NO. 32 NOTES FROM THE SHOP

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Sawdust

ABOUT THIS ISSUE: Whenever we build a project for an issue of *Woodsmith*, one of the first decisions we have to make is what kind of design or style should it be.

Two projects in this issue (the blanket chest and quilt rack) are designed along "country" lines — which is our way of saying we don't know exactly what to call the design. Both projects are sort of Early American, sort of Shaker, and mostly good old-fashioned clean design.

Much of the same could be said of the wood we chose for both projects. Cherry is usually thought of in connection with Early American or Shaker furniture. It's a good old-fashioned wood that cuts easily (although it does have a tendency to burn if you hesitate during a cut), and it responds well "under the knife" for carving.

All in all, cherry is a nice wood to work with and fits the "country" style of both projects. But there's one characteristic of cherry that I really like. It has to do with one of my favorite words: patience.

You know how I go on and on about being patient in almost every aspect of woodworking. Well, cherry is one of the best examples of when patience pays off.

It has to do with the finishing stage. I think everyone expects cherry to have a deep rich red color — even before it's finished. But in truth, cherry is often more of a pale salmon color (or maybe a dull red) when it's freshly cut.

To "fix" the color, the easy solution is to apply a stain to give the wood that deep burgundy color it's supposed to have. But the best way to finish cherry is with patience — just let it sit.

In a matter of months, cherry can go from a pale salmon color to a rich red. Give it a year or two, and it will turn a deep rich burgundy color.

This change is the result of exposure to ultra-violet light. Which means you have to be somewhat careful with projects made of cherry. For example, if you were to put a pillow on the top of the blanket chest and leave it there for six months, that area would not be exposed to light and would not age (darken).

It's the "picture on the wall" syndrome. For the first year or two, you have to be careful that all parts of the project get somewhat even exposure to light.

OIL FINISHES. One other thing about cherry and this "country" style. We thought both projects would look best if they were finished with a natural oil finish. But instead of the usual "dull" oil look, I wanted more of a satin lustre.

We decided to use Sutherland Welles polymerized tung oil, and follow Frank Welles' technique for applying it (described on page 7.)

This is a real "hands-on" approach to finishing. With other finishes (like varnish or lacquer), you put it on, stand back, and hope it turns out all right when it's dry. But with polymerized tung oil (and Frank Welles' method of putting it on), you really get involved with the whole process.

When I tried this technique, I felt that finishing wasn't just a chore at the end of a project . . . it was an *extension* of the project. And for the first time I'm beginning to enjoy the art of finishing.

DOVETAILS. Just the opposite is true of the joinery on the blanket chest. We wanted to try out the new Leigh jig for cutting dovetails. On one hand, I have to marvel at this jig for its versatility, precision, and convenience. But I lost the feeling of involvement.

If I had to build a couple of dozen drawers with through dovetails, I would probably choose the Leigh jig to speed things along. But for the blanket chest, I wish now I had gone back to the old ways.

CARVING. Kay Mulder joined our group three issues ago, and since then has been learning the "ways of *Woodsmith*." Kay designed the quilt rack for this issue, and as it was nearing completion, suggested that some carving might be a nice addition. I agreed.

Then she asked, "Who should we get in to do it?" "Who should we *get in?*" I responded. "If you want carving, get some tools and you do it." (I wasn't quite as harsh as that sounds.)

One week later, the vine and leaf design was part of the quilt rack. "That's really nice," I said. "How did you do it?"

Kay quickly responded, "If you want to learn carving, get some tools, and do it."

For years I've wanted to learn how to carve, and for years I've made up excuses for why I couldn't. "It takes an artistic talent I don't have . . . What if I get halfway through and the chisel slips . . . I don't know what tools to use."

No more excuses. I got a set of tools (described in Sources, page 24) and tried it. It's easier than I thought it would be, and even more fun. But I ran into some problems. I thought I'd do some carving while watching T.V. But now there's a pile of shavings imbedded in the living room carpet, and I got so involved, I missed the latest episode of "Dallas."

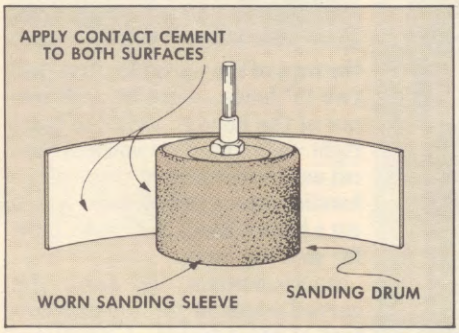
NEXT MAILING. We are making progress in our attempt to get back on a more normal mailing schedule. The May/June issue of *Woodsmith* (No. 33) will be mailed during the week of June 4th, 1984.

Tips & Techniques

TEMPORARY SLEEVES

While working on a recent project, I realized I didn't have the proper grit sanding sleeve for my drum sander. Since it was late at night, I was unable to get the fine grit sleeves I needed, so I came up with the idea of using contact cement to attach a piece of new sandpaper to the old sleeve. I wasn't sure if it would work, but the only other choice was to stop working. So I tried it, and it worked.

First, I cut a piece of new sandpaper to fit around an old worn out sanding sleeve, being careful not to let the ends of the sandpaper overlap at the joint. Then I coated both the sanding sleeve and the sandpaper with two coats of contact cement, let it dry, and wrapped the new sandpaper around the sleeve.



I've used these "temporary" sleeves a lot, and they've held up well. And at the cost of replacement sleeves, it's a method worth using . . . even when you're not in a bind.

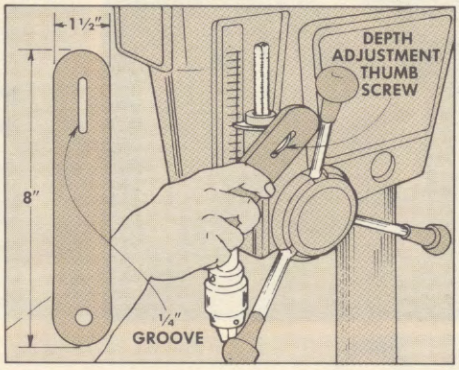
John Milewski
Milwaukee, Wisconsin

Editor's Note: Mr. Milewski's method for temporary sanding sleeves also works using the pressure sensitive adhesives for disc sanders. The advantage to using this type of adhesive is that when the outer layer of sandpaper wears out, it can be peeled off and replaced with a new layer.

THUMB SCREW WRENCH

Adjusting and tightening the thumb screw on the depth stop mechanism of my Sears floor model drill press has always been a real hassle. It never stays put. I've tried tightening the thumb screw with my fingers, but it always works loose from the vibration of the drill press. I've even tried keeping a pair of pliers near the drill press, but they always seem to disappear just when they're needed.

Finally, I decided to make a small, specialized wrench to tighten the thumb screw. The wrench is modeled after a small tool used years ago by apothecaries (pharmacists) for loosening ground glass stoppers of medicine bottles.



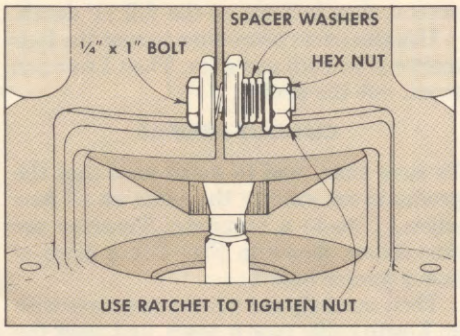
The wrench is simply a small piece of ½" thick hardwood with a ¼" groove down the center. I cut the groove by drilling ¼" end holes, and routing out the waste using a ¼" straight bit on the router table. Then I added a ¼" hole at one end for hanging the tool from the drill press table. Note: The overall size can be varied to whatever dimensions feel good in your hand.

To use the tool, just slip the ¼" groove over the head of the thumb screw.

John Seidel
Atlanta, Georgia

REPLACEMENT THUMB SCREW

In *Woodsmith* No. 31, you mentioned how painful it was whenever you tried to tighten the sharp edged thumb screw on the Sears 9-HT-1749 router. When I first bought my Sears router, I was having the same problem. But I solved it by using a totally different locking system.



First, I removed the original thumb screw and bolt from the base, and replaced them with a ¼" x 1" square head bolt, three small washers (which act as spacers), one medium sized washer, and a hex nut.

Then I use a 7/16" socket on a ratchet to tighten the nut after adjusting the depth of cut. I also use a short extension arm so the handle of the ratchet clears the motor of the router. When the ratchet is not in use, I keep it in the storage cabinet of the router table, where it's always handy.

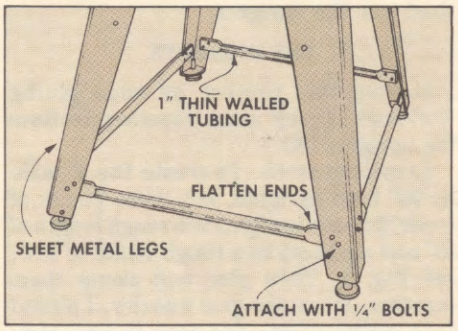
This system works well for me when the router is hand held, as well as when it's mounted on the router table.

Al Williams
Westlake, Ohio

SPIDER LEGS

Recently, I purchased a Sears 10" radial arm saw, including their four-legged sheet metal stand. I also purchased a set of four retractable casters so the saw could be moved around the shop as needed.

It wasn't long after the saw was set up and the casters were attached that the rough floor in my shop started creating problems. Every time I tried to move the saw, the thin sheet metal legs would twist around as the casters rolled over a rough area. This not only made it a real hassle to move the saw, but it also made tipping the saw over a real possibility.



To solve the problem, I added braces between the legs of the stand that are made of 1" thin-walled tubing. To attach the braces, I flattened the ends of the tubing in a vise, and drilled ¼" holes through the ends. Then the braces are attached as low on the legs as possible.

The addition of the braces prevents the legs from twisting, and the casters easily roll over the rough areas of my shop floor.

Carl Lampl
Tavares, Florida

SEND IN YOUR IDEAS

If you'd like to share a woodworking tip with other readers of *Woodsmith*, send your idea to: *Woodsmith*, Tips & Techniques, 2200 Grand Ave., Des Moines, Iowa 50312.

We pay a minimum of $10 for tips, and $15 or more for special techniques (that are accepted for publication). Please give a complete explanation of your idea. If a sketch is needed, send it along; we'll draw a new one.

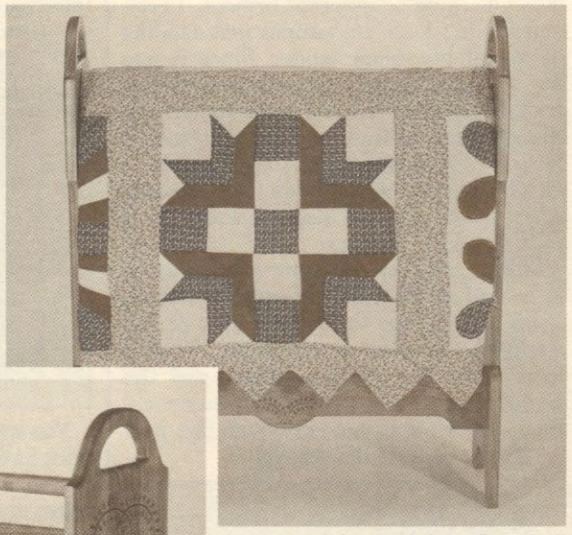
Quilt Rack

DISPLAY AN HEIRLOOM

My grandmother (who is now in her young 90s) has spent two afternoons a week for the past 30 years with a group of her friends keeping the art of quilt making alive. When I received one of her quilts as a gift, I wanted to find a way to complement her handiwork with some of my own. Since she had added some special touches to my quilt (grandmothers call it love), I added some special touches — carving — to the quilt rack I built to display my "new" heirloom quilt.

This quilt rack is styled along simple colonial lines so it won't compete for attention with the quilt that will be displayed on it.

The rack consists of two upright sides which are spanned by four stretchers mortised into the uprights.



THE UPRIGHTS

I started this project by edge gluing $^{13}/_{16}$"-thick cherry stock together to form the uprights (A).

LAMINATE SIDES. To create the 9" wide by 32" high uprights, cut three pieces of stock (for each upright) to a rough length of 33" and rip them to a rough width of 3¼", see Fig. 1. Then glue and clamp them together. When the glue was dry, I planed both uprights flat. (See page 13 for a complete explanation of this technique).

TRIM TO FINAL SIZE. Then I trimmed the uprights to their final length (32") using a panel cutting jig on the table saw, and ripped equal amounts off both edges to get each upright to its final width (9").

ROUT MORTISES

Before cutting the profile on the edges of the uprights, I marked the position of the four ⅜"-wide by ½"-deep mortises on each side piece, see Fig. 1. Then I used a router and a guide fence to rout the mortises.

POSITION FENCE. To position the fence, first drill ½"-deep pilot holes to mark the ends of each mortise. (I used a ⅜" Forstner bit for these holes.)

Then to position the guide fence, mount a ⅜" straight bit in the router and place the straight bit in one of the pilot holes. Trace around the edge of the router base with a pencil to mark its outside arc, see Fig. 2. Repeat the process with the router positioned in the second pilot hole.

Next, clamp the guide fence to the workpiece so the edge of the fence just touches the two circles, see Fig. 3.

ROUT MORTISES. With the router set to cut about ¼" deep, I made the first pass for the mortise by starting in one of the pilot holes and ending at the other. The second pass is made at the full ½" depth.

Use this same procedure to rout the four mortises on both uprights. Then I went on to cut out the profile.

CUT OUT PROFILE

To save time, and to make sure that the profile is cut exactly the same on all four edges, I made a template. Transfer the dimensions shown in Fig. 1 to a piece of heavy poster board.

Then carefully cut out the template with an X-acto knife, tape it down, and mark the profile on one half of the uprights. Flip the pattern over and repeat the process on the other half of the upright.

CUT OUT PROFILE. Use a sabre saw (or band saw) to remove the waste. (I made the cuts just a little "wide" of the pencil marks so I could sand the profile to the exact size later.)

CUT OUT HANDLE. To make the handles in the tops of the uprights, first drill two ½" holes — one in each corner of the handle. Drill the holes right on the marked line and then cut out the remaining shape of the handle with a sabre saw. Again cut a little wide of the line to allow for sanding later.

SAND EDGES. To sand the curved edges at the top and bottom of the upright, I used a 1" sanding drum mounted in a drill press.

Then to sand the straight edges of the "waste" section, I mounted a fence to the drill press and used it as a guide to move the upright evenly across the drum, see Fig. 4.

On the bottom curve of the waste section, I switched to a sanding block to smooth out the profile. And finally, to sand the handle opening, I used a ½" sanding drum on the drill press.

ROUND OVER EDGES. To complete the uprights, I rounded over the outside edges (only) with a ¼" rounding-over bit with pilot. (The inside edges are left square.)

However, the edges on *both* sides of the handle opening are rounded over to make the rack more comfortable to pick up.

STRETCHERS

To join the two uprights and support the quilt, four stretchers are mounted in the mortises. All four start out at a rough length of 29". The two middle stretchers (B) are ripped to 3" final width. The bottom stretcher (D) is ripped to a final width of 4½".

TOP STRETCHER. As for the top stretcher (C), it's made by laminating two pieces of

13/16"-thick by 1½"-wide stock together. Then this laminated piece is ripped to final dimensions of 1" x 1". (Shop Note: Depending on availability, and the kind of wood you're using, a 1" dowel could be substituted for the top rail.)

TRIM TO FINAL LENGTH. After all the stretchers are ripped to their final width, trim them to a final length of 27⅜".

CUT TENONS

Next, ½"-long tenons are cut on the ends of each rail to fit the mortises in the uprights. I used the table saw to cut the tenons, gradually raising the blade to cut away equal amounts of waste on both faces of the stretchers to produce a ⅜" thick tenon centered on the thickness of the stock, see Fig. 5. (There's a complete explanation of this in *Woodsmith* No. 26.)

As the tenons are cut, check to see that they fit the width of the mortises. (Snug but not too tight.) Then complete them by cutting shoulders on the top and bottom edges to fit the length of the mortise, see Fig. 6. Finally, round over the edges of the tenon with a file to fit the routed mortise.

BOTTOM STRETCHER. After the tenons are cut, I cut the bottom stretcher to the final shape shown in Fig. 7. This is just a matter of drawing a 2½" radius at the center of the stretcher, and a 1" radius near the ends. Then it can be cut and sanded to shape.

ROUND OVER SHOULDERS. Finally, round over all four edges of each stretcher using a ¼" rounding over bit on the router table.

MATERIALS LIST

Overall Dimensions: 28"W x 9"D x 32"H

A	Upright (2)	13/16" x 9" x 32"
B	Middle Stretchers (2)	13/16" x 27⅜" x 3"
C	Top Stretcher (1)	1" x 27⅜" x 1"
D	Bottom Stretcher (1)	13/16" x 27⅜" x 4½"

CUTTING DIAGRAM

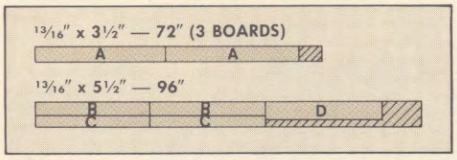


FIGURE 1

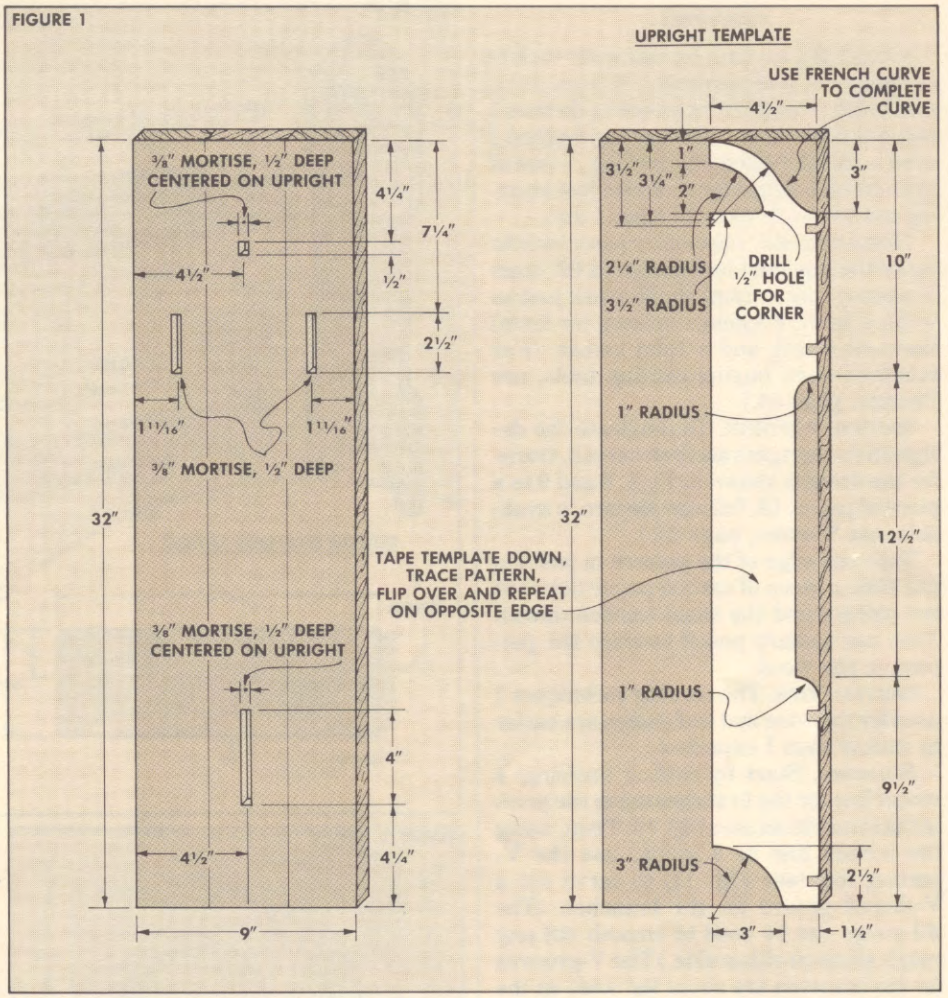
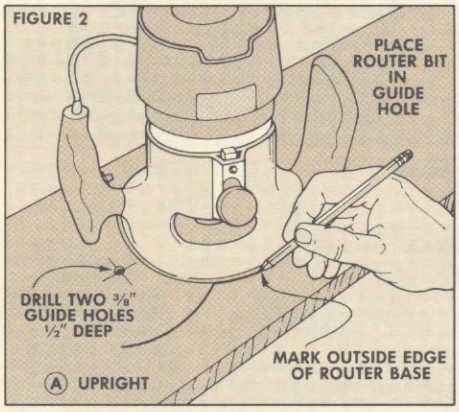


FIGURE 2



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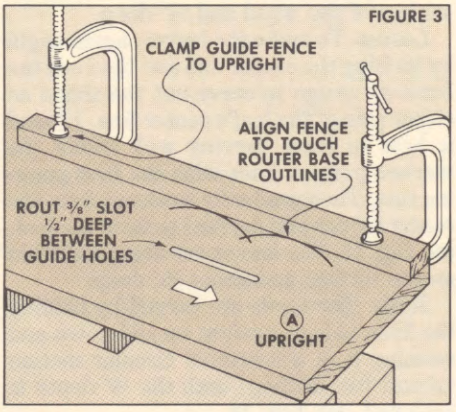
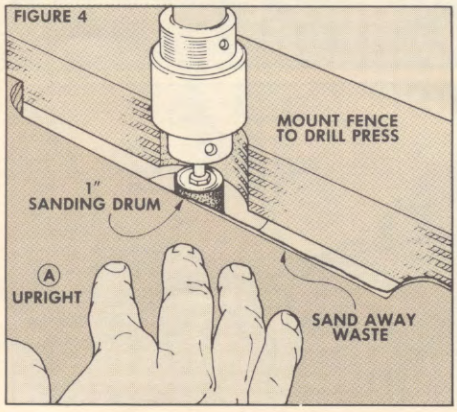


FIGURE 4



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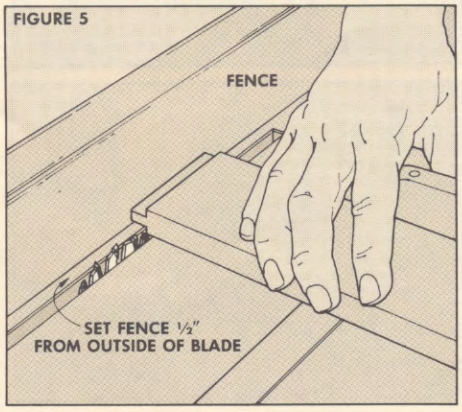

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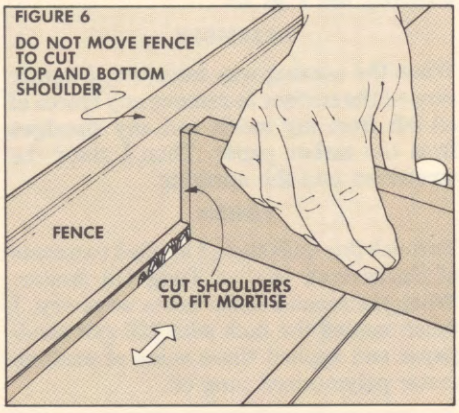


CARVING

Although the carving on this quilt rack is certainly not a requirement, it does add a nice touch — and is a lot easier to do than I thought it would be. The carving method I used is called incised line carving — one of the best techniques for someone just starting out (which is exactly what I am).

TOOLS NEEDED. I used four basic tools to carve the vine and leaf design: a 60° 3mm V-parting tool (a 2mm would work just as well); a 5mm, #3 gouge; a 5mm (or 6mm) skew-cut chisel; and a 1mm veiner. (For information on buying carving tools, see Sources, page 24.)

TRACING PATTERN. To duplicate the design on the uprights and bottom rail, transfer the designs shown in Figs. 8 and 9 to a piece of paper. (A full size pattern is available, see Sources, page 24.)

Tape one edge of the pattern in position and slide a piece of carbon paper between the pattern and the wood (carbon down). Then use a sharp pencil to trace the pattern on the wood.

CARVING TIPS. The carving techniques I used for this vine and leaf design are easier to master than I expected.

Branches. Start by cutting (incising) a center line for the branches using the point of the skew chisel, see Fig. 10. Then, using the incised line as a guide, use the V-parting tool (see Fig. 11) to carve out a V-shaped groove for the branches. (The #3 gouge can be used to smooth out any rough areas on either side.) The V-grooves for the branches are about 3/32" wide on the surface of the wood and 1/8" deep.

Leaves. To make the leaves, again begin by incising the center line and then use the 5mm #3 gouge to carve out the shape on either side of the leaf's center line. I found it best to start carving well inside the marked pattern lines with the first gouging cuts. Then gradually work out from the center (wider and deeper) to form the leaf, see Fig. 12. The leaves are about 3/16" wide on the surface and about 1/8" deep.

Seeds. The seeds are carved by holding the 1mm veiner straight up and down and rotating it in a continual circular motion (almost like drilling) until the 1/8" depth is achieved, see Fig. 13.

ASSEMBLY

When the carving was complete, I lightly sanded the surface to remove any traces of oil left from my hands and any smudges from the carbon paper. Then I glued the stretchers into the uprights.

FINISH

To finish this quilt rack, I applied two coats of Sutherland Welles Tung Oil Sealer. When the second sealer coats were dry, I finish sanded the rack with 220-grit sandpaper and applied three coats of medium luster polymerized tung oil.

FIGURE 7

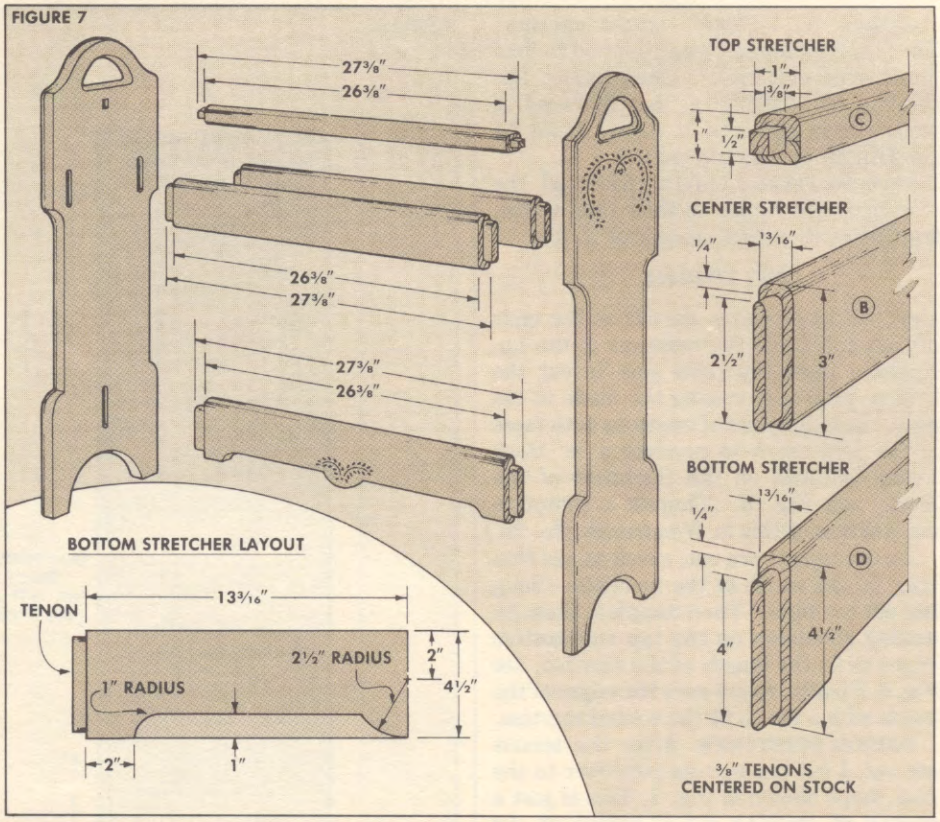


FIGURE 8

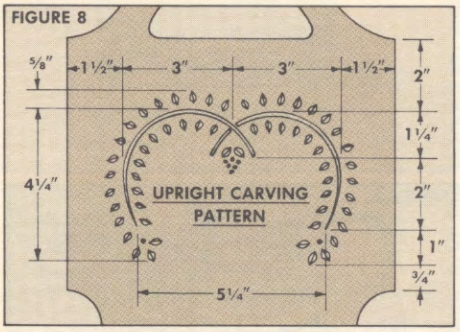


FIGURE 9

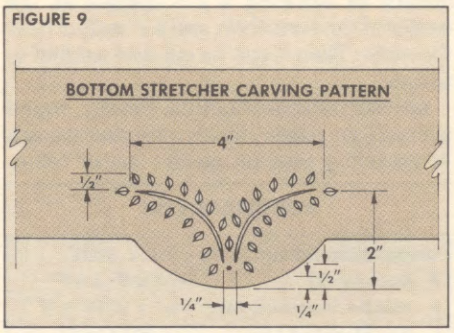


FIGURE 10

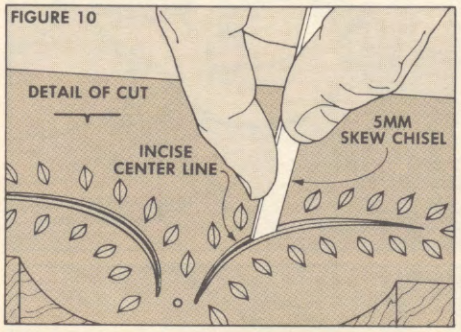


FIGURE 11

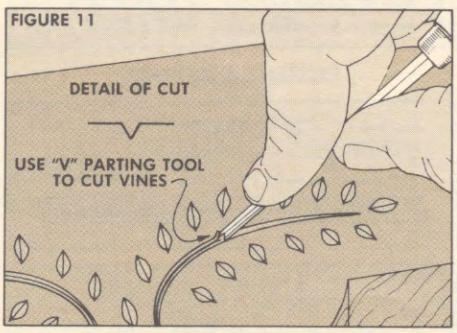


FIGURE 12

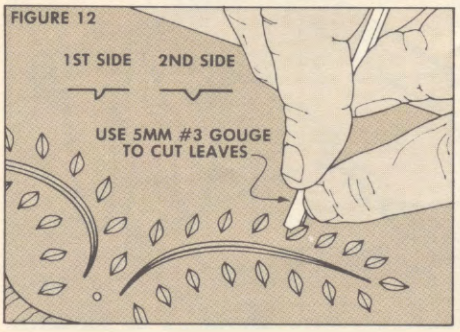
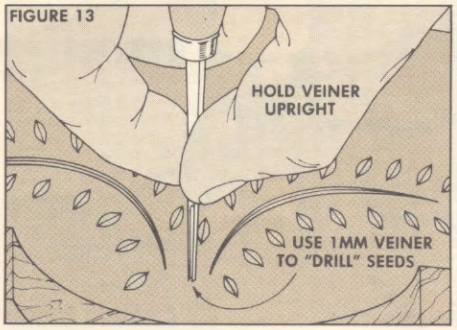


FIGURE 13



Polymerized Tung Oil

AN INTERVIEW WITH FRANK WELLES

When we were working on the article on oil finishes for *Woodsmith* No. 30, we got acquainted with Frank Welles, owner of Sutherland Welles, Ltd., a small company that sells tung oil finishes.

It didn't take long to discover that Welles is a genuine eccentric . . . but one who knows oil finishing. About fifteen years ago, Welles became dissatisfied with traditional "surface applied" finishing techniques, and began to experiment with the penetrating oil finishes, especially tung oil.

He quickly became an enthusiastic convert — to the point that he developed his own line of finishing products based on *polymerized* tung oil.

Polymerization is a process which involves heating the oil and bubbling oxygen through it. This alters the chemical nature of the tung oil so it dries faster, cures harder, and results in a finer, more durable luster than you can get with pure tung oil or other oil finishes.

We've used the Sutherland Welles tung oil products to finish several projects shown in *Woodsmith*. The results were impressive, and we decided there was a lot more to learn about finishing with polymerized tung oil.

The Sutherland Welles product list is extensive. But we were most interested in the four basic "penetrating oil finishes."

These four finishes are all based on polymerized tung oil, but have been mixed with different amounts of thinners and driers. The sealer has 19% polymerized tung oil, low lustre (27%), medium lustre (36%), and high lustre (50%).

Woodsmith: The only difference I can see between the "lustres" is that they simply have different amounts of polymerized tung oil in them.

Welles: That's right, but the balance between tung oil and thinners and driers really makes a difference. When I first started, I only used the sealer and the high lustre, but it was too big a jump. The high lustre is for people who've worked with polymerized tung oil for a while and know what it does.

Woodsmith: But it seems if someone started with your "low lustre," the only difference would be that there's just less oil going on.

Welles: Right. The problem is that people can't believe they don't have to use much oil, so they either put too much on in the first place or leave too much behind.

When they do, the oil doesn't cure properly, even though it seems dry to the touch. Then they put another heavy coat on top of the first, trapping the moisture, and the finish starts to look cloudy.

The higher the percentage of tung oil, the more likely it is that there will be problems of this type. You can take the high lustre and do wonders with it, but first you have to understand how the line works.

Woodsmith: Okay, if I were just starting out with your products, which ones would you recommend I use first?

Welles: I'd start with the sealer, the low lustre, and the medium lustre. Then to get an idea of how they work, I relate it to painting a picture for the first time.

When you paint a picture, you don't dip your brush into every color on your pallette. You concentrate on working with certain basic ones. But it's nice to have sixteen different colors available to try out when you've gained some expertise.

Finishing wood is the same way. I'm not trying to sell everyone my entire line. Start with the basics, learn to use them, then move on to experimenting with some of the other products.

Woodsmith: In your catalog, you mention that this line of products is actually part of a finishing system — the Loc-Lamin™ (for locking-laminating) Wood Finishing System. This system, as I understand it, is nothing more than putting one coat of polymerized tung oil on top of another. That's not much different from putting one layer of varnish or lacquer on top of another, is it?

Welles: There's a big difference. If you put layers of varnish or lacquer on top of each other, they'll adhere all right, but later, if some moisture seeps in between the layers, they can peel apart. That can't happen with my system.

By using polymerized tung oil as the initial sealer, you're setting up a base. The first sealer coat literally locks into the wood. Then the next coat goes on and chemically interlocks with the first coat, and that process just keeps happening.

Woodsmith: Let's say I'm ready to finish a project. Before any oil goes on I would normally sand the surface with a range of sandpaper grits to get the surface ready and then start the oiling process.

Welles: I don't sand any further than 220-grit sandpaper. It's not necessary because once you've gone beyond 220, all you're doing is burnishing the wood and closing off the pores.

In fact, you can get better penetration by sanding lightly with 120-grit to leave the pores open. The idea is to get the sealer into the wood on the first one or two coats to start the interlocking process. Then come back and do finer sanding with 220-grit.

Woodsmith: Let's assume I've done the initial sanding with 120-grit, and I'm ready to put the first sealer coat on. Is there any particular technique involved? The instructions on your cans say you can use a rag, brush, steel wool, or a lamb's wool applicator.

Welles: When I first started using oil finishes, rags were the big thing. Now I stay away from them, except to wipe away excess oil. Other than for that, I really

don't recommend them. I don't think you have any control with rags — you don't have any feeling for the oil. Oil gets on the corner of the rag and is slopping around, and pretty soon, you've got overlap.

Woodsmith: So instead of a rag or cloth, you use . . .?

Welles: The thing I find best for getting the oil out of the can and onto the wood is a good natural bristle brush. It's an investment well worth the price.

I look at it this way. I'm dealing with a beautiful piece of wood, there's a glorious oil going on it, and with a china bristle brush, it's a real pleasure.

Woodsmith: I'd have to agree with you. I've used a brush a few times and it seems to give better control. But let's get back to putting the oil on the wood. Is there anything you consider to be the most critical aspect of applying the oil?

Welles: I think I'd mention two things: penetration and thinness.

Penetration really applies only to the first couple of coats, but it's critical. The important thing is getting the oil deep into the pores. That doesn't necessarily mean you have to put a lot of oil on the wood. I recommend putting on a liberal amount for only the first coat of sealer. Then wait 10-15 minutes to allow the oil to penetrate completely, and wipe off the excess.

Woodsmith: You also mentioned thinness as being critical.

Welles: Thinness is extremely important in finishing with polymerized tung oil. If you use a natural bristle brush, you can control the thinness, and you can brush it out as dry as you need to.

After the first sealer coat, you put on each successive layer — *thin*. The first coat has sealed the pores, the second sealer coat will take less oil.

Woodsmith: And after the first two sealer coats?

Welles: The third coat should be one of the tung oil finishes, such as low lustre. This coat needs even less oil on the brush. By the time you're at the fourth or fifth coat, we're talking minimum oil . . . brush it on dry.

Woodsmith: Dry? I have to admit, I've never heard anyone describe applying oil finishes as *dry*. You must not put very much oil on the brush?

Welles: No. Basically, you dip your brush lightly in the oil. Then get it dry by running it around the inside lip of the can to get off any excess.

Woodsmith: I'm having a difficult time picturing this. How dry is dry?

Welles: I mean so dry that you think there's practically no oil on the brush. To give you an idea, I can finish one thousand square feet of flooring with one quart of oil. That's dry.

This is the hardest part of the polymerized tung oil process — getting people to believe that they don't need to use a lot of oil.

Woodsmith: As you're brushing the oil on, what about problems with brush marks.

Welles: If you tell me you've got brush marks, I can tell you right now that you've got too much oil on the brush. Much too much. You don't need all that oil because all you're looking for is enough oil to lock into the previous layer.

Woodsmith: If the brush is that dry, it seems that it would be difficult to brush a coat of oil on the wood. Do you daub it on?

Welles: Exactly. Move the brush around, and work the oil in. You'll end up with a gorgeous surface.

Woodsmith: How many coats of oil do you lay down after sealing the wood?

Welles: It depends on the piece and the amount of sheen I'm after. If I'm after a high French polish — something that looks like a real lacquer surface — I usually do it with six coats, including the sealer coats. A more mellow look requires just three or four coats, total.

"All of a sudden you see that oil set up, and you have an absolutely gorgeous sheen."

Woodsmith: After the oil is brushed on, what next?

Welles: After the oil is on, you still need to activate the chemical interlocking process. That's when I use my hands to provide some pressure and heat to make the oil molecules interlock more quickly.

For example, I put on medium lustre finish and brush it out dry. If I find I've got too much on, I come back right away with a rag, and wipe off the excess.

Then I take the palm of my hand and run it — you know, sort of rub it — on the side of my pants to heat it up. Then I come down quickly on the oil with that heated palm. I sort of "hit" it, coming down on it with a nice swoop and following through.

You do that, and all of a sudden you just see that oil set up on you, going from liquid to solid state, and you have an absolutely gorgeous sheen. But, don't overdo it. Too much of this will dull the finish or leave streaks.

Woodsmith: That brings up a good point. Part of learning how to use a finish involves how to fix it when it's not the way you want it. I'm thinking of the finish on the clock we built for *Woodsmith* No. 30. It's a little too glossy. How could it be dulled down a little without completely taking off the sheen?

Welles: You probably have too much oil on it, so it's too shiny. You can take fine steel wool (#0000) and just buff down the finish. Then go back over it with the low lustre finish to restore a little of the sheen. Put the low lustre on a little wet, then just wipe it off.

I should also say that when you're trying to take down the sheen, you definitely shouldn't use the "palm of your hand" method to rub in the oil since that brings up the sheen.

Woodsmith: There are times when I'd like to get more oil on the surface for protection, but I don't want a glossy finish. How would you go about that?

Welles: I'd stay with the low lustre finish. Either brush it on or wipe it on with a rag, then quickly buff it out with steel wool. Each time you'll be adding protection, but without adding sheen.

Woodsmith: If the piece is too dull and you want a glossier sheen?

Welles: Use a higher lustre. But really there's more to it than that. You have to be aware of things like the temperature and humidity because they will affect the final outcome. If you're working in a well-ventilated room, but with no direct breeze — where the temperature is about 60° to 70° with a relative humidity from 45% to 55%, that would be ideal.

In these conditions, you can just brush the oil on dry, use the heated palm of your hand, and the piece will have a nice lustre.

Woodsmith: I'd like to ask about one of the techniques I've used in the past with oil finishes. It involves wet sanding on the initial coat. When I'm working with an open-pored wood, like oak, I usually wet-sand the first coat of oil to form a sawdust slurry to seal the pores.

Welles: I don't object if you do that. But the thing with wet sanding is that the texture of the wood just doesn't come through. What you do with this process is close down the pores — and that keeps any more oil from penetrating.

It amounts to filling the wood. I don't object, if that's what you want, but it's just not the natural look.

Woodsmith: What about putting your tung oil products over stains — Minwax stain, for instance?

Welles: At one time I would have jumped up and down about mixing products. But I've gotten over it. In fact, I recently finished a table and used Minwax — although differently than they recommend.

In the case of the table, I wanted to tone down the graining of the wood. I'd already used my own stains, in which the color is part of the oil. But the color was pulled deep into the wood, and I thought the grain stood out too much.

What I wanted was a surface stain to solve the problem, and that's where I used Minwax. I poured off half the solvents, stirred up the pigments, dipped a rag in it,

and ran it lightly across the surface. Then, after the thinners had evaporated and the stain was completely dry, I came back and used my medium lustre oil on top of it.

One nice thing about Minwax is they have a whole combination of colors — earth colors — and that's great.

Woodsmith: You're pretty sold on using tung oil. But there must be times when there are some disadvantages.

Welles: There is a disadvantage in the sense that tung oil requires a maintenance schedule — a piece of furniture that's finished with tung oil has to be re-oiled occasionally.

Take a kitchen table, for instance. If you finish it with tung oil and follow the maintenance schedule, you'll end up with a beautiful piece with a lot of character. But if you know you're not going to take care of it, then finishing it with tung oil is ridiculous because within a year, all you'll have is a sort of dried out, ugly surface.

Woodsmith: For tables I think I would use varnish or polyurethane.

Welles: When you know you're not going to keep up with the maintenance, I'd recommend sealing the piece with tung oil. Then use polyurethane mixed with tung oil on the surface. [Ed. note: Welles has a pre-mixed tung oil/polyurethane product in his line.] The sheen will remain, the wood will be protected, and the piece will have that "clean look."

Woodsmith: You also have a tung oil varnish in your line. When I use this kind of finish I usually lay down a thick coat and leave it at that. In effect, I treat it like a thinned-down version of regular varnish.

Welles: Well, that approach is fast and foolproof, so I can't argue against it if it accomplishes what you want.

But practically speaking, you're not getting the best possible strength out of the finish because you're not using a system of interlocked layers. Flowing on one extra-heavy coat won't give you that strength.

And as for esthetics, it's just not the same. You're not getting the absolute beauty out of the wood that you *can* get.

You said it yourself in your first article: patience. That's a beautiful word. It's a matter of understanding what's going on, and having some patience. I am a big believer that if you take the time, you'll be fully rewarded at the end.

Woodsmith: Any final advice?

Welles: I think one of the most important things about all of this is realizing that wood is a living thing and applying a finish is a creative art . . . like an artist painting a picture.

An artist can use the same colors in two paintings, but by using different techniques, he gets very different results.

The same thing is true of tung oil. I can finish two pieces of wood with the same tung oil products and get quite different looks by putting each coat on a little thinner, or wiping it down sooner, or palming it harder with my hand.

So, start with the basics, learn them, then experiment. That's the way to do it. Pretty soon, you'll be doing great things with tung oil. There's nothing like it.

At the end of a project, you can stand back and say, "Wow! That's beautiful."

It's exciting stuff.

SHOP TEST... *what we found out*

The finishing techniques Frank Welles describes in this article are quite different from any we've used before.

After talking with Welles, I decided to go back to the shop and try out his method of finishing with polymerized tung oil.

SAND WITH 120-GRIT. As a test, I used a piece of cherry. First I sanded it with 120-grit sandpaper, then gave it a light sanding with 180-grit to smooth the surface, and vacuumed off all the dust.

FIRST COAT: SEALER. Then I brushed on a coat of Sutherland Welles "sealer" with a natural bristle brush. This sealer coat was *not* a thin coat. Rather, I put on enough sealer so the entire surface looked wet, yet not "puddled" anywhere. After 15 minutes I wiped off the excess oil, and let the sealer coat dry overnight.

SECOND COAT: SEALER. The next day, I applied another coat of sealer. Again this coat was put on so the whole surface looked wet. But it was obvious that the wood didn't require as much oil.

SAND WITH 220-GRIT. I let the second sealer coat dry overnight. Then I sanded the surface lightly with 220-grit sandpaper, and used a tack cloth to remove the sanding dust.

THIRD COAT: LOW LUSTRE. Now I was ready to try a coat of "low lustre" finish — this time using Welles' suggestion to "brush it on dry." If nothing else, I wanted to see just how little oil I could actually put on a piece of wood and still get it to look "finished."

I found it was easy to get too much oil on the brush. I dipped the bristles of the brush into the oil about ½", and ran them out "dry" on the rim of the can. (This reminded me of cleaning out a paint brush at the end of a painting job.)

As I began to brush on the oil, I quickly discovered that it cannot be applied with long brush strokes. Rather, I had to lightly daub and swirl the bristles on the surface. Then I smoothed and spread the oil with short brush strokes.

Although it took longer to cover the surface than with a fully-loaded brush, soon the board did have a thin coat of glistening oil on it.

I let this coat "cure" overnight, and the next day the finish was indeed a low lustre — a kind of dull satin look.

LIGHTING CONDITIONS. As I was applying this coat of low lustre, I found that it helps to have proper lighting. A mechanic's shop light came in handy to shine over the surface so I could see where the oil was — and where it wasn't.

FOURTH COAT: LOW LUSTRE. For the next coat, I used basically the same technique — but with even less oil on the brush. I barely touched the brush in the oil and then daubed the oil on the board, smoothing it out with the tip of the brush to get a thin, even layer of oil over the entire surface.

HAND RUBBING. At this point, I was starting to get more involved with this whole process and couldn't resist getting some "hands-on experience." I wanted to see what would happen if I rubbed out the oil.

I used long strokes (a motion much like using a plane to smooth the surface). Very quickly my palm heated up and the oil responded as Welles said it would. It seems to "set up" right away.

"This is it," I thought. The finish had the kind of hand-rubbed look I'd dreamed of, but could never attain.

EXPERIMENTS. After several more experiments, I learned that it is possible to get too little oil on the brush. On one attempt I had to stipple the brush (almost smash it) onto the surface. After letting this coat dry overnight, I discovered the surface was a little rough.

Fortunately, tung oil is very forgiving. The "error" was easy to correct by applying another coat of low lustre oil (a little heavier this time) and rubbing out the surface with steel wool.

I also tried coats of medium lustre and high lustre. Although the percentages of tung oil in these lustres increase only moderately, there's quite a difference in the way they behave. Both of these lustres create quite a "drag" when they're rubbed out, and also produce more of a sheen (almost a gloss) to the final appearance.

CONCLUSIONS. When I talked with Frank Welles, he was obviously excited about this method of finishing. His excitement has rubbed off. But I think Frank would agree, that finishing with polymerized tung oil takes getting involved with the finishing process (and maybe a few disappointments). Like everything else, the best finish is the one that's applied with patience.

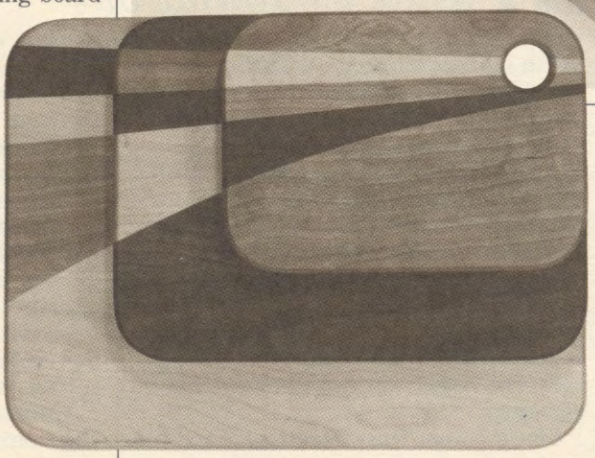
Cutting Boards

A NICE COMBINATION, ANYWAY YOU SLICE IT

Although no two woodworkers approach things the same way, there's one trait that seems common to all of us. Every woodworker I know cannot bear to throw away even the smallest scrap of wood.

But once all that scrap is collected, what can be done with it?

My solution is easy. When the scrap bin is overflowing, it's time to glue all those precious pieces together to make cutting boards.



THE DESIGN

In the past when I made cutting boards, I let the scraps dictate the design. By selecting wide and narrow pieces from a variety of woods, each cutting board developed its own unique pattern.

For a while, I liked this random approach. Then my drive for organization got the better of me. I had to "design" a random pattern — and make a cutting board that was a little out of the ordinary. That's how this set of cutting boards came about.

Each of the three increasingly larger boards has an identical pattern, as shown in the photo. To achieve this effect, there's a little trick involved.

LAMINATE PIECES

But before getting to the trick, the first step is to laminate enough scrap to get three blanks with a rough size of 10¾" x 16", see Fig. 2. (I made the three blanks out of maple, walnut and cherry.)

CHOICE OF GLUE. To glue-up these blanks, I used Wilhold Marine Plastic Resin glue. (This is a powdered glue that's mixed with water to form a thin paste.) This glue is waterproof (in cold water) — making it nice for projects that will be subjected to an occasional soaking.

However, Titebond or Elmer's Professional (the "yellow" glues) could also be used since the exposure to water isn't (or shouldn't) be that great.

TRIM TO SIZE. After the glue is dry, plane both sides of each blank flat and then trim all three blanks to an equal size of 10½" by 15½", see Fig. 3.

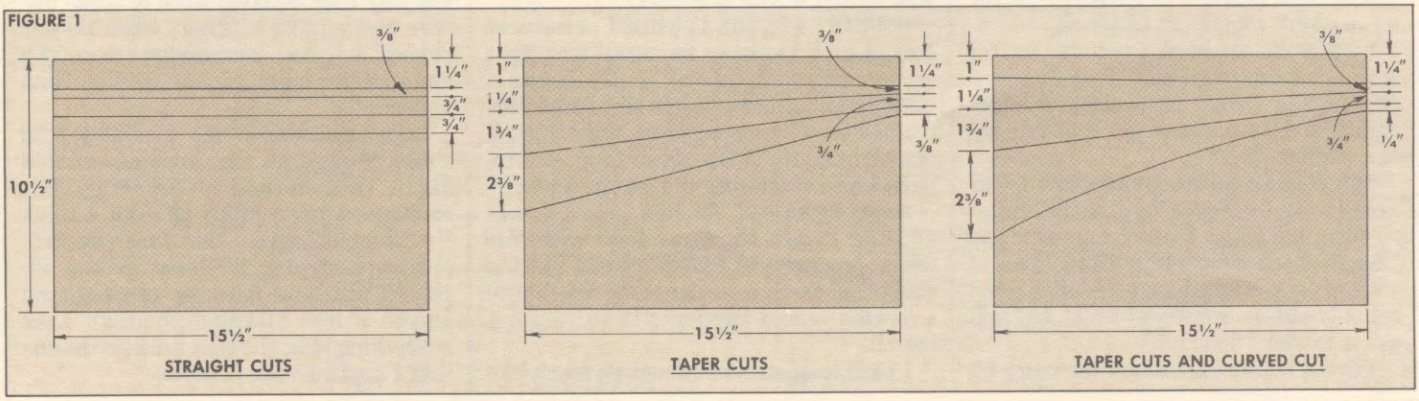
TACK BOARDS TOGETHER. Now for the trick. The key to getting identical "mix and match" patterns on three cutting boards is to cut the three blanks as a set. To do this, tack-glue the three blanks together by running a thin bead of glue about ½" from the ends of two of the blanks, see Fig. 4. Then clamp them together, see Fig. 5.

MARK THE PATTERN

After the glue is dry, the pattern can be marked on the top blank of the set. When I started out with these designs, I simply marked straight lines to make bands ranging in width from ⅜" to 1¼" wide, as shown in the first drawing in Fig. 1.

Then I began to experiment with tapered cuts, as shown in the middle drawing. And finally, I added a curved band saw

FIGURE 1



cut — which is the pattern used for the cutting boards shown in the photo.

Any pattern can be used, just draw the pattern you want on the three-blank assembly. Then before any cuts are made, use a square to extend the ends of the pattern lines straight down on the ends of the blanks, see Fig. 6. (These extended lines will help align the tapered cuts.)

CUTTING THE TAPERS

Although a taper jig can be used to make the tapered cuts, I found it difficult to align the cuts so they started and finished exactly where I wanted them. Instead, I tacked a piece of ¼" Masonite to the bottom of the three-blank assembly and used it as a guide to cut the tapers.

(Note: Since the three-blank assembly will be angled on the Masonite, the Masonite must be cut extra-wide so it extends beyond the opposite edge of the blanks. Also, it should be long enough to extend a few inches beyond both ends of the blanks.)

Cut the Masonite to size and then align one edge of the Masonite with the lines marked on the ends of the blanks. Tack the Masonite down so the nail holes are only in the last 1" at each end of the blanks.

CUT TAPERS. Now, to cut the tapers, it's simply a matter of pushing the right edge of the Masonite tight against the fence on a table saw. Then adjust the fence so the left edge of the Masonite touches the inside of the blade, see Fig. 8.

Then make the taper cuts. After each cut, simply reposition the Masonite on the blanks to make the next cut, see Fig. 9.

CURVED CUT

If you want to include a curved cut, it must be made on a band saw. (A sabre saw cannot make a smooth enough cut.)

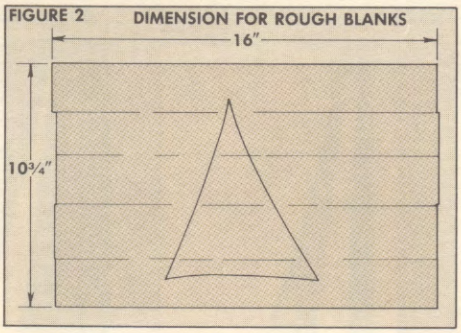
Even on a band saw, this cut is trickier than it seems. To reduce the chance of making little blips along the curve, I used a ½"-wide blade in the band saw. This size blade limits the sharpness of the curve — in effect *forcing* a gently curved cut.

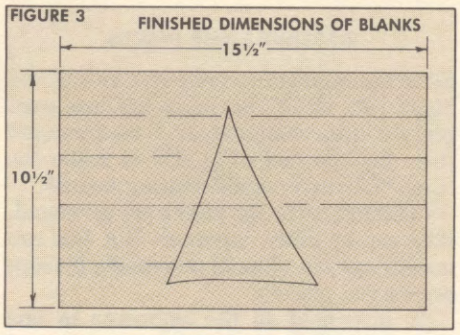
Shop Note: Before cutting the blanks, I made a few trial cuts on some scrap plywood to get the feel of it. The trick is to cut the curve in one continuous motion.

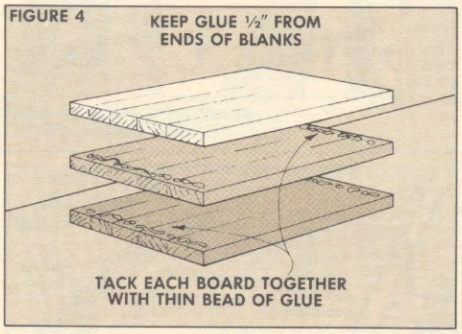
SPLIT APART

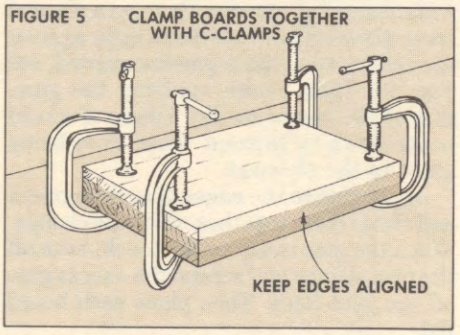
After the curve is cut, each of the segments is split apart, see Fig. 11. To do this, I placed a chisel on the joint line between the boards, and with one or two taps broke the glue bond at the ends. (The ends may chip out as the segments are split apart. But this isn't a problem because these ends will be trimmed off later.)

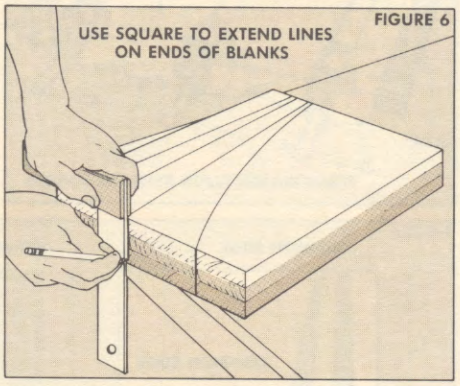
After splitting the segments apart, I scraped as much glue as I could off the ends and started to arrange the pieces in their final positions.

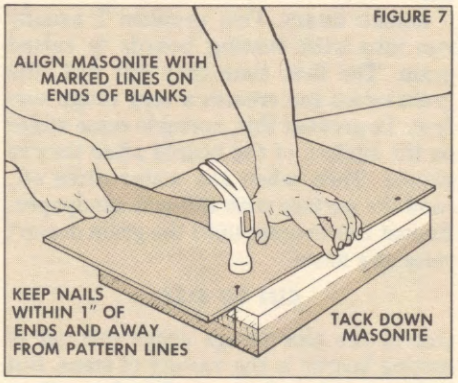


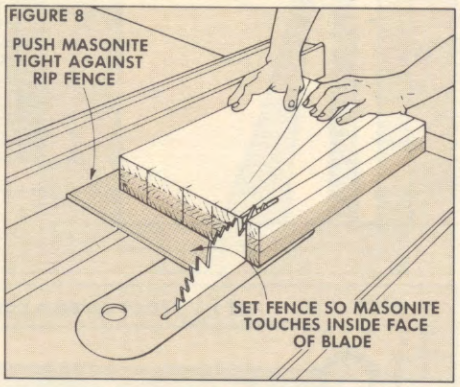


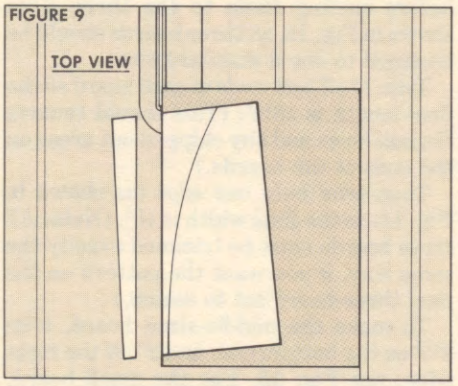


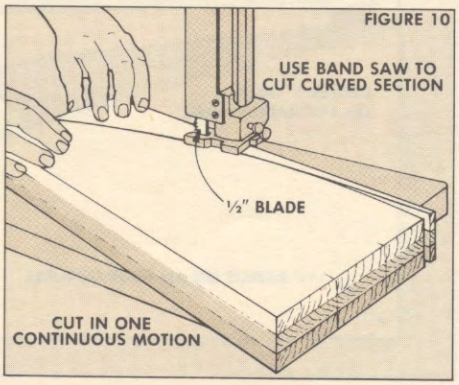


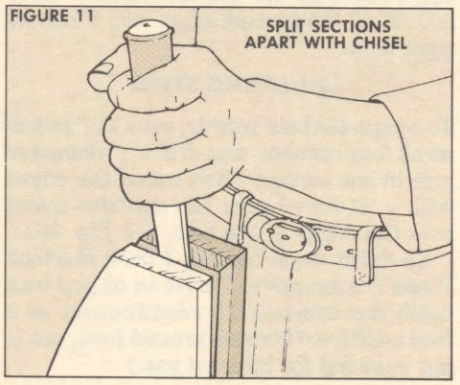












ASSEMBLE THE PIECES

Since the segments were cut from a three-blank set, all of the segments are completely interchangeable. I re-arranged them (as shown in Fig. 12) to make the three "mix and match" cutting boards.

GLUE UP. After the pieces are arranged, they can be glued together. But this can quickly get out of hand (especially if there are curved pieces).

To help hold all the segments in line while clamping, arrange them on a piece of scrap plywood and nail cleats tight against the ends to keep the segments aligned, see Fig. 13. Then before applying the glue, pick up the pieces and lay a piece of waxed paper down to prevent them from being glued to the plywood.

Apply glue to the edges of each segment and clamp them together with pipe clamps. When the glue is dry to the touch, take off the pipe clamps and scrape the excess glue off the joint lines. Then plane each board flat.

RAISED GRAIN. One problem I usually run into with cutting boards is raised grain. The first time they get wet, the grain raises and creates a very rough surface. To prevent this, sprinkle some water on the surface of the boards after they're planed. Then when the water dries off, sand the surface with 220-grit sandpaper. Repeat this process until the grain doesn't raise any more.

CUT TO SIZE

One of the nice things about this set of cutting boards is the variety of sizes. But before cutting them to the three sizes shown in Fig. 15, all three boards should be trimmed to one a standard size.

Trim 1" off *both ends* of each board so the final length is 13½". (This should remove the nail holes and any chipped out areas on the ends of the boards.)

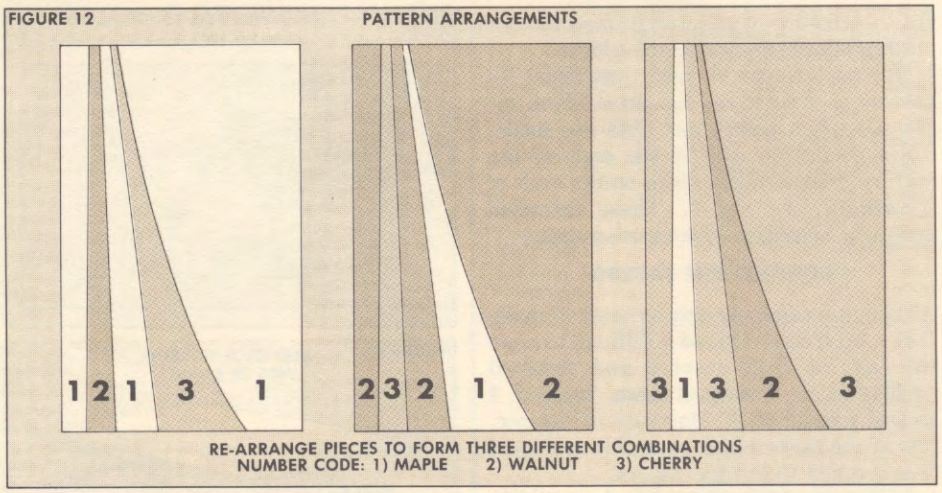
Then trim *only one edge* (as shown in Fig. 14) so the final width is 10". (Note: All three boards must be trimmed exactly the same way, if you want the pattern on the final three-board set to match.)

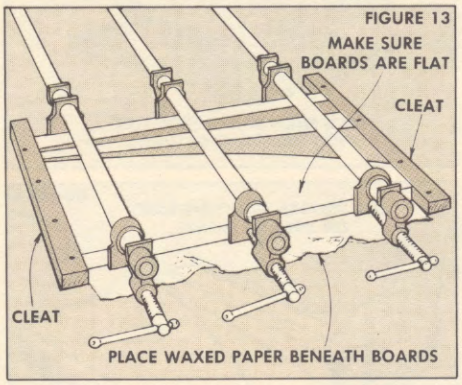
To make the middle-sized board, trim 2½" on the bottom end, and 2" off the right edge, see Fig. 15. For the small board, trim 5" off the bottom edge, and 4" off the right edge.

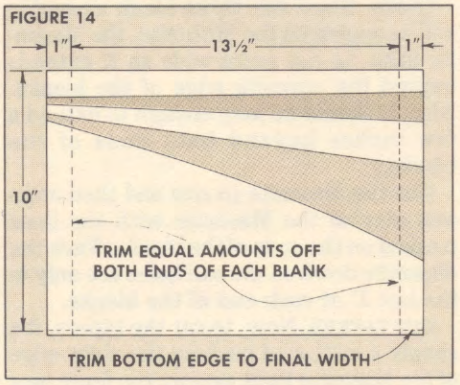
FINISHING STEPS

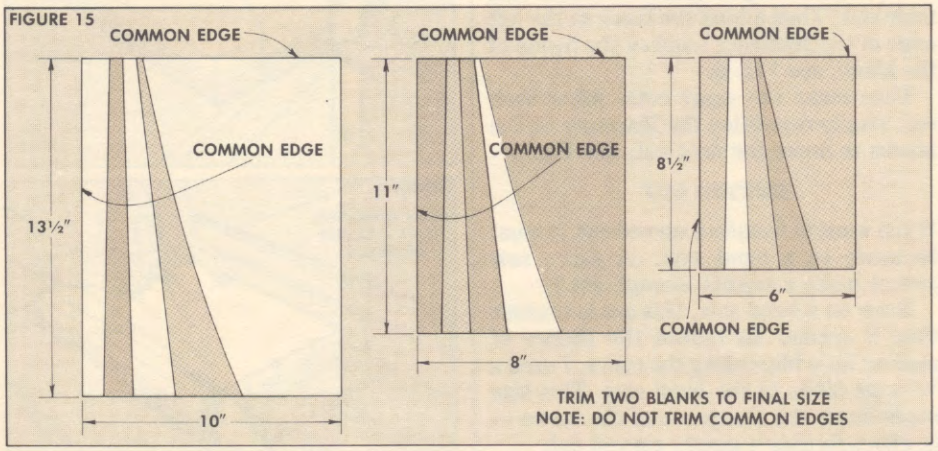
To complete these boards, cut a 1¼" radius on all four corners, and drill a 1"-diameter hole in one corner. Then round the edges with a ¼" round-over bit, and also round over the edges of the hole, see Fig. 16.

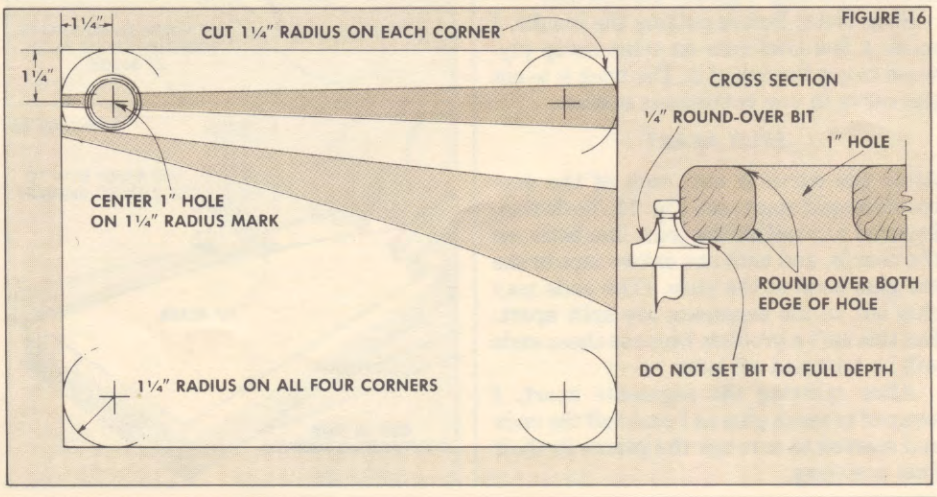
To finish these boards, I used Martens Wood Preservative. This is an oil and wax finish that meets FDA requirements as a food additive. (It's safe around food, but is not intended for internal use.)











Edge Gluing

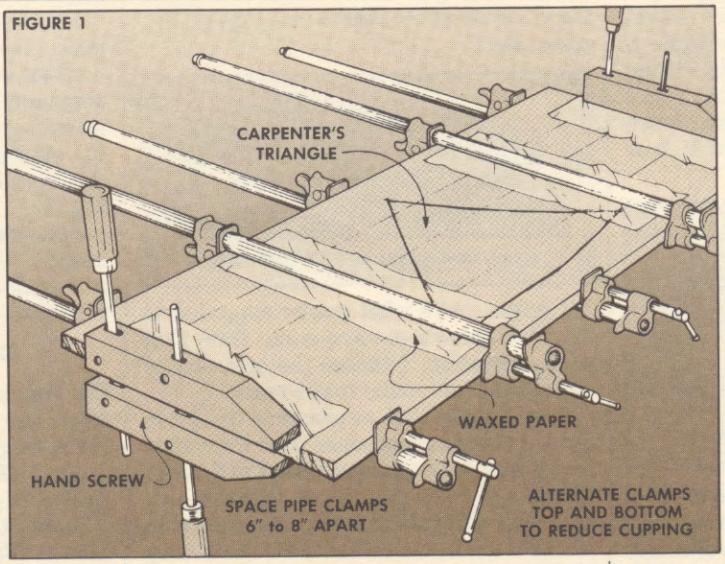
THE PROCEDURE FOR GLUING-UP PANELS

There's a paradox in woodworking: the basic techniques (the ones that *appear* to be easy) are usually the most difficult to master. For example, the first time I had to glue several narrow boards together to form a wide panel (which I thought should to be a relatively easy task), I wound up making a whole series of mistakes.

My first problem was wanting to get it done . . . quickly. But gluing boards edge-to-edge to form a wide panel requires patience. The result must be a panel that looks finished — not like just a bunch of boards glued together.

All of the projects shown in this issue require wide "panels" of solid wood. In fact, it's a basic requirement of almost every woodworking project.

FIGURE 1

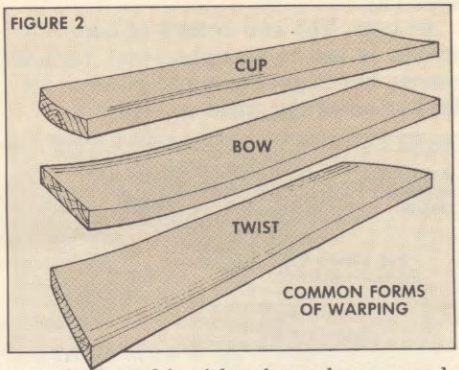


SELECTING THE BOARDS

The first step in gluing up a panel is to choose the boards that will be glued together. This is also the first problem.

WARPED BOARDS. Although wood is a wonderful material to work with, it has its faults. The first thing I do (out of habit, I suppose) when I pick out a board is sight down along the edge to see if it's *bowed* (curled in a U shape along its length), see Fig. 2. Then I put a steel rule across the width of the board to see if it's *cupped* (curled in a U shape across its width).

FIGURE 2



If the board is either bowed or cupped, it's best not to use it. (If the bow or cup is very slight, it can be used. But I'm never surprised if the panel turns out the same way.)

However, whenever I find a board that's *twisted* (where opposite corners are curled up), I don't use it. Twisting is often difficult to detect with the first inspection of a long board. Sometimes twist doesn't appear until after a long board is cut down to smaller sizes. If a board is twisted (no matter how slight the twist), don't use it.

GRAIN AND COLOR: After selecting boards that seem to be in pretty good shape, I look at the grain pattern and the color of the boards. This should be done with a degree of sensitivity. When strips from several boards are glued together, you want to be able to see them as a finished panel — without the distractions of variations in color and grain patterns between adjoining strips.

Although it's difficult to find boards that match perfectly in color, they should at least be kissing cousins. Then they should be arranged so the grain patterns look like they "melt" together.

CUT TO ROUGH SIZE

Once the boards are selected, there's a tendency to use only a few wide boards to make a wide panel. Instead, several narrow boards should be used. Why?

The wider the board, the greater the chance of cupping (curling across the width), and the greater the chance the glued-up panel will look like the rolling prairie. However, if the boards are ripped down to 3" to 5" widths, the effect of cupping is reduced, In fact, a wide board that's slightly cupped, can be "corrected" by ripping it down to narrower widths, which, in effect, reduces the amount of cup in each piece to within workable limits.

After the boards are selected, cut them to rough length (about 1" to 2" longer than needed for the panel size). Then rip them to rough width.

RIP TO ROUGH WIDTH. This ripping process should actually be done in two stages. First the boards are cut to rough width — but they don't have to be the *same* rough width. When I was gluing up the panel for the top (lid) of the blanket chest (shown on page 16), I knew I wanted to end up with an 18"-wide panel.

Some of the strips in this panel are only 2" wide while some are 4" wide. It was a matter of getting the most (the best parts) out of the wood that was available.

ALLOW EXTRA WIDTH. As the boards are ripped to rough width, it's best to allow an extra ⅜" or so on each board. (The second stage of ripping will reduce the width of the boards, sometimes by as much as ¼".)

CHECK FOR TWIST. After the boards are ripped to rough width, place them on a flat surface (the top of the table saw) and check each board for twist. (Place your fingers at the ends of the boards and try to rock them. If they rock, they're twisted and shouldn't be used.)

SQUARE-UP EDGES. If the boards are free of twist, I go ahead to the second stage of the ripping process. The edges of each strip must be squared-up — so they're straight along their length and exactly perpendicular with the face of the board.

How do you get the edges square?

This is a procedure that's open to much debate. The old-timers used a hand plane to square and straighten the edges. And in the process, also planed a very slight hollow down the length of the edge. (I have to admit this technique requires more skill than I have.)

The theory here is that when the strips are slightly hollowed, there will be tension at the ends as they're clamped together. Then later, as the wood dries and gives off moisture there's less chance of the ends of the finished panel splitting.

JOINTER. Modern cabinet shops take a more straight-forward approach. A jointer is used to straighten the board down its length, and at the same time square the edges. But I think jointers can do more harm than good. If there's wild grain, or if the grain simply changes directions anywhere along the length of the edge, the result can be chip out.

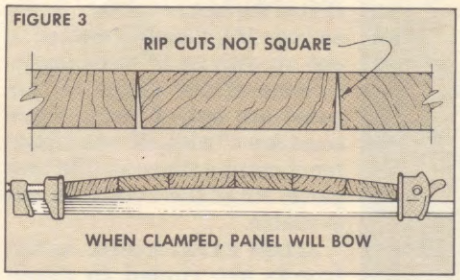
So, how do you square the edges?

I use a table saw. Although a saw blade

produces a slightly rougher cut than a jointer, it doesn't create chip-out.

There are two requirements if a table saw is used. First, the right blade. I use a Freud 50-tooth carbide combination blade. (Although a rip blade can be used, it usually produces a very rough edge. So I prefer combination blades.) The second requirement is to make sure the blade is exactly perpendicular to the table. (Note: If the blade is even slightly off, the edges will be beveled. Then when the boards are clamped together, the panel will bow across its width, see Fig. 3.)

FIGURE 3



TRIM PASSES. When the table saw is set up, I make multiple passes to rip as clean an edge as I can. The process goes like this: After rough-cutting the strips to width, take a very light pass on each edge, setting the fence so less than half the thickness of the blade actually makes the cut. This method produces a very clean cut.

BODY MOTION. Body motion here also helps. Make a smooth even cut down the length of the board, and try not to stop or hesitate while ripping.

CHECK FOR GAPS. After cutting enough boards for the panel, again lay them on a flat surface and push them together with hand pressure only. If the joints between the boards are tight, I know I'm half-way there. Next, flip the boards over and check the joints on the bottom side. If these joints are also tight, I'm all the way there.

However, if the joints are not tight, it probably means the saw blade was not set accurately (at exactly 90°), or the board wasn't held tight against the fence. Make adjustments and rip another set of light passes on the edges of the boards.

Of course, this process will reduce the final width of each board — by as much as ¼". So, there has to be enough extra width when you start out so there will be enough left to make the panel.

In addition, the total width of the boards should allow an extra ½" for the width of the panel before it's glued up. (This allows enough to trim the panel to final size after it's glued and clamped.)

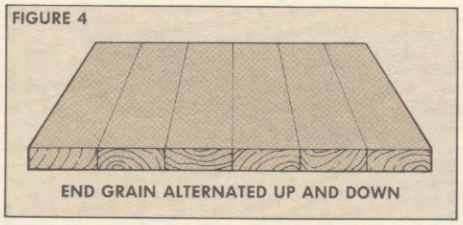
ARRANGE GRAIN PATTERN

After the edges are squared up, the boards *could* be glued together. But spending a little extra time at this stage means the difference between a finished panel and just a bunch of boards glued together.

First, arrange the boards so there's an even flow of grain pattern and color between one board and the next. Choose the best side of each board, and shuffle them around to get a nice visual effect.

Aren't you supposed to arrange the boards so the grain curves up on the first board, down on the second (see Fig. 4), up, down, etc.?

FIGURE 4



I guess that's what you're supposed to do. But there's always some flaw that goofs things up. I choose the best face of each board and make that the top.

I can't deny that alternating the grain up and down makes sense. But I'd rather have a nice-looking panel when I'm done. (I should add here that we've followed this approach with all the projects shown in *Woodsmith*, and haven't had any problems.)

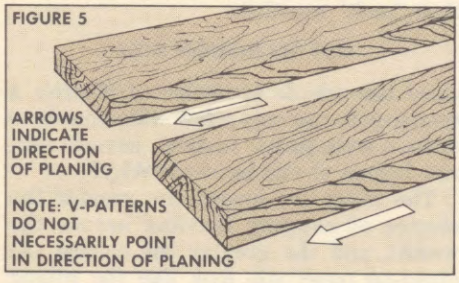
Besides, there's another aspect of grain direction that's rarely mentioned, and I think more important.

When the panel is glued-up, it still has to be smoothed. I use a hand plane to do this. Here it's important to have the grain going in the same direction on all the boards that make up the panel.

How do you determine the grain direction on the face of the panel?

There's a misconception about how to determine the grain direction for planing. When looking at the face side of a board, the grain usually forms a series of "V" patterns that "point" in one direction. There's a natural tendency to want to plane in that direction — "with the grain."

FIGURE 5



However, the only way to tell the grain direction on the *face* of a board is to look at the grain on the *edge* of the board, see Fig. 5.

If you're lucky, the grain lines on the edge will gently curve to one face of the other for the entire length of the board. When gluing up the boards, arrange them so the grain curves to the same face on the entire panel. (I draw arrows on both faces of each board to keep things straight.)

But wood is wood, and sometimes the grain pattern on the edge is wavy — it switches back and forth. When confronted with this situation, I make a democratic decision: the majority of the grain pattern wins. That is, I arrange the boards so the majority of the grain angles toward one face of the panel to reduce tear-out problems when planing.

MARK BOARDS. After all the boards are arranged for color and grain pattern, I mark them to keep things straight during the glue-up stage. The easiest way to do this is with a carpenter's triangle, refer to Fig. 1.

Just draw a large triangle across all the boards. Then, through the confusion of what follows, the boards can easily be returned to their intended sequence.

DOWELS AND SPLINES

The boards have been chosen for grain and color, the edges are cut square, and I'm ready to glue them together.

Wait. Don't you have to use dowels or splines to get a good joint?

Again, this is a question that's open to debate. It's usually said that dowels should be used for edge-to-edge joints.

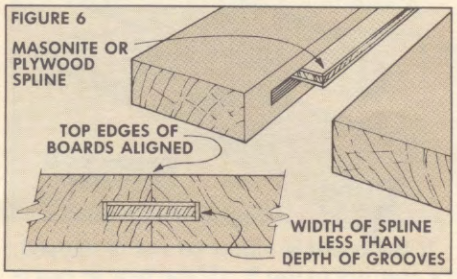
I personally don't ever use dowels for edge joints. It's difficult enough to get *two* opposing dowel holes aligned, much less a whole series of opposing holes down the length of every board. If the dowel holes are not aligned with extreme accuracy, they're just defeating the whole purpose.

But don't dowels or splines help straighten out warped boards?

As for straightening out warped boards with dowels or splines, it's questionable. All this is doing is creating a "tug of war" by joining boards that are warped in opposite directions. But the boards must be of equal warp, and equal strength. Otherwise, you just get a slightly less warped assembly.

SPLINES. The real benefit of dowels or splines is not to straighten out warped boards, but to get the boards *flush across the surface* of the glued-up panel.

FIGURE 6



When I need some help aligning the boards so they're flush (which reduces the amount of planing later), I prefer to use splines set in grooves, refer to Fig. 6.

The critical thing here is to cut the grooves (for the splines) so they're all exactly the same distance from the face

side (top) of the panel.

To do this, place the face side of the board against the fence of the table saw and cut a groove on one edge. (Here I use a 40-tooth carbide rip blade.) Then "cartwheel" the board (flip it end for end so the same face is still against the fence) and cut a groove on the other edge.

As for the splines, I like to use ⅛" Masonite. (It fits the kerf of the Freud blade nicely.) The splines should be cut to width so they're a smidgen narrower than the combined depth of the grooves. (This allows a relief for the glue.)

TEST CLAMP

All of this work is for one purpose: to glue the boards together. Everything is ready, all that's needed is the glue and clamps . . . and patience.

Before applying any glue, I make a dry test run to check things out. This is important because it's the last chance to catch any problems (and correct them) before the glue goes on.

CLAMPS. When clamping, I like to use pipe clamps. You need enough clamps so they're spaced no more than 6" to 8" apart. Also, they should be alternated — one on top, the next on the bottom, etc. This tends to equalize the cupping caused by the clamping pressure, see Fig. 1.

Also, the clamps should be laid out on a flat surface. (If they're on an uneven surface, it's more likely that the panel will be warped.)

Now tighten the clamps just enough so the gap between the boards disappears. Then lay a long steel rule or framing square across the width of the panel. You may find the panel is cupped. This problem should be solved before the glue goes on.

If you're sure the edges are square, then the problem is usually with the pipe clamps. Loosen and tighten them, trying to get the boards flush across the top. It may also help to fasten hand screws across the ends of the panel, see Fig. 1. Loosen the pipe clamps, tighten the hand screws, then tighten the pipe clamps.

GLUING UP THE BOARDS

When the boards are flush and free of warp, I loosen all the clamps and turn the boards on edge. Then, before applying the glue, place strips of waxed paper over the bottom clamps. (If any glue is squeezed out and touches the pipe, there will be a chemical reaction forming a black splotch on the wood.) Now I'm ready to glue.

What glue is best to use?

The vast majority of the time I use Franklin Titebond or Elmer's Carpenter's glue. Both of these are "yellow" glues that set up rather quickly. If I need more assembly time, I switch to Weldwood Plastic Resin glue (a powdered glue that's mixed with water and allows a 15 minute assembly time).

APPLY GLUE. To apply the glue, run a bead down the edge of the first board. Then spread it evenly over the edge with a small brush. I use a flat artist's brush with ½"-long nylon bristles. Another choice would be a ½" paint brush with the bristles cut back to about ¾" long.

How much glue should be applied?

After running a bead down the edge and spreading it with the brush, the glue should have a kind of glossy appearance all along the edge. If the glue appears dull in a spot or two, it means it's soaked in. Apply a little more. It's difficult to get too much glue on — it will just drip off the edge. It won't hurt the joint, but it makes a mess.

Note: If splines are used, you can glue them into the grooves, but it's not necessary. After applying glue to the edges of the boards, just slide the splines in the grooves, and push the boards together.

After glue is applied to one edge of each board, lay the boards flat on the pipe clamps. Then lay strips of waxed paper over the top of the panel and position the remaining pipe clamps.

TIGHTEN CLAMPS. Then tighten the clamps. If you're using hand screws, place waxed paper on the ends of the panel, and tighten the hand screws first.

As the pipe clamps are tightened, an even line of glue should seep out between the boards. (This may appear as a line of beads of glue.) That's good. You know there's enough glue in the joint so it's not starved, but not so much that glue is slopping all over the place.

ALIGN BOARDS. Just as in the test clamping procedure, check the surface of the panel with a steel rule or framing square to make sure it's not cupped. If you're *not* using splines to align the boards, you may have to tap the boards flush. (I like to use one of those Stanley "Dead Blow" black plastic hammers to do this. You can make pretty hefty taps without marring the surface of the panel.)

Should the excess glue that squeezes out be wiped off with a damp cloth?

The instructions on most glue bottles recommend that you wipe up excess glue. I don't. I think that wiping with a damp cloth at this point dilutes the glue and forces it into the wood — making it very difficult to remove later.

I leave the boards clamped up just the way they are for an hour or two — until the squeezed-out glue along the joints is dry to the touch. Then I take off the clamps and use a paint scraper (the kind used to scrape paint off the side of a house) to scrape away the dried glue.

WHAT WENT WRONG

After the excess glue is scraped off, place the panel on one end and lean it against a wall so it's as straight up and down as you can get it. Then let it rest (at least overnight) so the glue in the joints has a chance to dry thoroughly.

CHECK FOR WARP. The next day, check for warp. Place a steel rule over the width of the panel to see if it's cupped. Then check for twist by placing the panel on the top of a table saw and try to rock it.

It's not unusual for one or both of these problems to show up. But they shouldn't be severe because the panel can be flattened only to a small extent by planing or sanding.

If the panel is excessively cupped or twisted, there's only one solution: cut the boards down the joint lines and start over. I've had to do this more than once. It's frustrating, but it's the only solution if you want a flat panel. (This is also why the panel should start out extra-wide.)

SMOOTHING THE PANEL

Although every effort has been made to make the panel as flat as possible during the glue-up phase, it still has to be smoothed. The easiest way to do this is to take the panel to a cabinet shop equipped with a large drum or stroke sander, and let them do it. But that's no fun.

One of the nicest experiences in the world (of woodworking) is to use a hand plane to smooth a panel. Granted, it takes some work, but it's a thoroughly rewarding task.

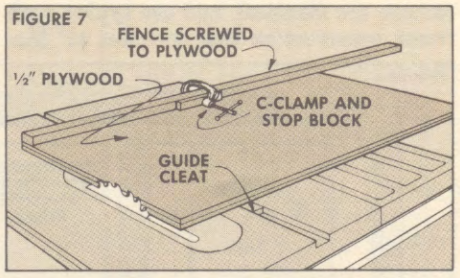
A panel can be smoothed to near perfection with one plane: a jack plane. The one I use is a 14" corrugated bottom Record 05 jack plane. (It costs about $65.) When the plane iron is sharp and it's set just right, there's no better feeling in the world.

There isn't enough room in this issue to go into all the details of planing a panel, but the steps necessary to adjust, sharpen, and use a hand plane are discussed in detail in *Woodsmith* No. 23.

CUT PANEL TO SIZE

After the panel is planed smooth, the last step is to cut it to final size. Since the ends of the boards are probably staggered, I use

FIGURE 7



a simple panel cutting jig to trim off the ends, see Fig. 7. (Making this jig is discussed in *Woodsmith* No. 18.)

After it's cut to length, the edges are ripped down to final width to produce a smooth, finished panel.

Blanket Chest

A COUNTRY CLASSIC

Have you ever noticed how dovetails are always hidden away on the corners of a drawer? It's never seemed quite right to me that one of the strongest, and most asthetically pleasing joints used in woodworking is constantly kept from view.

This hasn't always been the case. In the 18th and 19th centuries, country furniture often used dovetail joinery because of its strength and durability. Rather than spending a lot of time and effort hiding the joinery, craftsmen used the exposed dovetails as both an integral part of their design, and as a display of their skill.

This is one reason why country furniture, with its simple, functional design has always fascinated me. So it was only natural to use this "country" style when I decided to incorporate exposed dovetail joinery in a typically old-fashioned project — a blanket chest.

Unlike many of the modern hope chests, with their overabundance of frills, this chest is modeled after some of the original country versions. The drawers are a good example. Unlike the false fronts that are tacked on the modern versions, all three drawers on this chest are functional.

In keeping with the traditional theme, I decided to build the chest out of cherry . . . a wood that was very abundant, and often used during this period. Although moths aren't the problem today they were at one time, I added cedar to the bottom of the main box so that every time I open the lid, the aromatic scent fills the room.

THE FRAMES

The blanket chest consists of three sections: the main box, the drawer carcase that houses the drawers, and the kickboard assembly. I started by building the two frames that form the drawer carcase.

Both of the frames that form the drawer carcase are identical, and use typical web frame construction that includes ¼" Masonite panels, and cedar closet lining (available at local lumberyards) attached over the panels.

The first step is to cut the stiles (A and B) and rails (C) for the upper and lower frames 1" to 2" longer than their finished lengths, and to a final width of 2¼", see Fig. 1.

PANEL GROOVES. Next, grooves are cut for attaching the Masonite panels on inside edge of each frame member. Using a piece of the cedar as a guide, the groove is positioned so that the cedar will be flush with the frame members after it's attached to the Masonite panels, see Fig. 2. Then a ¼"-wide groove (matching the thickness of the Masonite) is cut ½" deep on the *inside* edges of the front and back rails (C), the end stiles (A); and on *both* edges of the center stiles (B), see Fig. 3.

APRON AND DIVIDER GROOVES. The next step is to cut grooves for mounting the aprons and drawer dividers between the frames, see Fig. 3. For mounting the aprons, cut a ¼" x ¼" groove on one face of the back rails (C) and end stiles (A), ¾" from the inside edge, see Fig. 3. For the drawer dividers, cut a ¼" x ¼" groove on one face of the center stiles, centered on their width.

MITERING THE FRAME. Once the grooves are cut, the frame members are mitered to final length. The front and back rails (C) are mitered 43½" long from point to point, and the end stiles (A) are mitered to 18¼" lengths, see Fig. 1.

FIGURE 1

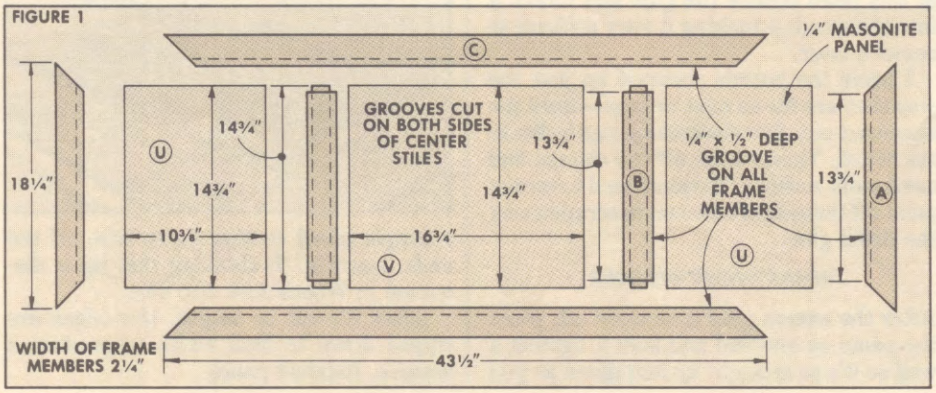
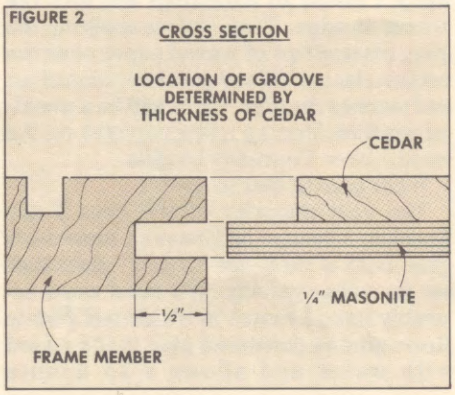


FIGURE 2



CUT TENONS. To join the center stiles (B) between the front and back rails, stub tenons are cut on both ends to fit the grooves in the rails. The final shoulder-to-shoulder length of the center stiles should equal the heel-to-heel length of the end stiles (13¾").

PANELS. Once the tenons are cut, the end panels (U) are cut 10⅜" x 14¾", and dry assembled with the frame to find the dimensions for the center panel (V). Then measure the center opening, and cut a ¼" Masonite panel to fit the groove-to-groove dimensions, see Fig. 4.

ASSEMBLY. After the panels are cut to size, dry clamp both frames together to make sure that everything fits and the assembly is square. Once everything checks out, glue both frames together . . . with the panels glued in place.

MOLDING

When the frames are dry, ⅜" is trimmed off all four sides of the *upper* frame, see Fig. 5. By cutting an equal amount off all four sides, the grooves for the apron and drawer dividers in the upper frame remain perfectly aligned with the grooves in the lower frame. (In this case, the upper frame will be a total of ¾" smaller in both dimensions than the lower frame.)

RABBET THE LOWER FRAME. Next, a rabbet is cut on the bottom edge of the lower frames so the kickboard can be joined to it. Note: When cutting this rabbet, be sure it's on the face without the ¼" x ¼" groove, see Lower Frame detail in Fig. 6.

ROUT THE EDGE. The top outside edges on both frames are routed using a ½" corner round bit, leaving an ⅛" shoulder. Note: On the upper frame, this molding is cut on the face *without* the ¼" x ¼" groove, see Fig. 6. On the lower frame, this cut is made on the face *with* the groove.

After the corner round was cut on both frames, I softened the bottom edges of the upper frame, see Fig. 6. This edge can be removed with a sander, or with a ¼" rounding over bit set for a very shallow cut.

CEDAR LINING. Next, the cedar closet lining is attached over the panels. First, trim off the tongue and groove moldings on the edges of the cedar. Then I ripped five equal width pieces to fit the panel opening, leaving a small gap between each piece for expansion, and cut the cedar to fit snug lengthwise in the panel opening.

To glue the cedar to the frames, I used yellow glue and clamped the slats in place using clamping boards and pipe clamps, see Fig. 7.

SAND. With the cedar glued in place, lightly sand both the cedar and the frame. (Note: Be careful not to oversand the edges of the frame that mate with the box and drawer carcase.) Then the frames are joined with aprons and dividers to form the drawer carcase.

FIGURE 3

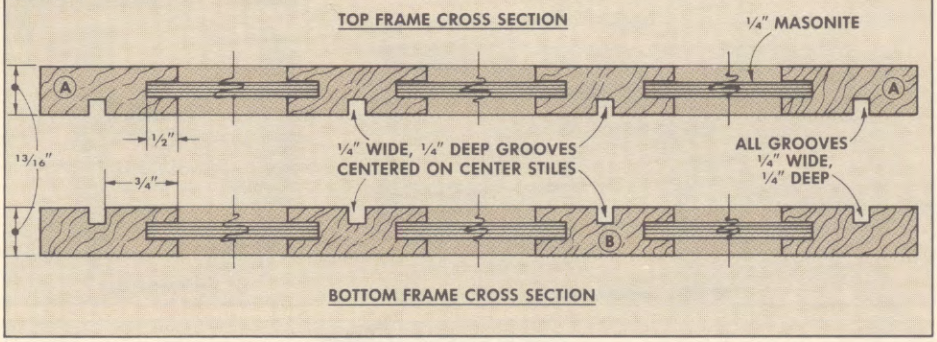


FIGURE 4

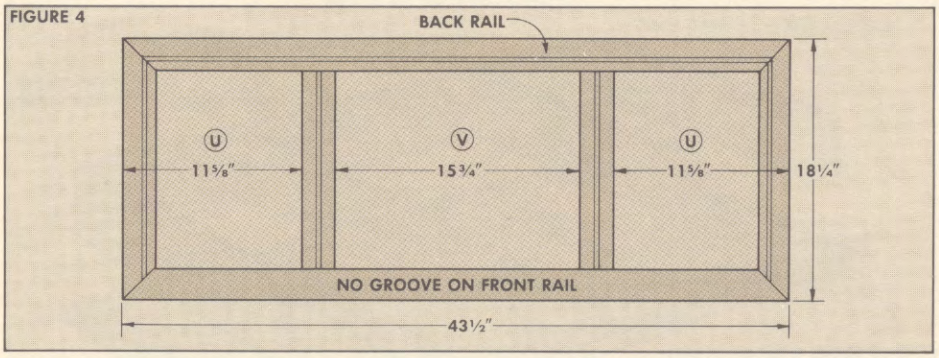


FIGURE 5

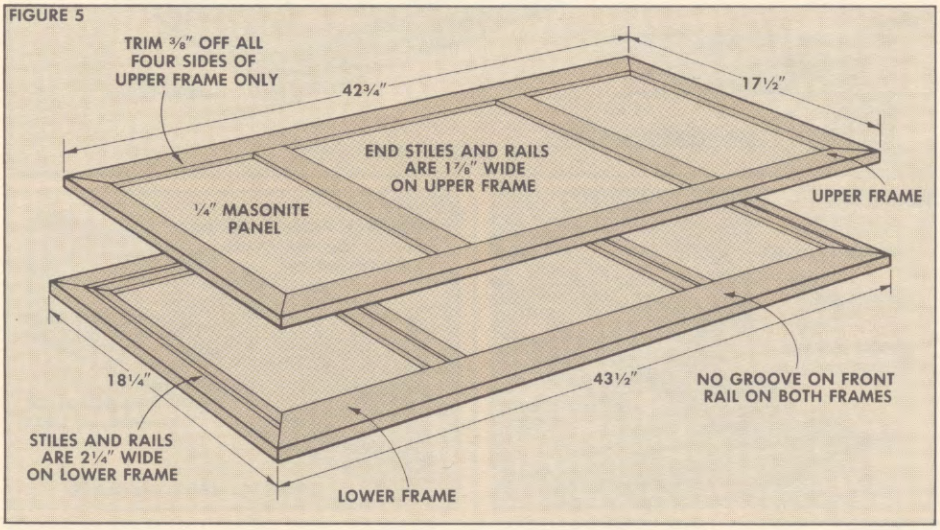


FIGURE 6

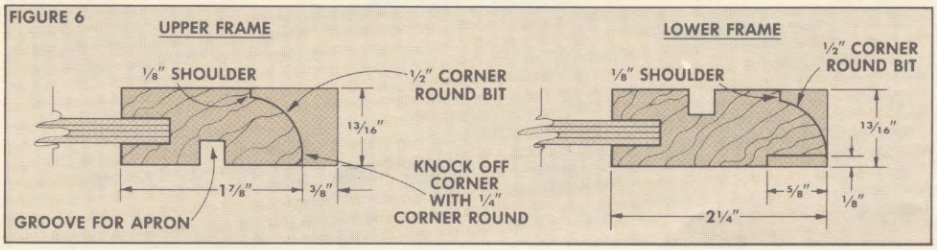
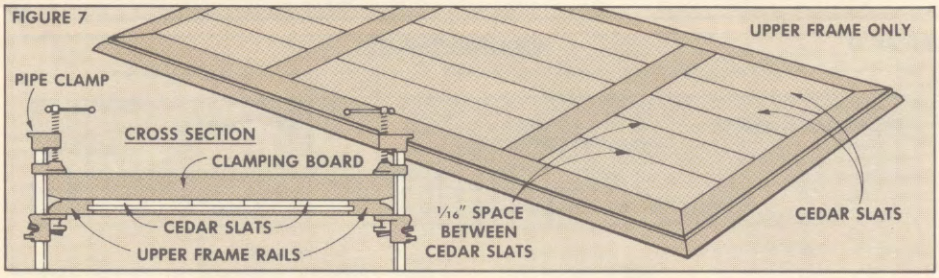
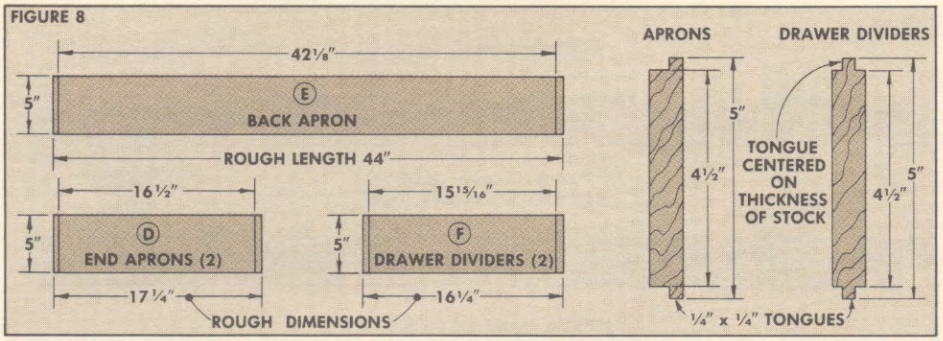
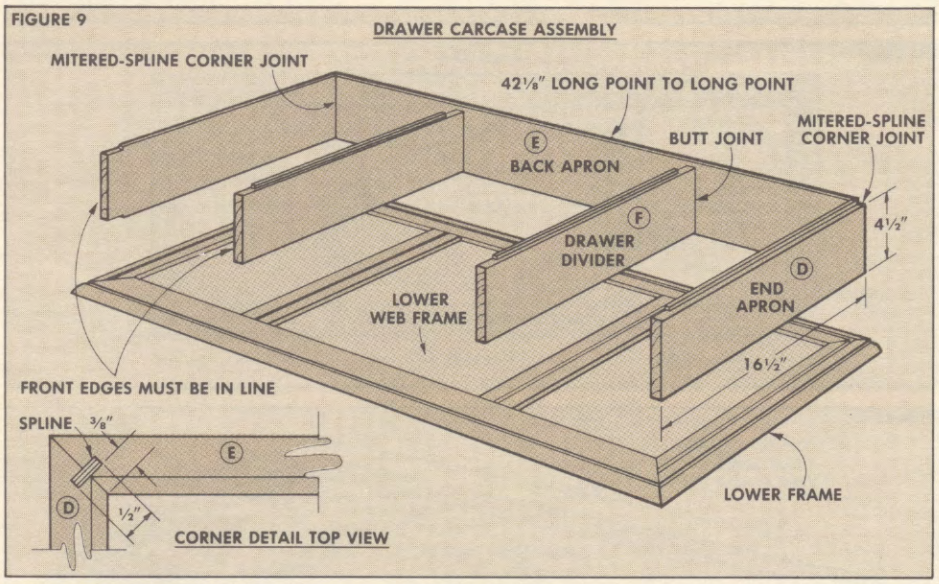
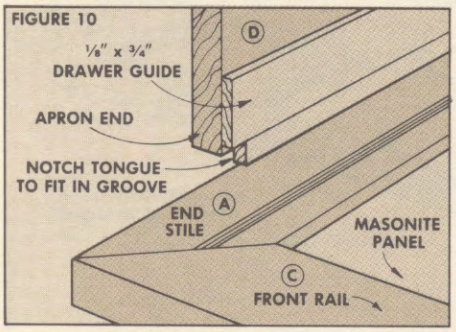


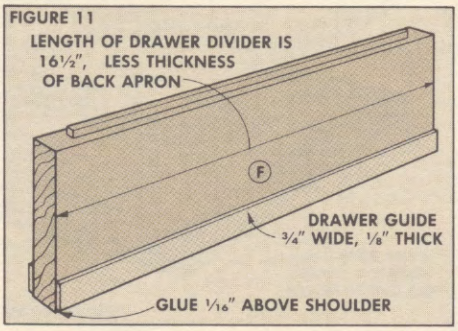
FIGURE 7

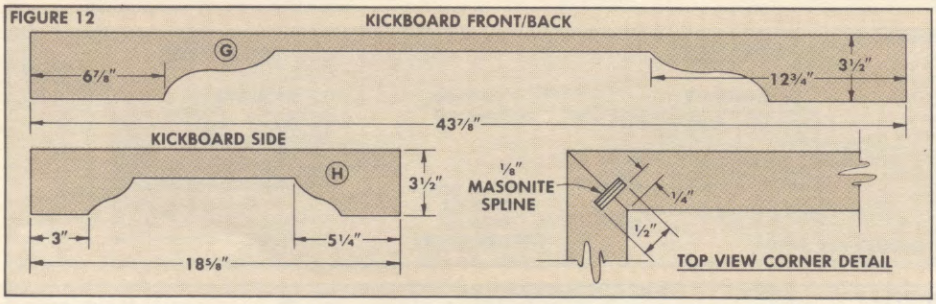


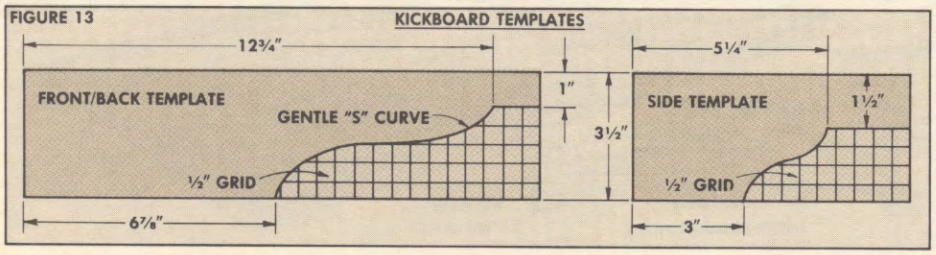












THE DRAWER CARCASE

Aprons and drawer dividers are used to connect the two web frames, and complete the drawer carcase assembly, see Fig. 9. I started by cutting the aprons (D and E), and the drawer dividers (F) 5" wide, and to rough lengths, see Fig. 8.

TONGUES. The next step is to form tongues on the aprons and dividers that fit the ¼"-wide grooves in the frames. On the drawer dividers (F), rabbets are cut on both edges to form tongues centered on the thickness of the divider, see Fig. 8. The shoulder-to-shoulder width between the rabbets should be 4½".

On the aprons (D and E), rabbets are cut so the tongues are flush with the *inside* face of the apron. Be sure that the shoulder-to-shoulder width is exactly the same as on the drawer dividers (4½").

MITERS. The back corners of the aprons are joined with a mitered spline joint to help keep everything lined up during assembly. Miter the back corners of the side aprons so the tongue is on the heel side of the miter, see Fig. 9. Then the front edge on both end aprons is trimmed so the overall length is 16½". Also, trim back the tongue on the aprons to fit the grooves in the frames, see Fig. 10.

Next, I inserted both end aprons (D) in the upper frame, and mitered the back apron (E) to fit between them.

MITERED SPLINE. While the saw is still set at 45°, cut ¼"-deep kerf on the face of the miters for the ⅛" thick Masonite splines, see Detail in Fig. 9.

TRIM DIVIDERS. Then the drawer dividers (F) are trimmed to the length of the end aprons, less the thickness of the back apron (so the front edges of the dividers and aprons are flush).

DRAWER GUIDES. To complete the drawer carcase, I cut ⅛" x ¾" drawer guides, and glued them to the end aprons and drawer dividers as shown in Fig. 10 & 11. Although all the parts for the drawer carcase are finished at this point, it's not assembled until after the kickboard assembly and the main box are built.

KICKBOARD ASSEMBLY

The kickboard assembly consists of a molded frame that's joined with miter and splines, see Fig. 12.

The kickboard sides are cut 3½" wide and long enough to fit the rabbet on the bottom edge of the lower frame, see Fig. 12. Then the patterns shown in Fig. 13 are traced on the kickboard sides, cut out using a band saw, and the kickboard assembly is glued together.

MAIN BOX

With both the drawer carcase and kickboard assembly finished, it's finally time to cut some dovetails.

GLUING UP. The first step is to glue up enough stock to produce two solid-wood panels for the front and back (I) with rough dimensions of 12" x 42", and two panels for the ends (J) with rough dimensions of 12" x 17". (See page 13 for the step-by-step procedure I used.)

After the panels are glued together, flatten them using a hand plane or belt sander. Then trim the panels for the front and back to final dimensions of 11½" x 41⁵⁄₁₆", and the end panels to 11½ x 16¹⁄₁₆".

Note: So the dovetail corners can be sanded flush after assembly, the measurements given are ¹⁄₁₆" longer than the final dimensions of the box.

DOVETAILS. I used the layout shown in Fig. 14, and cut the dovetails using the router jig shown on page 22. Of course, if the spirit moves you, the dovetails can also be cut by hand (see *Woodsmith* No. 19). After the dovetails are cut, the box is glued together, and the dovetail corners are sanded flush.

ASSEMBLY

Once the main box is glued together, the drawer carcase is attached to the bottom edge of the box.

UPPER FRAME. The first step is to attach the upper frame of the drawer carcase to the box. To do this, center the molded edge of the upper frame around the bottom edge of the box, see Fig. 15. Then clamp the frame to the box, and drill pilot holes for #8 x 1¼" woodscrews 1⅛" from the outside edge of the frame members. Finally, I unclamped the frame, applied glue to the bottom edge, and screwed the upper frame to the box.

APRONS. To assemble the rest of the drawer carcase, glue the aprons (with the splines in the mitered corners), the drawer dividers and the lower frame in place. Note: Be sure to keep the front edges of the drawer dividers and end aprons in line.

KICKBOARD. After the drawer carcase assembly has dried, the kickboard is glued to the rabbet on the bottom edge of the lower drawer carcase frame, see Fig. 15.

LIP MOLDING

With the bottom section completed, I flipped the cabinet right side up and started on the lip molding for the top edge of the box.

To make the lip molding, rip enough stock 1¾" wide for all four sides of the box. Then cut a ⅛"-deep groove ⅝" from the outside edge of the molding, see Fig. 16. (Note: Adjust the width of this groove to fit the top edge of the cabinet.)

Next, rout a ½" cove on the bottom outside edge of the lip molding, and remove the sharp corners on the inside edges using a ¼" rounding over bit set at a very shallow depth. Finally, miter the lip molding to fit the rim of the box, and glue it in place, see Fig. 17.

FIGURE 14

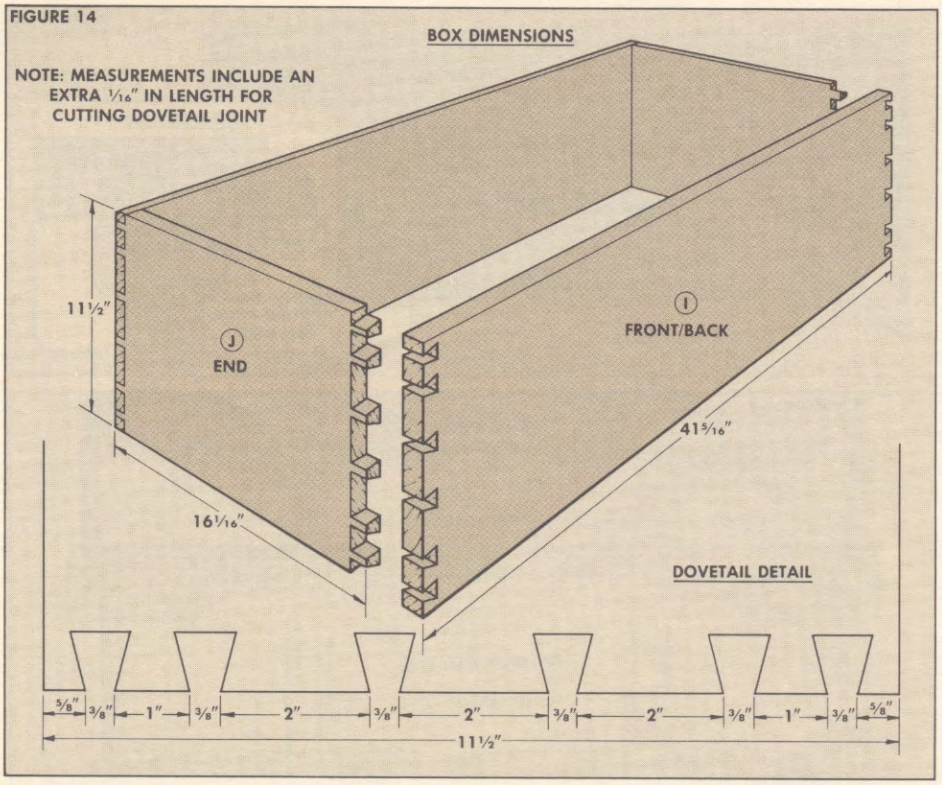


FIGURE 15

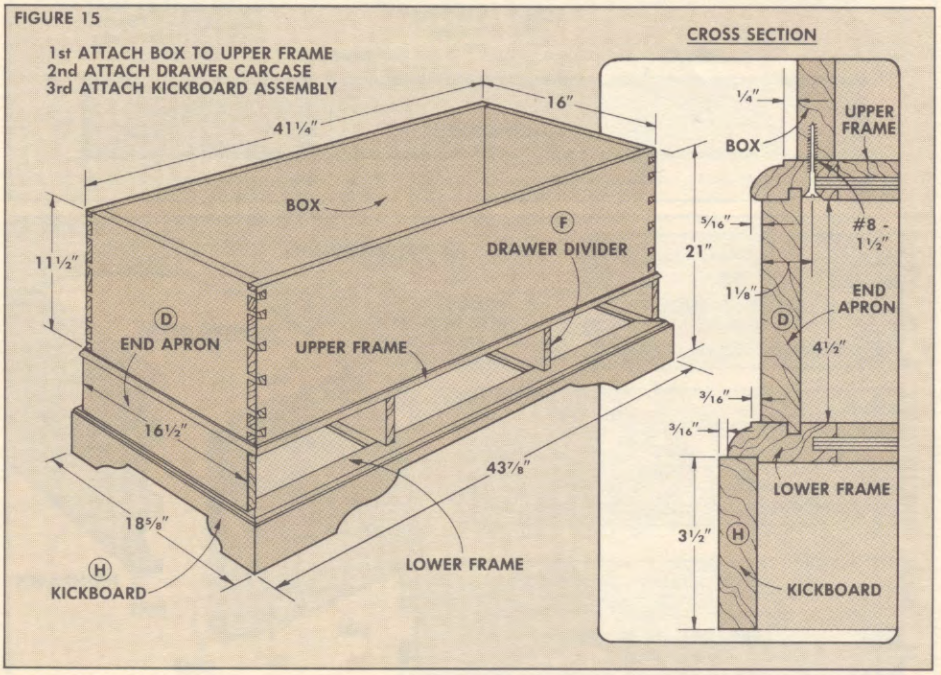


FIGURE 16

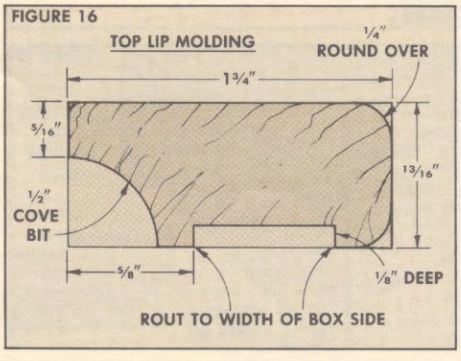
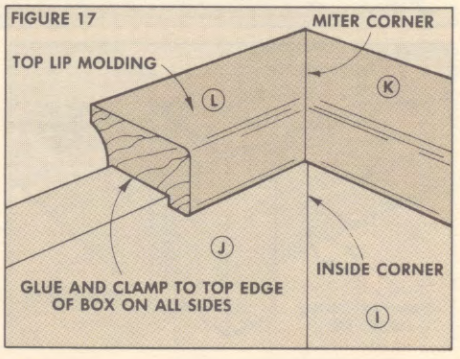
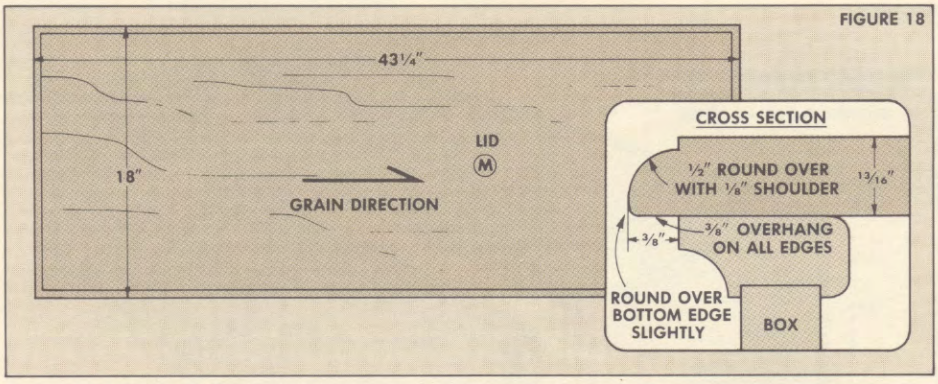
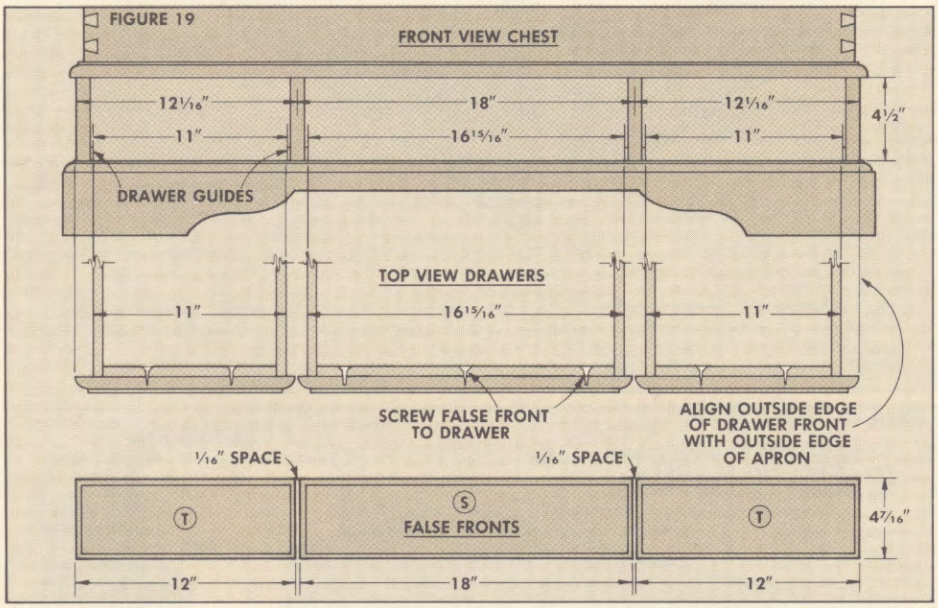
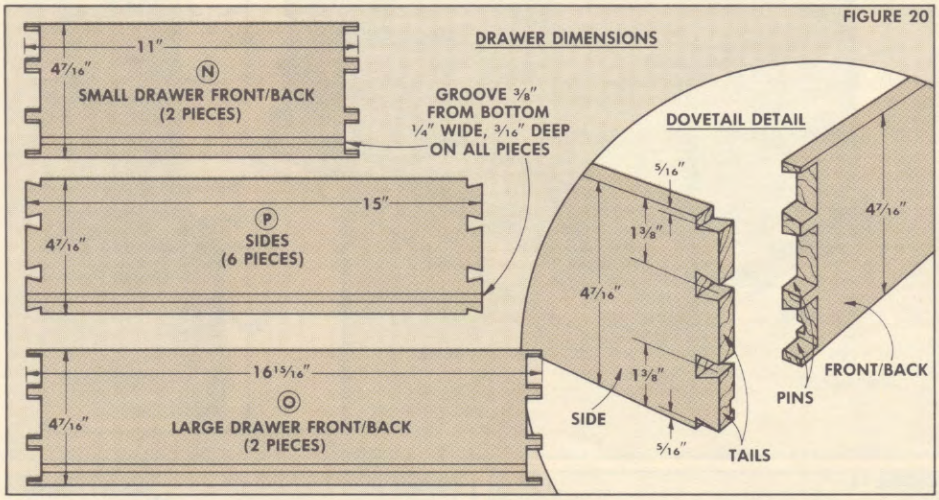


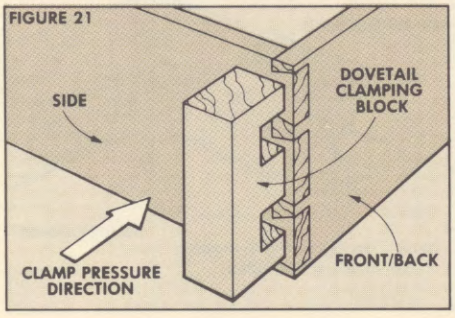
FIGURE 17

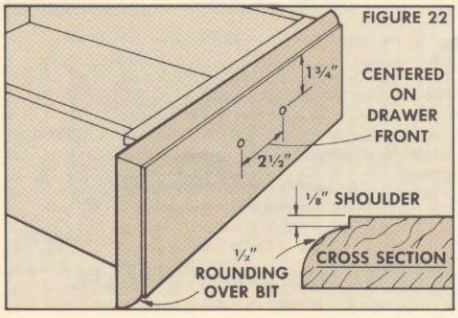












THE LID

Even though the first thing most people notice on a blanket chest is its lid, most contemporary chests are sold with either cushions covering the lid, or a little railing around the perimeter.

For the lid on this chest, I decided to follow the design found on most traditional chests — a flat, solid-wood lid that's simple in design, and lets the beauty of the wood speak for itself.

GLUING. Since the lid overhangs the lip molding ⅜" on all four sides, the first step is to glue up enough stock to produce a panel that can be trimmed down to provide the ⅜" overhang. Then the lid (M) is planed flat, and trimmed to its final dimensions.

MOLDING. After the lid is trimmed to final size, its outside edge is molded with a ½" rounding over bit, leaving an ⅛" shoulder, see Cross Section detail in Fig. 18. Then on the bottom outside edge, the sharp edge is removed using a ¼" rounding over bit set at a very shallow depth of cut.

THE DRAWERS

One of the things that makes this chest different from its modern counterparts are three *functional* drawers. The drawers are built in two sections; the four-sided drawer, and the false fronts that are molded to match the design of the chest.

DRAWERS. The first step is to cut the ½" drawer stock for the fronts and backs (N and O) to fit between the drawer runners, and 1/16" narrower than the height of the openings. Then cut the sides of the drawers (P) 15" long (for a 1" clearance at the back of the drawer), and to the same width as the drawer fronts.

JOINERY. To keep the joinery consistent, I used through dovetails routed with the jig shown on page 22 (the spacing is shown in Fig. 20). (Note: These drawers could also be joined with half blind dovetails using the standard router fixtures reviewed in *Woodsmith* No. 22.)

After completing the corner joinery, cut a ¼" groove for the drawer bottom (Q and R) ⅜" from the bottom edge, see Fig. 20.

BOTTOM. Finally, dry clamp the drawers together and measure the groove-to-groove openings for the drawer bottoms. Then cut the ¼" Masonite bottoms to fit, and glue the drawers together with the drawer bottoms in place. (Shop Note: To apply clamping pressure to the tails, I used the clamping block shown in Fig. 21.)

FALSE FRONTS. Each drawer has a 13/16" thick false front that's attached directly to the drawer front. To find the dimensions for the large false front (S), measure from center to center on the drawer dividers, see Fig. 19. Then cut the large false front to this length, and to the same height as the drawers.

To find the lengths for the small drawer fronts (T), measure the distance from the center of the drawer dividers to the outside edge of the side apron, and subtract 1/16" for clearance, see Fig. 19. Then cut the two small false fronts to length, and to the same height as the drawers.

MOLDING. The outside edges on the false fronts are routed with a 1/2" rounding over bit to match the moldings on the cabinet, see Fig. 22. Then I attached the large false front centered on the large drawer, and the small drawer fronts so they're flush with the outside face of the end aprons, see Fig. 23.

HARDWARE

DRAWER PULLS. The drawer pulls I used (see Sources on page 24) are centered on the width, 1 3/4" down from the top edge of the drawer fronts, and the screw holes are counter-bored from the back, see Fig. 22.

LOCK. To mount the full mortise lock, I drilled a series of 3/8" holes 1" from the front edge of the lip molding, see Fig. 24. Then the hole for the key is drilled, and the escutcheon is mounted over the key hole.

HINGES. When mounting the special hinges (that are designed for the excessive overhang of the lid), mortise them into both the lip molding and the lid, see Fig. 25. Then I added an optional (and expensive, see Sources page 24) lid support to prevent the lid from slamming shut.

FINISH. Naturally, I couldn't resist using the polymerized tung oil described on page 7. So I applied two coats of tung oil sealer, and four coats of medium luster tung oil. Note: Be sure not to finish the cedar, or you'll reduce its aromatic characteristic.

MATERIALS LIST

Overall Dimensions: 22 1/2"H x 18 5/8"W - 43 7/8"L		
A	End Stiles (4)	13/16 x 2 1/4 — 18 1/2
B	Center Stiles (4)	13/16 x 2 1/4 — 14 3/4
C	Frt/Bk Rails (4)	13/16 x 2 1/4 — 43 1/2
D	End Aprons (2)	13/16 x 5 — 16 1/2
E	Back Apron (1)	13/16 x 5 — 42 1/8
F	Drawer Dividers (2)	13/16 x 5 — 15 15/16
G	Kickboard Frt/Bk (2)	13/16 x 3 1/2 — 43 7/8
H	Kickboard Ends (2)	13/16 x 3 1/2 — 18 5/8
I	Box Frt/Bk (2)	13/16 x 11 1/2 — 41 1/2
J	Box Ends (2)	13/16 x 11 1/2 — 16
K	Top Lip Frt/Bk (2)	13/16 x 1 3/4 — 42 1/2
L	Top Lip Ends (2)	13/16 x 1 3/4 — 17 1/4
M	Lid (1)	13/16 x 17 7/8 — 43 1/8
N	Sm Drawer Frt/Bk (4)	1/2 x 4 7/16 — 11
O	Lg Drawer Frt/Bk (2)	1/2 x 4 7/16 — 16 15/16
P	Drawer Sides (6)	1/2 x 4 7/16 — 15
Q	Sm Drawer Bottom (2)	cut to fit
R	Lg Drawer Bottom (2)	cut to fit
S	Lg False Front (1)	13/16 x 4 7/16 — 18
T	Sm False Front (2)	13/16 x 4 7/16 — 12
U	End Panel (4)	1/4 x 10 3/8 — 14 3/4
V	Center Panel (2)	1/4 x 16 3/4 — 14 3/4
W	Aromatic Red Cedar	cut to fit

FIGURE 23

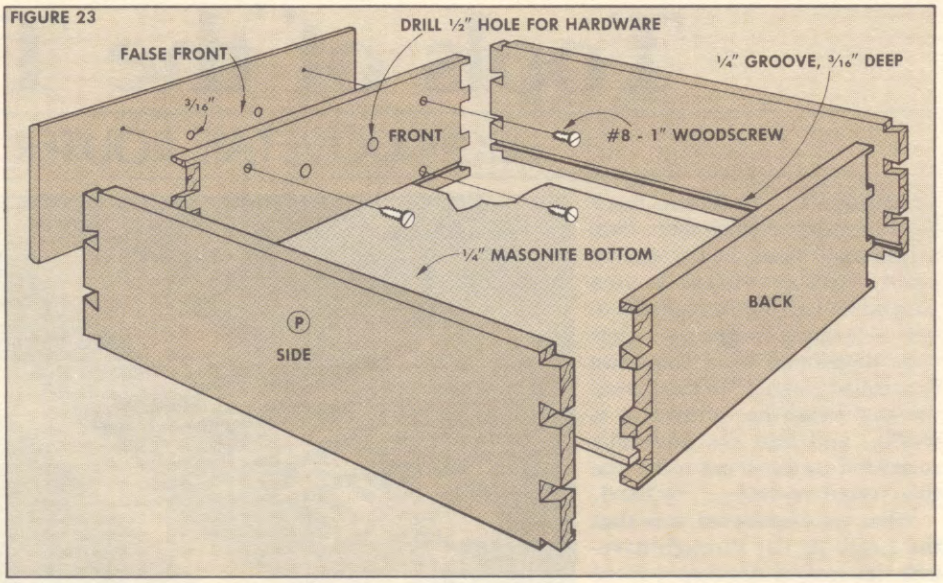


FIGURE 24

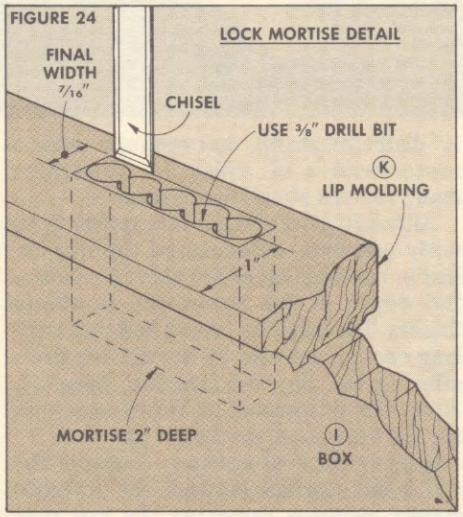
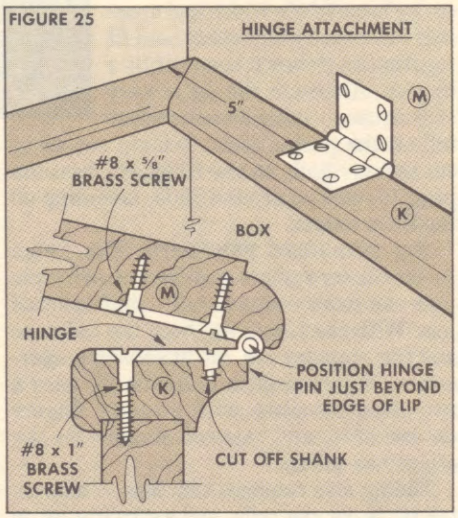
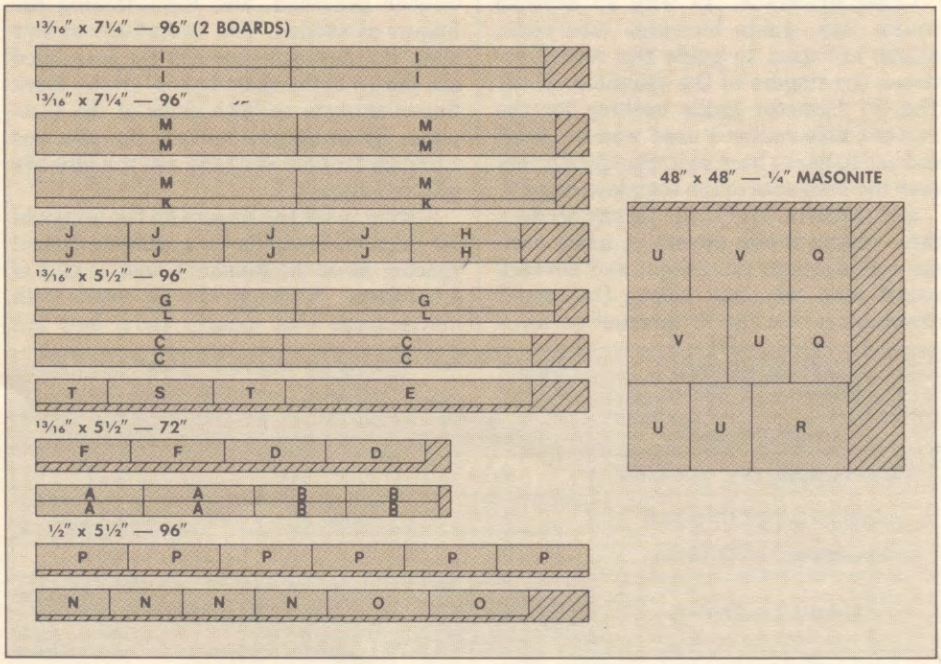


FIGURE 25



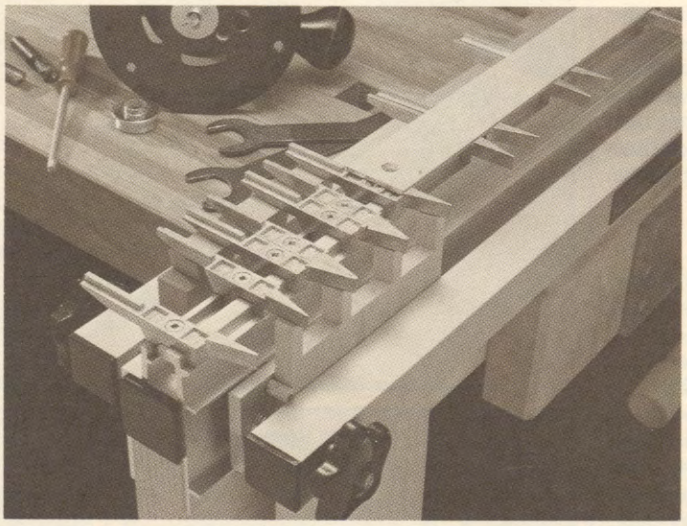
CUTTING DIAGRAM



Tools of the Trade

LEIGH DOVETAIL ROUTER JIG

Traditionally, dovetails have been cut using nothing more than a few hand tools and a steady hand. But recently, a new method for cutting through dovetails — using a router jig — has been developed by a Canadian firm called Leigh. We purchased the new Leigh jig to see how it works, and how its dovetails compared to those cut using the time tested method . . . by hand.



What we discovered was that the Leigh jig cut through dovetails that looked identical to those cut by hand (their width and spacings can even be adjusted), and fit together as if they'd been cut by a master. Although the jig is very easy to use, it takes a tremendous toll on the pocketbook. Getting set up to cut the dovetails on the Blanket Chest (on page 16) cost us around $200, including all the little extras.

THE TWO-SIDED TEMPLATE. The Leigh jig works on a slightly different principle than the more common half-blind dovetail jigs. With the Leigh jig, both the tailpiece and the pinpiece are cut in separate operations. To accomplish this, the jig uses a two-sided template with straight fingers on one side, and tapered fingers on the other, see photo.

The jig also requires two bits — a dovetail bit to cut the tails, and a straight bit to cut the pins.

GUIDE BUSHINGS. As with all dovetail router jigs, guide bushings (see chart below) are used to guide the router between the fingers of the template. Note: The ⅝" diameter guide bushing for the Porter/Cable router I used was too long, and had to be cut back so it was slightly less than the thickness of the template fingers.

ROUTER BITS. The Leigh jig can produce three different size dovetails, using various combinations of straight and dovetail router bits, see chart below. One major drawback is that the ¾" dovetail bit has a ½" diameter shank, and requires using a router with a ½" collet . . . something many routers simply don't have.

Although most of these bits appear to be fairly common, I discovered the bits we had in our shop were too short to allow a full depth of cut below the template fingers. The only bits I could find that were long enough are sold by the catalog firms offering the jig, see Sources, page 24. Note: The ¾" dovetail bit is *included* with the 24" version of the Leigh jig.

ADJUSTABLE SPACINGS. Setting the width and spacings between the dovetails simply requires removing the top slide bar, loosening the finger screws with the wrench provided, and repositioning the fingers as needed. The limitations on how close the dovetail pins can be positioned are shown in the chart below. (Note: Each finger extends to both sides of the template. So as they're moved, the size and spacings for both the tails and the pins are affected equally.)

Trying to set the fingers on the template for cutting dovetails to a predetermined spacing (as on the Blanket Chest) is kind of a headache. Although the jig comes with instructions that clearly show how it's used, the description of how to set the spacing on the template is poor. I had to make several trial joints to figure out the proper location for the fingers.

THICKNESS OF STOCK. The chart below shows the maximum thickness of stock that can be used on the Leigh jig. There's also one other restriction: the size of the dovetail is dictated by the thickness of the stock. This could be a problem, for example, when a ¾" drawer front with ½" drawer sides is being made. In this case, the dovetails must be ¾" wide (which tends to be rather clumsy looking on a drawer), rather than the typical ½" dovetails found on most drawers.

VISIBILITY. One of the most distracting things about using the Leigh jig is that when it's mounted in a vise (as recommended), you have to be on your knees to see what's going on.

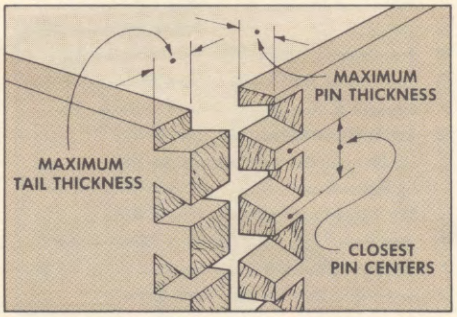
But overall, the jig performed with no major problems, and produced beautiful through dovetails that fit together so well it was almost eerie.

PRICES. If there's one major drawback with this jig, it's the price. The Leigh jig comes in two models, a 12" ($140-$150) and a 24" ($250-$275) version. (Note: The dovetails on the Blanket Chest can be cut with either size jig.) Both models are available from Garrett Wade or Woodcraft Supply, see Sources on page 24.

Although the price of the jig is high, after adding the cost of the long-shaft carbide-tipped bits and the proper bushings, the cost of the 12" jig can jump as high as $220, and the 24" jig almost requires a second mortgage at around $330.

Even though the Leigh jig cuts beautiful through dovetails, this kind of investment seems to make sense only if you have to cut a *lot* of dovetails. In most cases, I think I would take the time to cut dovetails by hand, and pocket the difference.

DOVETAIL CUTTER * (Denotes ½" Shank)	¾"* 14° angle	½" 14° angle	⅜" 14° angle
Straight Cutter	½"	5/16"	5/16"
Guide Bushing O.S. Diameter	⅝"	7/16"	7/16"
Maximum Tail Thickness	1"	1"	1"
Maximum Pin Thickness	¾"	½"	⅜"
Closest Pin Centers	1 5/16"	1"	1"



Talking Shop

AN OPEN FORUM FOR COMMENTS AND QUESTIONS

GLUE BRUSHES

In the past, whenever I spread glue on the edges of a board, I always used a ½" paint brush with the bristles cut back to about ¾" in length. But the brush became more hassle than it was worth. The problem was that the bristles kept pulling out and the ferrule got rusty after a while.

Then two years ago, I tried using a high quality artist's brush. We bought a flat, ½"-wide brush with ½"-long nylon bristles and a brass ferrule (which won't rust). The $8 price tag on this rather small brush seemed outrageous, but I have to admit it was worth the money.

The short stiff bristles make it easy to spread the glue and control the amount of glue that's put on. But the real advantage is that these brushes don't seem to wear out. We've used it on every project shown in *Woodsmith* for the past two years, and it's still in good shape.

Plus, I can't count the number of times I forgot to wash it out right away, and had to leave it soaking to soften the dried glue. The ferrule doesn't rust, and the bristles stay put — even after soaking (I hate to admit it) two or three weeks. It's not cheap, but I think it's worth the price.

HINGE MORTISES

As I was building the Blanket Chest, the most tense moments came as I was cutting the mortises for the hinges. Unfortunately, this isn't unusual for me. After spending hours and hours on construction, a mere slip of the hand at this stage, and good-bye project. I can never seem to get that out of my mind.

So in my efforts to become super-cautious during the "hardware stage" of the project, I've come up with a few techniques that really help.

ALIGN HINGE. The first step is to use the hinge itself as a guide to the size of the mortise. Then to keep the hinge aligned properly as the mortise is marked out, I butt the edge of the hinge against the edge of a square. (Keeping the hinge square is necessary to eliminate binding during opening that occurs when the hinges are either toed-in, or toed-out.)

SCORE OUTLINE. Then to mark the outline for the mortise, I use a sharp Xacto knife and score around the perimeter of the hinge, keeping the point of the blade tight against the bottom edge of the hinge. This scoring mark severs the fibers of the wood, and makes chipout at the edge of the mortise unlikely. The end result is a clean, accurate outline for the hinge mortise.

ROUT MORTISE. After the outline of the hinge is scored, I use a router to rout all the mortise. Using a router with a small (⅛" or ¼") straight bit eliminates any pulling normally associated with a router, and produces a mortise with a consistent depth and a flat bottom.

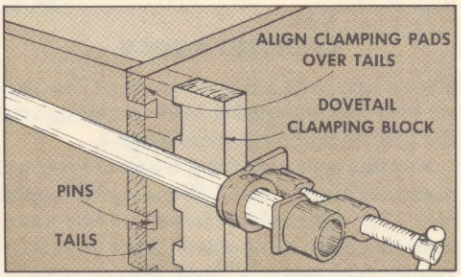
However, trying to follow a shallow score mark by sighting through the collet opening in the base of a router can be difficult, if not impossible. To make the outline of the mortise more visible, I mask it off with masking tape.

Then I set the router to cut about 1/32" deep (making trial cuts on a test piece to check the depth of cut) and slowly rout out the mortise within the masked off borders. It usually takes several very light passes to reach the final depth of the mortise. Note: Be sure to remove the masking tape on the last pass with the router so the depth of the mortise equals the exact thickness of the hinge flap.

DOVETAIL CLAMPING BLOCK

Trying to clamp a dovetail joint together isn't as easy as first impressions would lead you to believe.

The key to clamping a dovetail joint is to



apply pressure only to the tailpiece . . . that is, directly over the tails. An easy way to do this is to use a dovetail clamping block. The block is simply a piece of hardwood with "clamping pads" that line up with the tails on the dovetail joint.

NUMBERED BITS

I have a chart which specifies pilot holes for wood screws in terms of bit numbers running from No. 12 to No. 75. I have been unable to find a precise definition of those numbers and would appreciate anything you can tell me. Thank you.

W.A. Quammen
Cincinnati, Ohio

The designation for drill bit diameters varies from one type of drill bit to another. Most of the bits used in woodworking (spade bits, brad point bits, and Forstner bits) are calibrated in inches. But twist bits, which are used to cut both wood and metal, are labeled with several systems. The most recognizable system of labeling is in inches, but letter and number systems (representing wire gauge sizes) are also used.

The letter and number labeling systems are most often used in the metal working field. Metal working, with its extremely precisen requirements, often requires not only having a large range of bits, but also bits that increase in size in extremely small increments. With this in mind, these three systems (numbers, letters, and fractions) designate a total of 138 different bit sizes between .0135" and .5".

For woodworkers, this level of accuracy is overkill to say the least. For even the most accurate work, bits increasing in 1/64's are pushing the limits of accuracy needed in woodworking.

The problem Mr. Quammen is facing is that some charts still list the bit diameter for shank and pilot holes by letters or numbers. And unless you have a chart to convert these to inches, there's no way to know what size bit to use.

Listed above are the four most common woodscrews, and the correct diameter bits (in numbers and fractions) for drilling the shank and pilot holes.

For a more detailed list of the correct size drill bits for drilling in softwood, hardwood, or metal, and a complete listing of all 138 different bits between .0135" and .5", I recommend *Getting the most out of your drill press*, a Rockwell publication available from most Rockwell distributors.

	PILOT HOLE		SHANK HOLE	
SCREW SIZE	Numbered Drill	Nearest Fractional Drill	Numbered Drill Size	Nearest Fractional Drill
6	47	5/64"	27	9/64"
8	40	3/32"	18	11/64"
10	33	7/64"	10	3/16"
12	30	1/8"	2	7/32"

Sources

BLANKET CHEST

Woodsmith Project Supplies is offering three different hardware kits for the Blanket Chest as shown on page 16. The kits include your choice of pulls (see photos below) and all the necessary hardware to complete the project.

Blanket Chest Hardware Kits

732-100 Kit A.....$59.95
732-200 Kit B.....$59.95
732-300 Kit C.....$59.95

All of the kits above include:

- (2) 2" x 3" Solid Brass Hinges
- (1) Full Mortise Chest Lock With Brass Key Escutcheon
- (1) Satin Brass Lid Support (Featuring an adjustable tensioning rod.)

Note: For the aromatic cedar used to line the Blanket Chest, check at your local lumber yard, home improvement center or harware store for boxed sets of cedar paneling used to line closets.

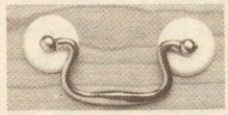
Blanket Chest Pull Types

Pierced brass pulls with a matching key escutcheon are included in this kit.

Kit A.....(Chippendale Style)

This is a traditional style solid brass pull with a matching escutcheon plate.

Kit B.....(Colonial Style)



These ceramic and brass pulls come with an escutcheon that covers the keyhole.

Kit C.....(Ceramic Rossettes)

LEIGH DOVETAIL JIG

Since we reviewed the Leigh dovetail jig, in 1984, the company has introduced a new model. The new jig produces both through and half-blind dovetails. The new jigs are still available in 12" and 24" widths. Because of the wide variety of options available we suggest that you get a catalog from one of the companies listed below in the Mail Order Sources before ordering.

CUTTING BOARDS

For the cutting boards, we used a plastic resin glue. (It comes in a powdered form and mixes with water.) This type of glue can be found in most hardware stores and lumber yards, or it can be ordered from the sources listed below in the Mail Order section.

The finish we used on the cutting boards is called Martens Wood Preservative, it's a oil and wax combination that's safe to use around food. It's available from the sources listed below.

As an alternative finish, Woodsmith Project Supplies is offering Preserve Nut Oil finish. Preserve is a blend of natural oils from exotic nut meats and provides an excellent, non-toxic finish for toys as well as bowls and wooden kitchen utensils.

Nut Oil Finish

4001-275 Preserve Nut Oil Finish, 8-oz. Bottle.....$8.95

CARVING TOOLS

There are a number of sources for the carving tools we used to incise the design on the Quilt Rack as shown on page 4.

For this type of carving we would recommend a "starter set." Woodcraft Supply (see Mail Order Sources below) has a set that includes a skew chisel, three gouges, a veining tool, and a "V" tool. These tools will be more than adequate for most incise carving. With these carving tools, the handle is placed in the palm of your hand, and your fingers guide the cutting edge.

Note: As with all edge tools, we recommend sharpening and honing these tools before using them.

CARVING BOOKS

If you would like more information on carving, check your local library or bookstore. We have found the following two books helpful. They are available from the sources listed below in the Mail Order Sources section.

Manual of Traditional Wood Carving,

The Book of Wood Carving: Technique, Designs and Projects.

Note: All of us here at *Woodsmith* found *The Book of Wood Carving: Technique, Designs and Projects* very helpful. Even though it was originally published in 1942, it remains one of the best introductory books on the techniques of incise carving that we've seen.

CARVING PATTERN

The full size pattern for the vine and leaf design on the Quilt Rack as shown on page 6 is available free. (There is a $1.50 shipping charge.)

Quilt Rack Pattern

8005-014.....Free

TUNG OIL FINISHES

The four tung oil finishes mentioned in the interview with Frank Welles (sealer, low luster, medium luster, and high luster) are available from the sources listed below. Or you can call Sutherland Welles at (800) 322-1245 to find a dealer near you.

ORDER INFORMATION

BY MAIL

To order by mail, use the form enclosed with a current issue. The order form includes information on handling and shipping charges and sales tax. Send your mail order to:

Woodsmith Project Supplies
P.O. Box 10350
Des Moines, IA 50306

BY PHONE

For faster service use our Toll Free order line. Phone orders can be placed Monday thru Friday, 8:00 AM to 5:00 PM Central Standard Time.

Before calling, have your VISA, MasterCard, or Discover card ready.

1-800-444-7002

Allow 4 to 6 weeks for delivery. Prices subject to change, call for current prices.

ALTERNATE CATALOG SOURCES

Similar hardware and supplies may be found in the following catalogs. Please call each company for a catalog or information.

Garrett Wade
800-221-2942
Dovetail Jigs, Cutting Board Finishes, Carving Books and Tools, Plastic Resin Glue, Tung Oil Finishes

The Woodworkers' Store
612-428-2199
Blanket Chest Hardware, Carving Books and Tools, Cutting Board Finishes

Trend-Lines
800-767-9999
Dovetail Jigs, Cutting Board Finish

Woodcraft
800-535-4486
Blanket Chest Hardware, Cutting Board Finishes, Carving Tools, Plastic Resin Glue