using the cauls to hold the boards flat, not bring them together. However, for panels wider than about 30 in., cauls are less effective. Splines, biscuits, or dowels will work better to align these boards,

## Straight cauls for flat panels



**Pressure from four sides.** To prevent the cauls from sticking to glue squeeze-out, apply packing or duct tape to the contact faces. Elevate the boards off the bench and clamp the cauls in pairs (above), sandwiching the boards flush with each other. Finally, apply the edge clamps to draw the boards together (left) while the cauls keep the tabletop from bowing.



## Thick cauls for thin edge-banding



**Wavy banding.** If you apply clamps directly to thin edge-banding, you'll get good pressure only in spots. The glue squeeze-out tells the tale.

although they are more time-consuming.

Cover the cauls' clamping surfaces with packing or duct tape to keep them from getting glued to the panel as squeeze-out oozes from the joints. Use a pair of cauls at each end of the panel, but if the panel is more than about 2 ft. long, use a third set of cauls in the center.

For the cauls at either end, have the clamps come in from the ends of the panel to get even pressure across all the joints. For the center pair of cauls, the clamps have to come in from the edges of the panel.

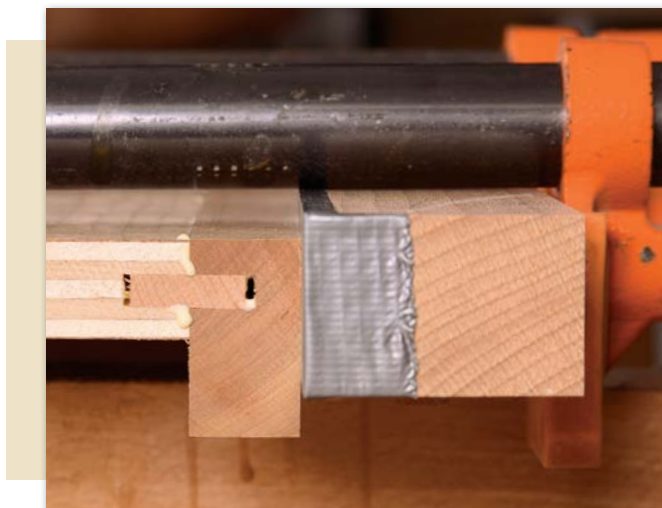
Clamp on the cauls and then apply the edge clamps. You don't need cauls to protect the edges from these clamps because you will clean them up later. The greater force of the edge clamps will easily overcome friction from the cauls and bring the boards together.

### Spread the load on edge-banding

A visible plywood edge needs some kind of edge-banding, preferably one of solid wood. However, if the strip is less than about 1 in. thick, placing the clamps directly on the edge-banding won't work very well. The banding doesn't have enough stiffness to distribute the clamping force sufficiently. In general, clamping



**One caul does it all.** A thick caul transforms irregular force from the clamps into even pressure between the edge-banding and the plywood (above), creating a perfect glue-line with no gaps (left).



**TIP**

**How to handle wide edge-banding.** To make a thin shelf look more substantial and help prevent it from sagging under load, you can add wide edge-banding. During glue-up, make sure the caul is centered on the shelf and not the edge-banding to ensure a tight joint.



## Curved cauls for bookcases

A slight camber on the clamping face of a caul ensures pressure will reach the middle of a workpiece, bringing bookshelves all the way into their dadoes, for example.



**Plane a slight curve.** Begin by making one pass across the first and last 2 in. of the caul's face. Make the second cuts 4 in. long, the third 6 in., and then make one pass from the middle to each end.



**It doesn't take much.** You should aim for the ends of the caul to be about  $\frac{1}{16}$  in. lower than the center for every 12 in. of caul.



**Apply the first clamp.** This will pull in the curved caul on one end, creating a gap between it and the workpiece on the far end. Don't apply maximum force yet.



**Put the caul to work.** As you tighten the second clamp, you'll see any gap between the caul and the workpiece disappear first in the center and later near the clamps. In this way, clamping pressure is maximized in the center, where it is often difficult for clamps to reach.

force spreads out at  $45^\circ$  from the face of the clamp, so the clamps would have to be right next to each other to give even pressure. A 2-in.-thick clamping caul in front of the edge-banding distributes the force evenly while also protecting the front face of the banding from the clamps.

### Create tight dado joints

When you glue shelves into the dadoed sides of a bookcase, you normally place a pipe or bar clamp at the front and back of the joint. Unfortunately, this may not exert enough pressure near the middle. Glue gets trapped there and the sides bow, leaving a gap inside the joint. And because the joint looks fine at the front and back edges, you might not notice that the sides are convex until it is too late.

A curved caul heads off this problem every time. I use a caul that is 1 in. thick by  $2\frac{1}{2}$  in. to 3 in. wide and as long as the width of the sides, putting a very shallow convex curve (no more than  $\frac{1}{16}$  in. per foot) on the face of the caul that will contact the workpiece. You can either do this using a curved template on a router table or with a handplane. Extra pressure is automatically distributed to the center of the joint as the clamps are tightened down at the front and back.

### Make custom cauls for dovetails

When cutting through-dovetails, most woodworkers make them so that the end grain of the tails and pins protrudes

### TIP

**Business cards work, too.** Except for wider pieces, you can place one or two business cards between the center of a straight caul and the workpiece to create the same effect as curving the caul.





## Notched cauls for dovetails

Pins and tails on through-dovetails are typically cut a little proud and planed flush after glue-up. A flat caul will bear only on the pins and won't bring the joint together.



**Avoid the pins.** Place a caul against the ends of the pins and mark their locations.



**Cut out for the job.** Cut away the areas on all four cauls that would otherwise contact the pins.



**Tight tails.** The shaped cauls fit over the pins and apply force to the tails only.

beyond the outer faces of the mating part. It is much quicker to trim the end grain than the entire face. However, a straight clamping block applies pressure against the end grain of the pins and not the face grain of the tails, where it is needed.

To get around the pins, notch the caul. Hold the straight hardwood or plywood caul up to the joint and trace around each protruding pin. Make these cutouts quickly on the bandsaw—they don't have to be fancy. Place the cauls on the joint with their points of contact on the tails and apply the clamps. Ensure that the cauls and the clamps are centered on the joint so that it is kept at 90°.

Don't throw away the cauls when you're done with them; they can be used over and over again for common dovetail spacing. The same kinds of serrated cauls work well for finger joints, except that you'll need cauls on both sides of each joint to pull it tight.

### Clamp around through-tenons

A normal (blind) mortise-and-tenon joint doesn't really need any cauls. You can just

clamp right at the tip of the tenon area and the tenon's shoulders will be pulled tightly against the mortised part.

However, this isn't possible with a through-tenon, and it is hard to balance the force from two clamps, one on each side of the tenon. To even the pressure on the long shoulders of the tenon, make

a plywood caul that fits over the end of the tenon. Then one clamp will pull the joint together perfectly. □

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## Clamp around a through-tenon

**Bridge the tenon.** To apply pressure to the shoulders of the tenon, build a plywood caul that fits over the protruding part (right). With a caul over both through-tenons (far right), the stretcher and legs on this four-board stool can be clamped tightly.

