Harvest Table * Wall-Mounted Organizer * Tool Tote • Breadboard * Combination Squares

WoodSMUMth®

Vol. 21/No. 122

Harvest Table

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- Build an Elegant Breadboard This Weekend
- A Clever Way to Tote Your Hand Tools to the Worksite
- Cut the Clutter With Our Wall-Mounted Organizer *
- Learn the When and Why of Using Breadboard Ends

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EDITOR'S COLUMN

SAWDUST

For as long as I can remember, my favorite room in the house has been the kitchen. In some ways, if s a lot like my woodworking shop.

There are some big pieces of equipment to work on, a variety of hand tools to use, and everyone in the family gets to enjoy what's "built" there.

Of course, you need a place to put these "projects" — mountains of mashed potatoes, platters of meat, and fresh baked pies. Nothing fancy, just a large table with four sturdy legs—the kitchen equivalent of a workbench.

Here in the Midwest, if s often called a harvest table. Thaf s because at harvest time, extra hands were around to work the fields. Naturally, feeding all those people required a big table.

Thaf s just the kind of project I wanted to build for this issue. But before getting started, there were a few design considerations to take care of.

SIZE. First of all, most of us don't have to feed a large crowd of farmhands today. So we scaled down the size of the table a bit Still, if s big enough to seat six people comfortably and have plenty of room left over for serving plates full of food.

LEGS. Another modification we made was to the legs. They're strong and sturdy like you'd expect on a country table. But instead of using a traditional turned leg, we've come up with a unique double-tapered leg that features a special routed profile.

TOP. Although the table is smaller and the legs are different, there's one thing I didn't want to change — the top. In keeping with its traditional heritage, it's made of solid wood and capped with breadboard ends.

Of course, any time you glue up a large panel, like a table top, you can count on having a certain amount of shrinkage (or expansion) depending on the time of year and type of wood (we used pine.) But we ran into a surprise with the top on this table.

As always, whenever we buy lumber, we assume that a few boards will warp or shrink. So we let them sit in the shop for several days. And then we picked the best pieces to glue up for the top.

Before adding the breadboard ends, we decided to set the top aside for a few days. I'm glad we did. The top had shrunk V&" across the width of the panel. Even though we purchased the wood from an *indoor* lumberyard, it was a long way from being dry.

Finally, we attached the breadboard end caps. While they started off flush with the edge of the panel, I know they won't be flush for long. As the humidity changes, the top panel will continue to shrink and swell.

Since you can't keep wood from moving, the trick is to come up with a way to keep the end caps in place. Our solution is to use adjustable, shop-built fasteners. For more on all this, check out the article beginning on page 6.

Terry

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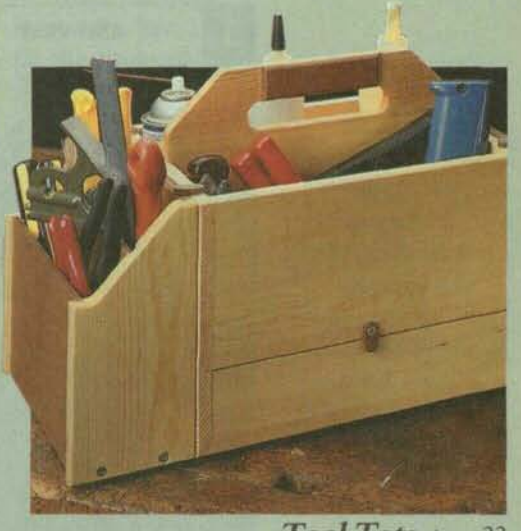

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TIPS & TECHNIQUES

Locking Stave Joints

Mitered stave construction is great for making multi-sided "cylinders" or turning blanks. But I have problems when it conies to gluing up the staves. Once you've got glue on the joints, the pieces become very slippery, and it's difficult to clamp them up.

I've tried using splines in the miter joints, but aligning the slots for the splines can also be tricky. So recently, I came up with a better alternative.

Instead of simply mitering the individual stave pieces, I created a shoulder or "notch" on one edge of each piece to hold the square edge of the piece next to it. The shoulders prevent the pieces from shifting during assembly.

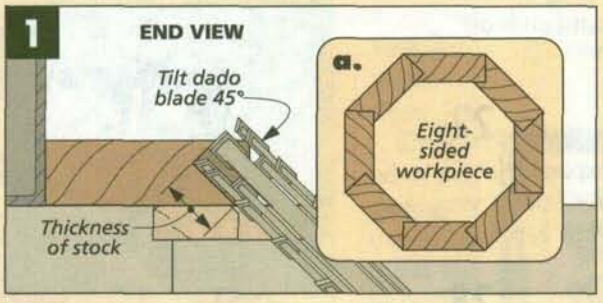
The shoulders are cut by tilting a stacked dado head cutter. By varying the degree of tilt and the height of the dado blade, you can create shoulders for six, eight, or twelve-sided "cylinders."

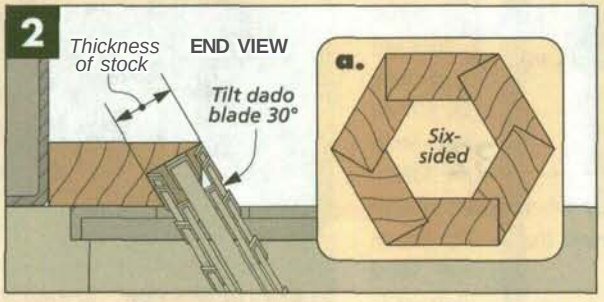
For eight-sided cylinders, the dado blade is tilted 45°, see Fig. 1. You'll have to "sneak up" on the final height of the blade by making test cuts until the pieces fit together evenly.

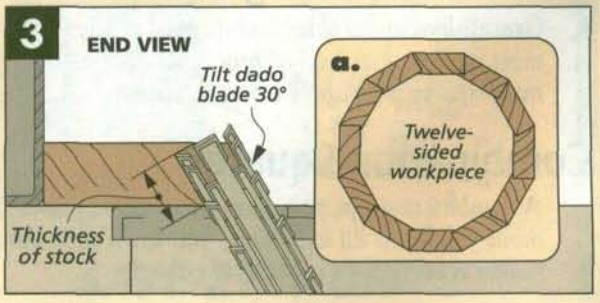
The dado set is tilted 30° for both six and twelve-sided cylinders. But the height of the blade is different for each. For a hexagon, the blade is raised so if s level with the thickness of the workpiece, see Fig. 2.

For a twelve-sided cylinder, the dado blade is raised a bit higher, see Fig. 3. (Again, you'll have to "sneak up" on the final height by making test pieces.)

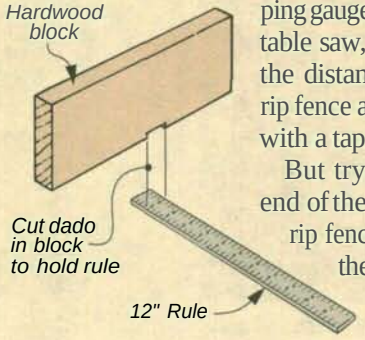
Edward Lesny
Camp Hi/1, *Pennsylvania*







Rip Fence Gauge



Since I don't trust the ripping gauge on the rail of my table saw, I used to check the distance between my rip fence and my saw blade with a tape measure.

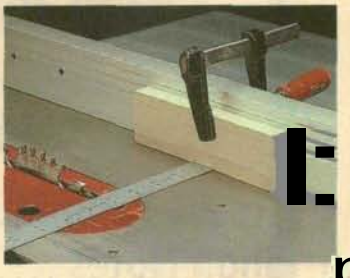
But trying to hold the end of the tape against the rip fence and adjust it at the same time took more coordination than I could muster. So instead I made a simple set-up gauge for my rip fence.

My set-up gauge consists of nothing more than a block of hardwood and a 12"-long steel rule, see drawing at left.

I simply cut a shallow dado across the bottom edge of the block to hold the rule. Then I epoxied the rule into the dado so that it was flush with the edge (face) of the block.

To use the gauge, I just clamp it to the rip fence, see photo. This way, the gauge moves along with the fence as I adjust it, leaving me with both hands free to align the fence.

Glenn *Shiels*
NeuviUe, Quebec



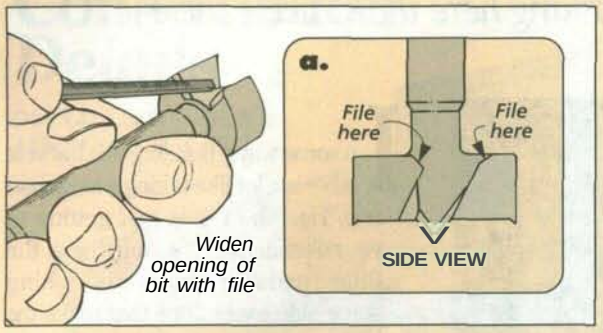
Editor's Note: *Ifyou have a steel rip fence, you could use small magnets to hold the gauge to yourfence.*

Clogged Forstner Bits

I have a number of Forstner bits in my shop made by various manufacturers. I've noticed that some of the bits tend to clog up with wood chips more than others, especially in the larger sizes. This is annoying because I have to stop the drill and clean out the bit.

When I started comparing the bits, I discovered that the "mouth" of the bits weren't all the same. On the bits that clogged, the sides of the mouth were nearly parallel. On the other bits, the mouth tapered out toward the top to eject the chips cleanly.

In order to create more room for the chips, I modified the bits that clogged by "opening" up the mouth. To do this, file or grind back the top edges of the opening, see drawing.



There's just one thing to watch out for. Be careful not to file or grind any of the cutting edges of the bit.

Don *Lancaster*
Norfolk, Virginia

Table Saw Slot Cover

To help control the dust in my small basement shop, I hooked up a dust collector to my table saw.

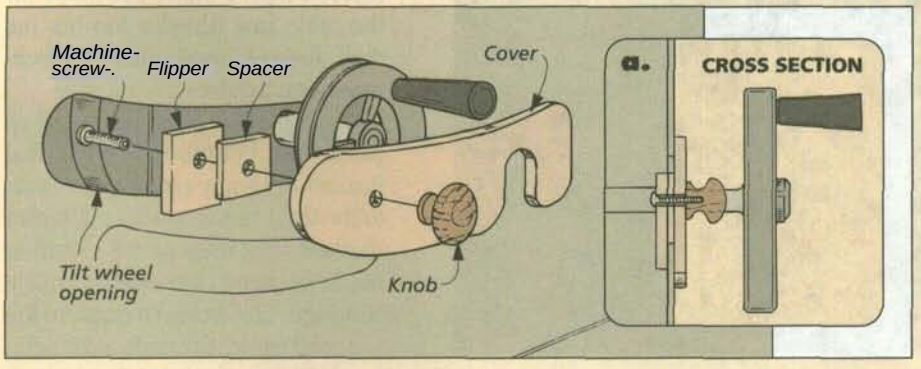
The only problem with this was that the opening in the front of my saw for the blade tilt wheel cut down on the efficiency of the dust collector. To block off this opening and increase the airflow around the saw blade, I made a simple cover.

The cover is just a piece of W'-thick stock with a notch cut out to fit over the arbor of the blade tilting mechanism, see drawing.

To hold the cover in place, I added a wood knob and a hardboard "flipper" that can be turned to lock over the lip of the opening, see detail 'a.' To allow the flipper to fit over the metal lip in the opening of the saw, a hardboard spacer is sandwiched between the flipper and the cover.

The cover can be quickly removed when I want to tilt the blade to make a bevel cut

Reggie Brown
Crittenden, Kentucky



◀ ***Finger* saver.** To *hold brads and small nails while hammering,* ***Richard* Baker** *of Brooksville, Florida, uses an alligator clip.*

SUBMIT YOUR TIPS

If you would like to share an *original* shop-tested tip, send it to: *Woodsmith,* Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Or if it's easier, FAX it to us at: 515-282-6741. Or use our E-Mail address: woodsmith@woodsmith.com.

Include a brief explanation and sketch or photo. If your tip is published, you'll receive $30 to $150, depending on the published length. And don't worry, we'll rewrite the tip and redraw the art, if necessary. Also, *please* include a daytime phone number so we can contact you if we have any questions regarding your tip.

QUICK TIPS

To clean up glue squeeze-out when gluing up a project, I immediately sprinkle sawdust on the excess glue. The sawdust absorbs some of the moisture, making it easy to scrape off the glue/sawdust mixture with a putty knife.

Robert Rottmann, Jr.
Polos *Heights,* Illinois

To make iteasiertofinish large projects, I use an old mechanic's creeper. By setting the project on the creeper, I can easily rotate it in order to finish all sides. And when I'm done, I roll the project out of the way while the finish dries.

Daniel Egan
Renton, Washington

FEATURE PROJECT

COUNTRY HARVEST TABLE

The design of this table is pretty simple. But from the tapered legs to the breadboard ends, there s more woodworking here than meets the eye.

A A *shallow drawer on each end of the table provides a convenient place for storing silverware, napkins or placemats.*

▲ *The legs on this table are* removable. To align *and position them, stub* tenons on *the ends of the aprons fit into shallow mortises.*

In some ways, building this harvest table is a lot like taking a long road trip. Half the fun is just getting to your destination. Ifs stopping at the little roadside diners and taking some side excursions that make the journey more enjoyable.

With this table, the side trips have more to do with the construction. All in all, it's not a terribly difficult or unusual project to build. But there are a few things a bit out of the ordinary that make for some interesting woodworking challenges.

TAPERtD LEGS. Take the legs for example. They have an unusual double taper profile. But unlike most tapered legs, I didn't cut these on the table saw (they're too big for that). Instead I used a different technique that involves a band saw.

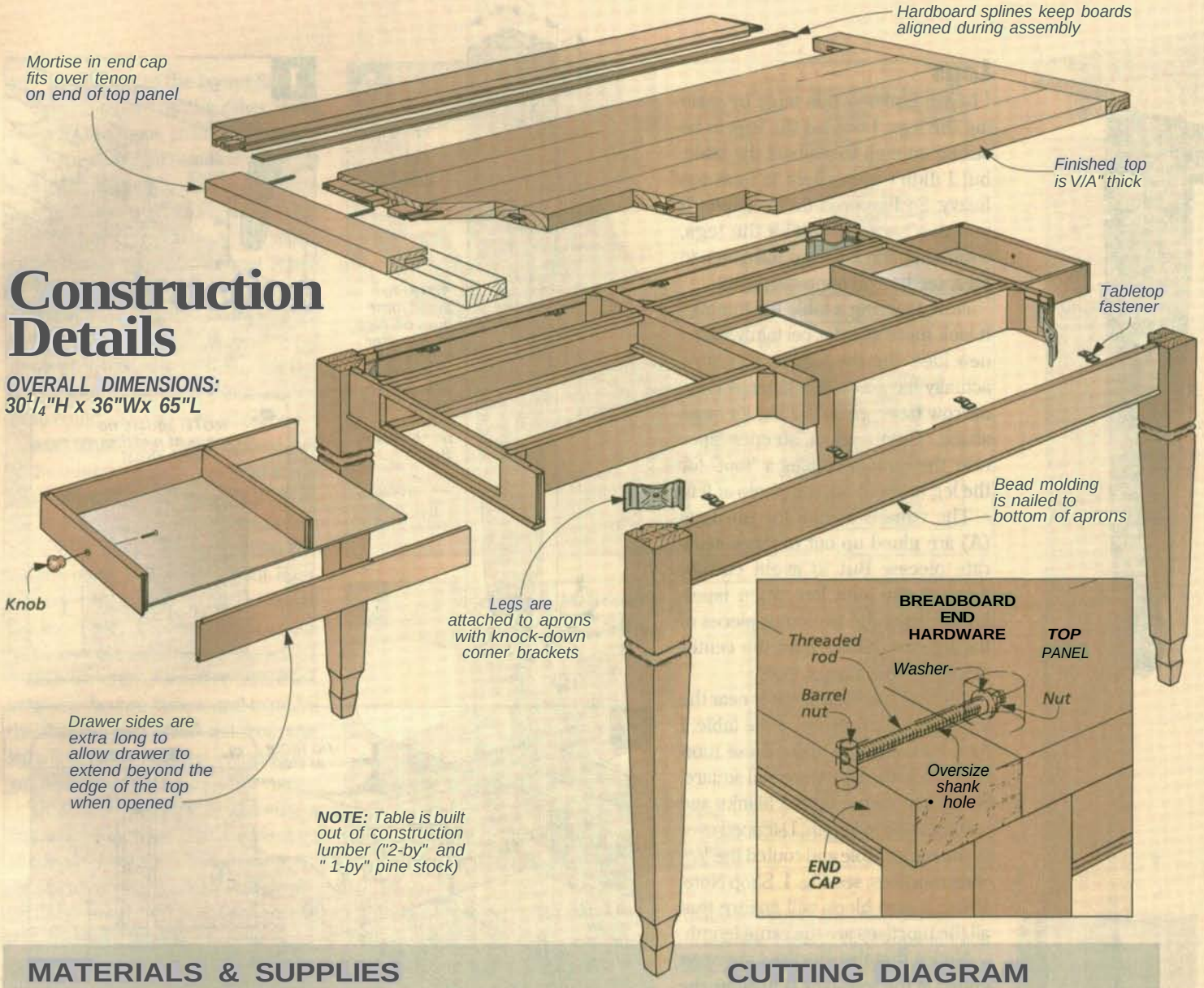
The top of the table is a glued-up panel with breadboard ends. But instead of simply pinning the ends to the top, I came up with a different method that uses some common hardware items, see detail on opposite page. This helps strengthen the joint and allows the ends to be tightened if the wood shrinks over time.

FINISH. Finally comes the finish. Normally I don't like to cover up the beauty of natural wood. But this time, I thought I would try using a stain on the base of the table. And I have to say, I was pleased with the results.

The finished product also has some pretty neat features, see photos at left. like a built-in drawer at each end to store silverware and napkins. And bolt-on legs that come off quickly so the table can be easily moved. So even when the building is complete, you'll have a nice reminder of the road you took to get there.

Construction Details

OVERALL DIMENSIONS:
30 1/4"H x 36"Wx 65"L



NOTE: *Table is built out of construction lumber ("2-by" and " 1-by" pine stock)*

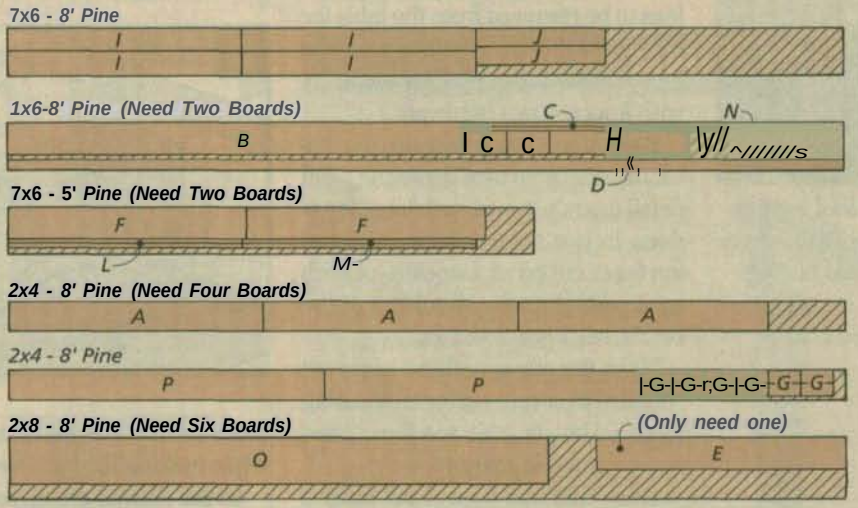
MATERIALS & SUPPLIES

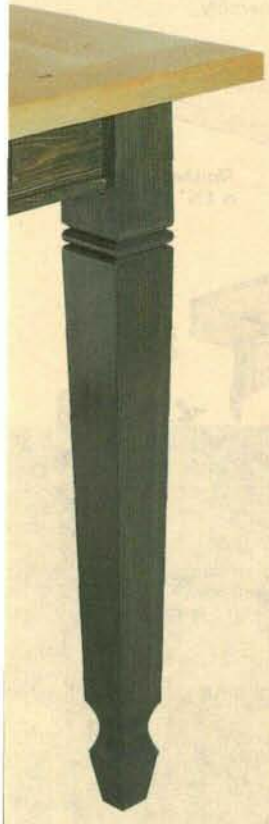
A	Legs (4)	3 1/4 x 3 1/4 - 29
B	Side Aprons (2)	3/4 x 3 3/4 - 52
C	End Aprons (2)	3/4 x 3 3/4 - 26
D	Bead Molding	1/2X1 - 13'(rgh.)
E	Center Divider (1)	1 1/2X3 3/4-29 1/2
F	Drawer Supports (4)	3/4 X 3 3/4 - 27V4
G	Glue Blocks (12)	1 1/2X1 1/2-3 1/2
H	Drawer Fronts (2)	3/4 X 2 5/8 - 1 5 7/8
N	Drawer Sides (4)	1/2 X 2 5/8 - 26 3/4
J	Drawer Backs (2)	1/2 X 2 1/8 - 1 5 3/8
K	Drawer Bottoms (2)	1/4 ply. - 15 3/8 x 26 1/2
L	Upper Guides (4)	3/4 X 1/2 - 26 3/4
M	Lower Guides (4)	3/4 X 9/16 - 26 3/4
N	Drawer Stops (2)	3/4 X 5/8 - 1 5 7/8
O	Top Panel (1)	1V4 x36-61V2
P	End Caps (2)	1 1/4 X3-36

- (4) 2" x 4 1/2" Corner Brackets
- (4)5/i6"- 18x3" Hanger Bolts
- (4)5/i6"- 18 Nuts
- (4) 5/16" Washers
- (8) 3/8" x 3/4" - 1/4" Barrel Nuts
- (8) 1/4" - 20 Nuts
- (8) 1/4" Washers
- (1) 1/4" - 20 Threaded Rod - 36" Long (rgh.)
- (30) 4d Finish Nails
- (12) Table Top Fasteners
- (12) #8 x 3/4" Rh Woodscrews
- (2) 1 "-dia. Wood Knobs w/Screws

Also Needed: 48"x 48" sheet of *VA"* plywood for drawer bottoms and *Vn"* hardboard for splines

CUTTING DIAGRAM





Legs

I began building this table by making the legs. I wanted the legs to be strong enough to support the table, but I didn't want them to look too heavy. So I tapered them. (Note: If you don't want to make the legs, another option is to purchase turned legs, see box on opposite page.)

Now, tapering a table leg to make it look more slender certainly isn't a new idea. But the legs on this table actually have a double taper. A long, narrow taper gives the leg its basic shape. Then a short, steeper taper near the bottom creates a "foot" for the leg to stand on, see photo at left.

The square blanks for the legs (A) are glued up out of three separate pieces. But to avoid cutting through the joint line when tapering the legs, the two outer pieces of the leg are thicker than the center piece, see drawing at right.

Each leg has two mortises near the top to hold the aprons of the table. I found it easiest to make these mortises while the legs were still square. So after squaring up the blanks and cutting them to length, I stepped over to the router table and routed the Vi"-wide mortises, see Fig. 1. Shop Note: Using a stop block will ensure that all the mortises are the same length.

Notice that the mortises are open ended at the top. This is to allow the legs to be removed from the table for moving or storage, see Fig. la. (The legs will be fastened to the aprons with knock-down hardware.)

BEAD. After completing the mortises, the next step is to make the bead detail near the top of each leg. This is done in two stages. First, a pair of kerfs are cut on all four sides of each leg to establish the shoulders of the beads, see Figs. 2 and 2a.

Next, the edges of these kerfs are rounded over on a router table, using a special beading bit, see Figs. 3 and 3a and photo in margin.

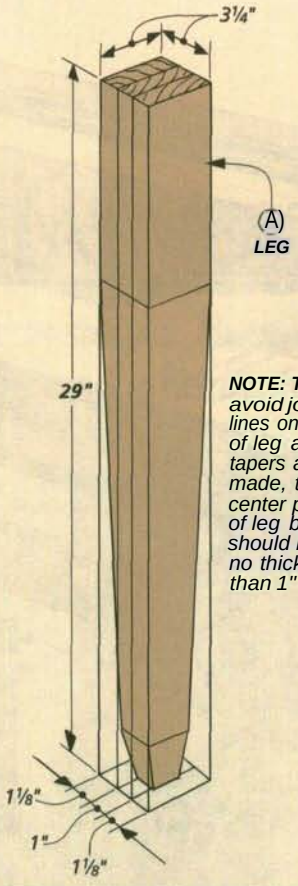
Once this was done, I cut away a small section of the inside corner of each leg, see Fig. 4. This is simply to create a flat surface for the leg brackets that will be used to connect the legs to the aprons. I made these cuts on the band saw, using a simple V-block to hold the leg at a 45° angle while making the cut, see Fig. 4a.

TAPERS. At this point, you're ready to create the tapers on the legs. This is a two-step process. First, the long slender tapers are laid out and cut. Then you can make the short tapers that create the "foot" of each leg.

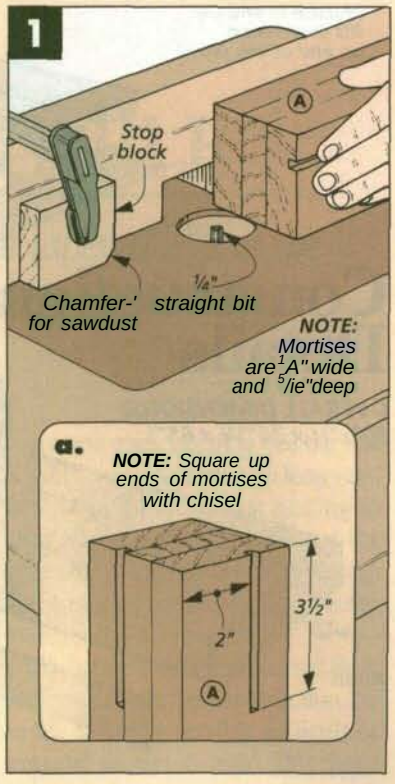
Because of the size of these legs, I cut the tapers on a band saw instead of a table saw. To do this, start by laying out the end of the long tapers on the bottom (end) of each leg, see Fig. 5a. Then lay out the tapers on one face of the leg.

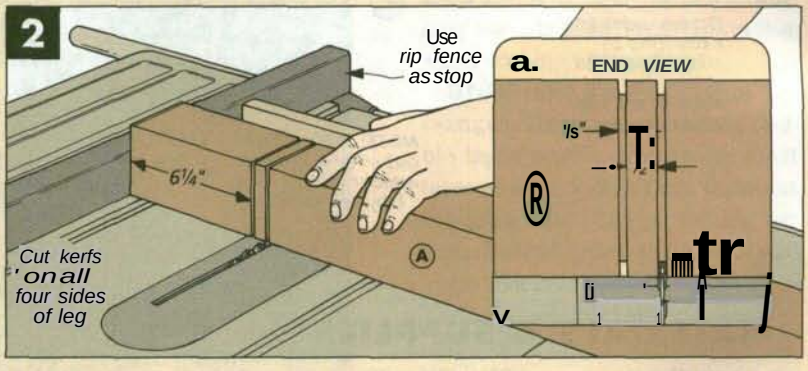
Now cut along the layout lines, staying just to the waste side, see Fig. 5. This allows you to come back later

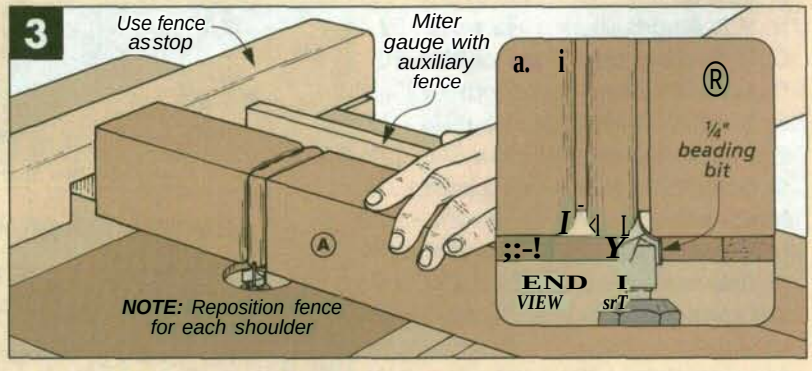
A A s£>ecia(*beading bit* is used to create *the bead* on *the* Jegs, seepage 35 *for sources.*



NOTE: To avoid joint lines on face of leg after tapers are made, the center piece of leg blank should be no thicker than 1"







and sand down to the layout line.

Cut the tapers on the other three faces in the same manner, drawing the layout lines on one face at a time and then making the cuts before moving on to the next face. Shop Note: You'll want to save one of the waste pieces from tapering the legs. It will be used later when sanding the arcs.

Once I had all the long tapers roughed out I cleaned up the faces of the legs by sanding down to the layout lines with a stationary belt sander. (You could also use a hand plane.)

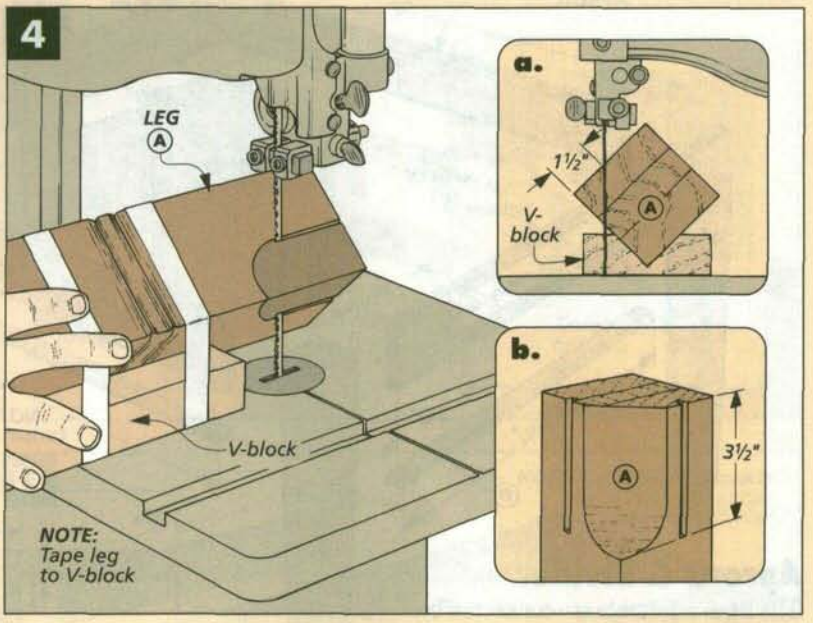
SHORT TAPERS. To create a tapered foot at the bottom of each leg, I cut some short tapers, beginning just 2" from the bottom of each leg. These tapers are cut in the same manner as the longer ones — I drew layout lines around each leg and on the bottom of the leg. Then I cut the tapers on the band saw, see Figs. 6 and 6a.

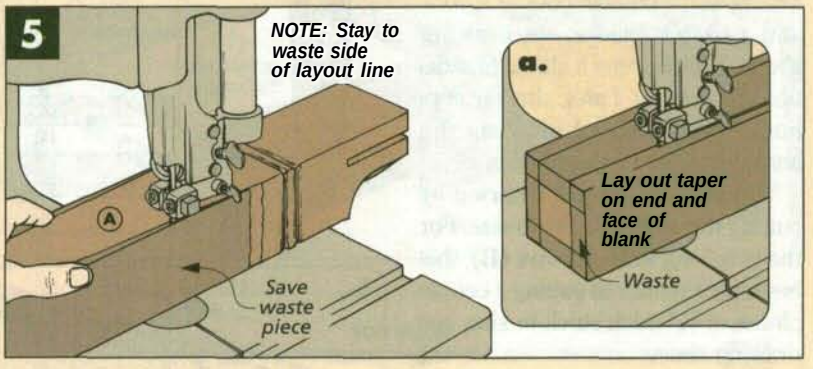
ARCS. To create a softer transition between the two tapers, and to make the tapered foot stand out from the leg a little more, I sanded a shallow arc just above the start of the short taper.

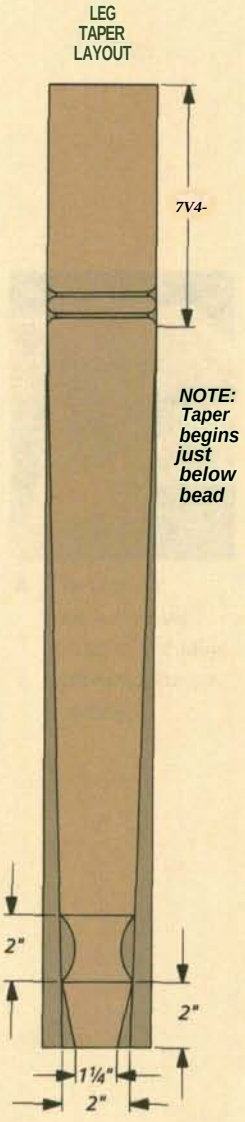
To do this, I started by drawing a line around each leg 2" above the start of the short taper. Then using a 3"-dia. sanding drum on my drill press, I hollowed out the area between the layout line and the start of the taper, see Figs. 7 and 7a.

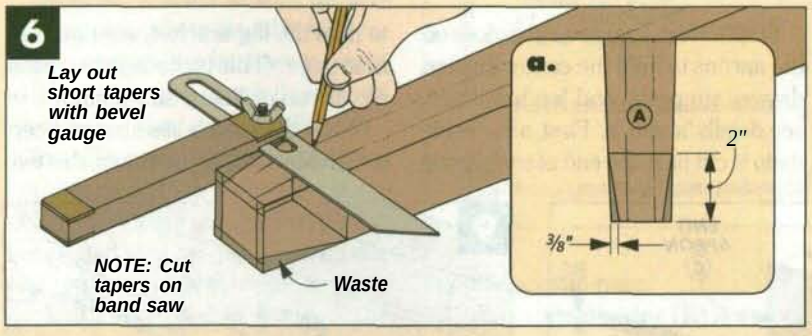
And to hold the tapered leg level, I shimmed the leg using one of the wedge-shaped waste pieces left over from tapering the legs, see Fig. 7. A long board underneath the leg helped support the workpiece.

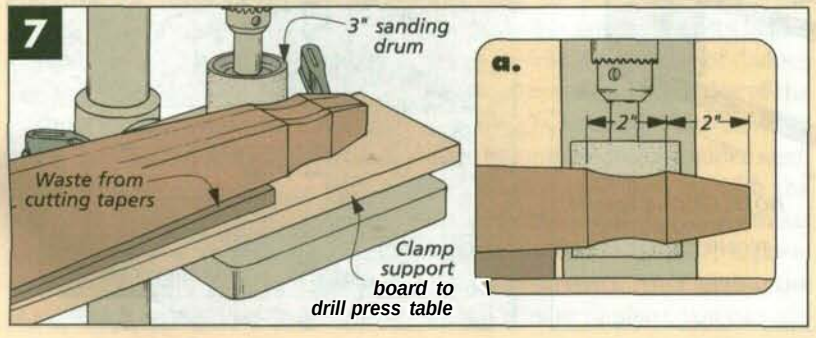
SANDING. Finally, to complete each leg, I eased all the sharp edges by sanding them lightiy.







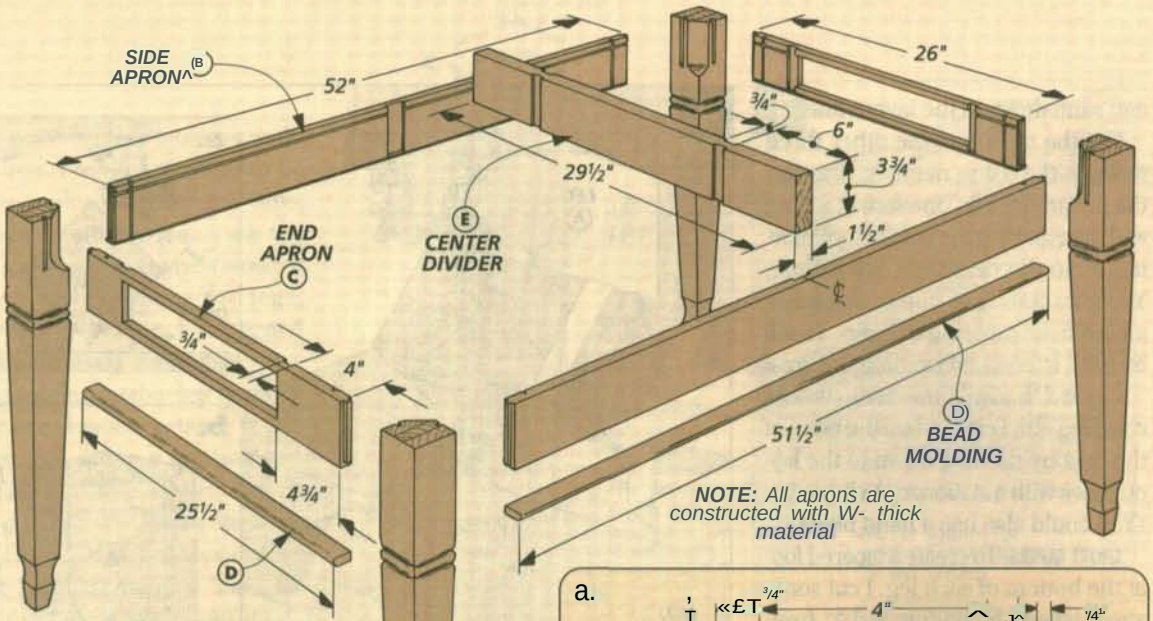




LEGS BY MAIL

If you prefer the look of turned rather than tapered legs, there are a number of mail-order sources that sell turned legs in several styles. (For more, see page 35.) Of course, you'll still have to make the mortises for the aprons.

SIZE. When ordering your legs, it helps to pay attention to the dimensions. Most table legs are a standard 29" long. But the width can vary. Of the sources we checked, some legs are SW square while others are SVa". Either size will work, but the larger leg will stand proud of the aprons a little more than the smaller one.



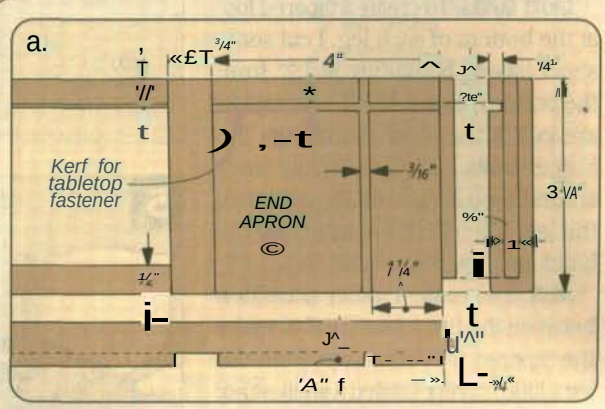
Aprons & Divider

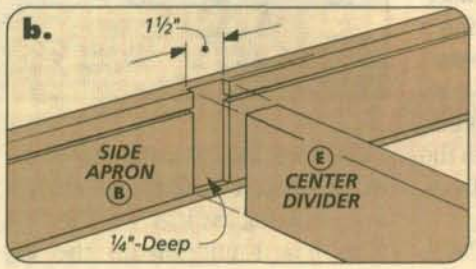
The legs of the table are connected by a framework consisting of four aprons and a center divider, see drawing above. This creates a stable foundation for the top. Later, drawer supports will be added between the aprons and the center divider.

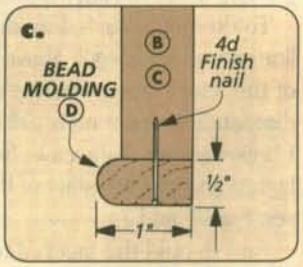
To make the aprons, I started by cutting the apron blanks to size. For the two, long **side aprons (B),** this is simply a matter of cutting a couple pieces of $^{3}/4^{n}$-thick stock to size, see drawing above.

But the **end aprons (C)** are a little different. They have a rectangular opening in the center for a drawer. So to create this opening, I glued up each end apron out of four separate pieces, see Fig. 8.

KERFS. With the apron blanks cut to size, next I cut a kerf on the inside face of each apron near the top edge for the fasteners that will be used to attach the top, see detail 'a.'

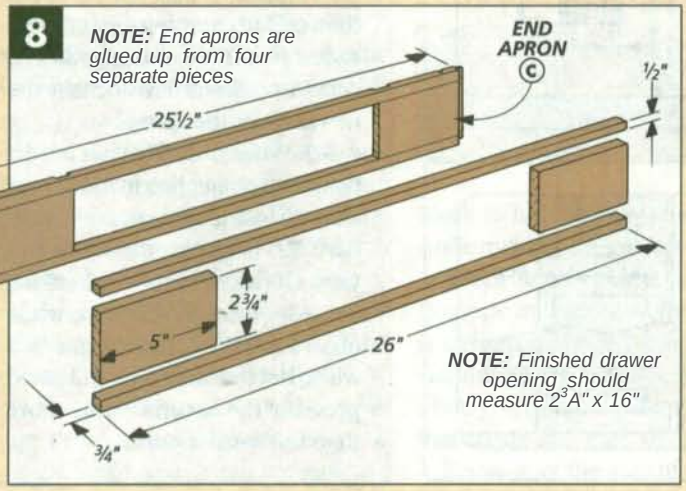


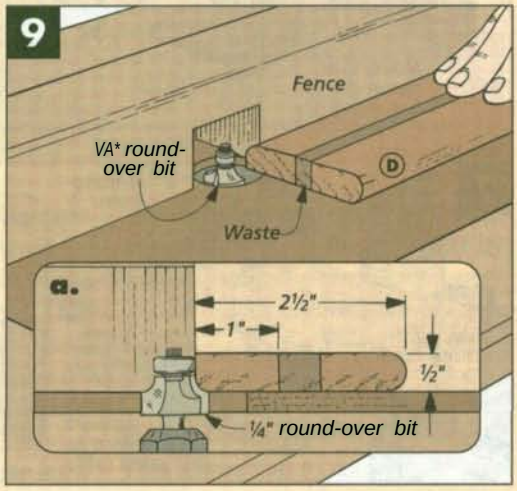




DADOES. Next, I cut several dadoes on the aprons to hold the center divider, drawer supports, and leg hardware, see details 'a' and 'b.' First, a $^{3}/i6$"-wide dado is cut near the end of each apron to hold the leg bracket, see photo on next page. (This is made in two passes with an ordinary saw blade).

When the table is assembled, a center divider will fit between the two





side aprons, preventing them from bowing inward. To help hold this 1%"-thick divider in place, a dado is cut on the inside face of each side apron, see detail 'b' on opposite page.

While I was at it, I cut similar dadoes on the end aprons. But these dadoes are narrower since they're sized to hold the 3/4"-thick drawer supports that are added later, see detail 'a' on opposite page.

TENONS. Once all the dadoes and grooves are cut, you can cut the tenons on the ends of the aprons to fit the mortises in the legs, see detail 'a' on opposite page. These tenons don't get glued into the mortises on the legs. Their real purpose is to simply help align the legs with the aprons while tightening up the leg bracket hardware. Because of this, the tenons are only W long.

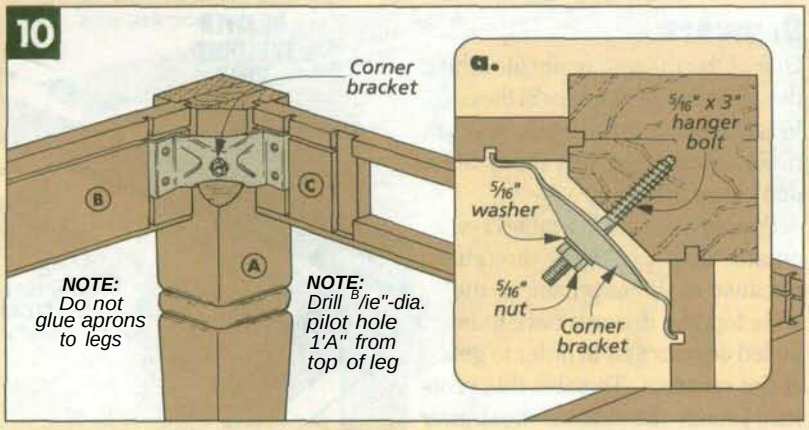
BEAD MOLDING. To dress up the aprons and support the center divider and drawer supports, I added a bead molding (D) to the bottom edge of the aprons, see detail 'c' on opposite page. This molding is made by rounding over the edges of a thin piece of stock, then ripping the molding to width, see Figs. 9 and 9a.

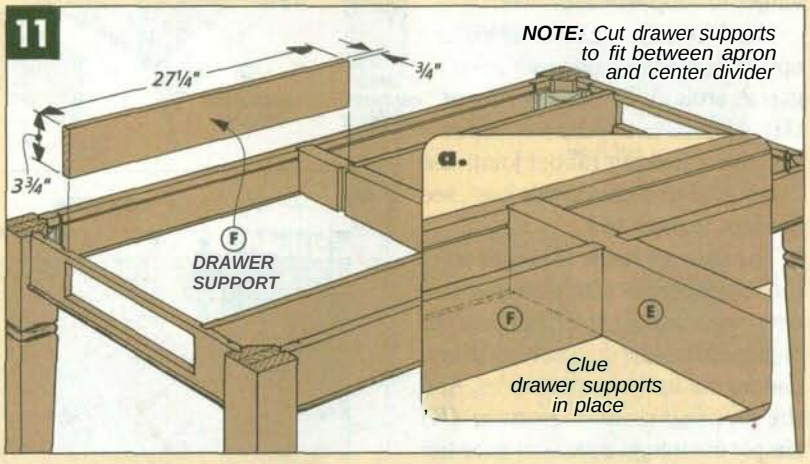
After cutting it to length, the molding is attached with glue and finish nails, see detail 'c' on opposite page. Once this is done, you're ready to attach the legs to the aprons.

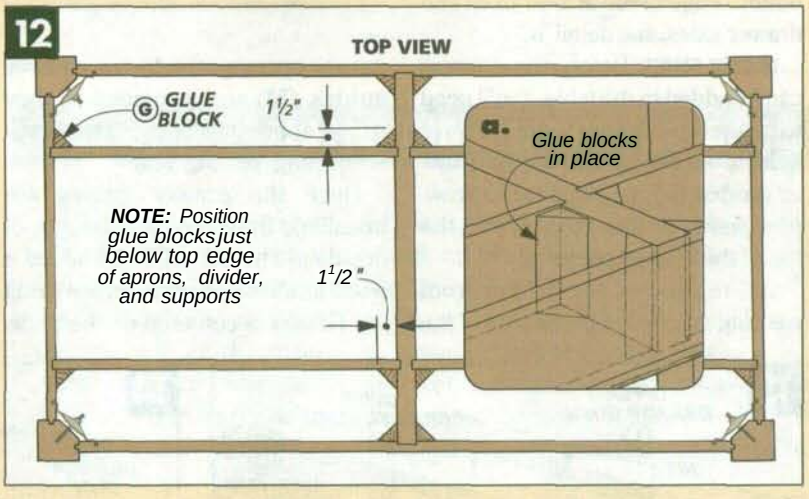
HARDWARE. In order to allow the legs to be removed from the table for moving or storage, the legs are fastened to the aprons with knock-down hardware rather than glue, see Fig. 10.

Installing the hardware involves nothing more than screwing a hanger bolt into each leg. (The hanger bolt is installed by threading a nut on one end and then using a wrench to screw it into a hole drilled in the leg.) The bolt fits into a hole in the corner bracket, and a washer and nut are used to pull the leg tight against the aprons, see Fig. lOa and photo in margin.

CENTER DIVIDER. Even with the hardware, the legs and aprons alone don't make for a very steady base for the table. To help strengthen and stiffen the table, as well as provide a means of supporting the top, I added a l^'-thick center divider, see drawing on opposite page.







A *The legs are attached to the aprons of the table with metal comer brackets.*

This center divider (E) is a piece of iVy'-thick stock, cut to fit in the dadoes in the side aprons. But before it can be installed, a pair of dadoes need to be cut on both sides of the divider. These dadoes will hold the drawer supports that are added next, and they should line up with the dadoes in the end aprons. Once this is done, the divider can be glued in place.

DRAWER SUPPORTS. After gluing the center divider in place, you can add the drawer supports (F). These 3/4"-thick pieces are simply cut to fit between the center divider and the end aprons and glued in place, see Figs. 11 and lla.

GLUE BLOCKS. Although the divider and drawer supports are glued into dadoes, the end grain of these pieces doesn't make for a very strong glue joint. So I added glue blocks (G) to each corner, see Figs. 12 and 12a. These pieces are nothing more than triangular-shaped blocks.

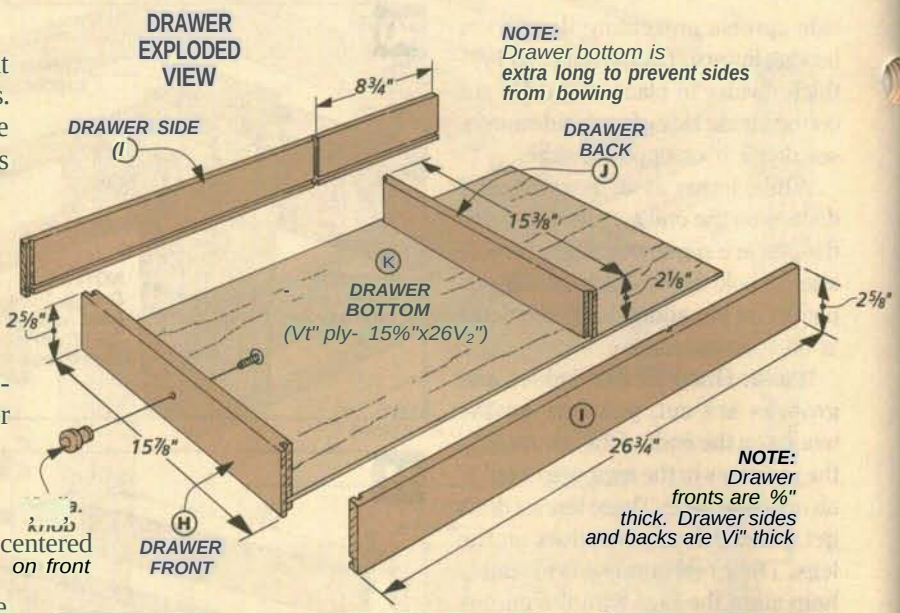
Drawers

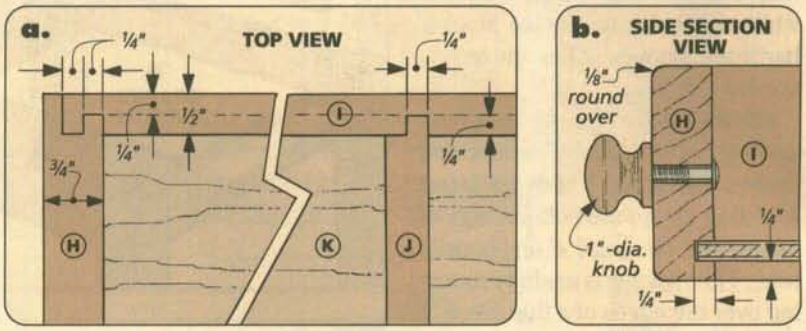
One of the things I really like about this table are the drawers in the ends. In fact, seeing how handy they are makes me wonder why more tables don't have this feature.

Putting a drawer in a table does create one problem though. Because of the overhang of the table top, the drawers have to be pulled out extra far in order to get at the contents. To solve this problem, I made the sides of the drawer longer to support the drawer.

The drawers are sized to fit in the openings in the aprons with a Vie" gap all around. The drawer front (H) is joined to the drawer sides (I) with a locking rabbet joint, see detail 'a.' (For more on this joint, see the box on page 16.)

The drawer back (J) is joined to the drawer sides with a tongue and dado joint, see detail 'a.'Tongues cut on the ends of the drawer back fit into dadoes cut in the drawer sides. And the plywood drawer bottom (K) simply fits into grooves cut near the bottom edge of the drawer front and drawer sides, see detail 'b.'



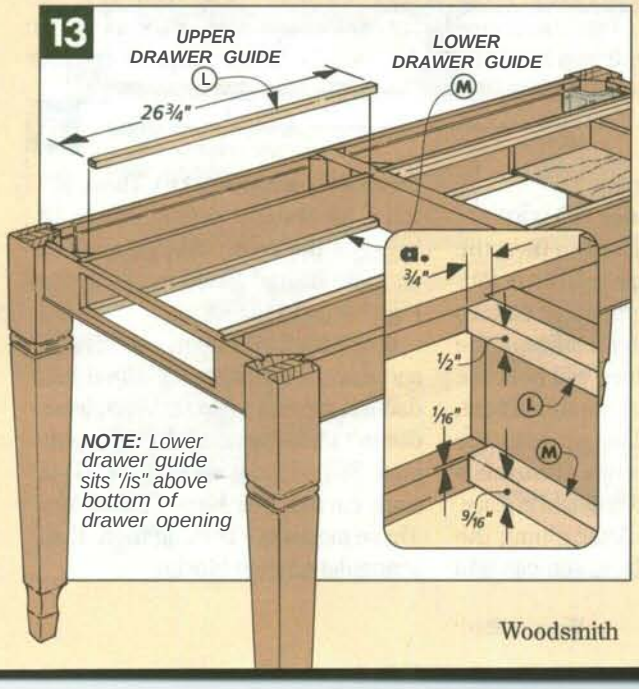


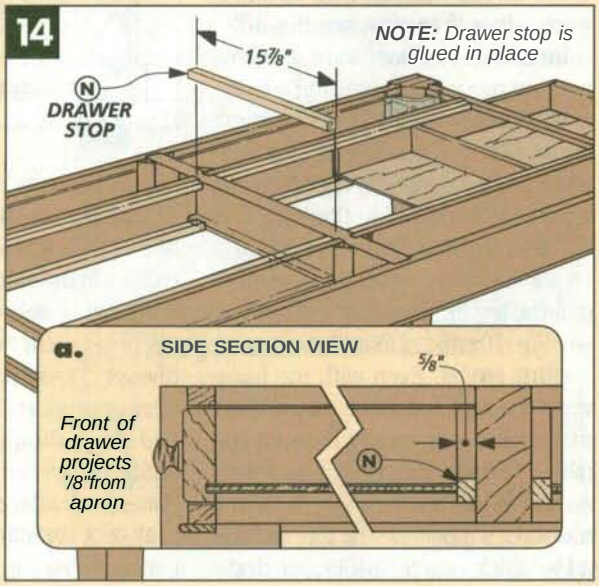
DRAWER GUIDES. Before the drawers can be added to the table, you'll need to make and install some drawer guides, see Fig. 13. The upper drawer guides (L) are glued to the drawer supports so they're flush with the top of the drawer opening.

But to prevent the drawer from wearing grooves in the bottom of the drawer opening, the lower drawer guides (M) are positioned so they sit Vie" above the bottom of the drawer opening, see Fig 13a.

Once the drawer guides are installed, there's just a couple of details to attend to. First, I added a wood knob to each drawer, see detail 'b.' These are centered on the drawer fronts and are fastened with a screw from the inside of the drawer.

To make the drawers stand a hair proud from the front of the aprons I added a drawer stop (N) to the back of each drawer compartment, see Figs. 14 and 14a. These are just pieces of $^{3}/_{4}^{n}$-thick stock glued across the lower drawer runners.





Top Panel

With the base of the table complete, you can now focus on making the top. There's really two steps involved in making the top. First, a large, flat panel is assembled from six separate boards. Then, breadboard end caps are made and attached to the ends of the panel.

The top panel (O) is made up of six 6"-wide boards, see drawing at right I started by planing the stock just enough so that all the pieces were a consistent thickness.

Shop Note: Don't get too carried away with the planing. Leave yourself enough material so that you can sand the entire surface flat after assembly and still end up with a top thats about IW thick.

Although the boards for the top are ripped to a width of 6", leave them a lime long for now. They'll get trimmed to length after the top is glued up.

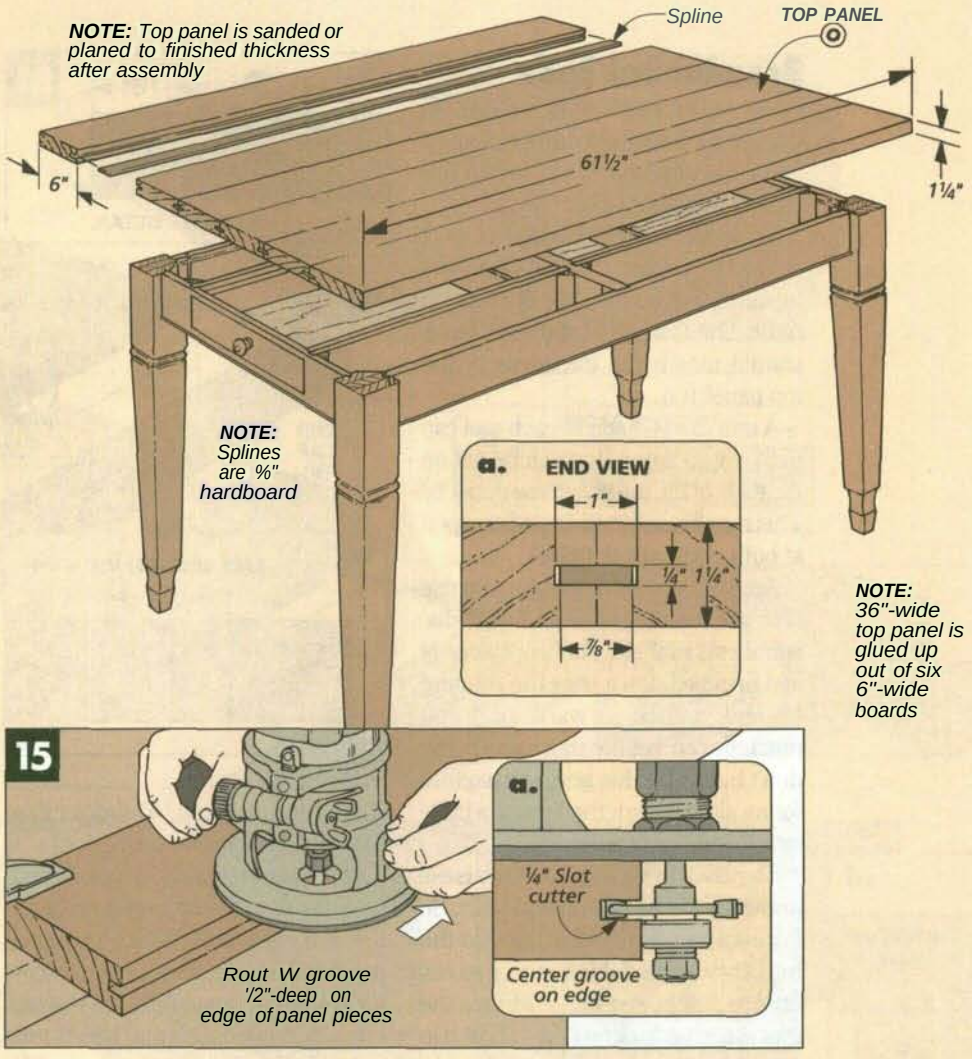
SPLINES. To help keep all the pieces aligned during the glue-up process, I used hardboard splines, see detail 'a.' These fit into grooves routed along the edges of each piece, see Figs. 15 and 15a. (For more on this, see page 17.) Then the panel can be glued up.

FLAT TOP. Even with the splines, there's a pretty good chance that your top panel will still have some uneven spots (mine did). To get a good, flat surface, I sanded my panel smooth with a belt sander, see box at right (Be careful here—you don't want to remove any more material than is necessary to achieve a flat top.)

TRIMMING THE ENDS. When it comes to trimming the ends of the top, you have a couple of options. One method is to use a hand-held circular saw with a straightedge for a fence. But I find that the table saw leaves a nicer finished cut with less chipping.

The problem with cutting a piece this wide on the table saw is getting a square cut, since you can't really use a miter gauge.

The trick I used was to attach a runner to the bottom of the panel that fit into the miter gauge slot on my table saw. Then with someone to help support the end of the panel, I simply trimmed each end. (For more on this procedure, see page 16.)



FLATTENING A LARGE SURFACE

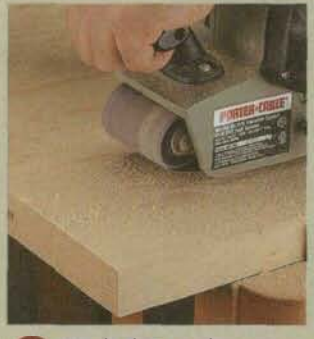
To flatten a large panel, about the only things you need are a belt sander, a straightedge, and a big can of elbow grease. Other than this, there's not really much to it.

I like to start by scribbling a pencil line over the entire surface of the panel so I can check my progress as I go along, see Step 1.

Then, I simply work the belt sander over the entire top, concentrating on the high spots, see Step 2. Keep the sander moving continually so you don't sand too much in one spot

Finally, check your work with a straightedge and stop as soon as the top is reasonably flat see Step 3. You don't want to remove too much material from the top.

1 *Scribble a line across the entire surface of the top to serve as a reference.*



2 *Work the sander across the grain at first, but finish up sanding with the grain.*

3 *Use a straightedge to check your progress. Stop when the top is flat.*

Breadboard Ends

Once you've reached this stage, all that remains is to add the breadboard end caps and attach the top to the base of the table.

To make the breadboard ends, I started by cutting the **end caps** (P) to width and length, see drawing at right The thickness of these pieces should match the thickness of the top panel (O).

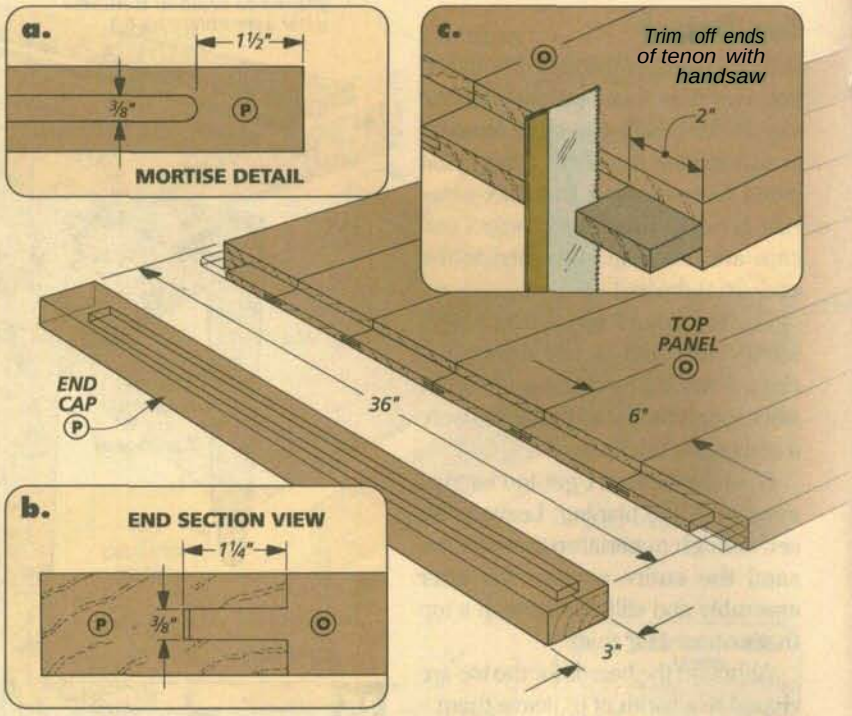
A mortise is made in each end cap to fit over a tenon that will be cut on the ends of the top panel, see detail V This mortise is %" wide and stopped at both ends, see detail 'a'.

An easy way to make the mortise is to use a router table and a %"-dia. spiral end mill bit The workpiece is just dropped down over the rotating bit and pushed forward until you reach the end of the mortise. (If you don't have a bit this size, see page 17 for an alternate method using a table saw to cut the mortise.)

The trick to routing the mortise is knowing where to stop and start So I drew a couple of index lines on the top of my router table to serve as reference points, see Fig. 16. Since the mortise is fairly deep (iVi"), I cut it in several passes, raising the bit W between each pass.

TENON. After completing the mortises in the end caps, you can cut the tenons on the ends of the top panel. These are also made with a router. But since the top panel is too large and heavy to maneuver safely on the router table, I found it easier to use a hand-held router with an edge guide, see Figs. 17 and 17a.

To allow the top to expand and contract with humidity changes, the ends of the tenon are trimmed off with a hand saw, see detail 'c.' The tenon



should end up about Vk" shorter than the mortise at each end.

HARDWARE. Normally, a mortise and tenon joint is glued together. But if the end caps were glued to the top panel of the table, they wouldn't allow for any wood movement. So instead, I used threaded rods and barrel nuts to hold the end caps in place. The threaded rods act as draw bolts, allowing you to pull the end cap snug against the top panel if the end cap happens to shrink over time.

Essentially, each end cap is held in place by four threaded rods. One end of each rod is threaded into a barrel nut that is inserted in the cap. On the other end, a nut and washer serve to hold the cap tight against the top panel. Drilling oversize holes for the threaded rods allow for expansion and contraction across the top.

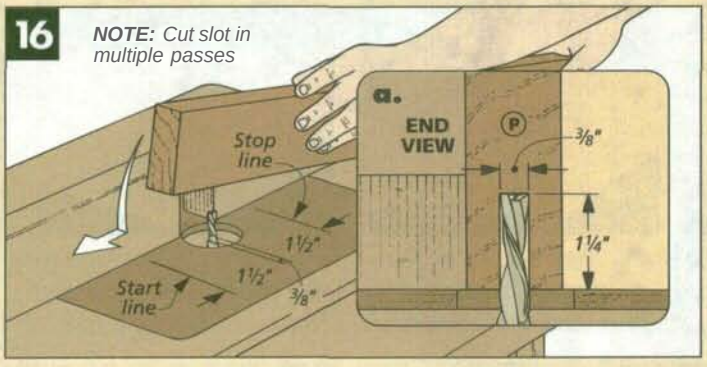
All the hardware is installed from the bottom of the end caps and the top panel so that it won't be visible once the table is assembled. To start with, place the end cap on the top panel and lay out the locations for the hardware, see Fig. 18.

Now all you need to do is drill holes for all the hardware. First four ^{7}/ie"-dia. holes are drilled in each end cap for the barrel nuts, see Fig. 18

Next l"-dia. counterbores for the washers and nuts are drilled in the underside of the top panel with a Forstner bit Then one side of the hole is squared off with a chisel to create a flat bearing surface for the washer and nut see Fig. 18a.

Finally, you'll need to drill ^{3}/g"-dia. cross holes for the threaded rods in the ends of the panel and end caps, see Figs. 19 and 19a. Drilling the cross holes in the end cap is pretty straightforward using a drill press.

16



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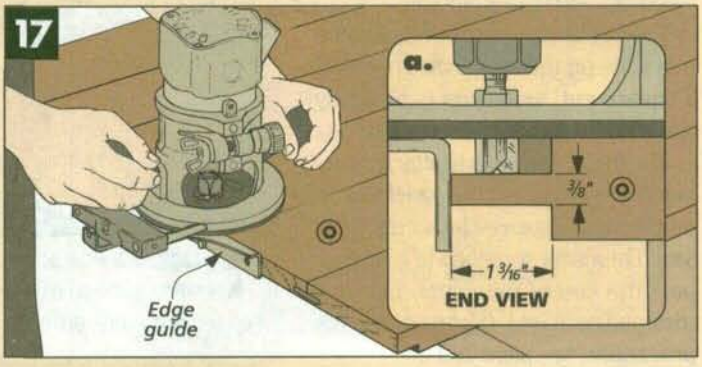


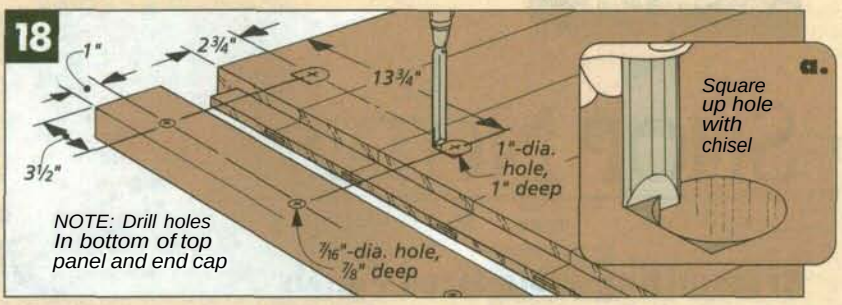
But the top panel is too large to place on a drill press. To overcome this, I used a portable drill. And in order to be able to drill the holes deep enough, I created clearance notches in the tenons for the chuck of my drill, see Fig. 19b.

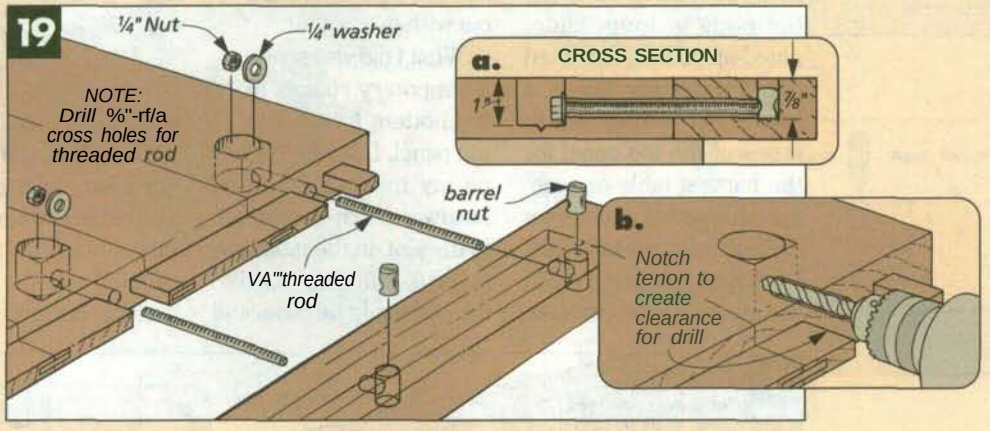
ATTACHING THE END CAPS. Once you've got all the holes drilled, all that's left is to attach the end caps. To do this, start by inserting the barrel nuts into the holes in the end caps. Next, insert the threaded rods into the cross holes in the end caps and thread them into the barrel nuts.

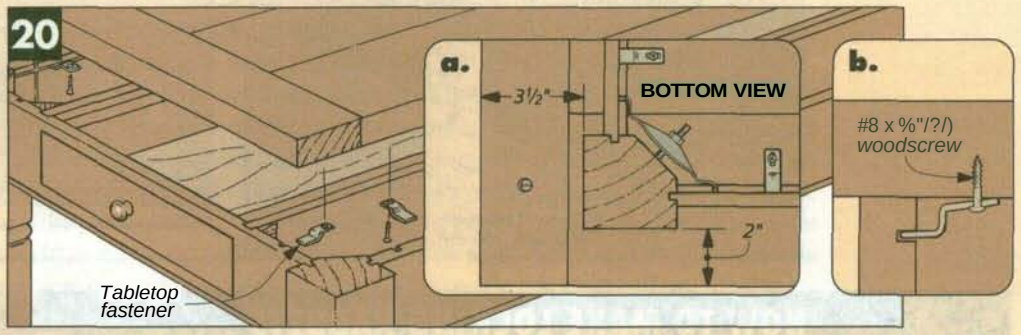
Now slip the end cap on the end of the top panel, taking care to make sure that the threaded rods enter the shank holes in the end of the panel. Finally, secure the end caps by placing a washer and nut on the end of each threaded rod.

Before attaching the top, I routed an Vs" roundover on all the edges. Then I finished the top and the base of the table separately, see box below.

ATTACHING THE TOP. When the finish is dry, you can attach the top. To do this, I used metal "Z" fasteners, see Figs. 20 and 20a. These simply fit into the kerfs cut near the top edge of the aprons. Then small woodscrews are used to secure the fasteners to the underside of the top, see Fig. 20b. d







FINISHING THE TABLE

Normally, I don't like to paint the projects I make because I feel that it hides the natural beauty of the wood. But the country design of this table seems to lend itself to a more colorful finish.

So I decided to use a colored stain on the base of the table. Unlike paint, stain allows the grain of the wood to show through a bit And by leaving the top of the table natural, you still get the warm feeling of wood.

WASH COAT. Before doing any staining, however, I applied a thin wash coat of orange shellac to the entire table (including the top). This serves two purposes. On the base of the table, the shellac serves as a stain controller, preventing the stain from penetrating deeper in some places than in others.

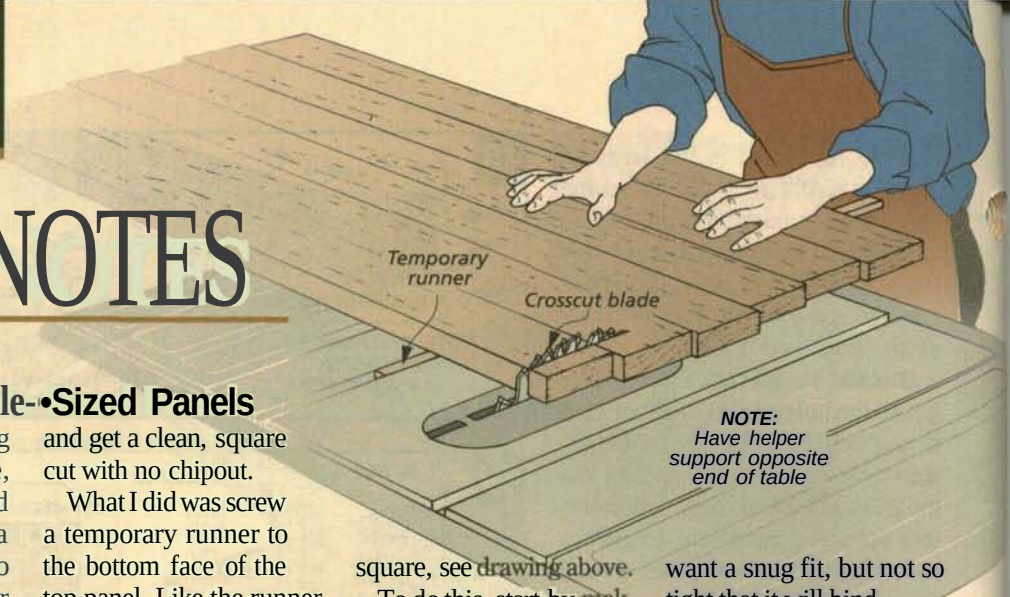
And on the top of the table, the shellac gives the wood a warm, amber color that you might expect to find on an old piece of furniture.

To make the wash coat, I mixed about 2 to 3 ounces of orange shellac flakes with a quart of denatured alcohol. Then after the shellac dried, I sanded it very lightly with 400-grit sandpaper, just to knock down the "whiskers."

STAIN. Next, I stained the base of the table, using a commercially prepared water-based stain. (I used General Finishes' Country Colors — Slate Green.) I applied two coats of stain, sanding the surface lightly after each coat

TOP COAT. After the stain had dried, I finished the entire table with a wipe-on oil finish. I used two coats on the base of the table, again sanding lightly between coats. But since the table top is subject to more wear and abuse, I applied a couple extra coats to build up a thicker finish.

SHOP NOTES



Crosscutting Table-•Sized Panels

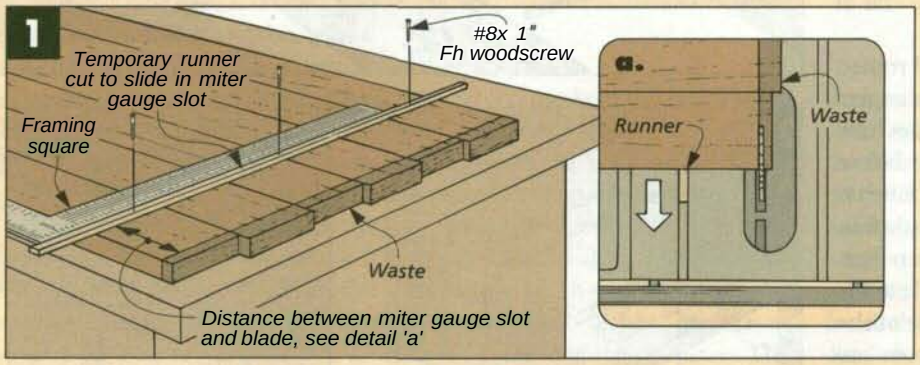
in the past when trimming the ends of long, wide, glued-up panels, I've used either a circular saw or a hand-held router. But to crosscut the top panel for the harvest table on page 6,1 came up with a different method using my table saw. With the table saw, I could use my good crosscut blade and get a clean, square cut with no chipout.

What I did was screw a temporary runner to the bottom face of the top panel. Like the runner on my miter gauge, this hardwood strip would ride in the slot on the table saw and guide the long panel so the cut would be clean and square, see drawing above.

To do this, start-by making a long runner to fit in your table saw slot (I made mine out of a $^{3}/_{8}^{M}$ x $^{3}/_{4}^{M}$ strip of solid wood.) Size this runner carefully — you want a snug fit, but not so tight that it will bind.

Next, I laid out two lines on each end of the panel: a cut line and a line for the runner, see Figs. 1 and la. The runner should be located the same distance from the cut line as the saw blade is from the miter gauge slot

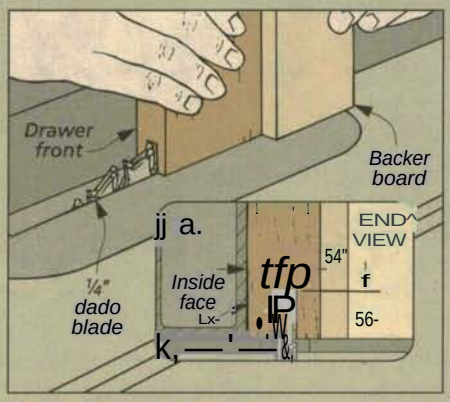
With the lines drawn, the runner can be screwed to the panel. (I used a framing square to align it) And with the runner in place, simply flip the panel over and get someone to help support it as you guide it over the saw. E9



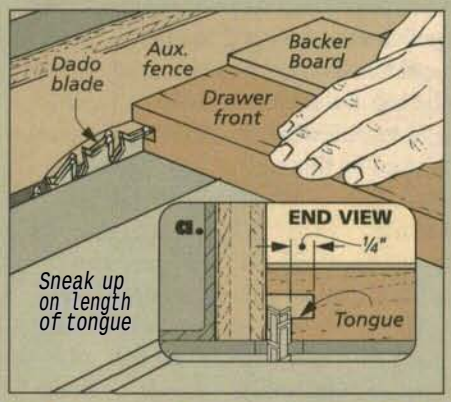
HOW TO MAKE LOCKING RABBETS

If of The drawers on the harvest table and organizer, I used a locking rabbet joint at the front corners, see photo. It's much stronger than a simple butt or rabbet joint, and it's not as difficult as cutting dovetails.

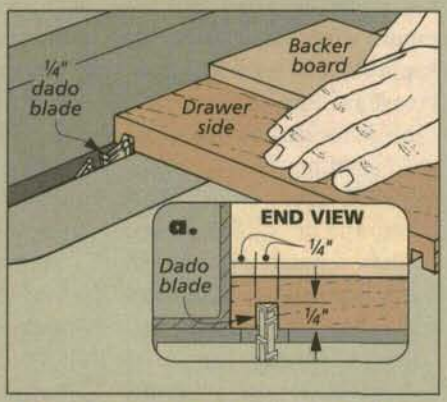
With a locking rabbet, a short tongue is cut on the front piece, see Steps 1 and 2. (I used a table saw but a router table will also work.) This tongue simply locks into a dado cut on each side piece, see Step 3.



1 *On the ends of the front piece, cut a slot to leave a W-wide tongue that's as long as the side pieces are thick C/z").*



2 *To complete the tongue, it needs to be trimmed to length. Sneak up on the cut until the tongue is W long.*



3 F/na/y to /io/d t/ie *tongue on the front, cut* a 54" x 54" dado on eac^i s/de p/ece. *(Check the setup with a test piece.)*

Stopped Mortises

If you don't have a iy4"-long end mill bit (ys'kiia.) to rout the stopped mortises on the ends of the table (refer to page 14), you don't have to buy one. You can do the lion's share of the work with the table saw.

Safely cutting a stopped mortise on the table saw requires a few shop-made accessories. First, you'll want to screw or carpet tape a long, tall auxiliary fence to the rip fence, see drawing. (Note that this auxiliary fence overhangs the front of the table so you can add a stop block.) Then set the fence 7/ie" from the inside edge of the saw blade.

Next, add a stop block to the front end of the fence, see drawing. This block prevents kickback *and* positions the workpiece at the start of the cut. When the piece is against the stop block and the blade is raised IM", the back of the blade should be iVfe" from the end of the piece, see detail 'a' in drawing above.

Finally, to hold the piece against the fence and table, I added a featherboard beside the piece and a hold down above it, see drawing. Like the stop block at the beginning of the cut, the hold down also indicates the position of the piece — this time at the *end* of the cut (though the piece won't butt against it), see Fig. la.

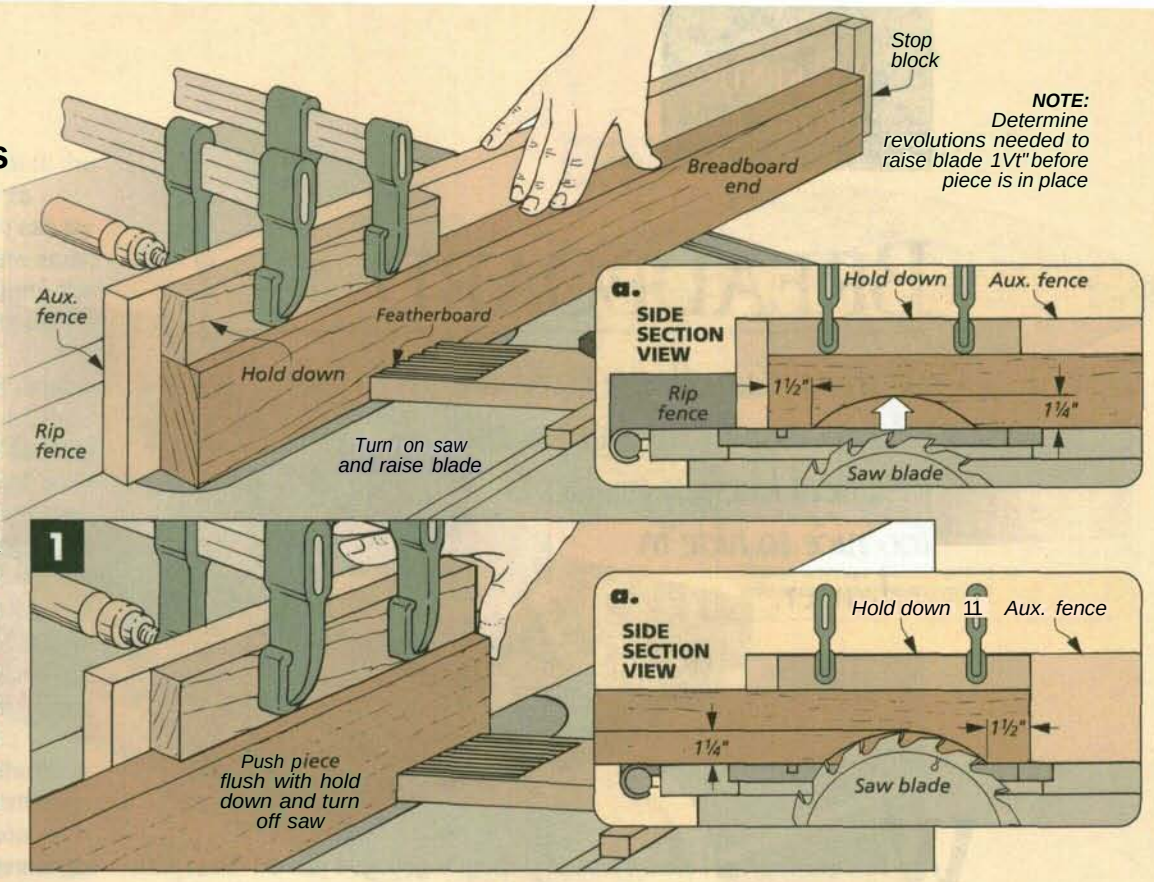
By now, you may have suspected that the procedure starts with the blade lowered. So before you put the workpiece in place, you'll need to count the number of turns it takes to raise the blade iVi" high *and* note where the handle ends up. (Mine ended at "7 o'clock" after being turned two and a half revolutions.)

With the piece in position, turn on the saw and raise the blade. Then push the piece forward until its back edge is flush with the hold down, see Fig. 1.

Now you can turn off the saw and lower the blade. Then flip the piece around and make another pass.

At this point, you've cut the sides of the mortise, but you'll need to reset the fence and make one more pass to remove the waste in the center. (The mortise should end up 3/s"-wide.)

Finally, since the blade has a circular shape, you'll need to clean up the ends of the mortise. (I used a sharp chisel to do this.) **(9**

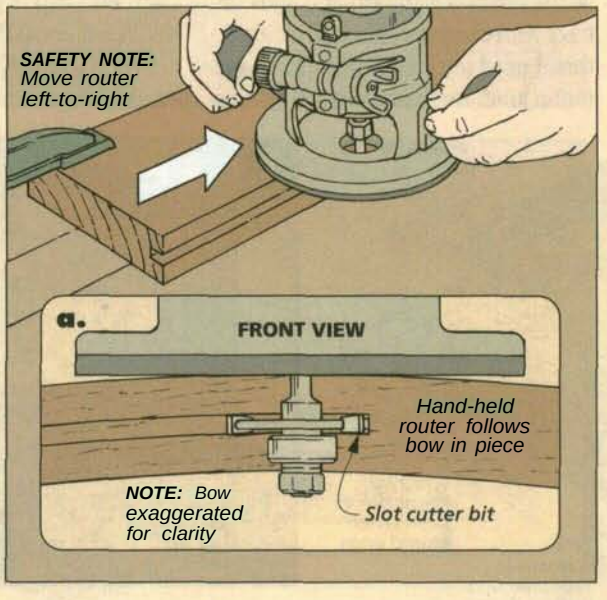


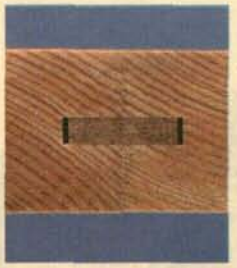
Adding Splines

When gluing up a long panel, like the top of the harvest table on page 6,1 typically add splines. These loose "keys" fit into grooves routed on the inside edges of the boards, see photo at right. This way, all the pieces are forced into alignment, which means less planing and sanding when the glue dries.

The key to routing the grooves on the edges of the boards is to use a hand-held router and a slot cutter bit, see drawing. A hand-held router works better than either a router table or table saw because it will follow any variations in the surface of the boards. If there's any bow over the length of the board, the router will keep the slot a *uniform* distance from the top edge, see detail 'a' at right.

To add splines, start by routing slots in all the mating surfaces, moving the router left-to-right, see drawing. (Be careful not to slot the outside faces.) Then for the splines, I usually cut long strips from J/4" hardboard, see photo, d





▲ *Hardboard splines will keep long pieces aligned when gluing up a panel for a table top.*

BREADBOARD

With its clean lines, curved ends, and recessed finger grips, this practical kitchen project is too nice to hide in a drawer.

When growing up, I often watched my mother bake bread. I would stand on a chair pulled next to the kitchen counter and ask her questions: "What's the yeast for? Why do you knead the dough? When's it going to be ready to eat?"

These days, I'm the one wearing the apron (though ifs covered with sawdust, not flour). And typically, I get a few questions while I'm working. With this cherry breadboard, there was one question that kept coming up: "What are the end caps for?"

The answer is simple. The end caps prevent the thin panel from cupping. The trick is to attach these end caps so the panel can still expand and contract with changes in humidity. To do this, I used a traditional mortise and tenon joint. But instead of just gluing them together, I pinned them with dowels. (For more on breadboard ends, see page 20.)

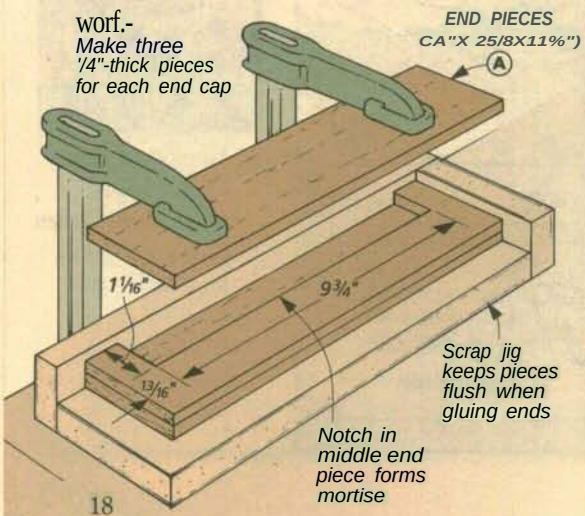
BREADBOARD ENDS. To make this breadboard, I started with the ends. The mortise on each of these pieces is $9^{3}/4^{M}$-long. So rather than drill or rout it, I avoided cutting a mortise at all. Instead, I made each **end cap** (A) out of three VV'-thick blanks, cutting each to finished size ($2^{5}/s$" x $H^{3}/8$"), see drawing below left.

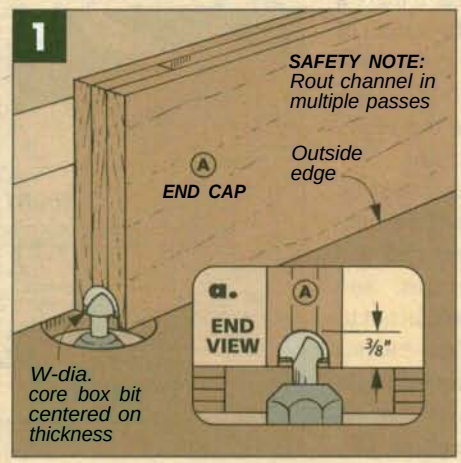
For now, you can set all but two blanks aside. These two blanks will become the center layer of each end cap. On these blanks, I cut a simple notch (iVie" x (W). This way, when each end cap is glued together, the notch will form the mortise.

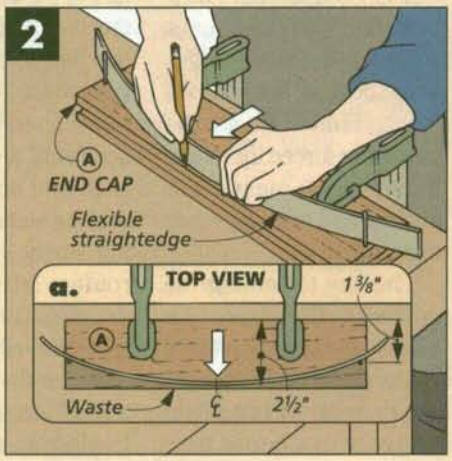
When gluing the end caps together, the important thing is that their edges are flush. So to keep the blanks aligned, I made a simple jig with an L-shaped corner, see drawing below. (Be sure to wax the jig so the pieces aren't glued to it permanently.)

SHAPE ENDS. After the end caps are glued up, the last thing to do is shape them. First, a small, round channel is routed on the edge so the breadboard is a little easier to pick up. Then a curve is cut along its outside edge.

The rounded channel on the ends gives your fingers a little shoulder to grab when picking up the breadboard. And to rout this semi-circular profile, you don't need any curved fences or special jigs; if s routed while the blank is square. So all you need is a y2"-dia. core box bit and a router table, see Fig. 1. Simply center the bit on the thickness of the pieces and make mul-







tiple passes, raising the bit until the groove is 3/s" deep, see Fig. la.

With the cove routed, you can lay out and cut the curve on the ends, see Fig. 2. Then after sanding the curves smooth, work can begin on the breadboard panel.

BREADBOARD. The secret to a durable breadboard is to use straight, tight grain. And the best place to find this grain is on the edge of a board. So to make the panel, I started with l5/s"-thick boards (8/4 stock). Then I ripped 13/ie"-wide pieces from this blank, flipped the pieces over, and glued them back together, see Fig. 3. When the glue is dry, the panel can be planed or sanded 3/4"-thick and cut tosize(H3/8"xl7").

Next, I cut the tenons on the ends, see Fig. 4. The only thing critical is the thickness of each tenon — it should fit fairly snug. Otherwise, I cut the length of the tenon Vie" short of the depth of the mortise, see detail 'a' above right. And I allowed a Vi" gap at each end.

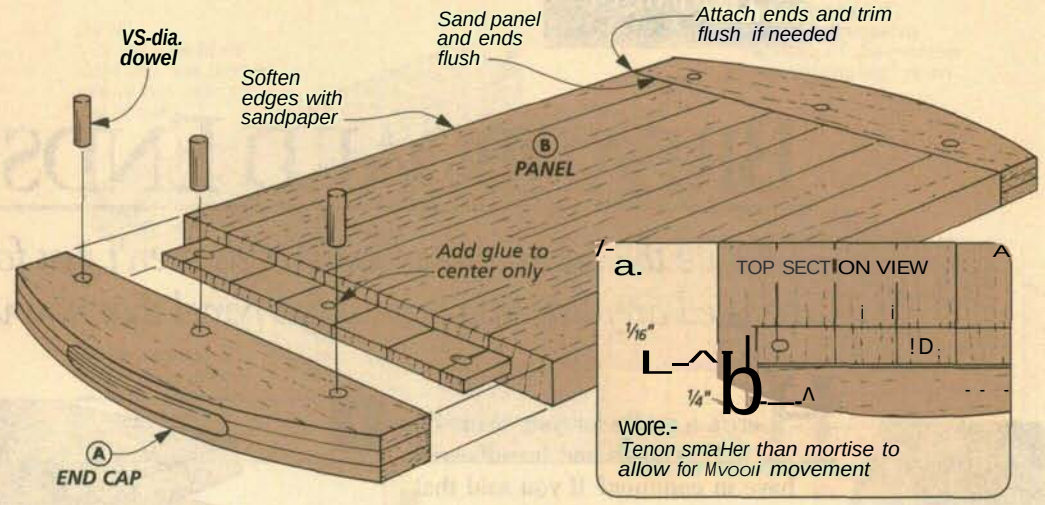
ASSEMBLY. Now the ends can be attached to the panel. The trick is to allow the panel to expand and contract with changes in humidity. The solution is a combination of glue and y4M-dia dowel pins, see drawing above.

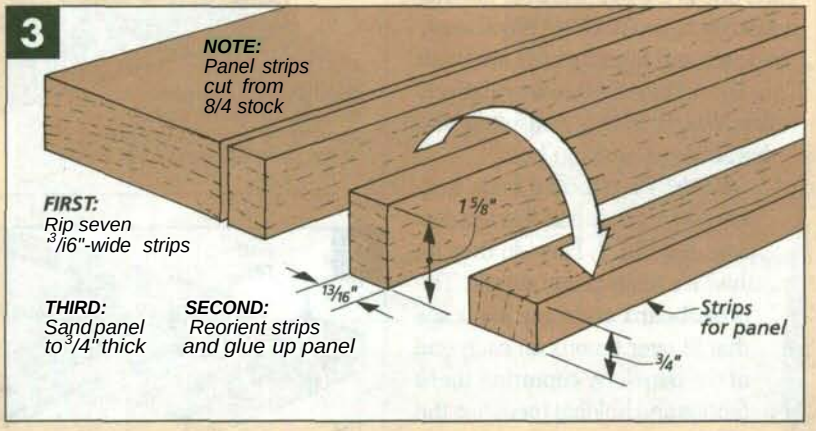
First, dry assemble the ends on the panel and drill three VV'-dia. holes all the way through the ends and tenons, see Fig. 5. (Make sure you back up the cuts so there isn't any chipout on the bottom face of the end caps.)

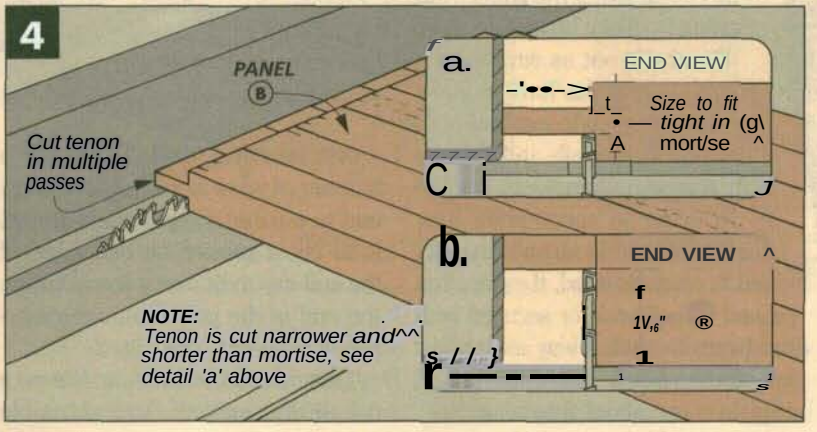
Next, remove the ends and slightly enlarge the holes near the outside of the *tenon*, see Fig. 6. (Leave the center hole alone so the panel will expand out from the center.)

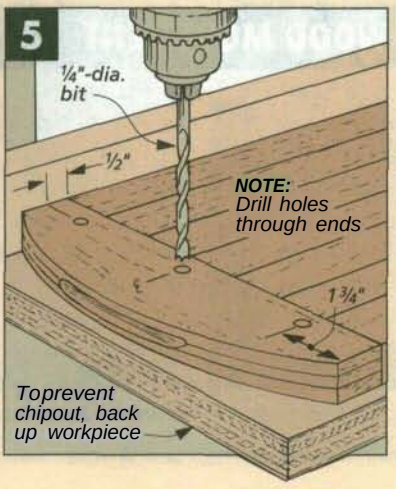
Now the ends can be glued to the panel. I spot glued the tenon at the center and put just enough glue on the pins to keep them in place. Trim and sand the pins flush, see margin photo. Then sand the panel and ends flush. I sanded with the grain of the *panel* first. Then I "hit" the ends to remove the cross-grain scratches.

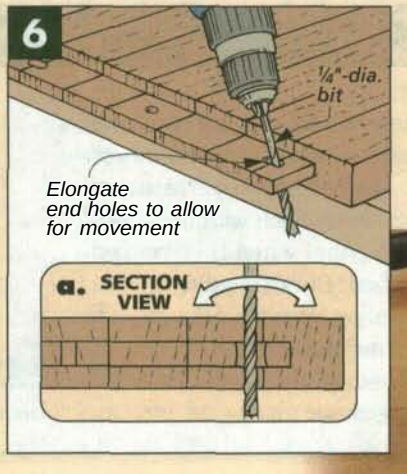
Afinish on a breadboard, to my way of thinking, is strictly optional. But if you'd like to add a coat or two, I'd recommend a penetrating oil finish that won't build a film on the surface. E9

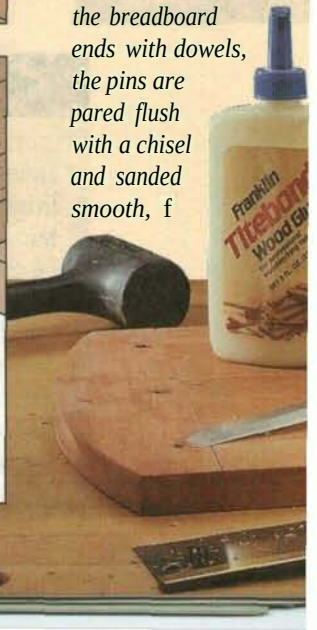












After pinning the breadboard ends with dowels, the pins are pared flush with a chisel and sanded smooth, f

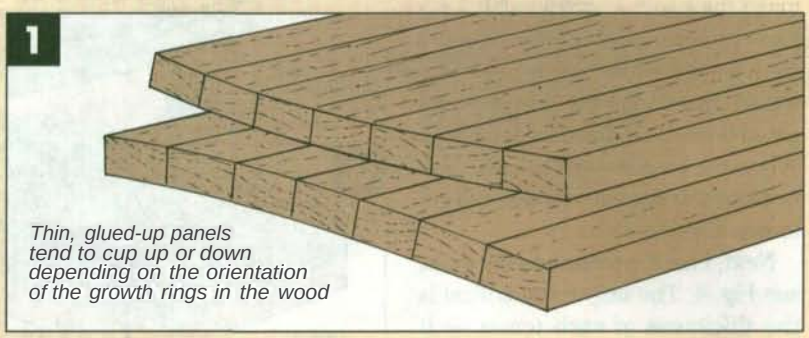
BREADBOARD ENDS

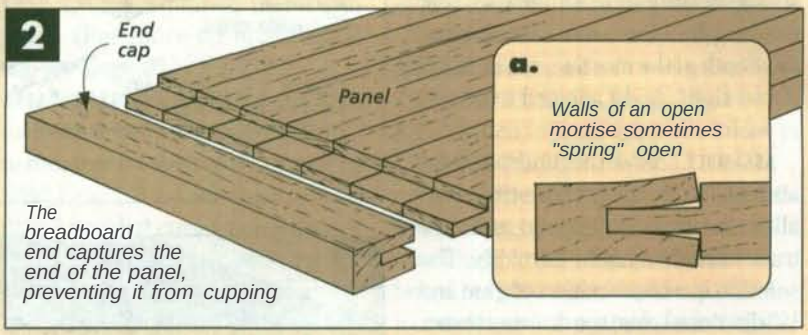
Despite the name, breadboard ends arent just for breadboards. They can be used anytime you have a flat panel that you want to stay flat.

Here's a riddle for you. What do workbenches and breadboards have in common? If you said that each one is a good place for making a sandwich, you're close. Since workbenches and breadboards are work surfaces, they need to be relatively flat. Which is why you often find breadboard ends on both.

FLAT TOP. Breadboard ends help prevent glued-up panels from cupping, see Fig. 1. How do they do this? It's really pretty simple. The breadboard ends are just caps that fit over tenons on each end of the panel. By capturing these tenons and holding them flat, the end caps prevent the panel from curling up like a big potato chip.

But that's not as simple as it sounds. They also have to allow for the side-to-side expansion of the wood as it swells and shrinks with seasonal changes in humidity. In order to accomplish this, breadboard ends aren't usually glued in place. Instead, they're often pinned with dowels or secured with hardware in such a way as to allow for some wood movement. (I'll explain more about this later.)





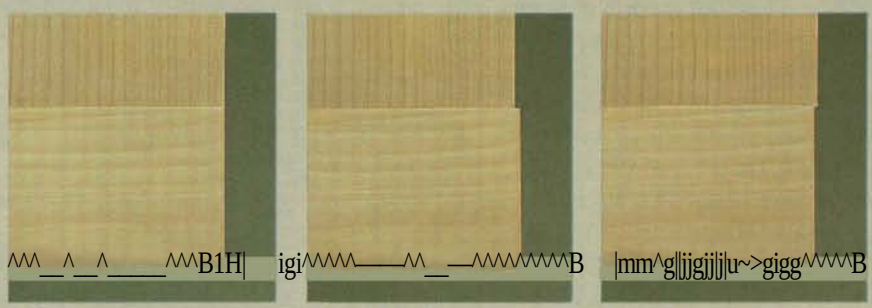
OPEN MORTISE & TENON. There are a number of ways to join a breadboard end to a panel. One of the simplest is to cut a groove on one edge of the end cap to fit over a tenon cut on the end of the panel (an open mortise and tenon), see Fig. 2.

This method works fine. But on a couple of occasions, I've had trouble with the walls of the breadboard end "springing" open after a while, see Fig. 2a. In addition, some people don't like the fact that you can see the exposed tenon on the edges of the panel. For these reasons, I like to use a different style of breadboard end.

CLOSED MORTISE. By making a closed mortise in the breadboard end, the

WOOD MOVEMENT

Panels with breadboard ends tend to be a bit finicky when it comes to humidity levels. The end caps may be perfectly flush with the edges of the panel when they're first attached. But depending on the time of year you build the project, the panel may expand or contract later when the humidity level changes, see photos.



Flush. Panel Contracts. Panel Expands.

walls of the mortise can't spring open, see drawing at right And then once the cap is installed, the tenon is hidden from view. This is typically the construction I use when making small projects that have breadboard ends (like the breadboard on page 18). The trick is to allow the panel to move *inside* the mortise.

GROWING ROOM. When you were a kid trying on new shoes, remember how the shoe salesperson would always pinch the toe of the shoe to show your parents there was plenty of growing room? The same thing applies to the mortise on a breadboard end.

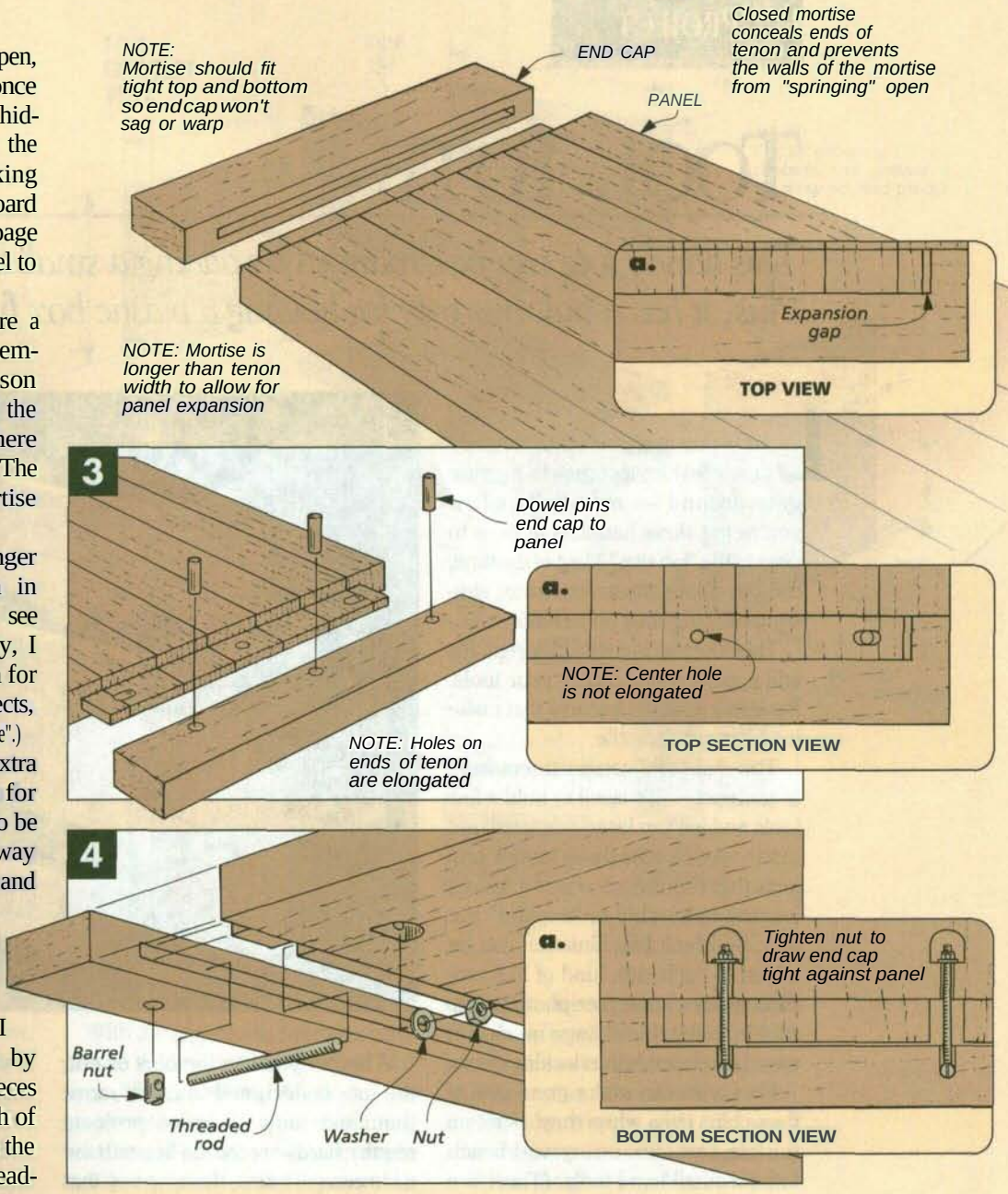
The mortise needs to be longer than the width of the tenon in order for the panel to "grow," see detail 'a' above right. Typically, I allow W at each end of the tenon for panel expansion. (On larger projects, I might even increase this to Vfe".)

PINNING THE JOINT. Making an extra large mortise provides the *room* for expansion. But the end cap has to be attached to the panel in such a way as to give it the *freedom* to expand as well. Thaf s were the dowel pins come into the picture.

Instead of gluing the cap onto the panel, ifs pinned with dowels, see Fig. 3. Normally, I pin mortise and tenon joints by drilling a hole through both pieces and then driving in a short length of dowel and trimming it flush with the surface. But when attaching breadboard ends, I add one more step.

To allow the panel to move, I elongate all the holes in the tenon (except the center one) before driving in the dowels, see Fig. 3a. This allows the panel to expand out in both directions, while the center pin anchors the end cap to the panel.

LARGE PANELS. I also used breadboard ends on the country harvest table on page 6, but for a slightly different reason. They're really more for appearance than for keeping the top flat. (They help to hide the wide expanse of end grain on the ends of the panel.) Since the top is attached to a base, cupping isn't as serious a concern as with the smaller panel of the breadboard.



Although the reasons behind them are different, the breadboard ends on the table also have to allow for wood movement across the width of the panel. And since the panel is fairly large, it's not unreasonable to think that the movement could be as much as W between seasons.

But the size of the top introduced a couple new problems. I was worried that dowels wouldn't be strong enough to hold the end caps to the panel, especially since the ends of a table are subjected to a lot of stress from people leaning on their elbows.

I was also a little concerned that the end caps themselves might shrink in width since they're fairly wide (3"). This could possibly create a loose joint between the end cap and the panel. To solve these problems, I used mechanical fasteners to attach the breadboard ends to the table, see Fig. 4.

By drilling oversize holes for the hardware, mechanical fasteners still allow the panel to expand and contract But they offer greater strength than wood dowels.

And if the end cap should shrink, the hardware can simply be cinched down a bit, pulling the end cap back tight against the panel, see Fig. 4a. This way, you know your top will always be flat *and* look good, d

SHOP PROJECT

1DOLIDTE

This handy tote can be expanded by adding a small bin to each end. Plus, it has a pull-out tray for holding a plastic box full of hardware.

Like a suitcase, a tool tote is handy to have when it comes to lugging gear around — especially when you've got *three* handfuls of tools to drag to the "job site." Most of the time, though, a tote sits tucked away, simply gathering dust on a shelf.

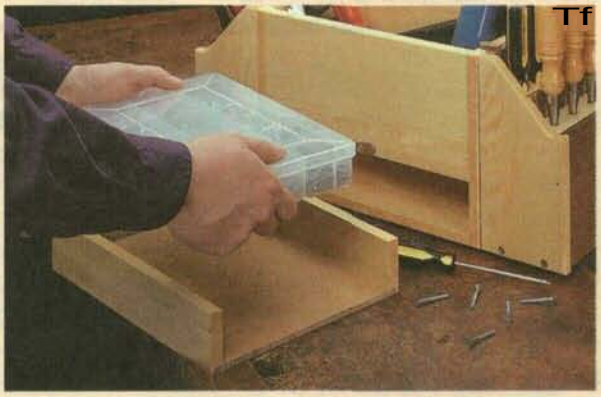
This tool tote is a little different It's still a great way to carry your tools. But it has a couple features that make it a bit more versatile.

The main tool compartment here is compact — it's sized to hold a few tools and isn't so large that it will get in the way. But for those bigger projects that require a few more tools, I wanted to be able to "expand" the tote. So I built two bins that can be added to each end, kind of like saddlebags on a horse, see photo below. And to make this change quick and easy, I used simple interlocking cleats.

Plus, you can make good use of these bins even when they're not on the tote. I set mine on my workbench to hold small hand tools. (There are several ideas for organizing the insides of the bins on page 27.)

Whether you use the bins or not, the tote is designed to carry more than just tools — most projects require hardware too. So beneath the main compartment, there's a tray that holds a plastic tackle box, see photo below. Like the shaving kit you throw in your suitcase, the box will keep all those tiny pieces organized. You can even have one box for nails, screws, and drywall anchors, and another for electrical supplies, and so forth. Note: This tote is sized to hold a box $1^{3}/4^{M}$ x 7V4" -11", see page 35 for sources.

Removable bins. *Optional bins make a handy addition to this tote. They are added and removed easily using a simple interlocking cleat system. Plus, the insides of the bins can be organized in a variety of ways, see page 27.*



Hardware tray. *Most projects require hardware as well as tools, so this tote is designed to hold a plastic tackle box full of hardware. Or if you'd rather store small tools, you can make a traditional drawer, see page 25.*

TOTE ENDS. To begin building the tote, I started with the two y2"-thick end pieces, see Tote Exploded View. These will end up SVi" wide (tall). So I glued up a long blank (about 19') and then cut the two **ends** (A) to final size from this blank, see detail 'a.'

Each end piece gets a groove and a rabbet for the bottoms (there are two) and stopped dadoes for the handle and sides, see Exploded View and detail 'a'. All are Vs" deep and can be routed on the router table in one pass.

The dadoes "stop" at the groove on each end piece, so I cut the y2"-wide groove and rabbet at the bottom edge first, see detail 'a'.

Next, since there was a Vy'-dia. bit in the router already, I routed the centered dado for the handle, see Fig. 1.

To rout the stopped dadoes, there's no need to set up stop blocks. Simply push the piece forward until the bit reaches the groove — you'll be able to hear when the router bit stops cutting. Then carefully hold the piece while you turn the router off.

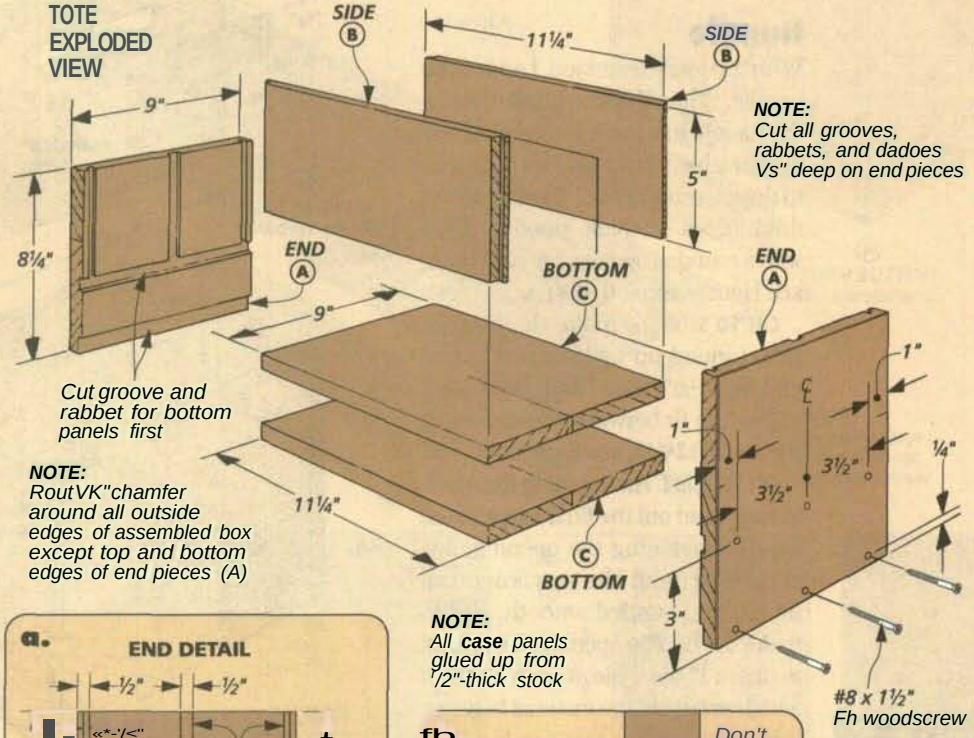
After the center dado was cut, I mounted a $^{1}/_{t}{}^{n}$ straight bit in the router, adjusted the fence and cut the dadoes for the two side pieces, see Figs. 2 and 2a. Again, stop the cut when you reach the groove.

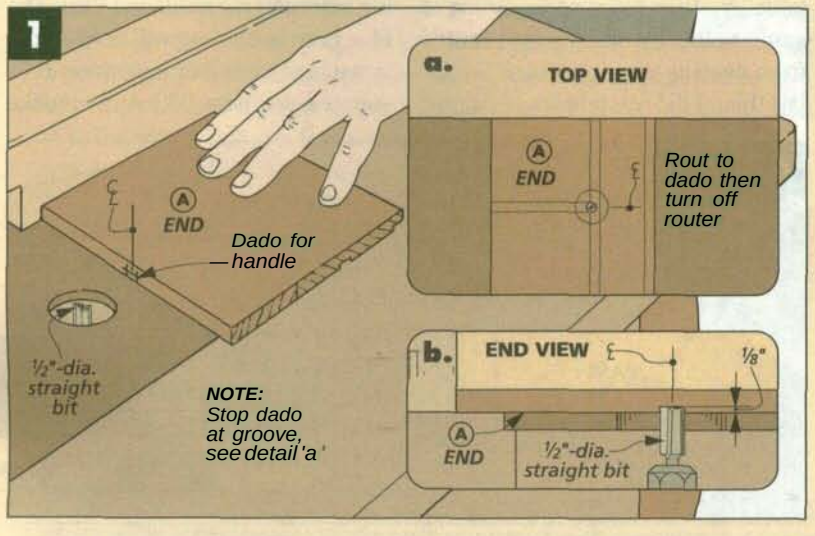
TOTE SIDES & BOTTOMS. The ends are ready for the sides and bottom panels that fit between them, see Tote Exploded View. I began with the **sides (B).** These V^'-thick pieces are cut to finished size (5" x llVi"). Then a rabbet is cut on each end to create a tongue that fits into the Vi" dadoes on the end panels, see detail *b' above.

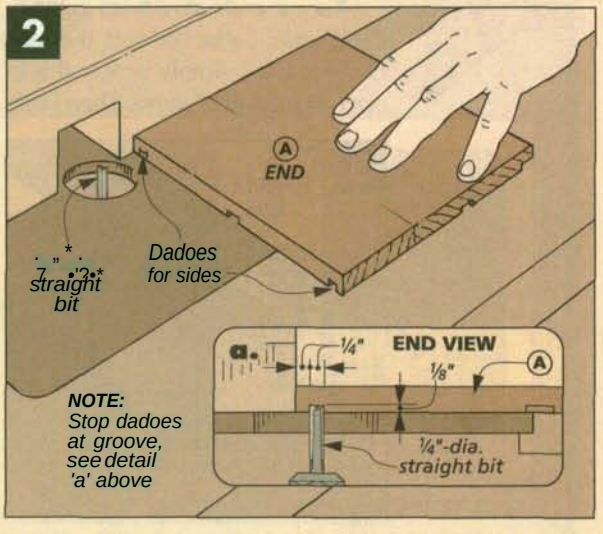
With the tongues on the sides complete, I dry assembled the ends and sides. Then I measured between the grooves to find the size of the two **bottoms** (C). These ^{1}/2"-thick panels are simply glued up and then cut to final size. (Mine were 9" x ll^{1}/*".)

ASSEMBLY. At this point, the main part of the tote is ready to be assembled. (The handle will be added later.) To join the sides and the ends, I simply glued them together. But I attached the bottom pieces with glue and added screws for extra strength.

When the glue was dry, I routed a Vie" chamfer around the side faces of the tote, see detail 'b' above.







Handle

With the tote assembled, I added the handle. When the tote is full of tools, the handle has to be both strong and comfortable. Otherwise, if s not going to do you much good. The handle on this tote is a ^"-thick, glued-up panel with a rounded opening for your hand, see Handle Exploded View.

CUT TO SIZE. To make the **handle (D),** I glued up a blank that would end up 7W wide (tall) and long enough to fit between the dadoes in the ends (11 Vi"), see Exploded View.

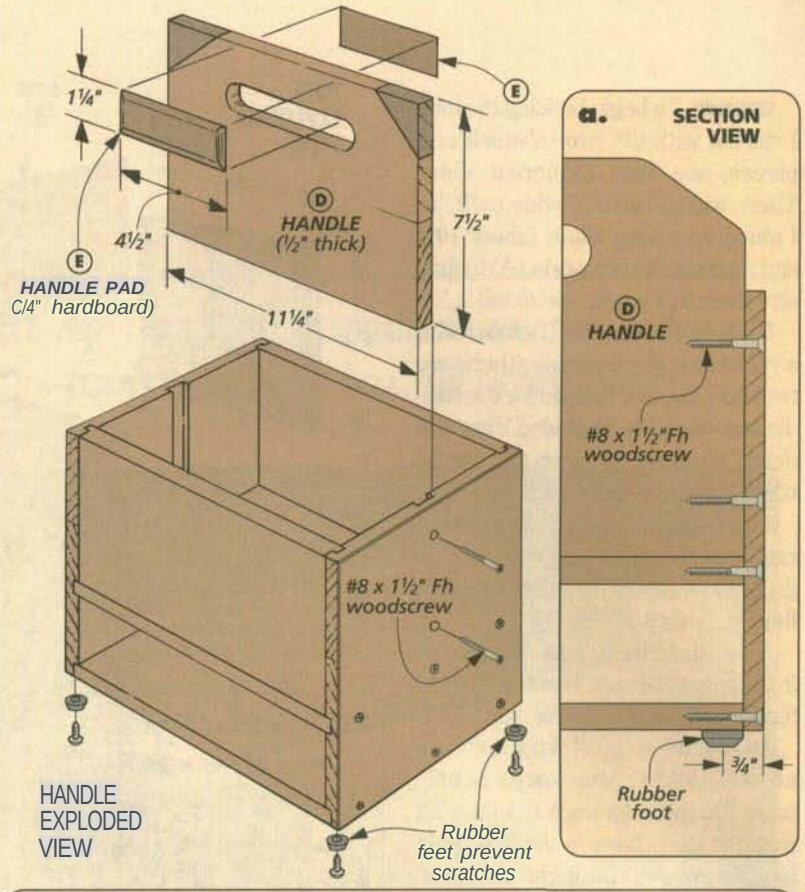
CUT TO SHAPE. After cutting the blank to size, I laid out the final shape of the handle, including the opening, see detail V at right The top corners can be cut and sanded smooth. But to make the handle opening, ifs easiest to drill a l"-dia. hole at each end first and then cut out the material between them with a sabre saw, see Fig. 3.

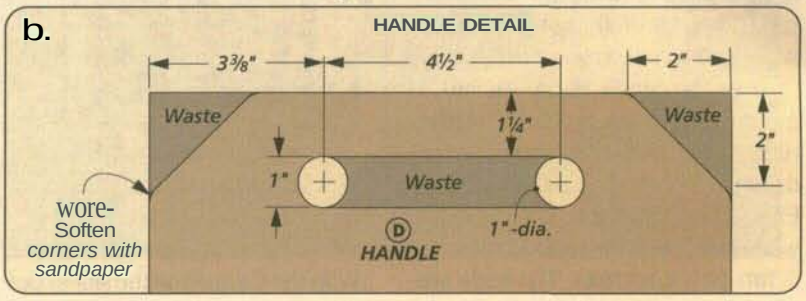
HANDLE PADS. When you have the opening cut out, slide your hand in it to test the fit I found that $^{l}/_{z}$" stock was a little too thin to carry comfortably. So I made the handle just a bit thicker by adding a couple Vi" hardboard pads to the faces.

These **handle pads** (E) are pretty straightforward. Simply cut them to size (iVi" x 4$^{1}/_{6}$"). Then round over the edges with a Vs" round-over bit Safety Note: Because these pads are narrow, when routing the ends you'll want to take a couple precautions. I used an auxiliary router fence with a small bit opening, and I supported the pieces through the cut with a backer board, see Fig. 4.

After the pads have been glued to the handle, I attached it to the tote. Here again, I simply screwed it in place, see detail 'a' above. Then I softened all the exposed edges of the handle with sandpaper.

▲ *A '/2 "-thick handle is too thin to hold comfortably — especially when the tote is full of tools. So loaded$^{1}/$*"-thick pads to each side of the handle.*

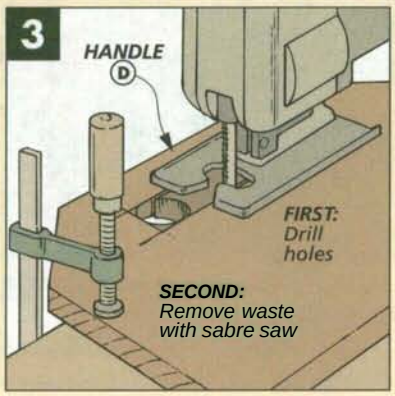


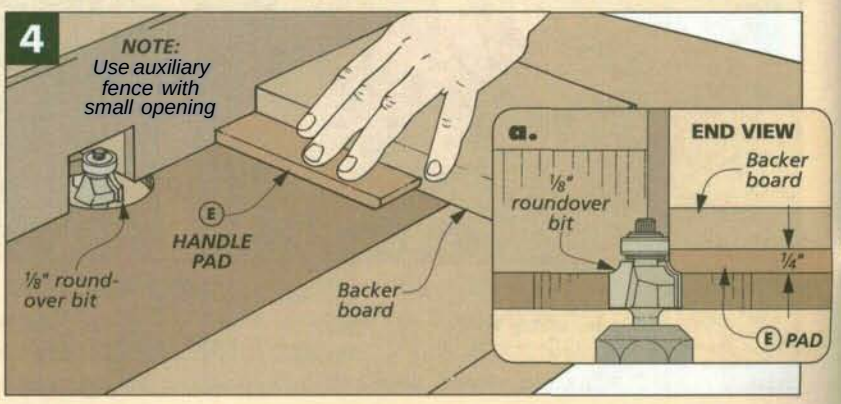


At this point, the tool tote's main compartment is pretty much complete. However, since the tote will probably get set down on the top of a table or other piece of furniture at some point, I wanted to prevent it from causing any scratches. So the last thing I did was add some rubber feet to the bottom, see Handle Exploded View and detail 'a' above.

TRAY

The opening under the tote's main compartment was designed for a sliding tray, see Tray Exploded View. The idea here is the tray will hold a plastic tackle box full of hardware. (For sources, see page 35.) And to make





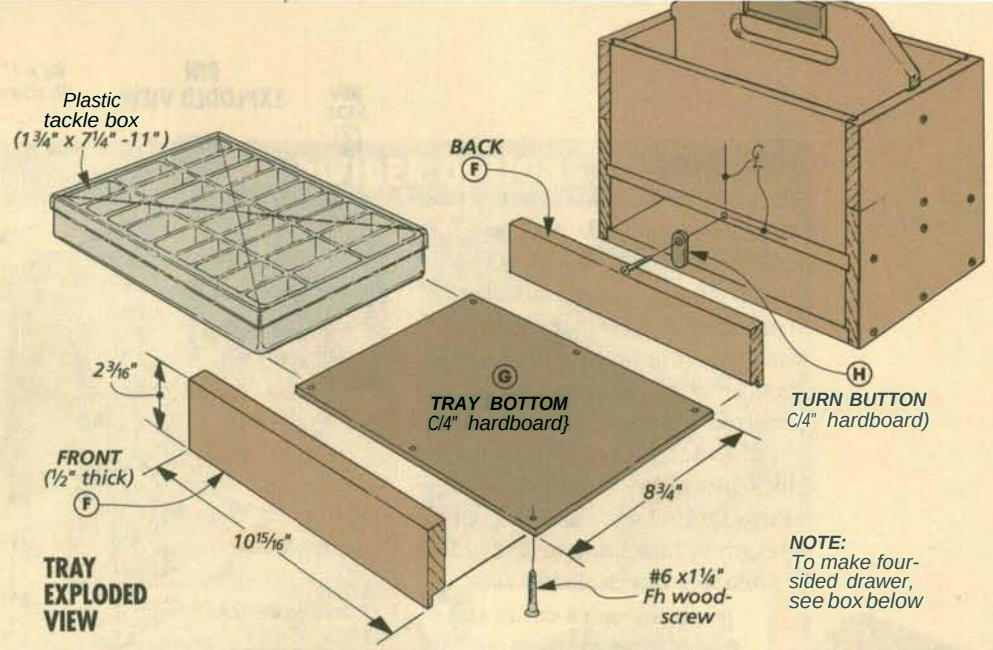
it easy to get the plastic box in and out, I left the ends open. (To build a traditional, four-sided drawer for the tote, see box below.)

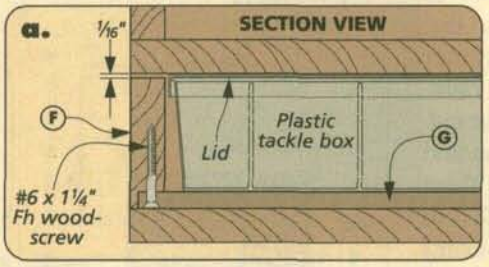
FRONT & BACK. The tray is simple. I started by cutting the front and back (F) pieces to size from ^"-thick stock, see Tray View. To make sure the tray slid in and out easily, I sized these pieces Vie" smaller than the opening in height and width, see detail 'a.'

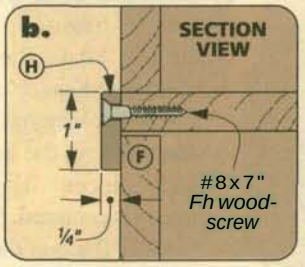
To hold the bottom panel, a %"-wide rabbet 3/s" deep is cut on the bottom edge of the front and back pieces, see Fig. 5.1 did this on the router table with a 3/4" straight bit.

BOTTOM. Now the tray bottom (G) can be cut from Vi" hardboard. It determines the depth of the tray, so it should be sized so the tray is the same width as the tote. (My piece was 8 3/4" x 10 15/i6".) Then the tray can be glued and screwed together.

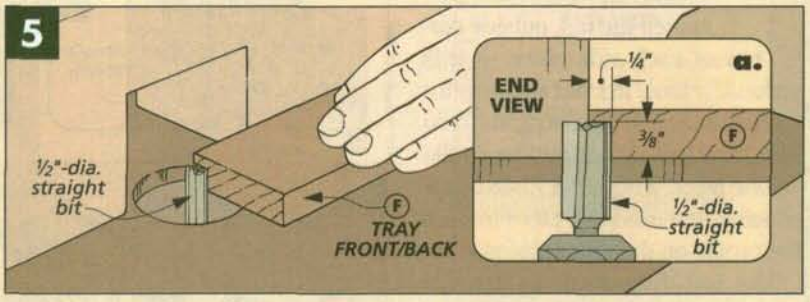
TURN BUTTONS. To prevent the tray from accidentally sliding out, I added turn buttons (H), see Tray View and detail 'b.' These l/y" hardboard pieces are small and awkward to work with. So I started with an extra-long, V2"-wide strip, cutting off l"-long pieces. To round the ends, I used a drum sander, holding the pieces with locking pliers, see photo at right Then they can be screwed to the tote.







A *When rounding the comers of the turn buttons, locking pliers will keep you from* sanding *your fingertips.*



DRAWER OPTION

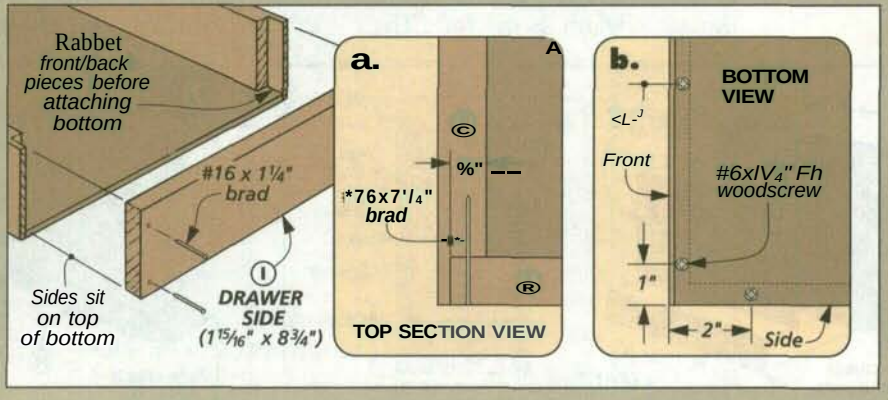
A sliding tray is great for boxes of hardware, but you can also make a drawer for holding small tools that would otherwise get buried in the bottom of the tote.

To make the drawer, you can cut the front and back (F) to size and cut the rabbet along the bottom edge as you would with the tray, see above. But before moving on to the bottom, cut a rabbet on the ends of the front and back pieces. These should be sized to hold the sides of the drawer, which will be V^" thick.

With the front and back pieces complete, you can cut the bottom (G) to size and glue and screw the tray together.

Now to turn the fray into a drawer, simply cut two drawer sides (I) to fit between the rabbets in the front and back pieces. The sides sit on top of the bottom panel, so they're slightly shorter than the front and back pieces (I 15/i6").

To add the sides, I glued them in place. Then I secured them with brads by nailing them into the front and back, and I screwed them to the bottom.



Side Bins

The last things I built for the tool tote were removable side bins, see Bin Exploded View. These allow you to "expand" the tote when you have a job that requires a few more tools. And when they're not attached to the ends, they can sit on your bench top to keep small tools in reach.

BIN SIDES. To begin, I cut four V&"-thick bin sides (J). These pieces start out 4V4[M] wide and are cut to length to match the height of the tote, see Bin Exploded View.

With the sides cut to size, I routed three V8"-deep grooves in each using a VV'-dia. straight bit in the router table, see detail 'b' at right. The two grooves on the outside will trap the front and back pieces. The third groove is centered. (ItTl hold a divider that's added later.)

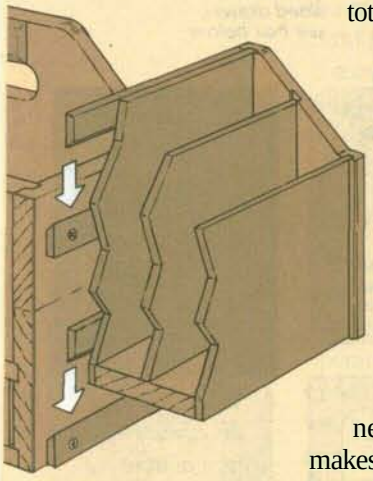
With the grooves cut, I angled the top, outside corner of each side piece — this makes the tools in front a little more accessible, see detail 'a' at right To do this, I first laid out and cut the profile on one piece. Then after it was sanded smooth, I used this piece to trace the profile on the other pieces.

The last thing to do to the side pieces is soften their edges. I routed a Vie" chamfer around the outside face and along the front inside edge of each, see Figs. 6 and 6a.

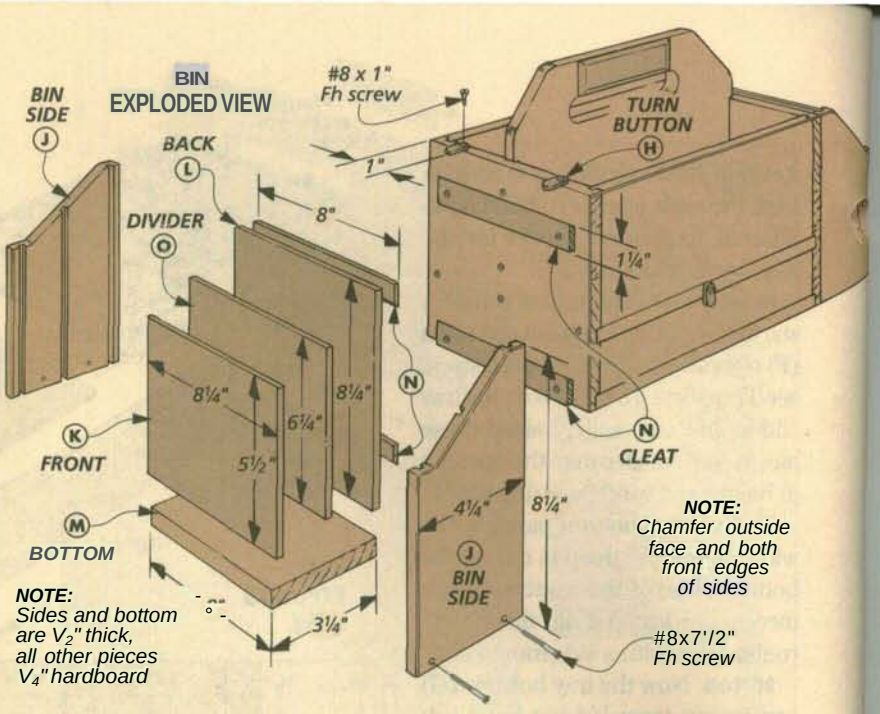
BIN FRONT & BACK. With the sides complete, the rest of the bin goes together pretty quickly. I cut two Vi" hardboard panels to size to make the bin front (K) and back (L), see Bin Exploded View. These pieces are cut to length (SW) so the bin ends up the same width as the tote. Their heights match the profile on the sides.

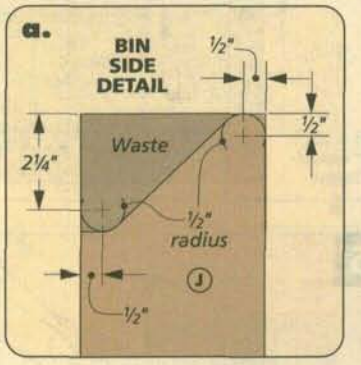
BIN BOTTOM. At this point the bins can be glued together. While the glue was drying, I cut y2"-thick bottoms (M) to fit the openings. Then I attached them with glue and screws.

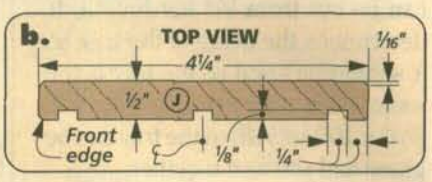
MOUNTING CLEATS. To make the bins removable, I used simple interlocking hardboard cleats, see Bin Exploded View and drawing in margin. This way, getting the bins on and off the tote takes only a few seconds.

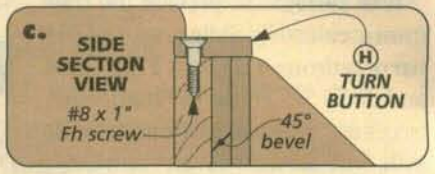


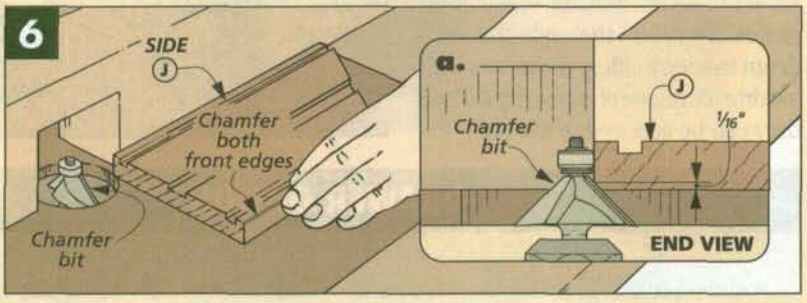
A *To attach the bins to the tote, 1 used two sets of interlocking cleats with beveled edges.*

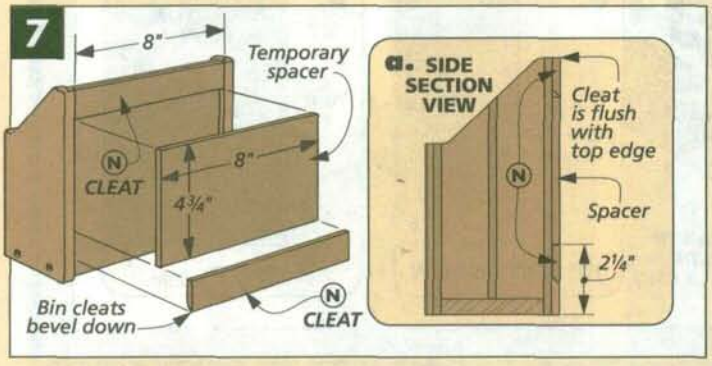


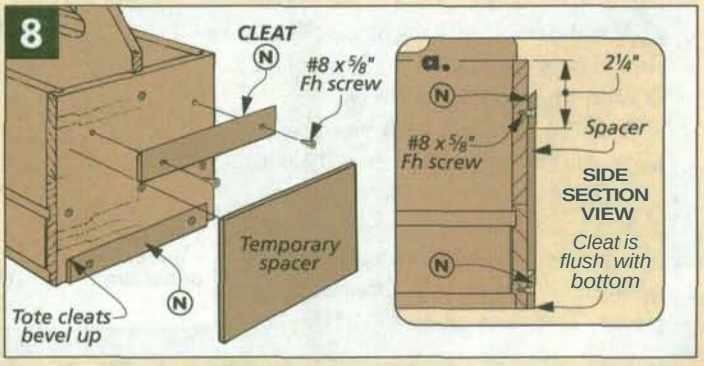












All eight of the cleats (N) are identical. These Vi" hardboard strips are cut iVi" wide and 8" long with a 45° bevel cut along one edge.

The real trick is to mount these cleats so that when you set the bins on the ends of the tote, all the edges will line up. The solution is to use a simple $4^{3}/4^{M}$-wide spacer, see Fig. 7.

I started with the bin first. The cleats here point down, and the top cleat is glued flush with the top of the bin, see Figs. 7 and 7a. To position the bottom cleat, I used the spacer.

Next, I worked on the tote. This time, the bevels face up, and the bottom cleat is flush with the bottom edge of the tote, see Figs. 8 and 8a. The procedure here is the same as on the bins, except you can screw the cleats in place as well as glue them.

While the cleats interlock, each bin really just hangs on the end of the tote. So it could fall off if bumped just right. To prevent this, I added more turn buttons (H) to the top of the tote, see Exploded View and detail 'c.'

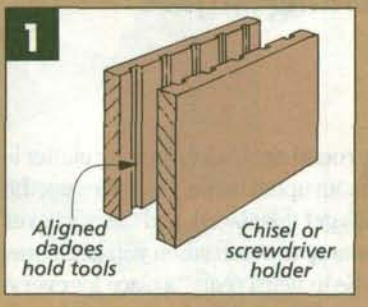
BIN DIVIDERS. Finally, to keep the tools in the bins a little more organized, you can divide the space inside the bins. I slid a single bin divider (O) into each bin, see Bin Exploded View. But there are other ways to organize the space. For a couple more ideas, see the box and margin at right C!

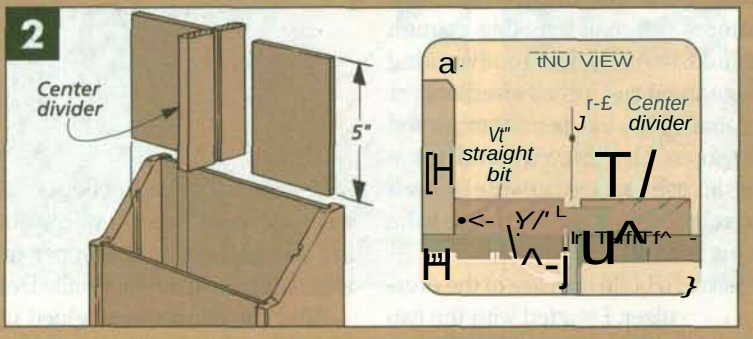
BIN DIVIDER OPTIONS

When it comes to filling the bins, there are a number of options, see photo. For one bin, I made holders for my chisels and screwdrivers.

To do this, I simply cut a series of dadoes in two $^{3}/4$"-thick blanks, see Fig. 1. Size and space these dadoes to hold the blades of the tools. Then you can glue the two halves so the dadoes align. Shop Tip: You can also make these holders out of "blue board," see margin.

Another way to organize the bin is to double the compartments, see Fig. 2. To do this, simply cut a $^{1}/2^{ll}$-thick center divider to fit between the front and back pieces. Next, rout centered grooves in this divider, see Fig. 2a. Then cut a couple hardboard pieces to fit.





▲ Rigid *insulation makes a good, lightweight filler for holding small hand took.*

MATERIALS & SUPPLIES

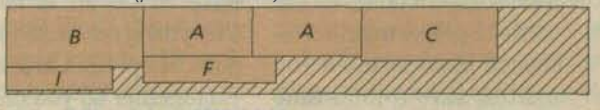
A	Ends (2)	V_2 x $8^{1}/_4$ - 9
B	Sides (2)	$^{1}/_2$x5- $11^{1}/_4$
C	Bottoms (2)	ttx9- $11^{1}/_4$
D	Handled)	$^{1}/_2$ x $7V_2$ - $11^{1}/_4$
E	Handle Pads (2)	$^{1}/_4$hdbd. - $1V_4$ x $4V_2$
f	Tray Front/Back (2)	$^{1}/_2$ x 2^{3}/ie - 10^{15}/ie
G	Tray Bottom (1)	V_4 hdbd. - 8% x 10^{15}/ie
H	Turn Buttons (6)	V_4hdbd. -^{1}/2 x 1
I	Drawer Sides (2)*	$^{1}/_2$ x $1^{15}/1_6$ - 8%
J	Bin Sides (4)	V_2 x $4^{1}/_4$ - $8^{1}/_4$
K	Bin Fronts (2)	$^{1}/_4$hdbd. - $5V_2$ x $8V_4$
L	Bin Backs (2)	$^{1}/_4$hdbd. - $8^{1}/_4$ x $8^{1}/_4$
M	Bin Bottoms (2)	$^{1}/_2$ x $3^{1}/_4$ - 8
N	Bin Cleats (8)	$^{1}/_4$hdbd. - $1^{1}/_4$ x 8
O	Bin Dividers (2)	$^{1}/_4$hdbd. - $6^{1}/_4$ x $8^{1}/_4$

*Needed only if building drawer instead of tray

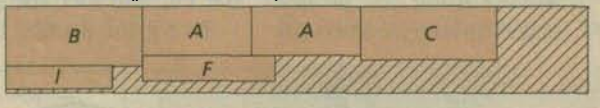
- (4) Rubber Feet w/Screws
- (24) #8 x $1V_2$" Fh Woodscrews
- (6) #8x1" Fh Woodscrews

CUTTING DIAGRAM

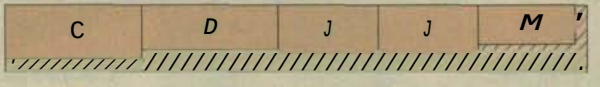
1x8 - 4' Pine (planed W thick)



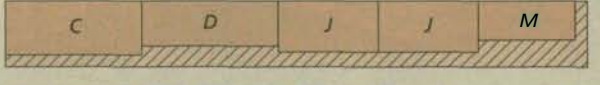
1x8 - 4' Pine (planed '/?" thick)



1x6 - 4' Pine (planed ¥2" thick)



1x6 - 4' Pine (planed Vi'"thick)



Also Needed: 48" x 48" sheet of W hardboard

- (8) #8 x ^{5}/s" Fh Woodscrews
- (6) #6 x $1V_4$" Fh Woodscrews
- (1) $1^{3}/_4$" x $7^{1}/_4$" -11" Plastic Box *(Piano* 3600 Series)

WOODWORKING PROJECT

WALL-MOUNTED ORGANIZER

This project features two bins for mail, a generous drawer, and a handy writing surface.

A-round my house, fighting clutter is an uphill battle. Mail piles up; the bills get misplaced, and there's never a stamp or a pen when you need one.

So to help create "a place for everything," I built this simple organizer. It features two mail bins (big enough to hold my favorite woodworking magazines) and a good-sized drawer for small notepads, pens, stamps, and envelopes. There's even a writing surface in case you need to write yourself a reminder. (Something I seem to be doing more of these days.)

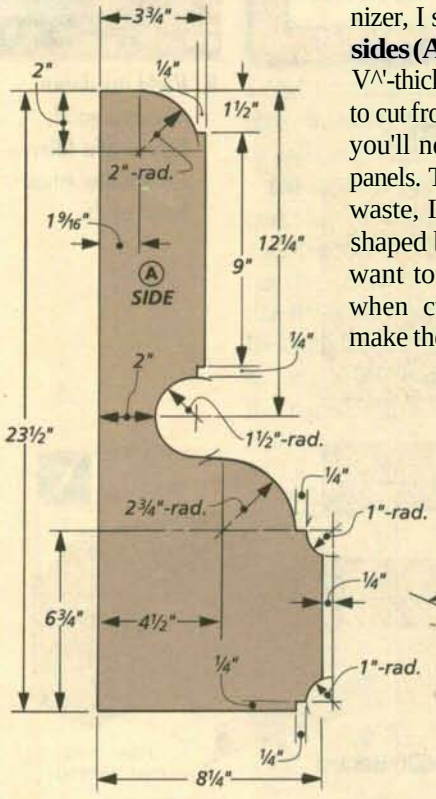
SIDES. To build the case of the organizer, I started with the two **sides (A),** see Fig. 1. These V^'-thick panels are too wide to cut from a single board, so you'll need to glue up two panels. To cut down on the waste, I glued together Lr shaped blanks. And if you want to save a little time when cutting the profile, make the long piece exactly 33/4" wide with parallel edges. This way, you won't need to worry about the straight cut on the upper front edge later, see the Side Profile Detail.

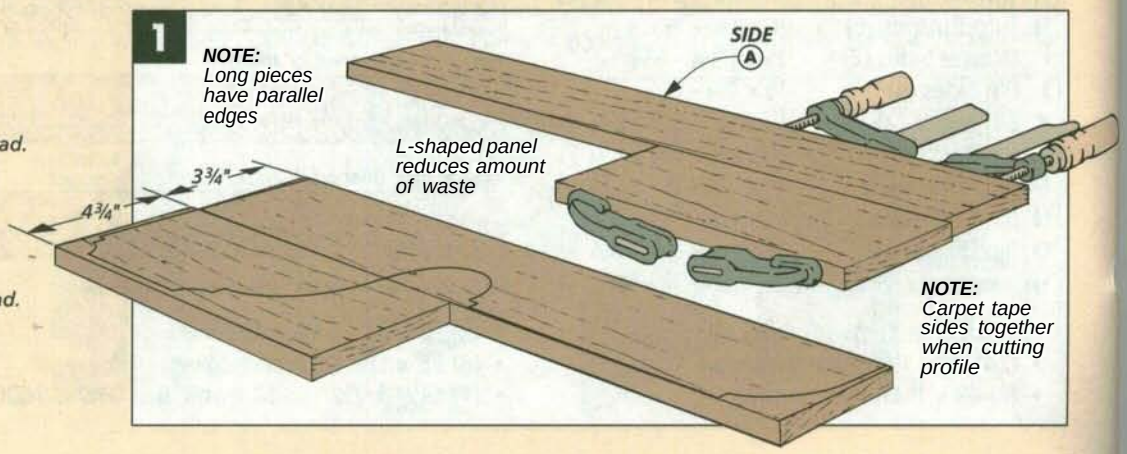
After the panels were glued up, I laid out the curved profile on their front edges, see Side Profile Detail at left. While this profile looks a little intimidating, don't worry. You don't have to be an artist to draw it. Everything can be laid out with a compass. Shop Tip: Carpet tape the panels together so you only have to lay out, cut, and sand the profile once.

To cut the profile, I used a band saw (though you can also use a sabre saw). Just remember that the important thing here is that the curves end up graceful and smooth.

When the profiles are cut and sanded, the sides are nearly complete. All that's left is to cut some dadoes and a rabbet, see Case Exploded View.

To hold the horizontal dividers that create the drawer opening, I cut two V8"-deep dadoes in each side with an auxiliary fence on the miter gauge to support the piece, see detail 'c' and Fig. 2. If s important that these dadoes align, so I used the rip fence as a stop.





This works fine for the left side, see Fig. 2. But when the bottom edge of the right side is set against the rip fence, only the short front edge rests against the auxiliary fence, see Fig. 3. So to support the upper end of the panel, I added a 4¹/£"-wide scrap piece.

The last step on the sides is to cut a³/s"-deep rabbet along the back edge of each side, see detail 'a.'These will hold the back rails and back panel.

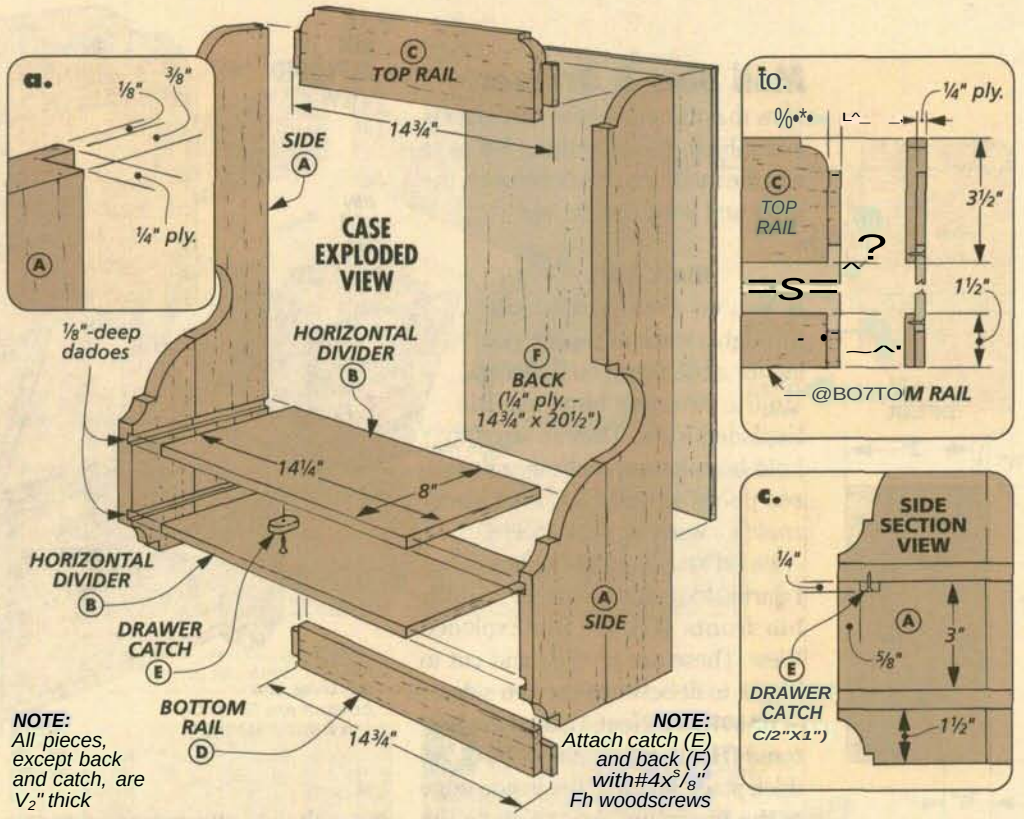
DIVIDERS & BACK RAILS. With the sides complete, I began work on the dividers and rails that connect them.

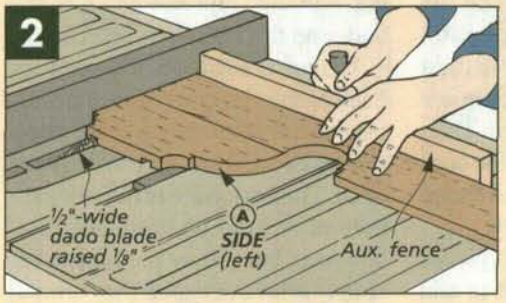
I started with the two **horizontal dividers** (B), see Case Exploded View. These y2"-thick panels fit between the dadoes in the sides and stop flush with the rabbets in back. (My dividers ended up 8" x 14V4".)

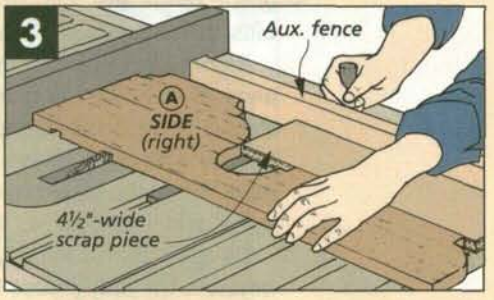
The other two pieces that connect the sides are the back rails, see detail 'b' at right The **top rail** (C) is 3V&" wide, while the **bottom rail (D)** is only 1V2". But both are cut to fit between the rabbets you just cut in the sides. (Mine were 14³/4ᴹ long.)

To connect with the sides, the ends of the rails are rabbeted to create a ¹A" x³/s" tongue, see Case Exploded View and detail *V*. Then another rabbet is cut along the inside edge of each rail to hold a Vi" plywood back later.

The bottom rail can be set aside for a moment while you cut the curved profile on the top corners of the top rail, see Case Exploded View. After laying out this profile, I cut it out with a band saw, see Figs. 4 and 4a. The square edges can be cut right to the line. But I stayed to the waste side of the curve. Then to smooth the curve and remove any burn marks, I sanded it smooth with a shop-made "sanding stick," see photo below right.



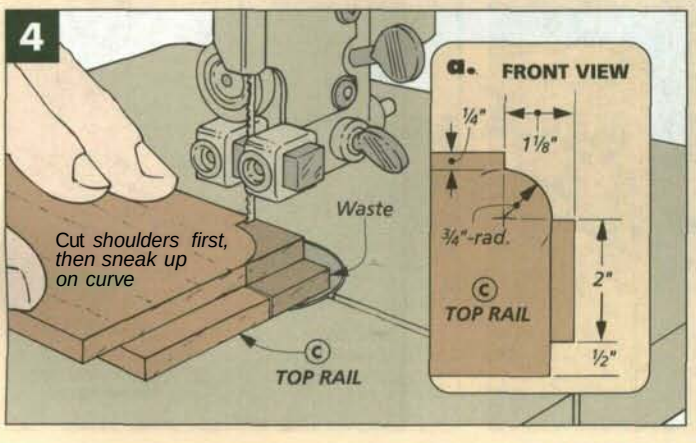


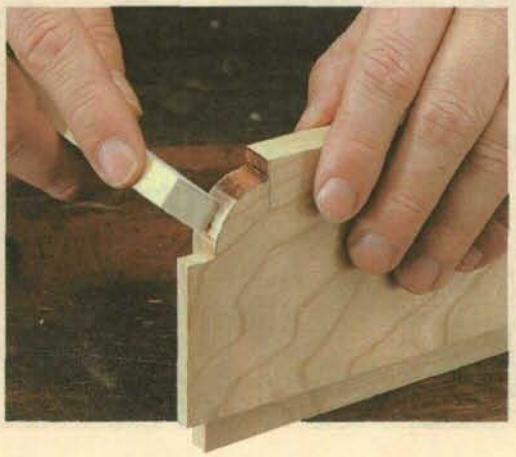


The organizer is almost ready to be assembled. But first, I made a catch for the drawer that's added later. (The dividers are too close together to add it after assembly.) To do this, I cut a VV'-thick **drawer catch** (E) with rounded corners (W x 1"). It's simply screwed to the inside face of the upper divider, see detail 'c' above.

ASSEMBLY. To assemble the organizer, the dividers are glued between the sides. (Just make sure the drawer catch on the upper divider is oriented correctly.) Then the back rails can be glued and screwed in place.

Now to complete the case, cut a W plywood back (F) to fit the rabbets in the sides (14³A" x 20V2"), see Case Exploded View. Then screw it in place.

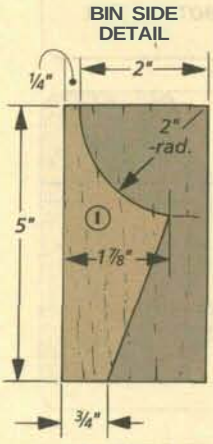




If you use a file to smooth a curve, the teeth on the edges can cut into the shoulders. Instead, 1 make a sanding stick with adhesive'backed sandpaper to do the job.

Mail Bins & Drawer

Now that the case of the organizer is assembled, the only thing left is to add the mail bins that fit between the sides and build the drawer.



MAIL BINS

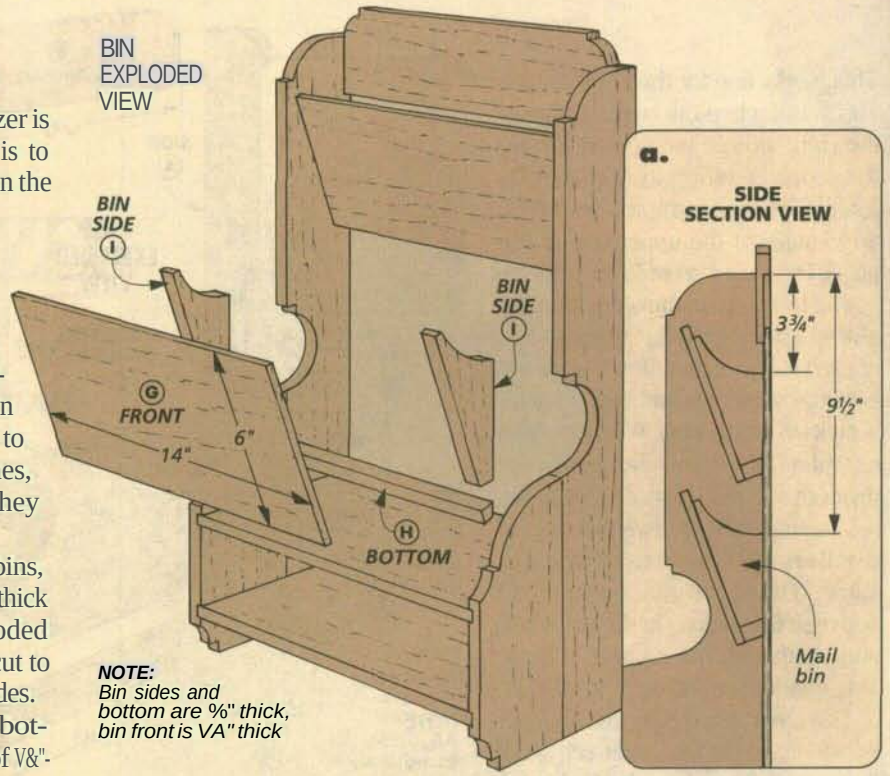
If you've ever had to dig through a stack of papers looking for a bill, then you'll appreciate the two mail bins, see Bin Exploded View. They're sized to hold both letters and magazines, see photo on page 31. Plus, they angle forward for easy access.

BIN FRONTS. To build the mail bins, I started by making a couple V^'-thick bin fronts (G), see Bin Exploded View. These are 6" wide and cut to length to fit between the two sides.

BIN BOTTOMS. Next, I added the bottoms (H). These are just strips of V&"-thick stock glued to the inside edge of the bin fronts. And to angle the bins, the back edges are beveled 20°.

Rather than bevel the edges right away, it was easier to glue a square strip (l"-wide) to the bin front Then after the glue dried, I beveled the back edge 20° so the bottom piece ended up 3/4" wide, see Fig. 5a.

BIN SIDES. With the bottom pieces beveled, the only pieces left to add are the bin sides (I), see Bin Exploded View. These pieces are easier to make than they look. Just lay out the arc and angled back edge on a V2"-thick blank that's cut 2V4M wide, see Bin Side Detail. Then cut them out with the band saw or sabre saw and sand them smooth, see Fig. 6.



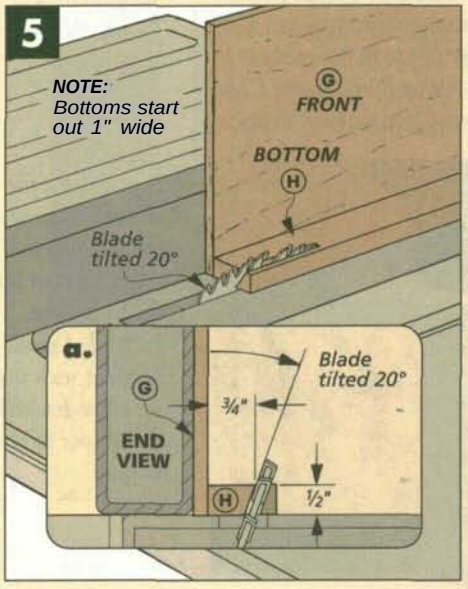
To glue the sides to the front and back pieces, just run a small bead of glue on the sides and press them into place with hand pressure for a minute or so. The back edge of the sides and bottoms should be flush, see detail 'a' above, but if they're not, you can simply sand them until they are.

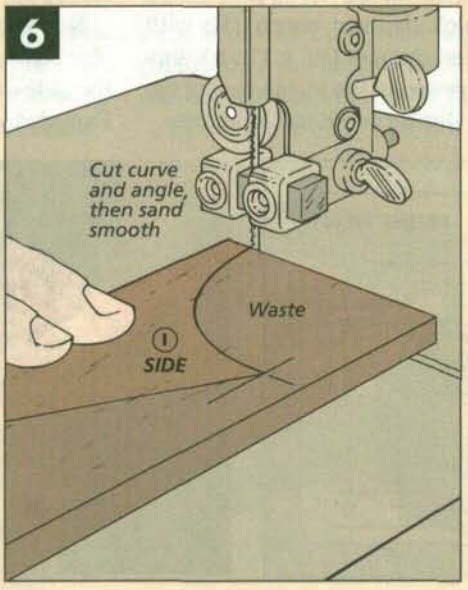
ATTACH BINS. At this point, the bins are complete, and they can be screwed to the back of the organizer. To position the bins, I measured from the top of each side (A) to the top, back edge of the bins, see detail 'a.' light clamping pressure across the sides will hold the bins in position while you drill the pilot holes and screw them in place, see Fig 7.

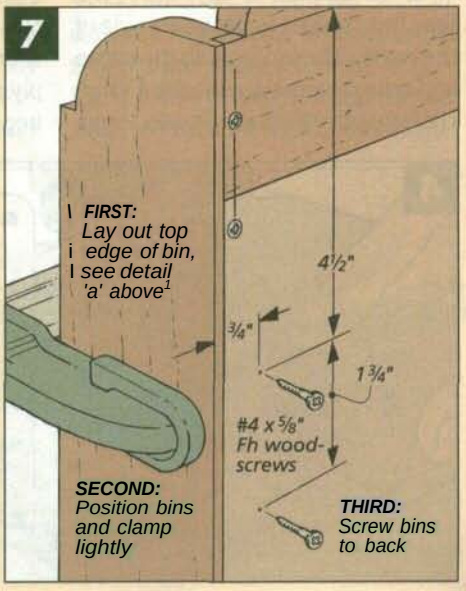
DRAWER

All that's left now is to make the drawer, see Drawer Exploded View. You can make your drawer as simple or complicated as you like. I built mine with a locking rabbet joint and "dressed up" the front with a cove profile and a small wood knob.

DRAWER FRONT. The locking rabbet joint and cove profile at the front of the drawer require a 3/4"-thick drawer







front (J). (If s the only 3/i"-thick piece on the project.) I sized my front to allow for a Vie" gap on the top and sides of the opening.

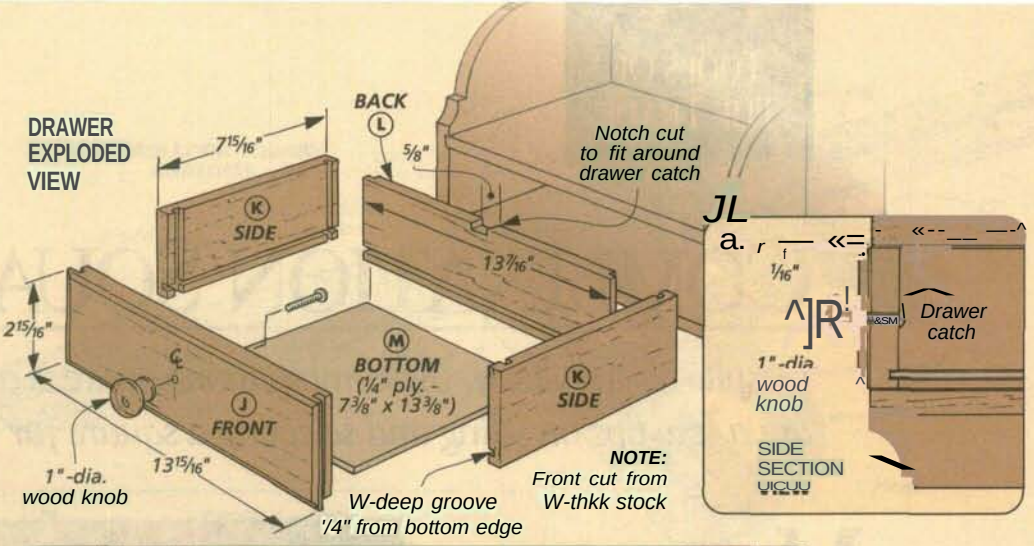
SIDES & BACK. Next the drawer sides (K) can be cut to size, and the locking rabbet joints can be cut, see detail 'b' and page 16. Then the drawer back (L) can be cut to size. It isn't as long as the front, and the joinery is a bit different—it connects to the sides with a simple tongue, see detail 'b.'

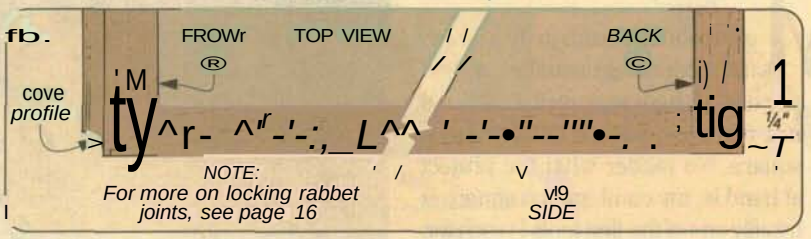
DRAWER BOTTOM. When the drawer joinery is complete, there are still a couple things to do before you can glue the drawer together. First, a groove needs to be cut in each piece to hold a Vi" plywood bottom (M).

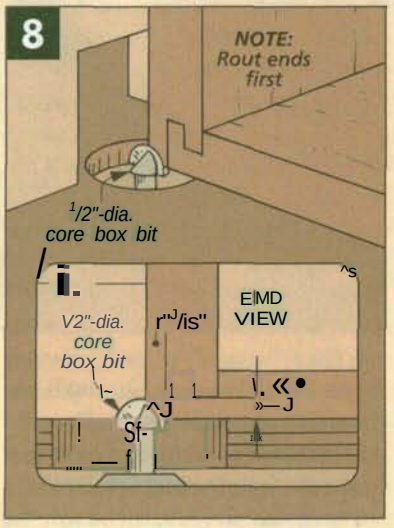
Also to allow the drawer to fit around the drawer catch (E), you'll need to cut a 5/8M-long notch in the back piece, see Exploded View.

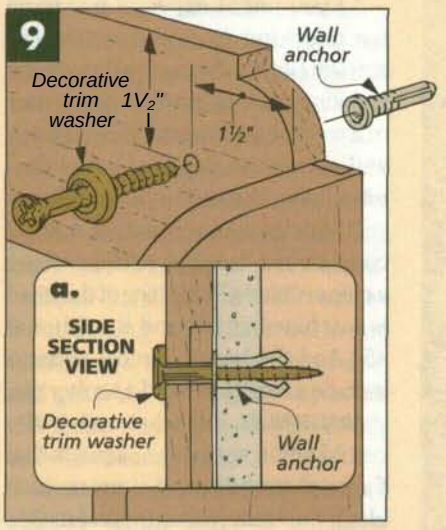
FRONT PROFILE. After the drawer was glued together, I routed a cove profile around its front face with a y4M-dia. core box bit, see Fig. 8. Rout the ends first so that when routing the sides you'll clean up any chipout. And use a miter gauge to support the drawer.

MOUNT TO WALL After the wood knob was added and I had wiped on a couple coats of an oil finish, I mounted the organizer to the wall. To do this, I used brass-plated woodscrews and decorative trim washers. And to make sure the organizer was secure, I used wall anchors, see Figs. 9 and 9a. 09









MATERIALS & SUPPLIES

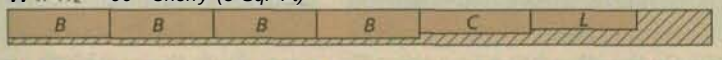
IA	Sides (2)	½ x 8¼ - 23v2	
B	Hor. Dividrs. (2)	1/2 x 8 - 14V4	
C	Top Rail (1)	1/2x31/2- 143/4	
D	Btm. Rail(1)	1/2x 11/2 - 143/4	
E	Drwr. Catch (1)	¼ - ½ x 1	
F	Back(1)	1/4ply.-143/4x201/2	
G	Bin Fronts (2)	1/4x6- 14	
H	BinBtms. (2)	1/^x3/4- 14	
I	Bin Sides (4)	1/2 x 21/4 rgh. - 5	
J	Drwr. Front (1)	3/4 x 215/16 - 1 315/16	
K	Drwr. Sides (2)	1/2 x 215/16 - 715/16	
L	Drwr. Back (1)	v2x215/16- 137/16	
M	Drwr. Btm. (1)	1/4 ply. - 73/8 x 13%	

- (1) 1 "-dia. Wood Knob w/Screw
- (29) #4 x %" Fh Woodscrews
- (2) Wall Mounting Hardware

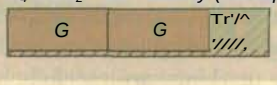
CUTTING DIAGRAM

%" x 7" - 96" Cherry (4.6 Sq. Ft.)

W x 4½" - 96" Cherry (3 Sq. Ft)



V4" x &/2" - 36" Cherry (1.6 Sq. Ft.)



Also Needed: One 3" x 14" (rgh.) piece of %"-thick solid cherry and one 2' x 2' sheet ofW cherry plywood

The wide drawer on this organizer keeps everything you need for daily mail and messages close at hand.

COMBINATION SQUARE

Despite its simplicity, the combination square is amazingly versatik. Here are a few tips on using and sekcting a square for your shop.

Most tools that claim to do a dozen different things usually can't do any one of them very well. But that's not the case with a combination square. No matter what the project at hand is, my combination square is usually one of the first tools I reach for.

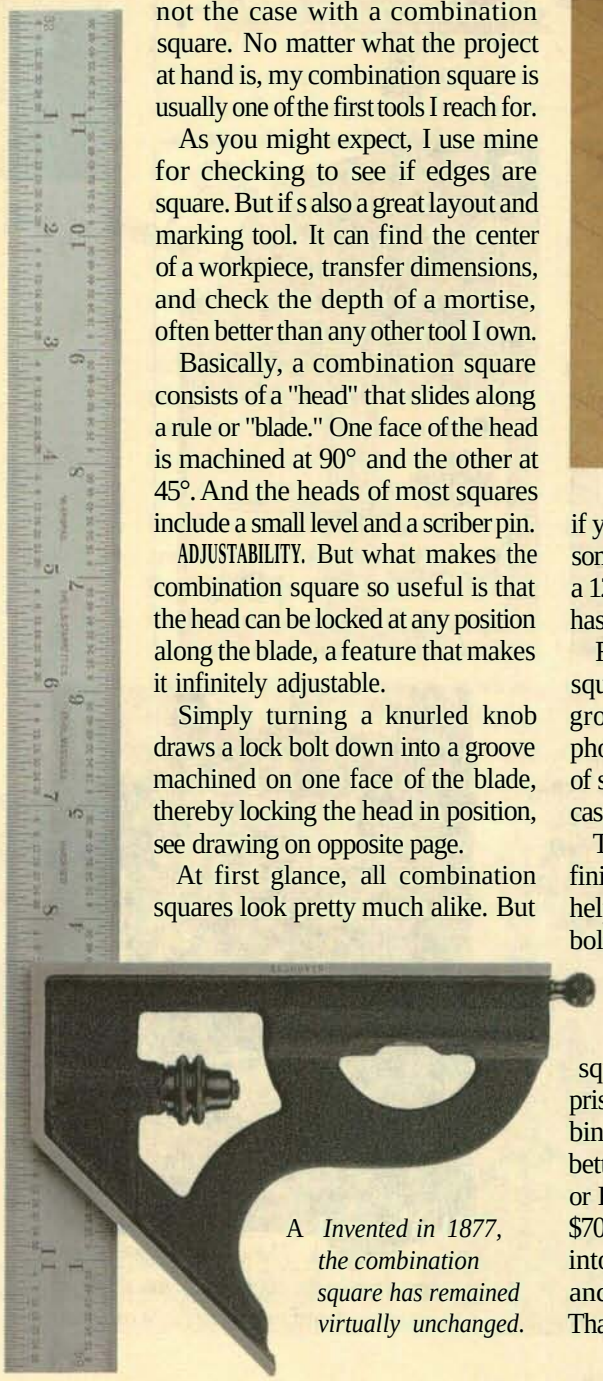
As you might expect, I use mine for checking to see if edges are square. But if s also a great layout and marking tool. It can find the center of a workpiece, transfer dimensions, and check the depth of a mortise, often better than any other tool I own.

Basically, a combination square consists of a "head" that slides along a rule or "blade." One face of the head is machined at 90° and the other at 45°. And the heads of most squares include a small level and a scriber pin.

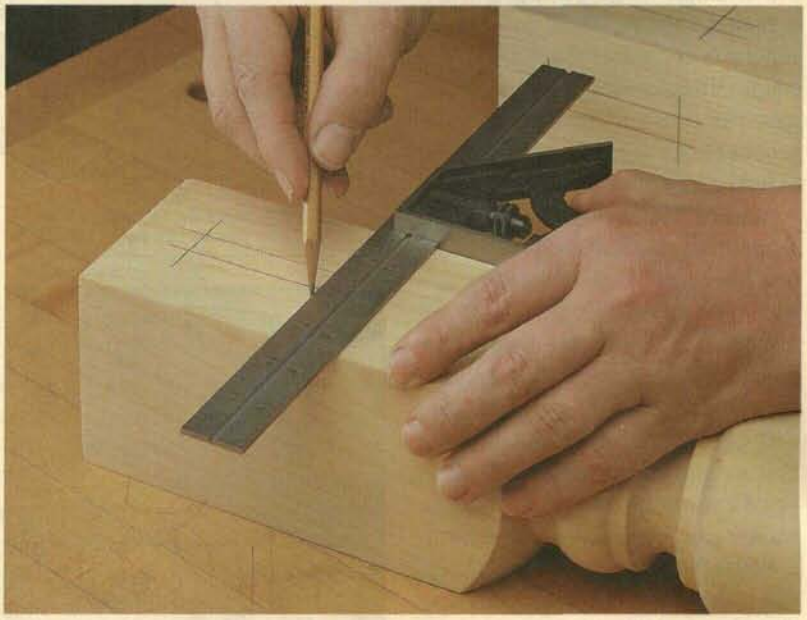
ADJUSTABILITY. But what makes the combination square so useful is that the head can be locked at any position along the blade, a feature that makes it infinitely adjustable.

Simply turning a knurled knob draws a lock bolt down into a groove machined on one face of the blade, thereby locking the head in position, see drawing on opposite page.

At first glance, all combination squares look pretty much alike. But if you take a closer look, you'll see some differences. For years, I've used a 12" Starrett combination square. It has some features that I really like.



A *Invented in 1877, the combination square has remained virtually unchanged.*



For example, the head of the square is made of heavy, cast iron, ground nice and smooth, see left photo on opposite page. (The heads of some squares are made from die-cast metal or even plastic.)

The 12" blade has a satin-chrome finish that makes it easier to read and helps to prevent rust. And the lock bolt is spring-loaded so it holds the blade in place while I'm making slight adjustments.

COST. Because I bought my square years ago, I was a little surprised to see how much a good combination square costs these days. A better- quality square (like a Starrett or Brown & Sharpe) will cost about $70. On the other hand, you can walk into just about any hardware store and buy a square for $10 or less. That's a pretty substantial difference.

To find out why there is such a discrepancy, I called the Starrett company and spoke to Bob Alien, department head for special orders. Bob explained several of the manufacturing differences that set Starrett squares apart from some of the lower-priced squares on the market

For starters, on many lower-priced squares, the slot that holds the blade is milled with aflat bottom. But Starrett squares are made with a small, raised rib on the bottom of the slot, see center photo on opposite page.

This rib does two things. First, it raises the blade up so the sharp edges don't catch on the bottom of the slot And second, it provides an accurate surface for the blade to seat against when the lock bolt is tightened.

Another major difference is in the blade, see right photo on opposite page. Each Starrett blade starts off as a thick, hardened blank which is ground and polished on both sides. The markings are carefully laid out

by machine and then acid-etched into the blade. Finally, the ends and the edges of the blade are accurately ground to finished dimensions.

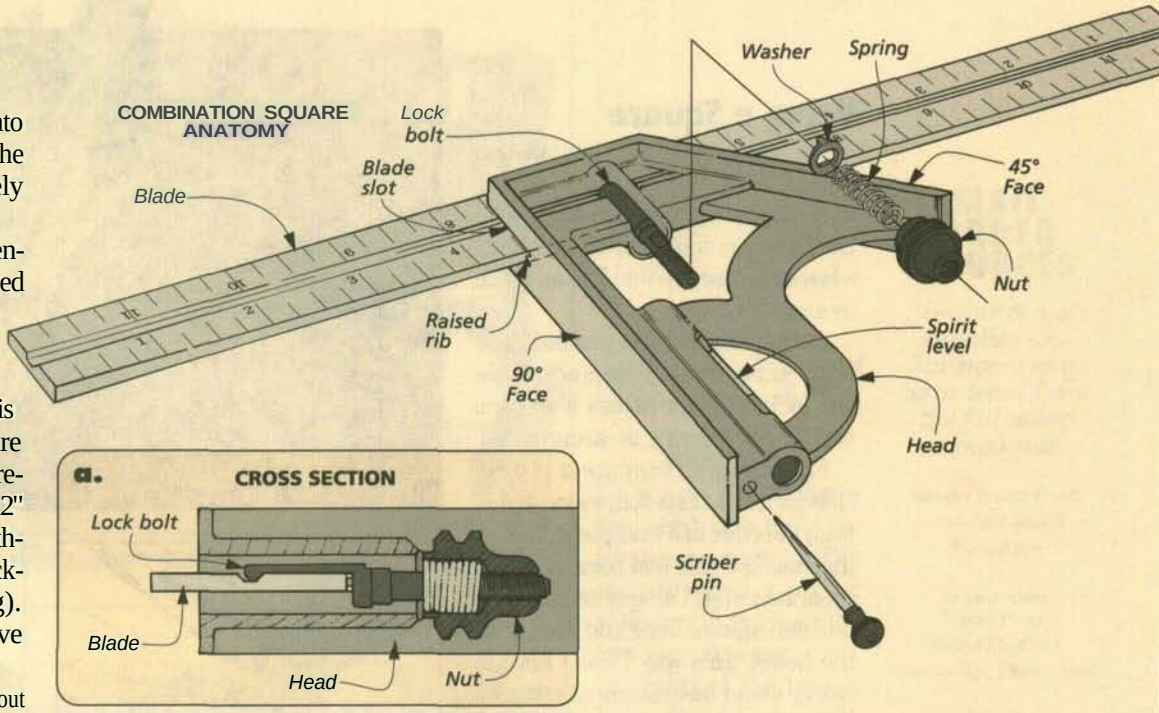
In contrast, blades on less expensive squares are usually die-stamped out of softer, annealed steel. This means they're more likely to get bent or nicked.

Finally, the biggest difference is in the accuracy. Starrett squares are hand-fitted and checked for squareness. According to Bob, a new 12" Starrett square is accurate to within .002" (that's about half the thickness of the page you're reading). Less expensive squares don't have the same tolerances.

HOW SQUARE IS SQUARE? To test out Starrett's claim, I bought a few different brands of squares. First I purchased a Starrett square for about $68. Next, I ordered a square from a woodworking catalog for $30. Even though the finish on this square left a lot to be desired, it had a cast iron head and an engraved rule, like the Starrett. Finally, I purchased a square with a die-cast head and stamped rule at a hardware store for $10.

With all these squares in hand, I paid a visit to a friend at a local manufacturing plant to test the squares for accuracy. And just for good measure, I brought along my old Starrett square to have it checked out as well.

As you might expect, the brand-new Starrett tested the best—it was off by less than .002". The $30 square and the $10 square didn't do quite as well. They were off by about .015". But this is still less than *Vet"* and is probably fine for woodworking.



The real surprise came when I checked my old Starrett. After several years of hard use, it was still more accurate that either of the new, less-expensive squares.

Of course, in the world of woodworking, you probably don't need this kind of accuracy. After all, I rarely work with any dimensions smaller than Vy. But I figure I can use all the help I can get. And I really like knowing that my "square" is still reasonably square after all these years.

In addition to this accuracy, a well-made square has a quality that you can feel. Pick one up and see how your hand naturally conforms to the shape and heft of the tool. The blade slides smoothly and effortlessly. The lock bolt turns without binding. And the finish begs to be touched. Owning a tool like this inspires me to try and do my best work as well.

CARE AND USE. Unlike a fixed-blade try square, a combination square has moving parts which are subject to wear. Over time, this wear can affect the accuracy of the square.

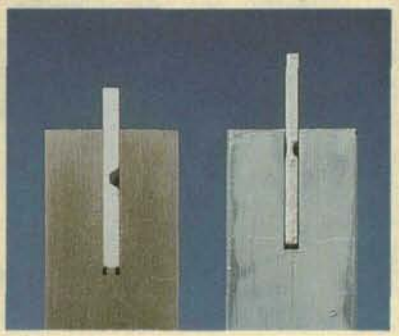
In a home-shop environment, it's unlikely that you'll ever"wear out" a good combination square. But I still like to take a couple of precautions.

Since most of the wear occurs from sliding the blade back and forth in the slot, I try to keep dust and grit from working its way in the slot I also wax the blade periodically to help reduce friction.

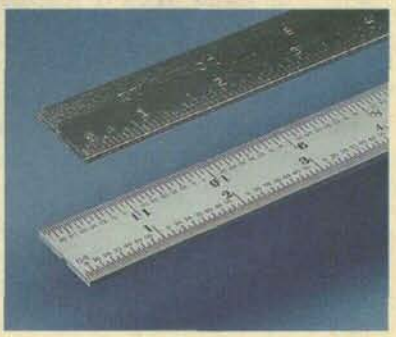
And whenever I slide the blade, I push up on the lock bolt to release the spring tension. This allows the blade to slide more freely.

Other than this, the only maintenance necessary for a combination square is to avoid dropping it or letting it "walk" away.

Cast iron. *Better squares usually have a head made of fine-grain cast iron (left). Theheadon the right is a rougher version made of die-cast metal.*



Machined fit. *The thick, steel blade on the left sits on a raised rib in an accurately machined slot, as opposed to the loose-fitting blade on the right.*



Etched blade. *A satin-chrome finish and finely-etched markings make the lower rule in this photo easier to read than the die-stamped rule above.*

Using a Square

As the name implies, a combination square is useful for marking (or checking) a square edge, see photo. But I use my combination square as a layout and set-up tool just as much as a squaring tool.

AIAYOUT TOOL The fact that the blade on a combination square is adjustable and locks in place makes it an ideal tool for transferring measurements.

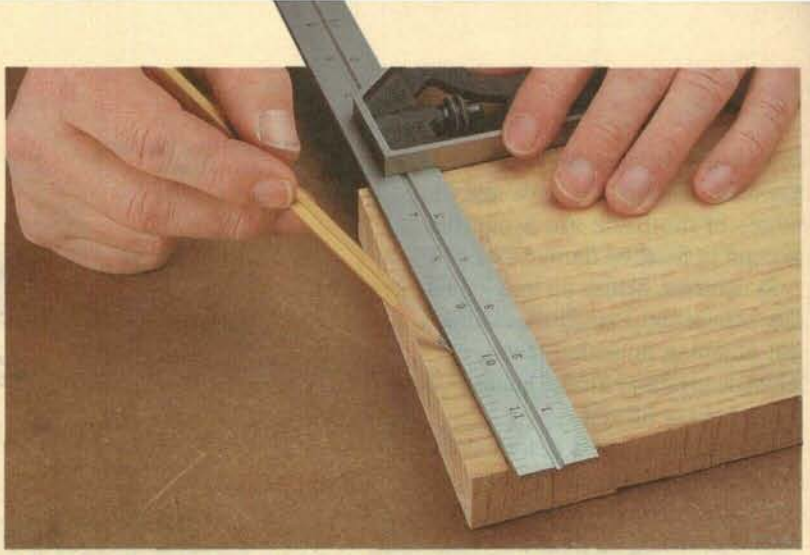
For example, suppose a project calls for a row of six screws located 2" from the edge of a workpiece. Rather than using a rule and measuring six separate times, I simply set my combination square once and lay out all the holes. This way I don't have to worry about measurement error.

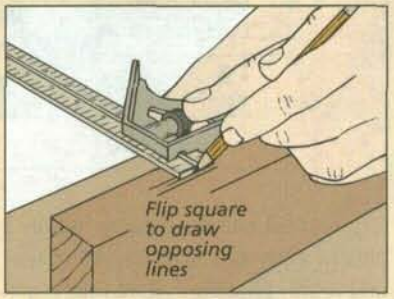
This idea can be used for lots of layout procedures, such as finding the center of a workpiece or drawing a line parallel with the edge of a board, see top two drawings at right.

A SET-UP TOOL. In addition to laying out, the combination square is a handy gauge for checking finished workpieces or setting up tools.

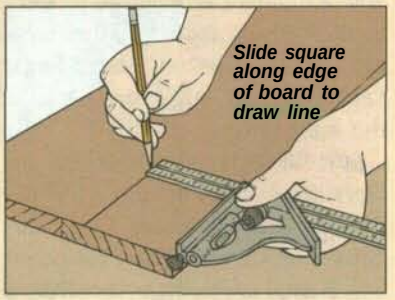
It can be used for checking the depths of mortises, grooves, or rabbets. And by removing the blade, the head of the square is handy for checking your saw blade on 90° or 45° cuts, see lower drawings at right.

SPACE SAVER. One of the things I really like about combination squares is that they're great space savers. Instead of half a dozen single-purpose tools littering your workbench, you only need one. Just keep track of where you set it down. OS

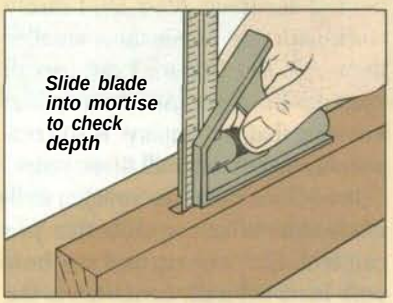




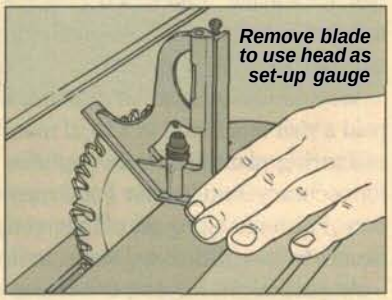
Zero in on the center. *Draw a line off of one face of a workpiece, then flip the square over and draw an identical line off the other face.*



Layout tool. *To draw a line parallel to the edge of a board, lock down the head and draw a line with the pencil held against the end of the blade.*



Depth gauge. *To check the depth of a mortise or rabbet, loosen the blade and drop it down into the mortise until it bottoms out.*



Setup gauge. *With the blade removed, the head of the combination square makes a handy setup gauge for 90° and 45° blade settings.*

COMBINATION SQUARE ACCESSORIES

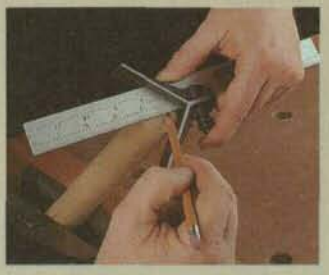
Some combination square manufacturers also make a couple of accessories to go along with the basic square.

PROTRACTOR HIAD. One of these is the protractor head, see left photo. This can be adjusted from 0° to 180°. It's useful for laying out or measuring angles.

CENTER FINDER. Another accessory is the center finder, see right photo. The center finder is used to locate the center of round stock (dowels). It comes in handy when marking out the ends of a piece of turning stock.

LARGER SQUARES. Better combination-square makers also offer different length blades (up to 36" long) that fit in the same head. This way, if you have an occasional need for a longer square, all you have to purchase is the blade.

Protractor head. *To lay out any angle, just adjust the protractor head to the desired angle and mark out a line.*



Center finder. *Place a dowel in the V-shaped jaws of the center finder and draw a couple of intersecting lines.*

f)

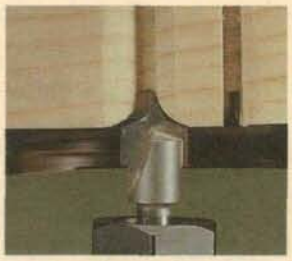
SOURCES

Woodsmith Project Supplies is currently offering a hardware kit for one of the projects in this issue. Similar supplies, as well as supplies for the other projects featured, are also available at local woodworking stores or the mail order sources at right Here's some information you'll need to know.

HARVEST TABLE

To build the harvest table on page 6, you'll need some hardware for attaching the legs as well as some for securing the breadboard ends. Currently, *Woodsmith Projects Supplies* has put together a hardware kit that includes everything you need to build the table:

(12) Tabletop Fasteners
(4)2"x4 1/2"Corner Brackets
(2) l"-dia. Wood Knobs w/Screws
(8) 3/8"x 3/4" -Vi" Barrel Nuts
(12)#8x3/4"KhScrews



A *To create* the *bead on the legs of the harvest table, we used a special beading bit, see the list of sources alright.*

(8)y4"-20x4 3/4" Threaded Rod
(8) "A" Washers
(8)y4"-20HexNuts
(4) 5/i6" Washers
(4)5/i6"-18HexNuts
(4)5/i6"-18x3"Hanger Bolts
(30) 4d Finish Nails

• Harvest Table Kit
7122-100 $16.95

Note: If you wish to buy the hardware separately, many of these items are available at local hardware stores. The tabletop fasteners, corner brackets, barrel nuts, and wood knobs are available from the mail order sources at right.

ROUTER BITS. Besides the hardware, there is a special router bit you'll need to create the bead profile on the the legs, see photo. You might find this bit called an ogee bit, a pointed round-over bit, or an end-point bit, but the important thing is that the "point" is W-dia. or less and the cutting radius is 1A", see the mail order sources at right

TURNED LEGS. Instead of using a traditional turned leg on the harvest table, we designed a unique double-tapered leg. It still looks "country," but you don't need a lathe to make it. However, if you prefer a turned leg, there are several companies that sell them, see the sources listed at right

The legs for our harvest table were SVV1 square and 29" long. If you purchase a leg that is slightly thicker or thinner, this shouldn't be a problem or affect any of the apron dimensions.

TOOL TOTE

There's no special hardware needed to build the tool tote on page 22. But you will need a plastic tackle box to fit under the main compartment

I designed the tote to hold a *Piano* Series 3600 box (!3/4"x TVi"-11") that I found at a local sporting goods store. The important thing is to have your box *before* you begin building so you can adjust the size of the tote to hold your box.

COMBINATION SQUARES

If you need to add a combination square to your tool box, you can find one at the sources listed at right

ORGANIZER

To build the organizer on page 28, all you need are some screws and a l"-dia. cherry knob, see the list at right for similar knobs. EB

MAIL ORDER SOURCES

Similar project supplies and hardware may be ordered from the following companies:

Adams Wood Prod.
423-587-2942
Turned legs

Grand River Wood Prod.
800-475-4001
Turned legs, Cherry knob

MLCS
800-533-9298
Beading bit

Rockier Woodworking
800-279-4441
Harvest table hardware, Turned legs, Cherry knob

Woodcraft
800-225-1153
Harvest table hardware, Turned legs, Beading bit, Combination square, Cherry knob

Woodhaven
800-344-6657
Beading bit

Woodworker's Supply
800-645-9292
Harvest table hardware, Combination square

FINAL DETAILS

◄ ***Harvest Table.*** *Below the breadboard ends of this table are a pair of shallow drawers perfect for storing tabk* linens. *Step-by-step instructions start on page* 6.

A ***Breadboard.*** *A routed finger grip on the ends of this breadboard make it easy to Uft it up off a table or counter-top. Easy-to-folk>w* instructions begin on page 18.

A Wall.

Mounted Organizer. This *organizer is a great place to toss mail, magazines, or soccer schedules. And it provides a handy writing surface to jot down a quick note. See page 28 for complete plans.*

▲ **Tool Tote.** With *two removable bins and a storage drawer in the bottom, this tool tote allows you to transport aft the tools you need in one* trip. Plans start on page 22.