Traditional Workbench

BY LARRY OKREND

An heirloom project to build on

Building a traditional workbench is a challenge that employs all of your woodworking skills, but the result can last a lifetime and will serve you like no other project can.

A traditional cabinetmaker's bench is much more than a work surface — it's really the biggest tool in your workshop. It clamps, aligns, supports and holds project pieces from start to finish. It's also furniture for your shop. And like any good furniture, it should be sturdy, square and durable — after all, it must withstand great physical demands.

You can build a workbench that will serve all of these purposes. It's a fairly ambitious project that takes about 30 to 60 hours to complete, but the time you invest in making it will pay off in years of service. The bench shown in this article has definitely stood the test of time: I designed and built it about 16 years ago, and it has been the functional centerpiece of my shop ever since.

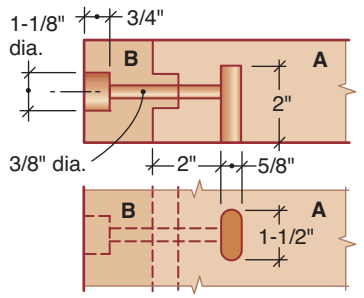
Gather tools and materials

Building this workbench requires intermediate to advanced woodworking skills and a good selection of tools. If you're a dedicated woodworker, you may already have what you need: a band saw, a table saw, a jointer, a planer, a plunge router, a biscuit joiner and various hand tools. Depending on your preferred work methods, you may be able to build the bench with fewer tools — the array suggested simply makes the job more convenient.

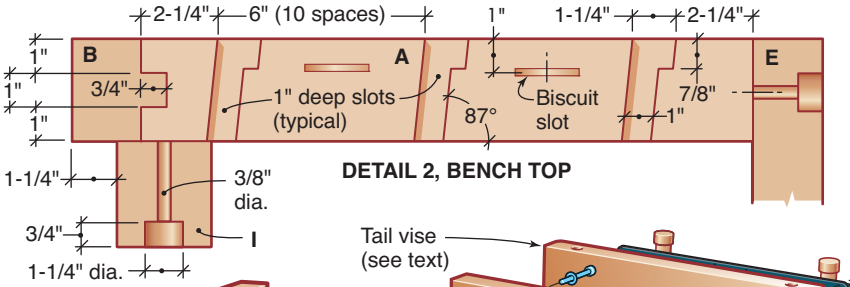
You'll need about 80 bf of 12/4 (3-in.) hard maple or a similar hard, heavy and moderately stable wood. (Light-colored wood creates a work surface that's easier on your eyes.) If you can't find thick stock, you can glue thinner pieces together. Another alternative is to buy a manufactured bench top online or from a local lumber dealer. However, the top's size and thickness may differ from these plans, so you may need to modify the size of the base and the way the vise hardware mounts. Be sure to purchase all of the hardware before you start construction to ensure a proper fit.

PHOTOGRAPHY BY MICHAEL ANDERSON

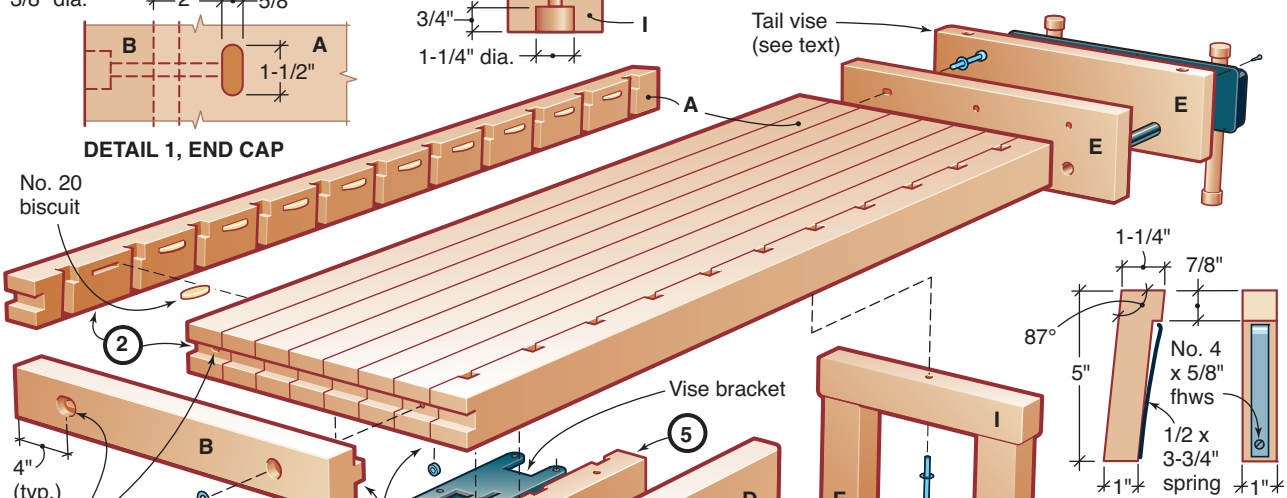
TRADITIONAL WORKBENCH



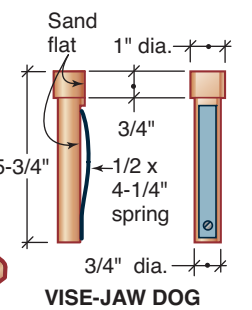
DETAIL 1, END CAP



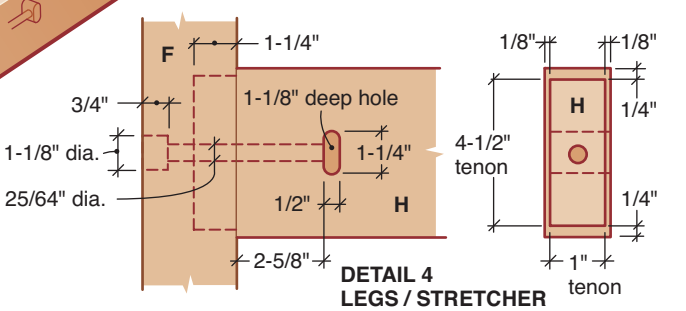
DETAIL 2, BENCH TOP



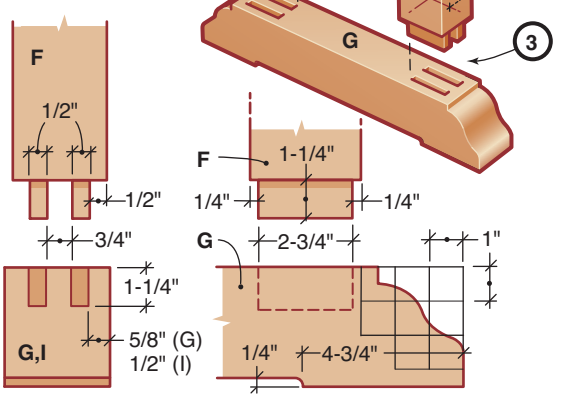
BENCH-TOP DOG



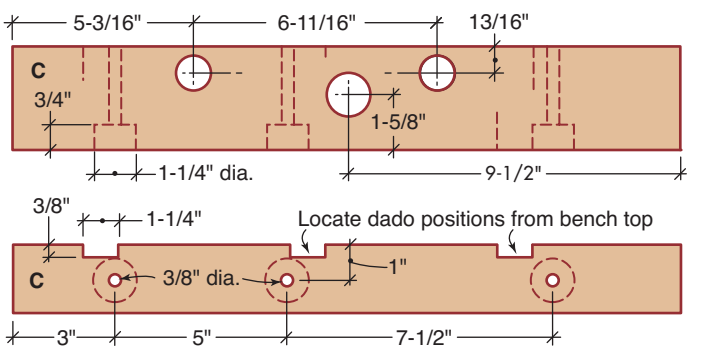
VISE-JAW DOG



DETAIL 4 LEGS / STRETCHER



DETAIL 3, FEET / LEGS / RAILS



DETAIL 5, FRONT VISE BENCH SLEEVE

ILLUSTRATION BY GABRIEL GRAPHICS

I used a large, traditional Veritas single-screw front vise and a Veritas twin-screw tail vise (see illustration, opposite, and SOURCES ONLINE). The twin-screw design prevents the vise jaw from racking to maintain even pressure on the workpiece. Although I made my own bench dogs, you can save some time by buying them. If you do, be sure to size the dog holes accordingly.

Rough out the parts

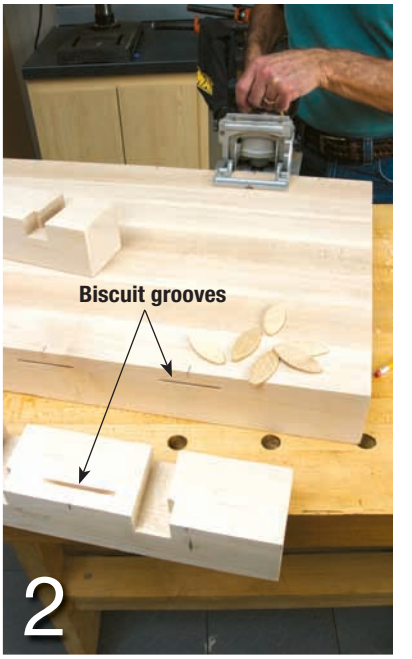
For the parts to fit together properly, it's essential that they be straight, flat and square. If you're starting with rough stock, use a band saw to resaw the lumber to approximate size for the bench parts. The pieces should be oversize to allow for milling waste. Sawing often releases tension in the wood, which can cause the stock to bow or twist. Let the wood sit for at least a few days in your shop to stabilize before milling it to size.

To make a bench top that is strong, wears well and experiences minimal wood movement, you should mill the parts so that the annual rings run vertically (typically referred to as quartersawn wood). This puts the fine, tight grain on the top and bottom of the bench; the wide-grain (plain-sawn) sides are glued together. The same principle holds true for the stand: For stability, orient the quartersawn sides vertically (feet, stretchers and top rails) or toward the front (legs).

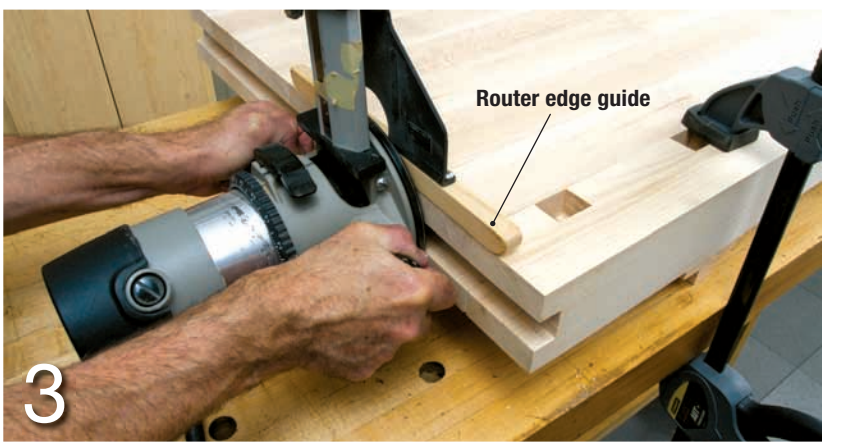
Make the top

The top is the most important and time-consuming part of the workbench to make. To keep waste to

Use a jig (see illustration, p. 10) and a router with a straight bit and a guide bushing to cut the bench-dog holes in the two outside bench-top laminations.



Use a plate joiner to cut biscuit grooves in the bench-top laminations. The biscuits don't add strength; they align the pieces to make assembly and milling much easier.



After squaring the end of the assembled top, cut the groove for the end cap (B) with a router outfitted with a straight bit and an edge guide. Make multiple passes to achieve the required dimensions.

CUTTING LIST (all parts maple)

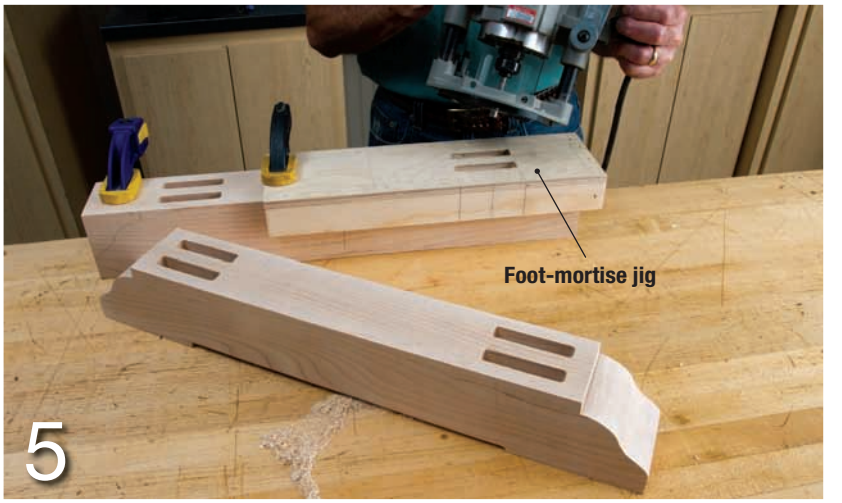
KEY	NO.	DESCRIPTION	SIZE
Top			
A	9	Bench-top laminations	2-11/16 x 3 x 66 in.*
B	1	Bench end cap	2-3/4 x 3 x 24 in.
C	1	Front-vise bench sleeve	2 x 3 x 19 in.
D	1	Front-vise jaw	2-1/2 x 6 x 19 in.
E	2	Tail-vise jaws	2 x 6-3/4 x 24 in.
Stand			
F	4	Legs	2-3/4 x 3-1/4 x 27 in.
G	2	Feet	3 x 3-1/2 x 23 in.
H	2	Stretchers	1-1/4 x 5 x 51 in.
I	2	Top rails	2-3/4 x 3 x 18 in.

*2-11/16-in. dimension is nominal; total width of stacked bench-top laminations is 24 in.

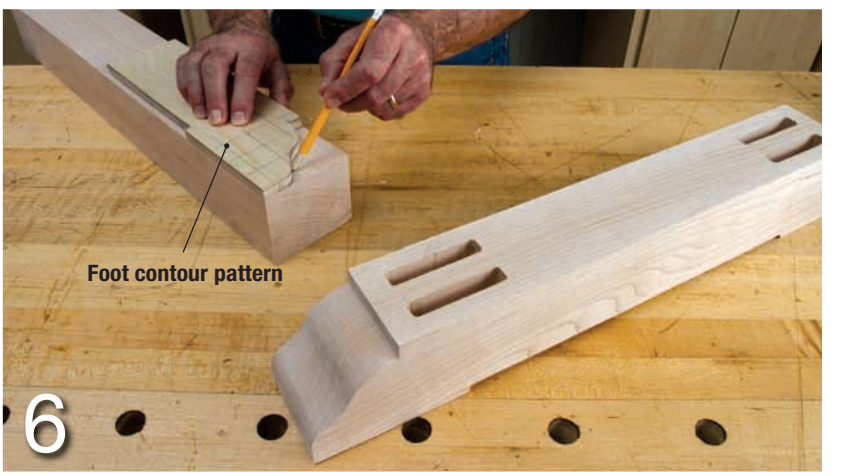
SHOPPING LIST

- Front vise (see SOURCES ONLINE)
- Tail vise (see SOURCES ONLINE)
- Bench stops (see SOURCES ONLINE)
- 80 bf of 12/4 maple
- No. 20 plate-joining biscuits
- 3/8 x 4-in. bolts (2)
- 3/8 x 5-in. bolts (4)
- 3/8-in. nuts (6)
- 3/8-in. washers (17)
- 3/8 x 4-in. lag screws (5)
- Bench dogs, including 1/2 x 3-3/4-in. springs.
- 1/2 x 4-1/4-in. springs
- No. 4 x 5/8-in. fhws

Once you've cut the end-cap groove in the top, cut the mating tongue in the end cap on a table saw. Make the cut on the outside of the blade, not against the fence, to avoid kickback. (The blade guard has been removed for photo clarity.)



Cut the leg mortises in the feet for the leg tenons with a router outfitted with a straight bit and guide bushing. Use a jig (see illustration, below) to guide the cut. You'll cut the contours in the feet after making the mortises.



Make a hardboard pattern for the foot contours; then trace the shapes onto the workpiece. Mark all sides so you can cut and sand to the line on both sides.

a minimum and produce a flat top that needs little sanding or planing, follow the steps outlined below.

First, joint and plane the benchtop laminations (A) to their exact thickness and width but about 1/16 in. longer than the length in the cutting list. Mill the bench end cap (B) at the same time.

Next, arrange the pieces in the order that they should be assembled, and mark them so they don't get mixed up. Then mark the positions of the plate-joining biscuits

on all of the pieces, and mark the dog-hole positions on the outside pieces (see illustration, p. 6).

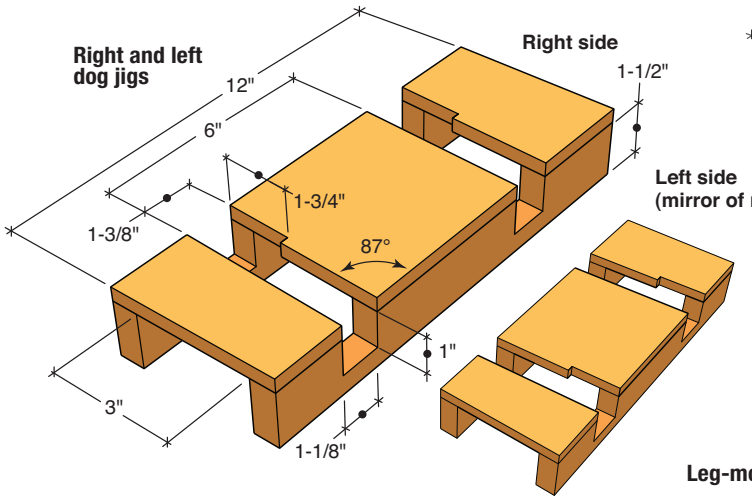
The best way to quickly cut the square dog holes is with a couple of simple router jigs — one for the left side and one for the right side (see illustration, p. 10). These can be nothing more than two pieces of 1/2-in. plywood nailed to scrap-wood blocks that fit snugly against the workpieces. Use a straight bit for the cut and a router template bushing to ride against the plywood. (The space between the plywood pieces depends on the diameter of the bit and the size of the template bushing.) The holes are angled toward the tail vise so the dogs can get a better bite on the workpiece. If this is too much work, you can opt for round dog holes.

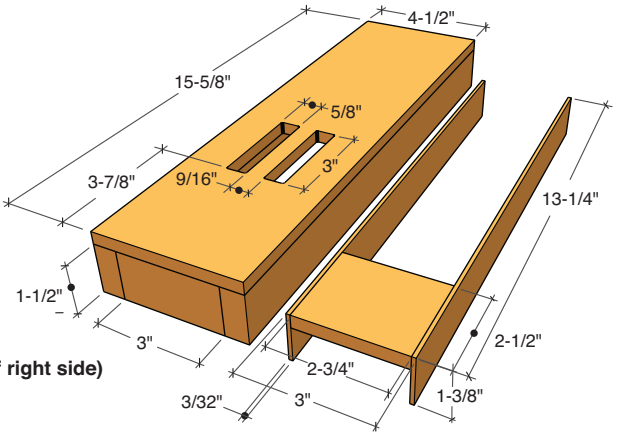
Next, cut the kerfs for the plate-joining biscuits in the bench-top laminations. (The biscuits keep the parts perfectly aligned during assembly.) If you don't have a plate joiner, use strips of 1/4-in. plywood and cut the grooves with a router.

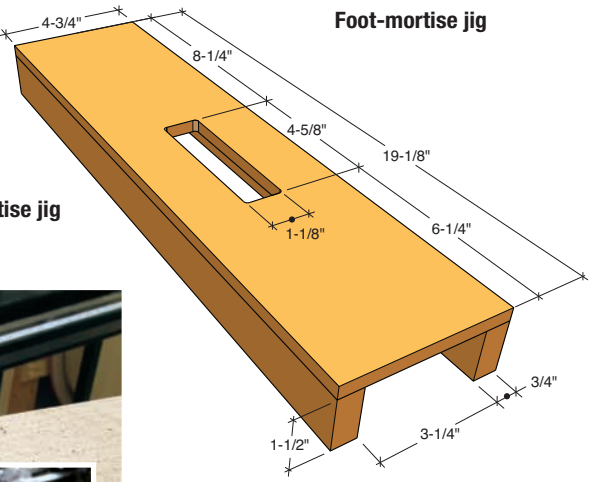
Rather than attempting to glue all of the bench-top pieces together at once, I assembled them in three sections and then glued those sections together. This made the procedure less rushed and more accurate.

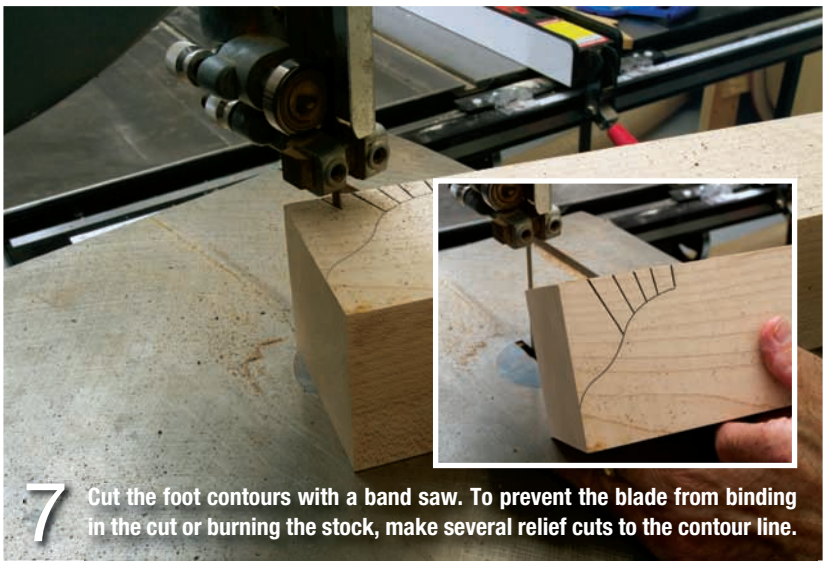
Sand or scrape off any glue squeeze-out to level the top. Then clamp a straightedge fence to the top and use a straight bit to square the ends of the top. Rout the groove for the bench end cap in the left end of the top using an edge guide and a straight bit. (A spiral-cut end mill works well.) You can do this with the top resting flat (see photo 3, p. 7) or with it standing on end.

Drill the counterbores and holes for the bolts in the end cap; then cut the tongue to match the groove in the top (see photo 4, opposite). Rout the slotted holes that are opposite the bolt holes in the bottom of the bench top (see illustration, detail 1). Position the end cap; then drill holes into the top using the end-cap holes as guides. Elongate the rear (left) hole in the top to allow for wood movement. Install the









7 Cut the foot contours with a band saw. To prevent the blade from binding in the cut or burning the stock, make several relief cuts to the contour line.

8

Before finishing the stand joinery, test fit the legs, feet and top rails to ensure a good fit. Make necessary adjustments with a sharp chisel.

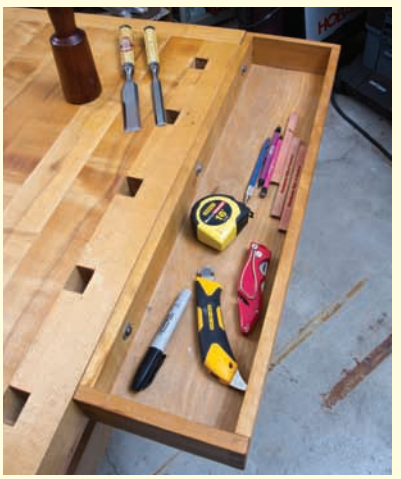
end cap by bolting it to the top. (Do not use glue.)

Installing the vises varies according to the models you purchase. (If you use the same ones that are on this bench, use the illustration as a guide.) The Veritas twin-screw vise I installed necessitated that I use round bench dogs rather than the square ones I used for the top. That's because the required 2-in.-thick jaw isn't quite wide enough to accommodate the angled holes for the square dogs. Although a little quirky, it's only an aesthetic compromise, not a functional one.

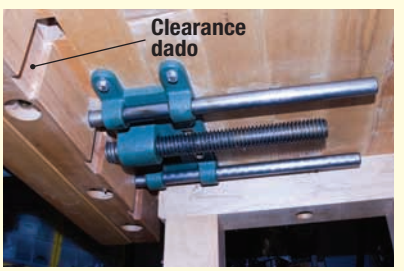
Don't rush through installing the vises — they must be mounted and adjusted properly to work effectively. Getting a vise to work smoothly can be tricky and requires patience. Be sure not to cover any dog holes with the front-vise-mounting bracket. To ensure a good grip, use a hand plane to taper the front-vise jaw slightly so it's a little thicker on the top than on the bottom. Once the jaw is mounted and working smoothly, plane the top edge so it's flush with the top of the bench.

ILLUSTRATION BY MICHAEL ANDERSON

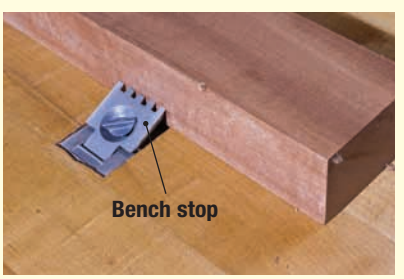
CUSTOM TOUCHES



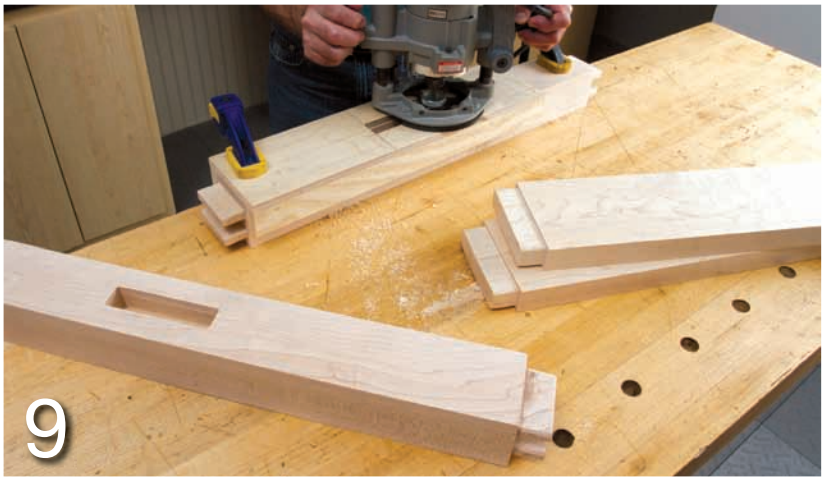
Although it's not shown in the plan, this simple tray mounted to the workbench top provides ready access to frequently used small tools such as a tape measure, pencils and a utility knife. You can make the tray any size to accommodate your needs.



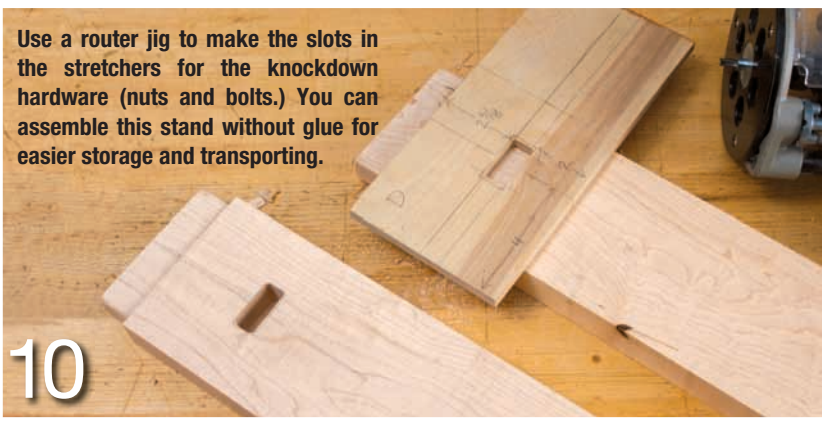
Mounting the front vise takes patience and precision. Be sure to pay attention to details such as the clearance dados for the bench dogs in the front-vise bench sleeve (see illustration). Also take care in tapering the jaws to achieve a secure grip (see text).



A mortised bench stop (see SOURCES ONLINE) can be a useful device to brace workpieces perpendicular to the length of the bench top. To mount a stop, simply bore a hole for the screw-down mechanism and cut a shallow mortise with a chisel or router.



The mortises in the legs that accept the stretchers (H) can be cut with a router and jig. The joints should be snug but not too tight.



Use a router jig to make the slots in the stretchers for the knockdown hardware (nuts and bolts.) You can assemble this stand without glue for easier storage and transporting.

Make the stand

A sturdy set of legs for the bench is essential, so build the stand carefully. If you're familiar with making mortise-and-tenon joints, constructing the stand shouldn't be difficult. I used a router to cut the mortises; then I cut the tenons on a table saw.

The procedure for boring the bolt holes in the legs (F) and stretchers (H) is essentially the same one used for boring holes to attach the end cap to the bench top. If you want a stand that can be disassembled, don't glue the stretcher/leg joints. Before you assemble the stand, bore all of the holes, including those in the top rails (I) that are needed to bolt the stand to the bench top.

Once you've completed the stand and attached the top, cut mortises for the optional bench stops (see SOURCES ONLINE). These are useful for bracing workpieces perpendicular to the length of the bench. Place them wherever they'll do the most good.

You can buy bench dogs or you can make your own. It doesn't take long to make them, and it's a relaxing break after building this bench. See the illustration for details.

Finishing is optional, but it will enhance the appearance of the bench and offer some protection. I used a clear water-base finish for the stand and Danish oil on the top because it can be easily renewed. Be sure to apply oil to all surfaces of the top. Don't worry about occasional nicks and dings — after all, this is a workbench, and the resulting patina shows admirers that you're a real woodworker. ◇

SOURCES ONLINE

For online information, go to www.HandymanClub.com and click on WEB EXTRAS.

Lee Valley
(Veritas twin-screw vise, Veritas large front vise, mortised bench stops), 800-871-8158
www.leevalley.com