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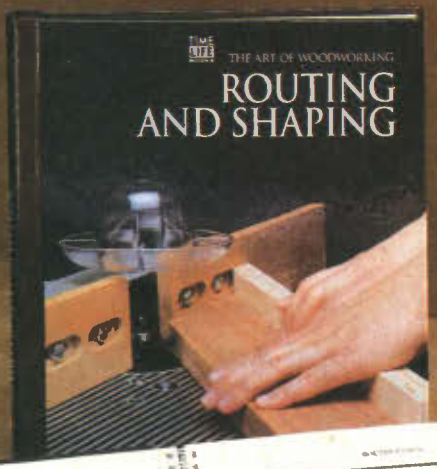

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CONTENTS

Columns & Departments

On the Cover

Our main cover project this month is a six-legged sideboard crafted from tiger-striped, quarter-sawn white oak. Fabricated in *Popular Woodworking's* cabinet shop by editor Steve Shanesy, the sophistication of this traditional piece's stepped-out front is the result of a few simple steps.

COVER PHOTO BY RON FORTH PHOTOGRAPHY

SAFETY NOTE Safety is your responsibility.

Manufacturers place safety devices on their equipment for a reason. In most photos you see in Popular Woodworking, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand. Think ahead. Safety First!

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Subscription Information
Tel. (515) 280-1721

Popular Woodworking (ISSN 0884-8823, USPS 752-250) is published six times a year in January, March, May, July, September and November by F&W Publications, Inc. Editorial and advertising offices are located at 1507 Dana Ave., Cincinnati, OH 45207; tel.: (513)531-2222. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (6 issues) is $19.97; outside of U.S.A. add $7/year. **Send all subscription inquiries, orders and address changes to: Popular Woodworking, P.O. Box 5369, Harlan, IA 51593 or call (515) 280-1721. Please allow 6 to 8 weeks for delivery.** Copyright © 1995 by *Popular Woodworking*. Second-class postage paid at Cincinnati, Ohio, and additional mailing offices. Postmaster: Send all address changes to Popular Woodworking, P.O. Box 5369, Harlan, IA 51593. F&W Publications, Inc. officers: President: Richard Rosenthal; Senior Vice Presidents: Wm. Budge Wallis, Book Division; David R. Luppert, Finance and Administration; Vice President: Jeffry M. Lapin, Magazine/Educational Services Division; Corporate Managers: Mert Ransdell, Book Division; Michael Patton Hoover, Manufacturing. Vol. 15, No. 4. Canada GST Reg. # R122594716

Produced and printed in the U.S.A.

Attention Retailers:
To carry *Popular Woodworking* in your store, call (800)786-6138, or write: Retail Services, F&W Publications, Inc., P.O. Box 601, Mt. Morris, IL 61054.

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TURNINGS

Let's Celebrate Craft!

The Renwick Museum in Washington, D.C. is part of the complex of buildings that make up the Smithsonian Institution. Renwick's mission is to collect and display the best craft work produced by American hands.

Armed with the expectation of vast exhibits one associates with the Smithsonian, I planned to spend an afternoon exploring the Renwick, seeing first hand what I'd sampled only in books.

Upon arrival, I was a little disappointed to learn the temporary gallery was "dark"— in transition from one exhibit to the next. So, I went on to the permanent collection. As I began meandering the maze of displays, I was thrilled to see the Sam Maloof double rocker with its shimmering curly maple. There was also a whimsical setee by Judy Kensley McKie in her best animal motif. I saw a fluid bentwood rocking chaise by Michael Hurwitz. I also viewed the exquisite workmanship of Wendell Castle.

Along with these wood works lay metal work, ceramics, glass and textiles, all fine examples of America's best. And then, less than 45 minutes after starting my tour — the *Exit?* Was I disappointed? I could've left my sensible shoes at home and walked this museum on my hands!

As I left the Renwick, a thought occurred me — why do we as a nation (and why does the Smithsonian, which simply mirrors our society) pay greater homage to the machines that produce our highest technical achievements than to the creations that passionate hearts, trained hands and thoughtful eyes produce using a tool or machine?

Let's celebrate craft. Sure, we enjoy our tools, but our pride and fulfillment is in our work. Our inspiration often derives from the achievements of those whose hands toiled in the field of craft ... the craft that we ourselves pursue.

Nothing Could be Feiner . . .

German factory and commercial craft workers, even today, must provide their own hand and power tools. They expect high performance and long life from their tools and are willing to pay top dollar for good quality. After all, it's an investment in their livelihood.

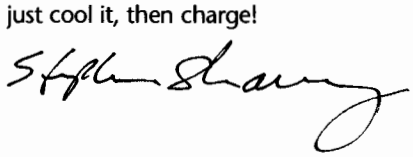
Woodworkers Dan Hoetker (left) and Wally Stegman give the DeWalt Random Orbit Sander a whirl at one of* Popular Woodworking's *in-house tool seminars.

Fein Power Tools, Inc., a German company, produces fine power tools in Germany and sells them throughout the world. Fein invented the very first hand power tool, the drill, and this year celebrate their 100th Anniversary. As part of *Popular Woodworking's* ongoing reader seminar program, Fein Tools' U.S. president, Chris Cable visited with 50 readers here and presented their impressive line of drills, dustless sanders (yes, dustless!), and jig saws. Everyone was impressed with the absolute quality of their products, their innovative features, and an unsurpassed guarantee in the industry. Check them out when you get a chance.

"Cordless, Not Gutless"

The DeWalt message above come to town for another reader seminar. We learned from Mike Birch, DeWalt's cordless tool product manager, that many of us are thinking alike — we no longer see a cordless tool as a convenience, but as a regular workhorse in our shops. And as such, the more power the better. At a later time, we'll get into some of the particulars about cordless tools, it's just too big a subject for this space. But let me put to rest a question that I finally got answered by Mike.

Do these batteries have memories? NO! Today's batteries have "no memory effect." Batteries that came to market years ago were different than today's. Just remember this — today's battery chargers are thermal based. When you "cook the pack," or charge, the charger shuts off when the battery reaches a specific temperature. If you charge a battery that's still hot from use, the charger will falsely sense that it has reached its full-charge temperature. So just cool it, then charge!



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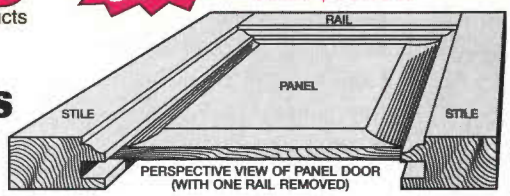

PERSPECTIVE VIEW OF PANEL DOOR (WITH ONE RAIL REMOVED)

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1/4" Shank Router	#1301	$69.95
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*3-1/2" Large Diameter (1/2" Shank)
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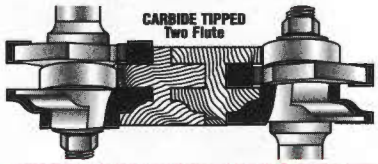

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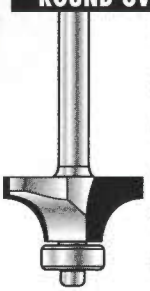

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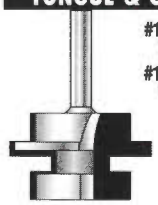

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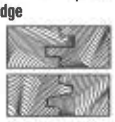

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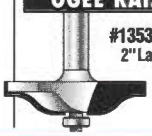

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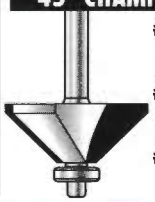

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#1405 . . . . $16.00 1 1/2" Lrge Diameter, 5/8" Cutting Lngth
#1406 . . . . $22.00 1 3/4" Lrge Diameter, 1" Cutting Lngth

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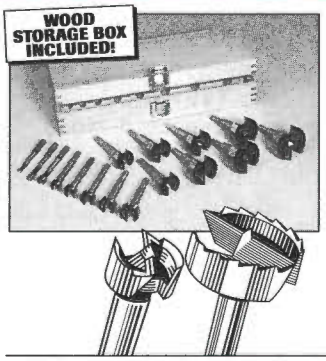

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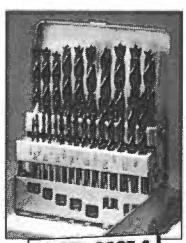

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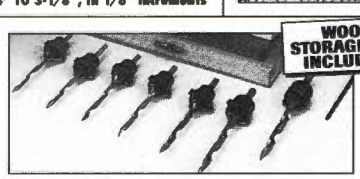

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We welcome your comments, pro or con, about articles we publish. We also want to see color pictures of what you're building. Send your letters and photos to: Letters, Popular Woodworking, 1507 Dana Ave., Cincinnati, OH 45207. Letters may be edited for publication.

Peddle Me Some Plans

I have looked everywhere for some plans for an old fashioned peddler's push cart with a canopy, similar to the modern metal hot dog vendor carts, but made out of old fashioned wood. Can you or any of your readers help me?

Thomas Willi
Enumclaw, Washington

ED.— You're in luck! PW *published push cart plans in Issue #49, July 1989. You'll find them on page 69. If you don't have this issue, write to our Back Issues department and they'll set you up!*

See Der Patchin'?

Recently, while looking through some back issues of your magazine, I saw your article on patchwood in the January 1992 issue (#64). I remembered thinking that I had wanted to try patchwork then, but had never followed through. I resolved that this time, I would do it.

I decided if it could be used on small projects, it could be used on large ones. I got busy and built a cedar chest and used it on the two ends and front. The rest is built from oak and the bottom, back and front are lined inside with a ¼" aromatic cedar flakeboard. I think it came out well. What do you think?

Over the years, I have built more than sixty cedar chests of the same model using many different hardwoods. I made two out of purple heart and some from figured red gum, which were very beautiful.

I am 86 years old and have been retired from my own retail building supply business for the last six years. I spend a lot of time in my hobby wood shop. Your magazine makes that time more enjoyable. Thank you.

Raymond Scott
Hannibal, New York

ED.—The patchwood work on your cedar chest is great. We're sure that it took quite some time to complete. That's one of the great benefits of being a retiree and a woodworker — you have the time (finally!) to try out all those projects you've always wanted to build. Good luck with your future projects!

Fetch Me A Forstner

I would like to solicit your help in locating the vendor for this Forstner style drill bit (***see photo above***). I have tried to find the vendor through the many woodworking tool catalogs I receive, but to no avail.

My problem is that I bought this bit about five years ago and have lost all paperwork that indicated the vendor and cost of the item. During the past year, I have had many occasions to use this tool for special presentations of coins for celebrations such as birthdays, anniversaries, worthy achievements, etc.

I am hoping you can put me in contact with a vendor who can provide this marvelous bit. It is carbide tipped and cuts very cool and rapidly. It has a ⅜" shank. On the case is written the item number CPT 47167/67.

C. Gordon Emerson
Fort Myers, Florida

ED.— If anyone out there can help Mr. Emerson find his fabulous Forstner, feel free to write us at Popular Woodworking *and we will pass on the information.*

Topshelf

My workshop is full of woodworking magazines and books. The one magazine that has the best projects and tips for me is *Popular Woodworking*. I have one special shelf over my workbench just for your magazine.

I would like to commend your staff for putting out such a fine magazine. The articles are full of useful information and tips. The Tool Talk column helped me to choose a thickness planer and table saw. The PullOut™ Plans are extremely helpful when a plan is needed. Bob Rech draws some wild cartoons for the "Caption the Cartoon" contest.

Keep up the good work and keep the best woodworking magazine in America coming. Looking forward to my next issue.

Steven B. Hopkins
Lockport, New York

ED. Thank you for the kind words. We hope your shelf doesn't collapse under the weight of our next holiday issue — we plan to pack it with 25 different projects!

Email us!

On CompuServe, contact us at Bruce Woods, 75463,3377, or leave a message in the Woodworking Section of the CompuServe Crafts Forum.

Our American Online screen name is Wudworker. To leave us a message without using the mail system, look for the Exchange's Woodworking Center.

Those of you on another online service can write to us at Wudworker@AOL.COM.

Tricksters Everywhere, ATTENTION

Alright, we know you have a few tricks up your sleeve, so, send 'em in! Jigs, customized attachments, ways to save a buck or two — anything that makes woodworking easier — they're all fair game! Plus, if we use your idea, we'll pay you $35!

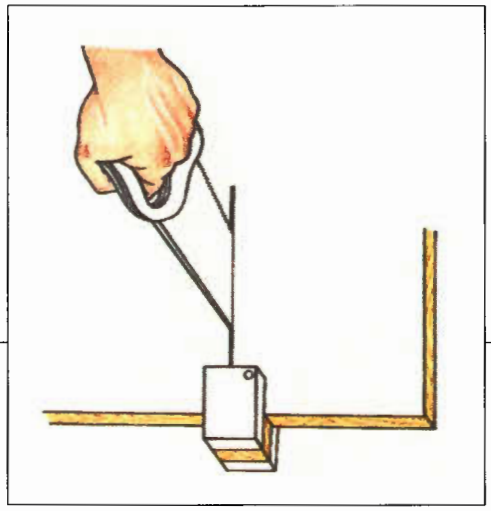
SS, the Editor.

Tricks of the Trade shares readers' tips for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, *Popular Woodworking*, 1507 Dana Ave. Cincinnati, Ohio. We pay $35 for each TOT we publish.

A Non-Binding Solution

I often saw sections of plywood and hardboard for assorted workshop projects. I made a simple panel holder that's a great help in doing this type of cutting. I made up the holder by nailing a small spacer that's of the same thickness as the work to two small scraps of wood. In use, this gadget is slipped over the work to keep the cut from separating thus preventing the usual binding, etc. I've made several of these handy helpers using spacers of the same thickness as most of my common work material. I keep the holders handy so they're always ready for use . Sure saves a lot of time and makes my shop work much easier, too.

Howard E. Moody
Upper Jay, New York



An Eccentric Tapering Jig

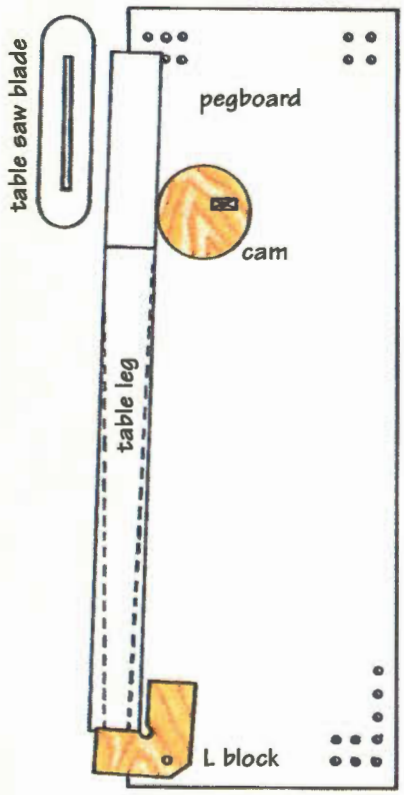
Like many woodworkers, I've built the standard "two sticks, a hinge and a cross bar" tapering jig for use on the table saw. Once I fabricated the tapered feet for at trestle table, and found the larger angle and flimsiness of the standard jig unsatisfactory. So, I developed something new.

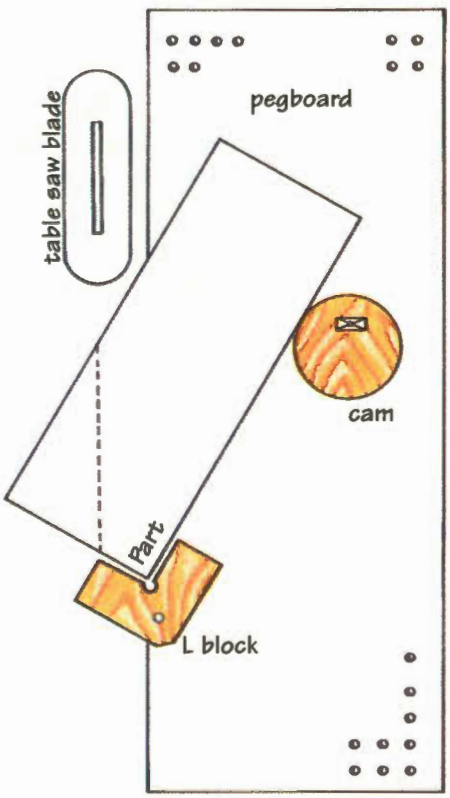
The eccentric disk was cut from scrap at a 3"-diameter with a ¼" hole offset about 1" from center. Using the 1" spaced holes on the peg board I inserted a ¼" flat-head machine screw (after countersinking the peg board hole selected) through the eccentric and topped it with a wing nut. The supporting "L" block is left free to pivot as an aid to align the workpiece at the correct angle. Attachment to the peg board is the same as the eccentric. The peg board hole is countersunk to avoid scratching the table of the saw.

Typically, with the standard taper jig, you make a two-step block or shim out the workpiece for the third and fourth cuts of a full tapered leg. With this jig you simply rotate the eccentric to obtain the second angle. The peg board runs against the table saw fence, therefore that edge should be cut parallel to a line of holes to facilitate the set-up. By relocating the eccentric and L block, a wide variety of angles is available. In the second sketch, flipping the workpiece without disturbing the set up will assure a like angle for the other half of the foot.

I consider the L blocks sacrificial pieces and usually make up four at a time from ¾" plywood scraps. A handful of these corner squares always come in handy when assembling carcasses, drawers, etc. Clamping a couple on the drill press table will also serve as stop blocks for repetitious drilling.

L.F. Alexander
Franklin, North Carolina





Make Your Pattern Clear, Forever!

Making multiple toys from paper patterns tends to destroy the paper. To prolong the life of my patters indefinitely, I use a clear, all purpose vinyl covering. It's available in either 3' or 4' widths.

I trace the pattern on to the plastic with a black magic marker, and place the plastic on the wood. Once I've found the most pleasing grain patterns, I tack two corners to the project. Next I place carbon paper under the plastic and trace in onto the wood. I've had great results!

Jerry L. Cozzen
Anchorage, Alaska

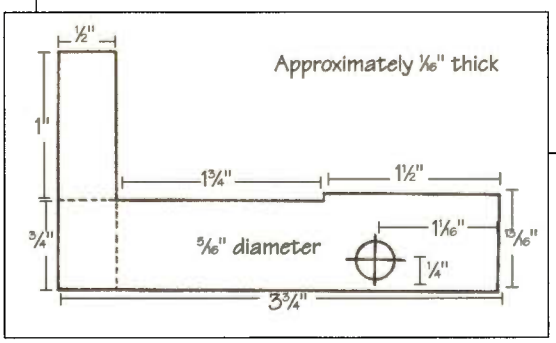
Keep Your Hands Behind the Guard at All Times, Please!

Grabbing the shoe of a sabre saw to steady it while you cut is dangerous. I've seen carpenters employ this technique on both "This Old House" and "Home Again." Although I bet manufacturers would deny or shun this practice, we should all admit it's commonplace and incorporate a guard like I suggest on their saber saws.

Anyone can make this guard rather easily. It's simply a piece of sheet metal cut and bent into shape and mounted to the edge-guide-set screw hole. I coated mine with "Plasti-Dip" for better grip and visibility. It doesn't block the view of the cutting edge, so the blade, and thus the user, is well protected.

The dimensions below are for the Sears Craftsman™ saw I own with the "Anti-Splintering" mode, but can be adapted to most saber saws.

Mark Stryker
Jersey Shore, Pennsylvania



Sizing Up End grain!

The end grain of coarse woods such as pine and redwood can be finished smoothly for painting or enameling by giving it a heavy coat of thick casein glue. Rub the glue into the endgrain thoroughly with your fingers, allow it to dry then sand to a smooth, hard finish.

Thomas LaMance
Prewitt, New Mexico

Child-Safe Doll Furniture — from Scrap!

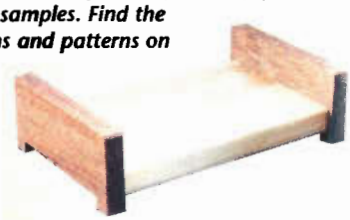
With nine grandchildren to entertain, I have built more child-related projects than I can count. In between, I have built a variety of boxes, cabinets, tables, chests, etc. Most of these things were built from my own designs. I have filled special orders and sold other items direct or on consignment, but still consider myself a hobby woodworker.

A German woodcarver from Stuttgart piqued my interest in woodworking about 20 years ago. I asked the gentleman to help me buy woodcarving tools for my son, and after helping me buy a basic set of tools, he taught me how to use them. My intention was to pass this information and the tools to my son. But, I became so enthralled with woodcarving my son never got those tools!

From building and carving chests and other projects, there was a natural progression into general woodworking. I began learning by examining how things were made. Later, I subscribed to woodworking magazines, and from these I gained an extensive education in woodworking.

Martha A. Dawson
Squaw Valley, California

Build this clever doll furniture! Woodworker Martha Dawson's nine grandchildren love these pieces, which are sturdy enough to stand up to rough child's play. The furniture is made from scrap wood, and the "upholstery" is simply old wallpaper samples. Find the PullOut™ Plans and patterns on page 33.



Women Readers!

Whether you design and create your own projects or help your spouse in the shop, wood is a part of your life. And this is your forum! Share your project ideas, ask questions and discuss your concerns. Write us soon!

—Tori

Martha —

Congratulations on your success! The doll furniture is a great idea, and I'm sure our readers will enjoy the plans for the furniture and perhaps even build a couple pieces! Thanks!

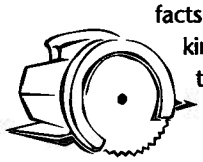
–Tori

The Great Blade Mystery — Sawlved!

My question concerns circular saws and their blades. Which type cuts my tree limbs, and what kind of blade do I need to cut my pine shelves with? Last time I went shopping I couldn't find an employee to help me, so I turned to a man who was also gazing at the circular saws and blades. I said, "Excuse me, could you tell me if this saw could be used to trim tree branches?"

He looked at me, leaned over to examine the saw, then said with hesitation, "I don't know." His face turned red and he fled.

I asked my children if I looked scary, and they said no. So, I can only conclude that both men and women need this kind of information. But, I can't afford to get red-faced about knowing my blade facts. So, could you be so kind to help me and that red-faced gentleman?



Diane Bugeja
Athens, Ohio

Dear Diane —

Thanks for your letter — judging by your experience, you aren't the only one who needs some information about saw blades. Saw safety starts at a basic level, which includes choosing the right saw and right blades for the job.

First of all, don't cut tree limbs with a hand-held circular saw. It's not safe. The unseen irregularities of a tree limb could catch you off guard, and send a dangerous tool flying out of control — circular saw blades spin at speeds of 5,800 RPM. Plus, you wouldn't want to ruin your expensive circular saw blades by cutting unseasoned wood. Sap in unseasoned wood can coat your blade, making clean-up a real pain, if not impossible.

At your local hardware store, you'll find what is commonly called a tree or log saw, which is not a power tool. The blade teeth are big enough to get the job done, safely.

On the other hand, your circular saw will work wonders on flat lumber. If you plan to cut many types of wood, soft or hard, and in many thicknesses, I suggest you buy a general purpose combination blade, with about 20-24 teeth on the blade.

Thanks for your letter — hope your hardware store buddy reads this, too!

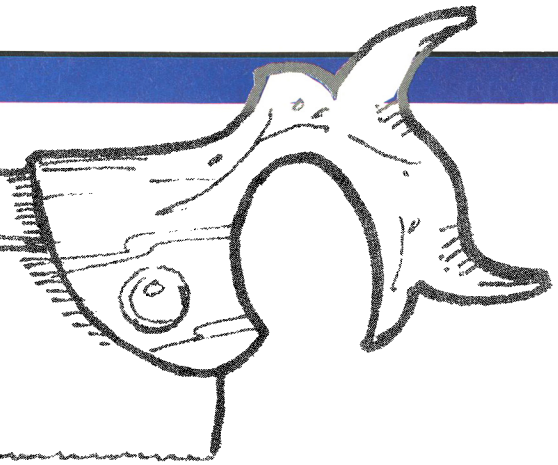
Tori

I know from the mail we receive here at Popular Woodworking that many of our women readers are involved with woodworking. You're active in the shop creating your own projects or you advise your spouses on projects. Many of you get involved with finishing projects, decorative painting, or restoring antiques.

This space is not about "macho" woodworking — the big, formidable projects and monster tools (though we'll probably talk about such subjects) — it's about what women find interesting about woodworking.

Ladies, this is our space. Share your projects, ask advice, request information, suggest projects you'd like to see, or even relate a funny anecdote about woodworking.

Hope to hear from you soon!



Backed Saws

Strength and agility make these saws a must in your shop!

To work well, a saw blade needs to be strong. The strength required, however, is not necessarily measured against the material it is designed to cut. Strength in a saw blade can be obtained in various ways, the chief of which is a result of the cunning invention of teeth.

A relatively small saw with a surprisingly thin metal blade can fell a tree many times its size and weight simply by taking advantage of the principle of the cutting edge, applied to a large number of small teeth. We take this for granted (unless suddenly asked to fell such a tree with a blunt saw) but the ability of a relatively tiny tool to achieve impressive results might seem miraculous to anyone unfamiliar with the secret strengths of a saw.

Still, even those familiar with saws might not be aware of some of the saw's abilities. These stem from opposing aspects of the saw's design.

Cutting edges and teeth alone aren't sufficient to constitute a useful saw. Despite such "scientific" advantages, a certain amount of strength relative to the material being worked is still required. But providing a saw with greater strength by making it bigger and therefore heavier detracts from the efficiency of the cutting edge.

Without getting too complicated, suffice it to say that the principal of cutting depends partly on a perfectly fine-edge slicing into the material with a wedging action. If you've looked at micro-photographs of supposedly sharp edges formed on plane irons or chisel blades you no doubt are familiar with the fact that there is no such thing as a perfectly smooth, fine edge. The granular composition of metal limits the formation of any edge to a series of irregular blunt serrations. The wedging action is what really constitutes the "sharpness" of any given edge. When we judge a sharp blade to cut well we are really commenting on the fact that the wedging action, which pushes apart and then severs the fibers of the wood being cut, easily overcomes the resistance encountered by the density of the wood.

This is where opposing needs come into the picture. On the one hand, the wedging will be easier if the blade is made thinner and sharpened to a narrower edge. On the other hand, the sharper and narrower the blade is, the less able it is to push its way through the wood.

Thinness can be maintained, however, if the strength required to push through the wood is provided by some other means than by simply making the blade thinner. Hence the development of a wide range of strengthened and supported reinforced saw blades.

The most common way to strengthen a thin saw blade (and for a long time, the only way) was to make a frame saw (see *PW* #36). The blades in framed saws are strengthened by being held in tension. We use several of these saws today: web saws, pruning saws and even the lowly buck saw, are still sold at most hardware stores for garden and yard work.

The other way to provide a thin blade with enough strength to prevent it buckling is to "back" it, by fixing some strengthening material to its back. There are one or two examples of prehistoric and Roman saws that appear to have been backed (***see figure 1***), but the principle seems not to have been generally adopted until recently in the history of woodworking tools. Only in the 18th century do illustrations begin to show various backed saws.

Interestingly, it was about this time that improvements in steel making made possible the fabrication of saw blades from rolled steel. This material can be produced in a form wide enough and strong enough to form backless and frameless hand saws of the type common to this day, known as rip saws and crosscut saws. Previous saws, made of bronze or iron, all required strengthening. Today's Japanese saws, which avoid much of the danger of buckling by employing teeth to cut on the pull stroke rather than the push stroke, are made with high grade steel, a material

Figure 1

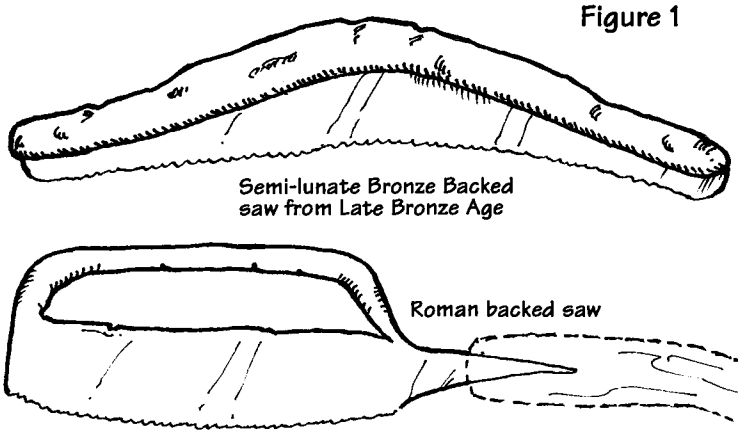
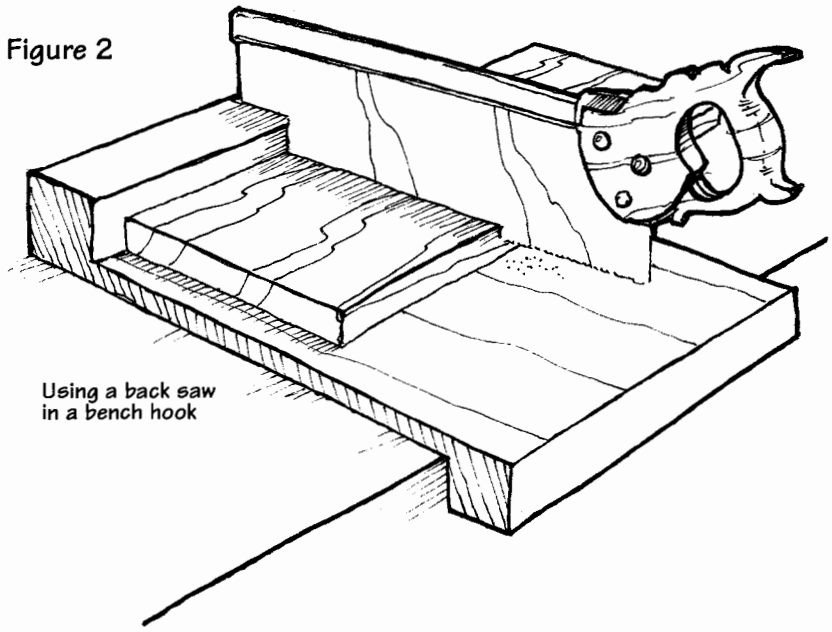


Figure 2



Using a back saw in a bench hook

far stronger than what was available for most of woodworking's history.

The reason for it's late development may be because a backed saw has a necessarily limited depth of cut. For most purposes we want to be able to saw through the material, from one side to the other. Framed saws, by having the blade mounted at right angles to the frame, can (provided the frame is large enough) saw down a long, large balk of timber. It's hardly practical to make a backed saw with a blade much wider than 8". A depth of cut restricted to 8" imposes serious limitations on many woodworking tasks. This was especially true as long as most woodworking was relatively massive and crude. Only when joinery became finer, and parts became smaller and more exactly made was there a need for smaller saws. To make finer cuts possible, a smaller blade with finer teeth was needed. Finer teeth and thinner blades demand strengthening, and so the backed saw was born.

The Tenon/Back Saw

Of all backed saws, the tenon saw is the best known and the most common, it's still useful even in today's table-saw and band-saw-equipped workshop. Although generally referred to in America as the back saw, it was first known as a tenon saw. Since there are several other backed saws substantially different in design and use that are also called backed saws, the confusion caused by the change of name is regrettable. The familiar tool's chief use is cutting tenons, both across and with the grain. For this job, a relatively fine-toothed saw is needed for a smooth, neat cut with little rag.

In some areas such tools are still known as tennant saws, reflecting a very old spelling (sometimes appearing as "tenaunt") that is believed to derive from the nature of the joint now known as a mortise-and-tenon. Old carpenters sometimes explain that the tenon part of this joint is the "tenant" of the mortise, occupying the cavity as a tenant occupies an apartment.

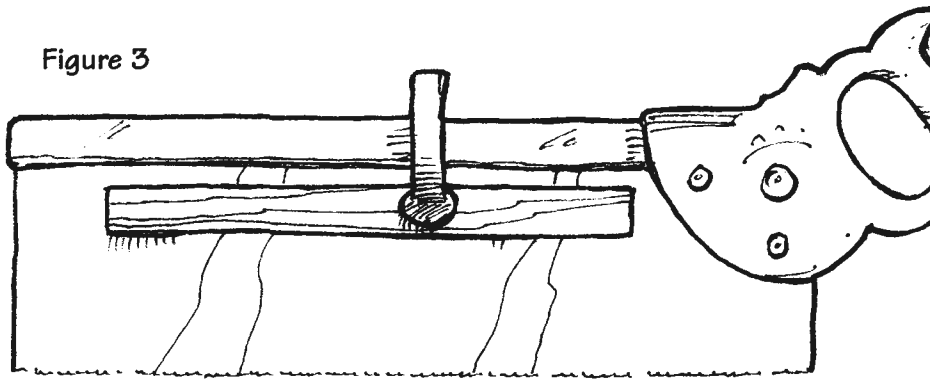
To be useful for more than the general, shallow cross-cutting performed with the use of the bench hook (***see figure 2***), the back saw requires relatively fine teeth, usually equipped between 12 and 14 to the inch. The most common form of the saw is a parallel blade about 12" to 24"-long, cut with cross-cut-type teeth. Since tenon making requires kerfs both across the grain (best made with cross-cut teeth) and along the grain, some people like to keep a back saw filed with square teeth in the manner of a ripsaw.

Another difference between back saws and other hand saws is seen in the set of the teeth. Since hand saws (cross-cut and rip) are used generally for coarser work than finished joinery, their operation can be made easier by providing them with a fairly generous set (the amount by which adjacent teeth are bent to alternate sides). This creates a wider kerf that's less likely to bind the saw, especially when working with moist wood that may swell due to the heat of the sawing action.

Back saws, both because the kerfs involved are typically smaller and shorter, and because the wood being sawn is likely to be better seasoned and drier, can be conveniently used with less set. This will result in a smoother cut. If a new back saw makes too wide or coarse a kerf, run a file held flat against the side of the teeth down the length of the saw, doing this on both sides evenly.

Older back saws, especially top quality models, were frequently backed with strips of brass. Some models still can be found brass-backed, but the usual variety is now steel-backed. The back is simply pressed on, being crimped at both ends. It's not hard to remove should the blade ever require de-kinking by judicious hammering on the convex side of the kink, bump, or buckle. In addition to brass backs, older saws were frequently made with blades narrower at the toe than the heel (the end nearest the handle). While these saws also tend to be narrower overall and consequently capable of relatively shallow cuts, they are better balanced and easier to use. When you consider that the bulk of the work is most easily done with the toe end of the blade, using this part gives greater control in the attempt to saw "to the line." The slightest deviation in the longitudinal angle of approach is inevitably magnified the further away from the handle the blade is used.

Figure 3



Clamping a depth stop to a back saw to control depth of shoulder cut on tenon

The Double-Edged Variety

When cutting tenons by hand, or on any machine, one of the most important points is to make sure that the cut is not allowed to extend past the shoulder line. Besides weakening the joint, the fault usually remains visible and advertises sloppy workmanship. Depth stops can be clamped to saw tables to limit the cut, but when using a back saw you must try to hold the saw as level as possible and keep an eye on both ends of the kerf to avoid cutting below the line.

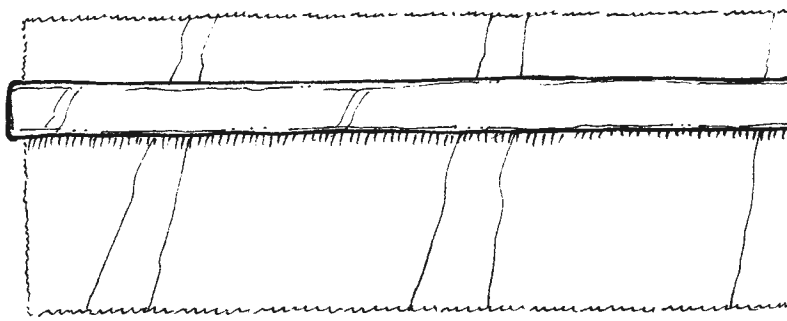
There is, however, a way to guarantee the perfect shoulder cut. Most back saw users sooner or later make the mistake of trying to make a cut deeper than possible and discover that the saw is riding backwards and forwards on the backing strip with the teeth no longer cutting into the wood. A little thought will suggest that by clamping an additional strip to the side of the blade (***see figure 3***) you can provide a needed depth stop at precisely the right spot, assuming you're trying to make a cut for which the blade is indeed wide enough.

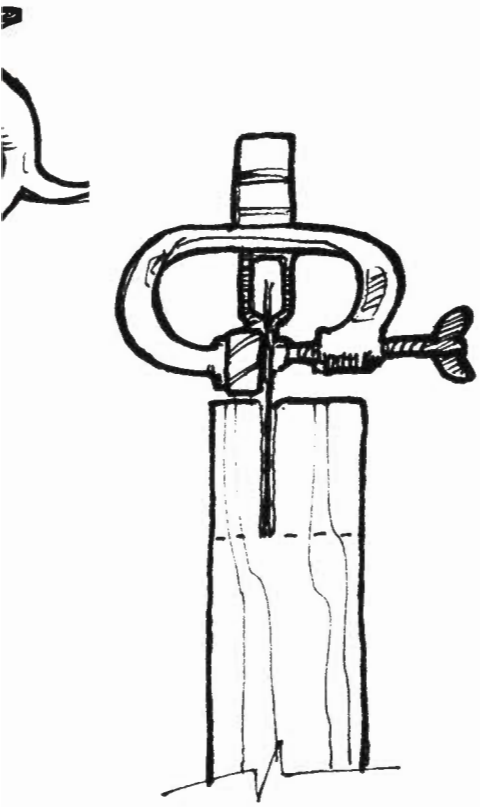
At least one manufacturer thought of this and produced a back saw with an adjustable back. Moreover, one that could be tilted out of parallel with the cutting edge, guaranteeing a perfectly angled cut such as occasionally required for canted, tilted or splayed work. Since the back may move up or down the width of the blade, it made sense to cut teeth on both sides of the blade's width, thereby providing cross-cut and rip capabilities to the same saw, combined with a fail-proof depth stop (***see figure 4***). The only disadvantage to this type of saw, still to be found from time to time at auction and with old tool dealers, is that the handle is not quite as perfectly comfortable as one designed to be always held in the same way.

Finer Work

There are several smaller, backed saws distinguished by different names and different shaped handles that may be called back saws. These include the gent's saw, the dovetail saw, and the dowel saw.

Figure 4 Double-sided, adjustable back, back saw





A modern dovetail saw looks just like a smaller back saw with a proportionately narrower blade but with a straight handle similar to the original handles found on antique Roman and Egyptian saws. Older dovetail saws from the last century were invariably furnished with the dolphin or pistol-grip type of handle common on contemporary hand saws. Since the saw is considerably smaller, these pistol-grip handles are, however, open, rather than forming a completely closed oval (***see figure 5***). There is a slight advantage to the pistol-grip type in that it allows you to keep your eye on the line being sawn and feel whether the saw is being held in the correct plane by the position

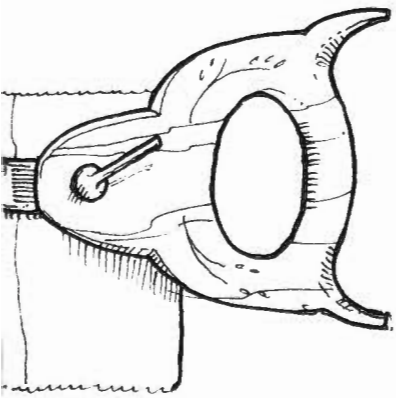
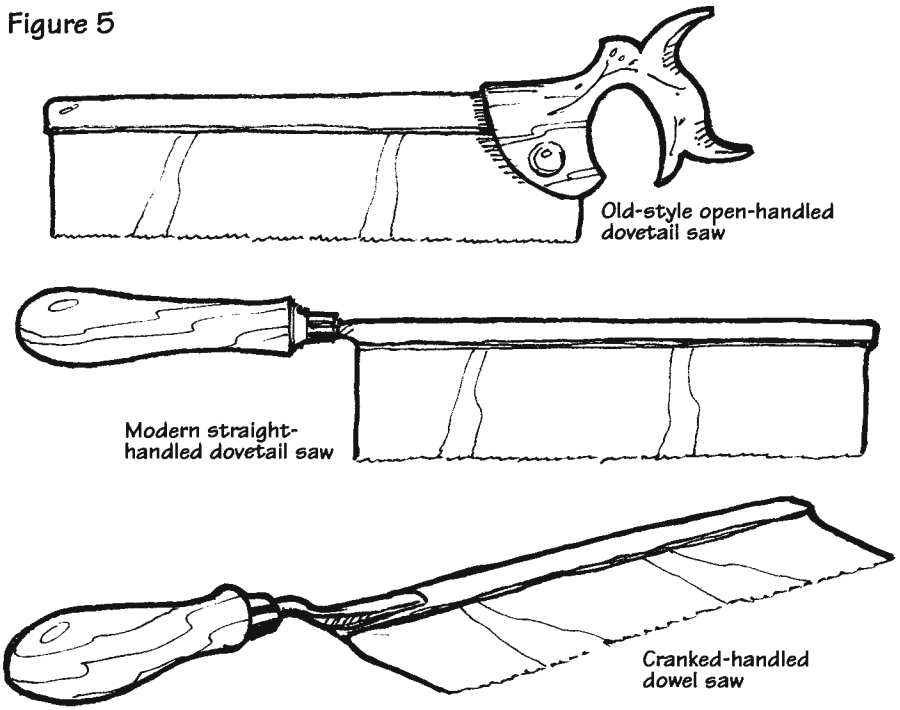


Figure 5



of the handle. A round, straight handle offers no such clue.

The variety known as a gent's saw (a contraction of the term "gentleman's saw") originated in the last century as a class of tool made somewhat smaller than the regular tradesman's size and intended for use by gentlemen hobbyists. Gent's saws were invariably made with straight handles like a modern dovetail saw. They were the forerunners of modern-day do-it-your-selfer's tools, but can be very useful as a small general-purpose hack saw. They usually have crosscut teeth in distinction to a true dovetail saw which should have rip saw-type teeth. The true dovetail saw has square teeth, frequently as many as 22 per inch, since cutting out dovetails and pins typically involves sawing with the grain and requires as smooth and exact a cut as possible.

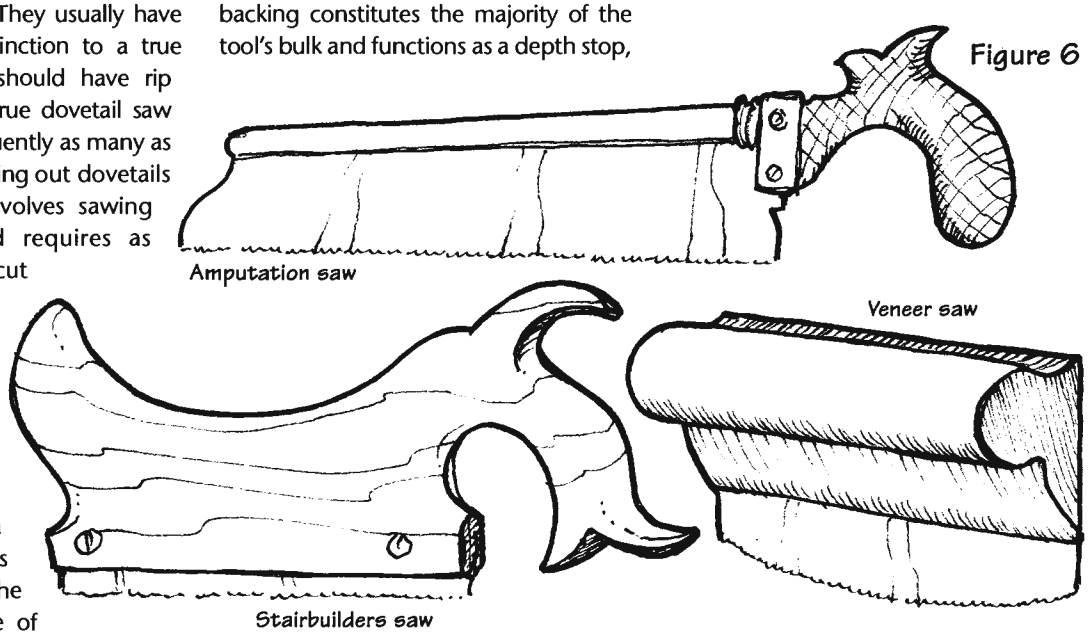
The third type, known as a dowel saw, may be identical to either of the previous types except for a cranked neck formed by a bent tang to which its handle is attached. The crank allows the side of the blade to be held flat on the face of the work — ideal for sawing off protruding dowels or other proud parts.

Other Backed Saws

Additional varieties of reinforced blades and backed saws include the gory amputation saw once used by doctors and veterinary surgeons, and prized for its top-quality steel and the usually cross-hatched handle which provides a superior grip. The stairbuilder's saw, essentially a narrow blade, is designed so that the backing constitutes the majority of the tool's bulk and functions as a depth stop, allowing evenly formed kerfs to be sawn when making shallow grooves such as are required for housing the treads and risers of stairs to each other. Small veneer saws and even comb saws have two narrow blades side by side, one slightly shallower than the other to act as a guide by running in the previously cut kerf (*see figure 6*). PW

Graham Blackburn *builds furniture and writes about woodworking from his shop in Woodstock, New York.*

Figure 6



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These Bosch power tools carry a one-year warranty, a 90-day money-back satisfaction guarantee and a one-year service protection plan. The 12-volt driver retails for $345. For more information, contact the S-B Power Tool Company, 4300 West Peterson Ave., Chicago, Ill. 60646; (312) 286-7330.

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Birch to Dye For

If you like the dramatic results you get from exotic, imported woods, but don't like the dramatic expense and controversy of using endangered tropical species, try the new **Domestic Exotic Birch**, available from **The Woodworker's Store**.

The wood's dramatic coloring is achieved by injecting dyes and resins into common birch veneers, which are then compressed. Two inches of veneer are used to produce a 1"-thick piece of exotic birch with dramatic colorings and reliable durability and hardness. It can be sawn, planed, drilled and sanded.

Another benefit of the birch is that it polishes to a nice sheen with no finishing, a unique feature made possible by the resins injected into the veneer.

Exotic birch is available in dimensional stock, which retails for $12.95, and turning squares, which retail for $9.95 — both of which are available in three colors: Macassar Cocobolo, Rosewood Burgundy and Charcoal Ruby.

For more information or to order call (800) 279-4441 (for credit card orders) or write The Woodworker's Store, 21801 Industrial Blvd., Rogers, Minn. 55374.

Circle #109 on Resource Directory Coupon.

The New Tools in Town

Ryobi introduces 20 new tools designed for the do-it-yourselfer — many for less than $100. The new line includes six new drill/divers, including model CD75K 7.2 (shown here), a cordless four-position clutch driver in a kit that includes two batteries, keyless chuck and bits. The driver, shown at left, retails for less than $65.

Other tools in the new line include a reciprocating saw, three grinders, a biscuit joiner, two miter saws and more — all new! For more information about Ryobi tools, contact Ryobi American Corporation, 5201 Pearman Dairy Rd., P.O. Box 1207, Anderson, S.C. 29625; (800) 323-4615. Circle #119 on Resource Directory Coupon.

Insert Strength into Your Wood

Brass Knife-Thread Wood Inserts by **The Tool Club** are a good alternative to traditional wood inserts. The Knife-Thread inserts slice into the wood, providing a stronger joint than traditional inserts, whose threads crush the wood. The internal threads of the Knife-Thread inserts accept machine bolts and screws. The inserts are sold in packages of 25, 100 and 1,000 and vary in price depending on the size of the insert. A package of 25 (in sizes .440, .632 and .832) retails for $5. For more information or for a free catalog, contact The Tool Club, P.O. Box 6, Calumet, Mich. 49913; (800) 486-6525. Circle #133 on Resource Directory Coupon.

Give `em an inch, mate

If you need a handy calculator that's ideal for quick math solutions while working on your projects, the INCHMATE+ by DigiTool Corporation has added new features to help! The new Inchmate+ will automatically solve for rise, run, diagonal and slope of any right triangle.

Inchmate+ will also instantly convert between and calculate in feet, inches, decimal feet and meters. The Inchmate retails for less than $50. For more information, contact DigiTool Corporation, Box 12350, Aspen, Colo. 81612; (800) 543-8930. Circle #132 on Resource Directory Coupon.

What Goes Around Cuts A-round

The new **Circle Jig Attachment** from the makers of **Micro Fence** offers precise, repeatable circle, curve and arc generation with the same patented measuring capability as the original Micro Fence. The Circle Jig attachment offers micrometer-dialed adjustment that assures simple, safe and efficient set-ups and eliminates the need to make and store a wall full of shop-made jigs.

The tool is ideal for a wide variety of circular job requirements with either plunge or fixed-base routers. The ability to start your router clear of the work and "dial" into the cut not only offers measuring capability, but provides a safe, "anti-skate" approach to cutting surfaces.

The Circle Jig Attachment retails for about $79, or get both the jig and Micro Fence for $98. Contact Micro Fence, 11100 Cumpston St. #35, North Hollywood, Calif. 91601; (818) 766-4367. Circle #131 on Resource Directory Coupon.

Jatoba

This South American cousin of cherry offers some special advantages.

Tropical hardwood dealers often do sell jatoba as "South American cherry." Although there are some similarities between the two woods, jatoba has many distinct advantages when compared to its North American namesake. It also has some disadvantages. Still, it's a wood worth considering for many projects.

General Description

Jatoba (pronounced jah - toh - **buh**) is sometimes sold under its more formal trade name, courbaril, so-called because of its Latin name, *Hymanaea courbaril.* This is slowly being dropped because much of this wood species comes from Brazil, where it is popularly known as jatoba. Other South American exporting countries use many other local names for this wood. But stick with jatoba and most lumber dealers will sell you the wood described here.

Grown almost everywhere in South and Central America from Bolivia to Mexico, as well as in the West Indies, jatoba is generally agreed to be far from an endangered tropical hardwood. It is as common in South America as oak is in North America. It grows on almost any well-drained soil, often attaining a height of 130' or more, with a trunk diameter of up to five feet. It grows straight and moderately fast from roots or somewhat more slowly from seeds. The tree has been grown on plantations, though most of the lumber exported today comes from forests. In addition to its value as lumber, jatoba trees are also important for the sap and bark they produce. The bark is sometimes employed by indigenous people to make canoes, or for its tannin, which is used to process animal skins into leather goods. The sap is used in some specialty varnishes, a few religious incenses and as a glue or sealing agent in native crockery and boats. The seed pods from the tree are also made into an edible pulp.

For a hardwood, jatoba is very hard and heavy, more so than its North American namesake black cherry (*PW* #57). Jatoba's color is quite similar to black cherry, depending on the setting and finish. Freshly planed, jatoba is

Although jatoba often lacks the interesting grain patterns cherry offers, its color uniformity makes it almost impossible to distinguish from cherry.

Black streaks in jatoba add character to your projects. For the most part, jatoba displays little figuring or curling.

more brownish than black cherry, generally lacking the reddish-pink hues so common to cherry. But in some lights and with some finishes, the color difference between the two is virtually indiscernible. As with cherry, jatoba darkens considerably when exposed to sunlight.

Still, there are some easy ways to tell South American jatoba from North American cherry. Jatoba is more straight-grained than black cherry, providing few chances for exciting figures. The grain in jatoba is also more open and touched with tiny black lines or specks much like Philippine mahogany (*PW* #63). Fortunately, jatoba also lacks the prominent, annoying black pitch pockets or gum streaks often found in North American black cherry. There is an occasional black streak in the grain of jatoba, but this is usually more interesting than offensive. Also, there is very little white-ish sapwood in a jatoba tree, so color uniformity is easier to obtain than with black cherry.

The stability of jatoba is superior to black cherry, though not particularly spectacular. Jatoba is also more resistant to checking and warping. And because of its weight and density, it is highly resistant to impact dents and dings. It steam-bends fairly easily if first soaked for a few days. Its interlocked grain keeps the breakage normally associated with steam bending to a minimum. It is very resistant to decay.

Because of its hardness and durability, jatoba has been traditionally used in tool handles, flooring, turnings, furniture and cabinet work. It has also been used in South America as railroad ties, gear cogs, wheel rims, trunnels, dock planking, and general frame carpentry.

Working Properties

Jatoba is easy to work in some respects, and more challenging in others. With power planing, you can obtain excellent results. Done slowly, power planing usually results in a board that needs no additional dressing and little sanding.

The same cannot be said of hand planing. The interlocked grain makes hand planing a chore — even with the sharpest blades. This is a tough wood. And hand planing sometimes "snags" the grain, resulting in grain tear-out that requires extra attention with the sander. But sanding is easy, either by hand or with power, producing excellent results.

Like cherry, jatoba does have a stronger-than-normal tendency to burn when ripped, crosscut, routed or shaped. This can be overcome by using very sharp blades and moving the work briskly through the cutting or shaping process. Unfortunately, when boring jatoba, it's very difficult to speed up the process. Higher boring speeds just make burning more likely. Thus burning while boring is common, particularly when using larger diameter drill bits. Smaller bits have a tendency to "stick" in the wood. To overcome the tendency to burn, the only solution is to drill a bit, back out, drill some more, back out and so on, allowing more efficient removal

from the tool while reducing the heat build-up that causes burning.

Lathe work with jatoba is moderately easy. Shavings come off evenly, in a manner much like shaved ice. However, the resulting surface does require some extra sanding, about on a par with Honduran rosewood (*PW* #78). For hand carving, the wood responds well — provided tools are well sharpened. Fine details are easy to obtain and they resist breakage. When worked, the wood has a faint cotton candy smell, which disappears quickly. Some woodworkers report allergic reactions to the dust but not to the wood itself.

Fastening jatoba requires pilot holes for both screws and nails. Thus the problems you'll have with boring are present during fastening operations. The wood does, however, respond well to all glues. When using a clear epoxy glue to bridge gaps as well as bond the wood, mix the fine jatoba sawdust with the glue. It makes gaps very difficult to detect.

Finishing

Finishing jatoba can be a little tricky. The wood is quite photo-reactive, darkening considerably when exposed to sunlight. A salmon brown jatoba plank can easily turn into a dark walnut brown board in a year or two — a darkening process that's more pronounced than cherry. It's therefore a bad idea to use jatoba as a cherry substitute and expect identical results. Different lighting will also have a slightly different effect on how finished jatoba appears. I made a table top in which I used jatoba as a border around black cherry ***(see photo).*** When planed and sanded, the color difference between the two is obvious. However, when shellacked and var-

Versatile, high density jatoba makes a great table top because it resists dents and dings. Here, it frames black cherry.

nished, the two wood colors seemed to merge in natural lighting, and were indistinguishable from each other in regular house lighting. The manner in which jatoba reflects light, however, is definitely an improvement over cherry. Finished clear, jatoba has a depth to it much like machiche (*PW* #70) and somewhat like American elm (*PW* #40).

Thus I wouldn't cover a jatoba project in anything but a clear finish. The wood's grain is handsome enough to stand on its own. Since the surface is a bit porous, a filler or several undercoats of shellac are advisable. If the wood is sanded to a fine surface with 320-grit sandpaper or finer, a wax can make jatoba shine.

Availability

Jatoba is becoming more widely available throughout North America, although you may have to do some searching to find a supplier. For a tropical hardwood it's inexpensive. Prices range from $3 to $5 per board foot. The wood is readily available in 4/4 and 8/4 thicknesses. Anything beyond that generally has to be specially ordered. Long lengths and widths up to 12" are commonly available, sometimes without any special ordering.

Veneers are not readily available. Predictably then, plywood using jatoba as the facing veneer is virtually non-existent. Wood dealers say this situation is unlikely to change until jatoba becomes more popular with the American public.

However, I suspect American woodworkers will warm up quickly to this tropical hardwood. Considering jatoba's on no one's endangered species list, and it's no more expensive than its North American counterpart, maybe it's time to try a little trip to the tropics this winter — if only through your woodworking. PW

Ken Textor works wood and writes about it in Arrowsic, Maine.

Simple Steps to a Six-Legged Sideboard

Could this stately classic really be easy to build? You bet!

By Steve Shanesy

Although most often associated with dining room use, the sideboard (also known as a buffet or huntboard) might also be found in an entry hall or living room. Because it offers both door and drawer storage, as well as a useful top surface, the sideboard can serve any number of purposes in any room in your home, such as storing linens, china, flatware or liquor — you decide! The ample top surface is great for everything from displaying photographs to presenting dinner buffet-style at the next family get-together.

The huntboard described here is of the six legged variety, which gives it a "leg up" in both style and character when compared to its four-legged cousins. This piece uses classic, tapered legs and graceful brasses (knobs and bale pulls) in the popular Hepplewhite style. For my sideboard, I used nicely figured tiger-striped, quater-sawn white oak. I took special care to arrange the wood for the best grain patterns before cutting.

Don't be discouraged by the two extra legs — they don't complicate the building. Those extra, centered front legs are as easy to build into the piece as simply gluing a smaller sized cabinet face frame on top of a larger one.

Photo 1 (left) *A drill press with stop and spacer blocks bored holes for the leg dowel joints.*

Photo 2 (right) *The front rail ends were drilled using a doweling jig.*

Photo 3 *After drilling, the legs were tapered on the table saw.*

Make the Front Frames

With the exception of the legs, all the white oak used is from four-quater stock. If your material arrives in rough form, leave the top as thick as possible, or about ⅞" thick. Run everything else down to ¾". The legs are net 1⅞" and are cut from a piece of eight-quarter.

Refer to the cutting list for all part sizes and quantities. To save money and time, you might cut the bottom, cabinet partitions and cabinet back from ¾" birch plywood. I used ½" poplar for drawer sides and backs and ¼" birch plywood for the drawer bottoms.

Making the framework for the piece isn't difficult at all. When boiled down, you have legs and rails glued up as an ordinary cabinet face frame. In this case, the legs are the stiles. Just as you would want your face frame material to be the same thickness, so are your sideboard rail widths the same as the specified leg thickness. The horizontal rails are 1⅞" x ¾" with the ¾" dimension showing on the face. You are actually making two separate frames, each consisting of two legs and the rails that go between. The longer frame is the entire length of the sideboard. The second frame, which is later glued to the first, is the drawer section. By applying one frame to the other, the step out drawer section is created — that's all there is to it! Join the rails to the legs using two, 2"x⅜" dowels for each connection. The hole spacing requires careful set up and lay-out. As you can see in ***photo 1***, I bore the legs using the drill press and spacer blocks to achieve consistent results. The rail ends are drilled using a typical doweling jig (***photo 2***). After all drilling is complete (and not before) the legs are tapered (***photo 3***) using the simple tapering jig described on page 29 of *Popular Woodworking* Issue #86. The jig and saw fence are set up so that the taper ends about ½" from the bottom rail.

In Hepplewhite style (and in many Shaker style tables) the leg always tapers to the inside. That means two taper cuts for the front and back legs at the corners of the sideboard and three tapers for the front, middle-section legs (see ***diagram***).

After tapering on the table saw, you can take a light pass on

WOOD WORDS (*wood´wurds*) n.

Cope block: a fixture that bears against the fence and carries a rail end across the end rail (cope) shaper or router knives.

Cope: in stile and rail panel door construction, the mating detail milled on rail ends that match the stick profile.

Stick, or sticking: the inside edge (molded) of a frame which receives a raised or flat panel.

Flash: the moment when a finishing material changes from a wet, liquid appearance to a dry look.

PHOTO BY RON FORTH PHOTOGRAPHY

the jointer to eliminate any saw marks and save yourself some sanding. Now glue up separately each set of leg and rail assemblies (***photo 4***) and make sure the openings are square. After a couple hours in the clamps, glue on the front frame ***(photo 5)***. To make sure they are properly aligned right to left, mark the center of each, then match center lines. Make sure your leg tapers turn to the inside. When gluing the two frames together, make mating rails flush to each other. To help with this, I used a biscuit joiner, although it isn't necessary if you don't have one.

Hepplewhite, George: One of the five principle English furniture designers of the 18th century from which most "Traditional" furniture traces its history. The other four include Thomas Chippendale, brothers Robert and James Adams and Thomas Sheraton.

Photo 4 (left) *The step out drawer section, leg and rail assembly is glued with dowel joints and clamped. The diagonal clamp is used to pull the assembly square while the glue dries.*

Photo 5 *After gluing the leg, long top and bottom rails together, both sets of leg and rail assemblies are glued together. The center drawer section creates the step out — its as simple as gluing one face frame on top of another!*

Photo 6 (above) *The cabinet sides are glued to the legs using biscuits to align. The side setback from the leg is created by simply adding a ¼" spacer under the biscuit joiner fence when cutting the side slots.*

Photo 7 (above) *Partitions between drawer and door sections are nailed up through the bottom and down through the front and back stretchers.*

Photo 8 (left) *The back is slipped in place and later attached with screws. It fits in rabbets on the top-back rail and bottom. Cleats were screwed between the legs for attaching the back at the legs.*

Assemble the Case

Prepare the ends by making a ½"w x ¾"d rabbet at the top and bottom of both end panels. This rabbet will receive the case bottom and top back stretcher. I use a biscuit joiner for alignment to assemble the ends to the back legs and front frame assembly (***photo 6***). In doing so, I set the ends back ¼" from the legs. With a biscuit joiner, this is easily accomplished using the fence. After adjusting to the desired height, mark the lines where you want to make the slots, then cut the slots in the legs. Without moving the fence, set a piece of ¼" thick scrap on the case side where the joiner fence will be placed to mill the slots in the edges of the side. The additional thickness of the scrap equals the setback. Glue the rear legs, sides and front frame assembly.

After the glue sets, tum the sideboard upside down on your assembly bench to install the bottom. Other than cutting to size, the only preparation for the birch plywood bottom panel is to notch the back corners to fit around the rear legs and cut a ½"w x ¾"d rabbet on the back edge with the notches. The rabbet will accept the back.

While you're set up to cut the rabbet, cut another one in the top rear stretcher. When done, apply glue to the bottom front edge and the mating back edge of the bottom rail. Drop the bottom in place and clamp the glued surfaces. Next, nail the bottom to the ends using finish nails. After the glue has dried, turn the unit right-side up and nail the back rear stretcher in place after notching the corners to fit around the rear legs.

The two partitions that make up the center drawer section are nailed in place (***photo 7***). They are set flush with the drawer side opening. Before nailing in place (up through the bottom, and down through the rear stretcher and front rail) make sure they are set square to the front rail. I use a framing square and when aligned, clamp it in place while nailing.

Before installing the back, screw a cleat to both rear legs for attaching the back. Set the cleats in position so that when the back is placed in the bottom and rear stretcher rabbets, it will contact the surface of the cleats (***photo 8***). The case assembly is complete when the back is screwed in place.

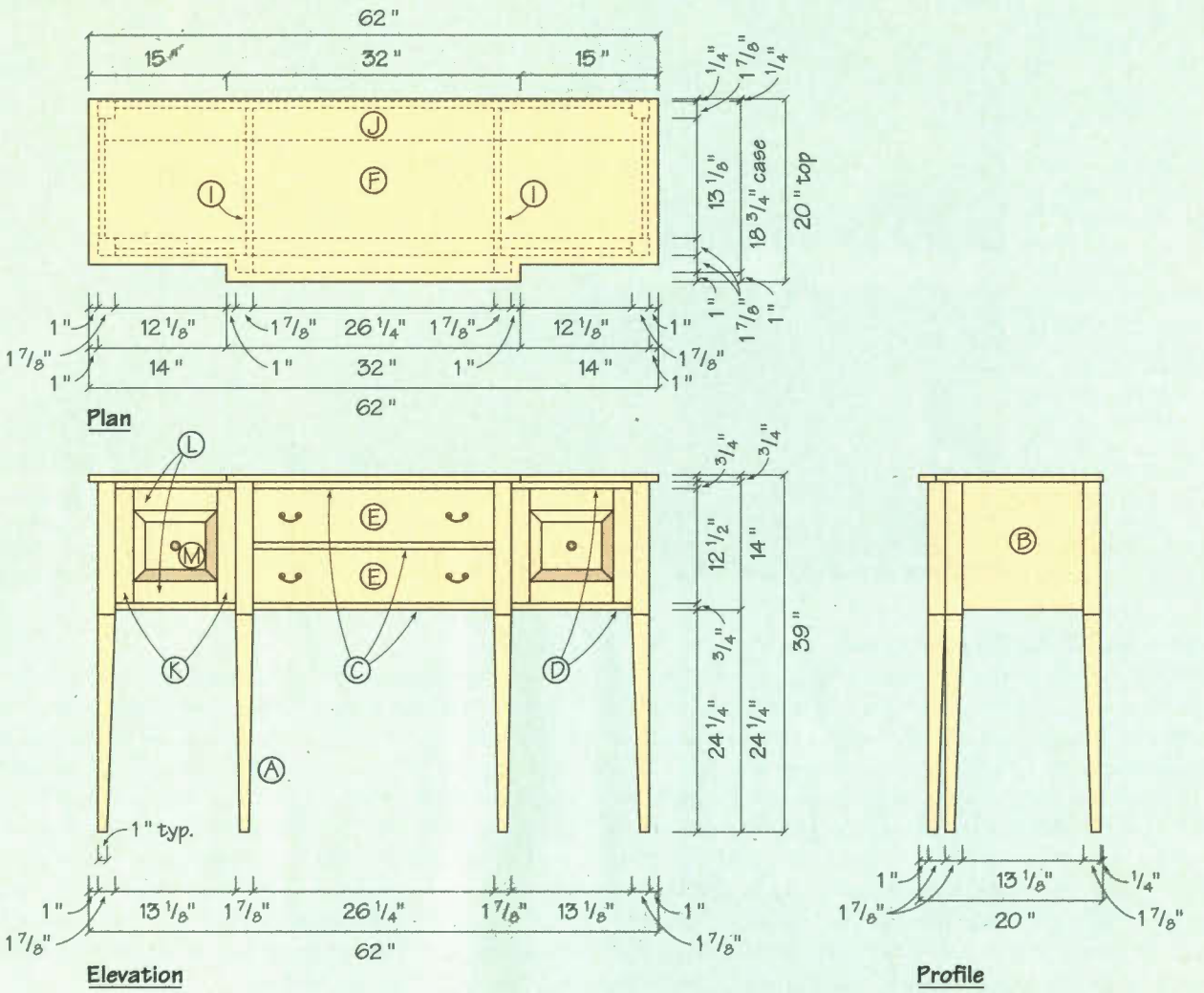
Make the Drawers

The two center drawers can be made any way you prefer. Certainly, hand-cut dovetails would be nice if you have the time and the skill. For my sideboard, I use a half-blind dovetail jig and router (***photo 9***). The poplar sides and back are ½"-thick and the bottom is ¼" birch plywood.

The sizes in the cutting list are based on this method and materials. The bottom drawer simply slides on the case bottom between the two partitions. Since there's nothing for the upper drawer to ride on, I simply screw cleats to the partitions that are parallel to the bottom at a height that aligns them flush with the top edge of the middle drawer rail (***photo 10***).

Photo 9 *Half blind dovetails routed on a jig were used for drawer construction. Another method would be to rabbet the front and back to receive the sides.*

Diagram



Schedule of Materials: Six-Legged Sideboard

No.	Letter	Item	Dimensions	Notes
❑ 6	A	Legs	1⅞" x 1⅞" x 38¼"	
❑ 2	B	Ends	¾" x 13⅛" x 14"	
❑ 3	C	Front Rails	¾" x 1⅞" x 26¼"	Drws
❑ 2	D	Front Rails	¾" x 1⅞" x 56¼"	
❑ 2	E	Drawer Fronts	¾" x 5¾" x 26⅛"	
❑ 1	F	Top	¾" x 20" x 62"	
❑ 1	G	Back	¾" x 13¼" x 56¼"	plywood
❑ 1	H	Bottom	¾" x 14¾" x 58⅞"	plywood
❑ 2	I	Partitions	¾" x 15¹³⁄₁₆" x 12½"	
❑ 1	J	Back Stretcher	¾" x 4⅜" x 58⅞"	
Doors				
❑ 4	K	Stiles	¾" x 2¼" x 13"	
❑ 4	L	Rails	¾" x 2¼" x 9⅞"	
❑ 2	M	Panels	¾" x 9⅝" x 8⅝"	
Drawers				
❑ 4	N	Backs	½" x 5¼" x 26⅛"	poplar
❑ 8	O	Sides	½" x 5¾" x 16½"	poplar
❑ 2	P	Bottoms	¼" x 17" x 25⅝"	birch ply

Photo 10 *The upper drawer requires cleats for drawer slides. Simply screw a piece on that's flush with the top edge of the middle rail. I used a spacer to position the rail while it was screwed in place. The bottom drawer rides on the case bottom. Since the partitions are set flush to the leg and square to the front, the drawers are captured between them. Sizing the drawers is just a matter of deducting ⅛" from the overall drawer opening size to allow for side to side and top to bottom clearance.*

Photo 11 *Raised panel door rails are first machined to cut the cope (rail end) detail using a cope block. This fixture provides a bearing surface for the shaper or router fence and a block to position the rail perpendicular to the cutter. It also prevents tear out where the cutter exits the part.*

Photo 12 *Next, the stick detail is cut that mates to the cope detail. It is run on the inside edges of both stiles and rails.*

Photo 13 *The door panels are raised with the longer knife down for safety purposes. Since the panel is small, special care must be given to keep the correct pressure on the piece against the fence to prevent the cutter from pulling the work into the fence opening.*

Frame and Raised Panel Doors

I decided to dress up my sideboard using raised panel doors. If you're not equipped, or don't care to make doors like this, the piece will also look nice with a flat door of glued-up stock. And, of course, it'll be easier and less time consuming.

To make my doors, I use a shaper, a wonderful machine that's a joy to use if you have one. If your method of making frame and panel doors is with a router, all the same principles apply. You can also make frame and raised panel doors using only your table saw. The choice is yours. If your method is router or shaper, always use a cope block when running the cope detail on the ends of the rails. Also, move your fences as close together as possible to help prevent the work from being pulled into the rotating knife. When running the stick detail on stiles and rails, offset your fences. Set your infeed fence in about 1/32" so that the profile cutter cleans up the surface, such as when a jointer is set lower on the infeed and flush to the knives on the outfeed.

Finally, I make my stiles 1/4" wider and 1/2" longer in length and the rails 1/4" wider than my finished opening dimension calls for. This gives me 1/4" trim and fitting allowance for each side of the door. Just remember to take equal amounts of trim from all sides when trimming to finished size.

The doors are hung using brass butt hinges with the door side leaf mortised into the door edge. The hinges are swaged, which makes mortising to the cabinet side unnecessary (***see illustration below***).

The Top

The sideboard top overhangs all edges (except the back) by 1". In the back, I let it hang over 1/4". Since the front steps out, various cuts have to be made to arrive at the final shape. First cut the overall width and length. Next, make stop cuts on the table saw for the narrower width over the door sections. The first cut is made with the front edge nearest the fence and, rather than flipping the work and risking tear out on the top side, reset the fence further away and make the second cut. Finish the rip with a handsaw, and make the short crosscut to complete the top cutting. Some vigorous sanding will remove the saw marks left by the handsaw.

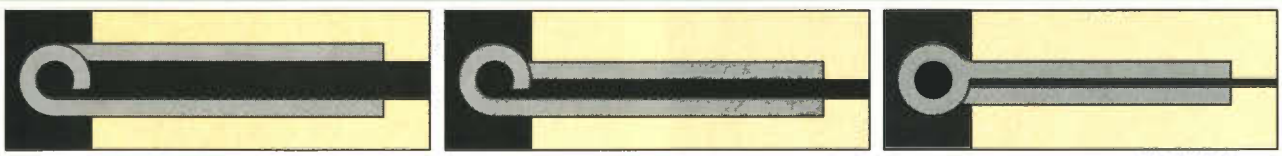
Fasten the top to the case using screws drilled up through the front rails and the back stretcher.

Sanding and Finishing

Before sanding, inspect the whole project and look for areas that might need special attention. Where lumber was edge glued and not quite flush, scrape it level. Inspect joints where dried glue might lurk. And check for any dents or dings which might require repair. Then wipe the piece down with a clean, damp rag to make apparent any glue spots not easily visible.

To sand, I use a random orbit sander and 150, then 220 grit paper. I give particular attention to the end grain areas of the raised panels in the doors. It usually requires extra sanding to make sure it takes the finish color the same as the rest of the piece. After thorough sanding, break (ease) all edges with 120

Swaging Hinges



The hinge above is not swaged and will leave a wide door gap if not deeply mortised in door and case side.

This hinge has been swaged on the top side only. You can see how the door gap required will be be lessened, as will mortising.

Both hinge leaves above have been swaged and, depending on leaf thickness may not require mortising at all.

Photo 14 *Grain filler, stained to the desired color, is ragged on in a circular motion. After it flashes, or starts to dry, it is first rubbed off against the grain driving it deep into the open pores. Next, the filler is wiped with the grain to remove any excess remaining on the surface.*

grit paper to remove sharp edges. This task, while simple, does require attention to detail to insure the edges are eased consistently.

Even though my material is quarter sawn, the open pores of the straight grain beg to be filled in order to produce a very smooth, semi-closed pore finish. To fill the grain, I use a paste wood filler. If you find a filler with a pre-mixed color you like, use it. Usually, I make my own colored filler by mixing an oil-based, penetrating stain to the neutral paste filler. In addition to making the color, the stain thins the filler, which makes it much easier to apply, and immensely easier to wipe off the excess once it starts to dry. In fact, I like to thin the filler with additional mineral spirits and some VMP naphtha until the filler is about the consistency of heavy cream. The addition of naphtha speeds the drying process since it evaporates much faster than mineral spirits. If you add naphtha, don't add more than three parts spirit to one part naphtha.

Apply the filler with a rag, rubbing it on large surfaces in a circular motion (***photo 14***). In smaller areas, just rag it on. Don't try to put filler on the whole project at once, as it will dry too much before you have a chance to wipe off the excess. For example, do the top, then wipe it off. Then the front, then wipe it off, and so on. As you apply the filler, don't leave too much on the surface — after all, you only want it in the pores. All the rest will only have to be rubbed off with elbow grease. You'll know it's time to begin rubbing off the excess when you see the filler "flash." This means it transforms from a wet look to a dull, dry look. At the time the filler "flashes," it is pasty enough to drive it into the pores by rubbing against the grain, yet soft enough to wipe off without working up a big sweat. First rub using medium pressure and a clean rag against the grain. Next wipe with the grain to remove any cross grain filler color left behind. Make sure you don't leave the filler (the stain color remains, of course) on the surface of the wood. Filler you can barely see on the surface at this stage will pop out like a billboard when you top it with clear finish.

The filler needs to dry thoroughly before any clear finish can be applied, so set it aside for at least 24 hours under most circumstances. Longer drying is not a problem. Some recommend lightly sanding the filler. A potentially big problem at this stage is sanding through the stain color. If you sand, do so very lightly with not less than 320 grit paper. Be extremely careful near edges and on anything other than a flat surface. Don't even attempt to sand profiles, corners or uneven surfaces. I find this sanding step unnecessary

To complete my sideboard, I sprayed clear lacquer. If you're not equipped to spray, you can brush varnish or even apply a tung oil finish if that's the finish method of your preference. If you use oil, however, rub it on lightly and lightly remove any excess. The oil can temporarily soften the paste filler and lift it out of the pores. You must, of course, let the oil dry for 24 hours before applying each successive coat.

Continuing with a lacquer or varnish finish, let each coat dry thoroughly and sand with 400 grit paper between coats. For a super finish, apply three good coats, lightly sanded between with 360 grit paper. PW

TIP

Hinge Mortising Jig

A quick method for mortising butt hinges is to make a jig and use a straight bit and router template guide. Make the template opening to correspond with the size hinges you're using plus the template guide size. Mark the centerline of the jig and the mortise to be cut, clamp the template in place, and route to desired depth.

TIP

Swage your own cabinet hinges using a steel block with a square edge that's at least ¼" thick and a heavy hammer. First, place the hinge on an extra solid, flat surface like the tail of a machinist's vise. Then lay a flat side of the steel swaging block on the hinge so that its edge is aligned at the point where the hinge leaf starts to form the hinge barrel. Give the swage block a good whack with the hammer to bend the leaf.

Steve Shanesy *is editor of* Popular Woodworking.

Evolution of An Entryway

Form and function go hand in hand toward a successful conclusion.

By Sal Maccarone

As an artist I have learned to appreciate the fact that an *entryway* can become the "opening statement" to the architecture of a building and its interior. With this in mind, it has always been a privilege to be commissioned to design and build the entry for a special piece of architecture. It goes without saying that craftsmanship and technical knowledge are important to the piece itself, but it is continuity of design that brings the whole project together. The evolution of the design from concept to reality should be as painstaking and meticulous as the physical construction of the project. The numerous considerations within this design stage are always dependent upon the timing of the specific job. Nonetheless, There is a chronological sequence to all construction projects, and a formula can be followed.

I was contacted by a client to build the entryway doors to their new home in Mammoth Lakes, California. They had spent a night at the hotel "Chateau du Sereau" where I had produced the doors and furniture in 1990. Although they appreciated the provincial treatment used at the Chateau, their home was being designed in the style of the architects Greene and Greene who played a major role in developing and popularizing Craft Period design. The foundation work had just been completed, so I was assured of enough time for my part of the project. The seventy-five hundred square foot residence would take nine more months to complete.

At the time I was only somewhat familiar with the work of Greene and Greene from my days as a college art student. As a result of this project I was afforded the opportunity to research in detail these brothers who worked in

The front doors to this Mammoth Lakes, California home evolved from many elements ranging from the overall architectural style of the residence (Arts and Crafts period inspired by Greene and Greene) to concealment of wire pathways for electronic latches. Other concerns included mural design and fabrication techniques to prevent warping in a climate known for rapid changes.

Sal Maccarone is a designer/craftsman and wood sculptor from Mariposa, CA.

"The evolution of the design from concept to reality should be as painstaking and meticulous as the physical construction of the project."

Pasadena, California around the turn of this century. I was amazed at how I shared many of the same attitudes as the Greenes about the use of space and its relation to architecture.

Pioneers of the so called Arts and Crafts Movement, they believed that the completeness of their environmental works included responsibility for the smallest details. This would include the furnishings, and everything that surrounded the lives within their houses.

Further, the design research for a project like this also includes the involvement of the present architect, builder, and most importantly, the owner. It is very important to adapt the design to the attitudes and lifestyle of the client. Purity of style is not as important as the underlying attitude of that style. Team effort; or the lack of it, is what will be most evident in the final presentation of the whole project.

I was given a lot of freedom with the design of this project. It was decided early on that the surface of these doors should somehow become a reflection of their surroundings in Mammoth Lakes. The Greene and Greene style of architecture allowed for the use of a "plank type" door which lends itself to relief carving. Once this was decided I could begin to put my thoughts on paper to first lay out the door design, and then make sketches for a proposed carving. This is where it is important to work closely with all involved.

At this stage all the decisions that affect the total look of the project occur. For instance; my choice of wood species, based

***Photo 1.** Another double door entryway by the author shows a book matched design using plank construction technique.*

***Photo 2.** This single entry door by Maccarone incorporates a symmetrical look featuring panel construction and side lights.*

upon its grain and friendliness to carving, may dictate that the same species be used to trim the entire house. Or, the owner's ideas for the exterior masonry treatment might suggest a different wood be used for my doors. There are many concerns regarding the continuity, but the time invested now is well spent to insure that mistakes either in design or fabrication do not show up at the time of installation.

After an initial meeting with all concemed the design aspect can be handled by telephone, Fax, or through the mail. However, the field measurements are too critical to be lost through communication. After framing has been completed a trip to the site is scheduled. In the case of an entry door system I will meet both with the owner and builder to verify such things as floor treatments, drywall thickness, and the transition height from outside to inside.

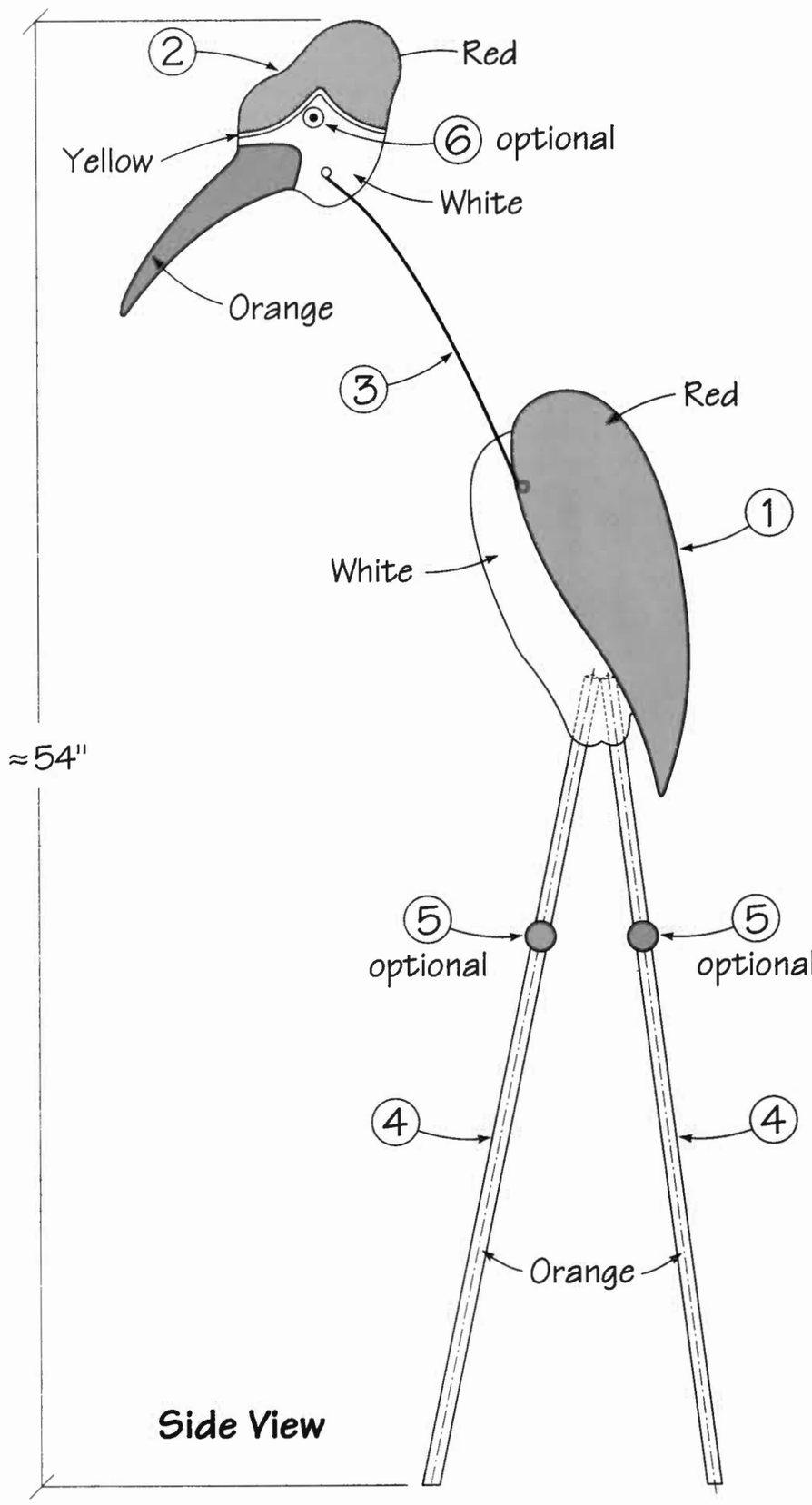
In this case concealed electric locks were used to avoid disturbing the carving with hardware. The locks made it necessary for me to provide a hidden channel for the wiring. Also at this meeting we decided to use wooden door handles. Such details are too important to be left to chance.

It's especially rewarding to me when a project design evolves towards a sculptural treatment. The design aspect for me is a system of development and refinement and, once completed, the actual carving can begin. By this time the client has already approved the concept and drawings so I know that they will be happy with the sculpture. In this case I used a mural approach to the carved scene as opposed to a book-matched pattern ***(photo 1)***, or some other symmetrical design ***(photo 2)***. While wanting to maintain a good balance, it was necessary to include many subjects in the mural which were important to the client. These included the aspen trees growing on the property, the deer in the foreground and Yosemite falls up high and in the background. The lake was used to bridge the scene by adding a diminishing perspective.

In constructing these large plank doors, great pains were taken to insure that they didn't warp. In extreme climates such as Mammoth Lakes, (elevation 7200'), there are rapid temperature swings. Also, carving on one face relieves tension within the board which may also cause warping. Laminating the planks individually, (using many plys), before they are edge glued, eliminated the problem. The cross braces on both sides are also laminated to keep the door from curling.

Delivery and installation is what all design, planning and fabrication leads to. It is the point in time when all of the different aspects of the project must come together. Delivery and installation is the moment of truth.

Because of distance, this will most likely be the only time that I can see my completed work installed within the architecture it was designed for. It is also a time when I can see the owner's first expression. And, after all, they are the people I am trying to please. For these reasons I always try to budget enough time to personally deliver and install my work. This way I can attend to all the details, and by doing so, thank the client for their confidence and trust. PW



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Build a Gooney Bird

by John A. Nelson

When I was growing up in Rhode Island during the late forties, these silly-looking lawn birds were everywhere. It seems many people had one in their front yards, or at least those folks who had "taste." They were painted with bright colors, and their heads bobbed up and down all day long.

I'd been looking for one of these birds for many years. A few years ago, I did finally find one in an antique shop, and though the shop owner wouldn't part with it, he did allow me to trace it, so I could reproduce my own.

The bird can be made with most any type of spring steel that's .030"-thick, ¾"-wide and about 12" long. The legs can be painted on as the original birds were. However, a kit has been made up specially for this project, which includes two 36" fiberglass dowels, two wood beads for knees, a spring and two eyes. The kit can be purchased from Meisel Hardware Specialties, P.O. Box 70, Mound, MN 55364; (612) 471-8550. The Gooney Bird package, item # W869, costs $7.99 (plus tax for Minnesota residents) and $3.50 for shipping and handling.

Instructions

Cut the head and body from ¾"-thick pine and sand. If you use the spring from the kit, carefully locate and drill the 5/16" diameter holes in the head and body as shown. If you use a flat spring, you will not need these holes. Make the saw kerfs as shown by cutting just past the hole. If you are going to use the eyes from the kit, drill a ¼" diameter hole for them. Likewise, if you use the fiberglass legs available in the kit, carefully locate and drill the two ½" holes in the body for the legs. Take care to drill them at the exact angle shown.

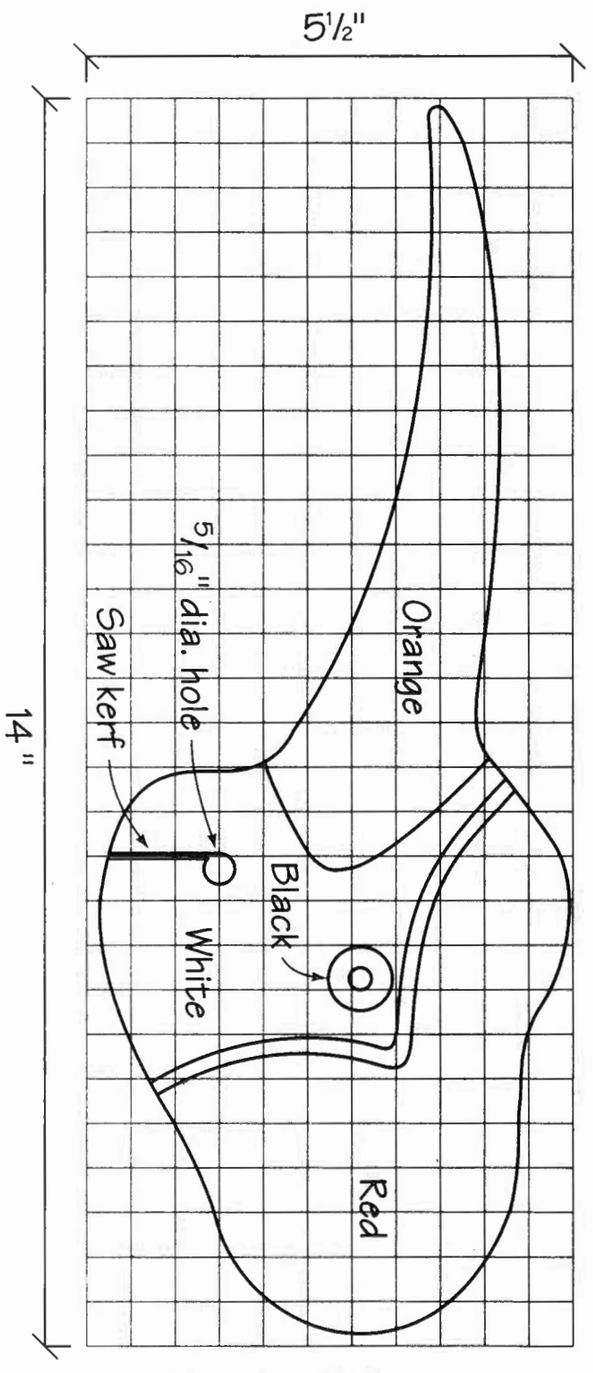
Finishing

Prime your bird with an exterior primer. Now comes the fun part. Paint your bird whatever colors you like. I have noted the colors on the diagram, which denote how the original was painted. Glue the legs and eyes in place with epoxy glue.

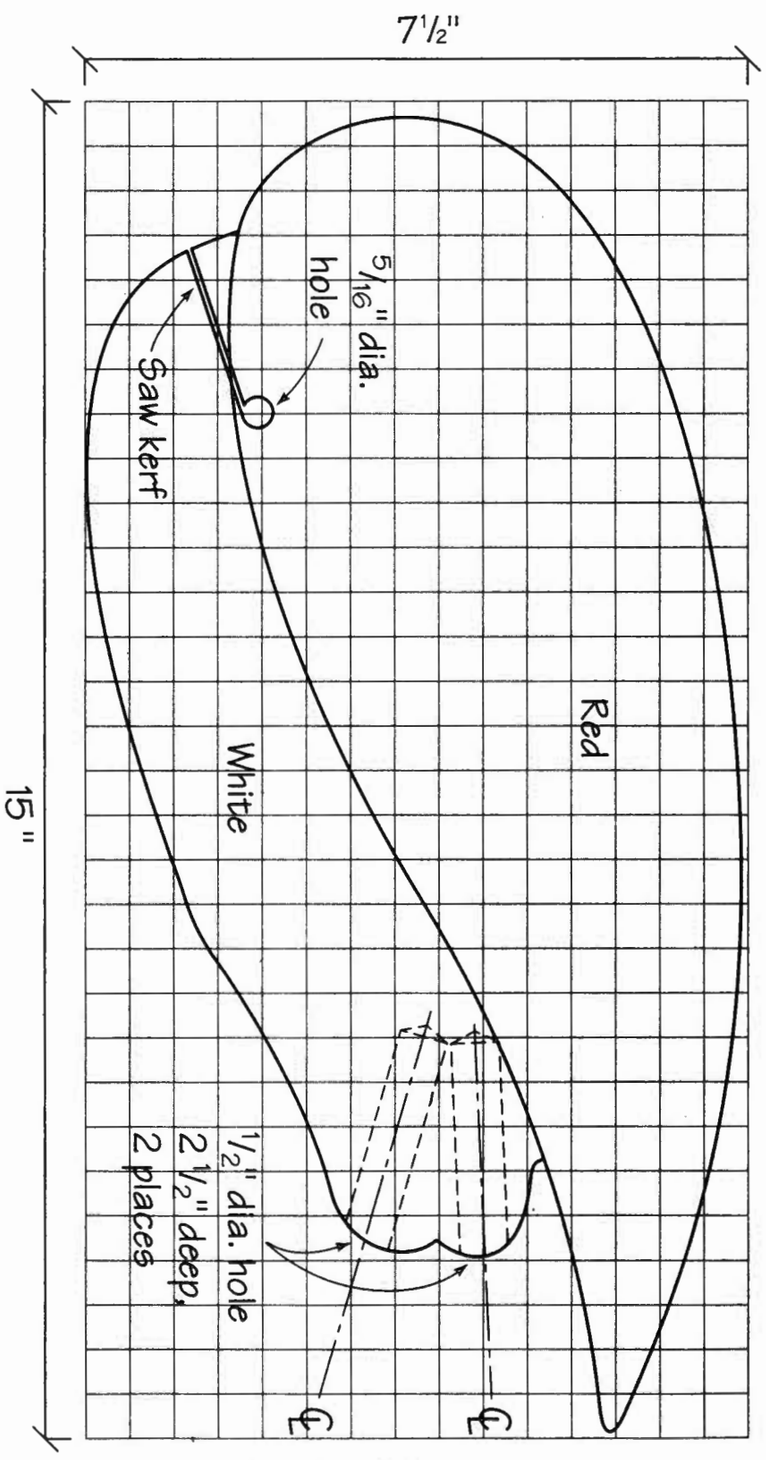
John A. Nelson, author of 52 Decorative Weekend Woodworking Projects, *created quite an uproar in his small New England town when he set up his gooney bird on the lawn. Every night, under the cover of darkness, he moves his gooney bird around the yard — just to keep the neighbors guessing.*

Schedule of Materials: Gooney Bird

Qty.	No.	Item	Dimensions	Notes
❑ 1	1	Body	¾" x 7½" x 15"	
❑ 1	2	Head	¾" x 5½" x 14"	
❑ 1	3	Neck	.030" x ¾" x 13"	spring steel
❑ 2	4	Leg	½" x 36"	
❑ 2	5	Knee		(optional)
❑ 2	6	Eye		(optional)



Head - Side view



Body - Side view

Doll House Furniture

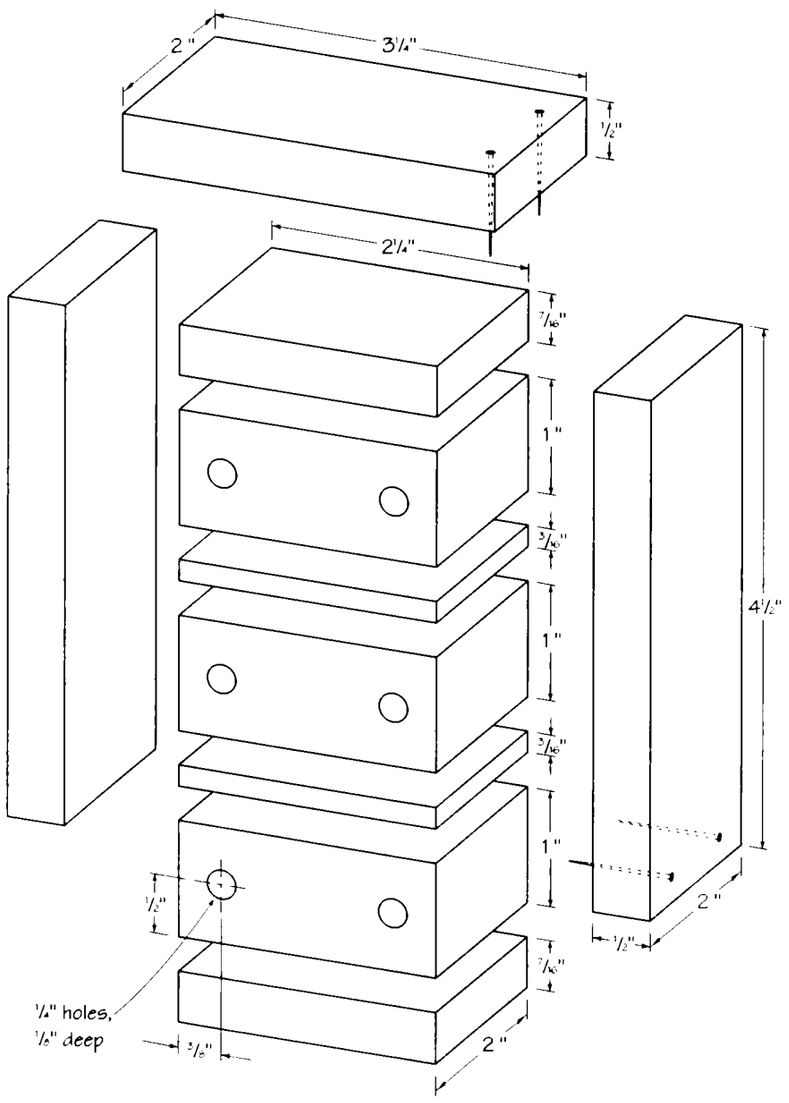
by Martha Dawson

When my grandchildren asked for a doll house, I knew I would need to come up with some special designs for the furnishings. Most children tend to be a bit rough with toys so everything would have to be built to withstand the rigors of child's play. Little ones will try to detach any protruding or loose part and pop it into their mouths. Everything needs to be securely fastened together, with no sharp corners or edges.

As for myself, I didn't want these toys to cost a fortune to make. Also, I wanted them to be fairly easy and fast to make. The designs I came up with have endured years of happy child's play with no mishaps and no repairs needed.

Most of the wood used is molding scraps obtained from lumber stores or building sites. The drawer pulls are ¼" screw hole tapered plugs, available at most hardware-lumber stores. The "upholstery" is from wallpaper sample books. Wallpaper outlets will usually give these away when they become outdated.

DRESSER



Once all pieces are cut, begin assembly with the drawer stack. (Drawers that "work" would surely be removed and lost, so these don't. No complaints from the users.) Stack all the pieces together as shown, but insert a piece of playing card between the pieces. Let the card protrude in front enough to grasp and remove it when assembly is completed. Bind this stack with two rubber bands running from front to back. To achieve a good glue joint, you may need to sand away any saw marks on the ends of the drawer stack.

Apply glue to the two side pieces and the ends of the drawer stack. Assemble, being sure that the tops of the side pieces. Clamp with thick rubber bands, After the glue sets, remove all rubber bands. After glue sets, remove all rubber bands. Apply glue top of assembly and to the bottom side of the top piece. Set in place, align and clamp with rubber bands. Round over all edges and corners.

Mark positions of drawer pulls. With a ¼" brad point spur bit in place, set the drill press to ⅛"-depth. Drill holes for drawer pulls. Drop a bit of glue in each hole and firmly seat a tapered plug in each hole.

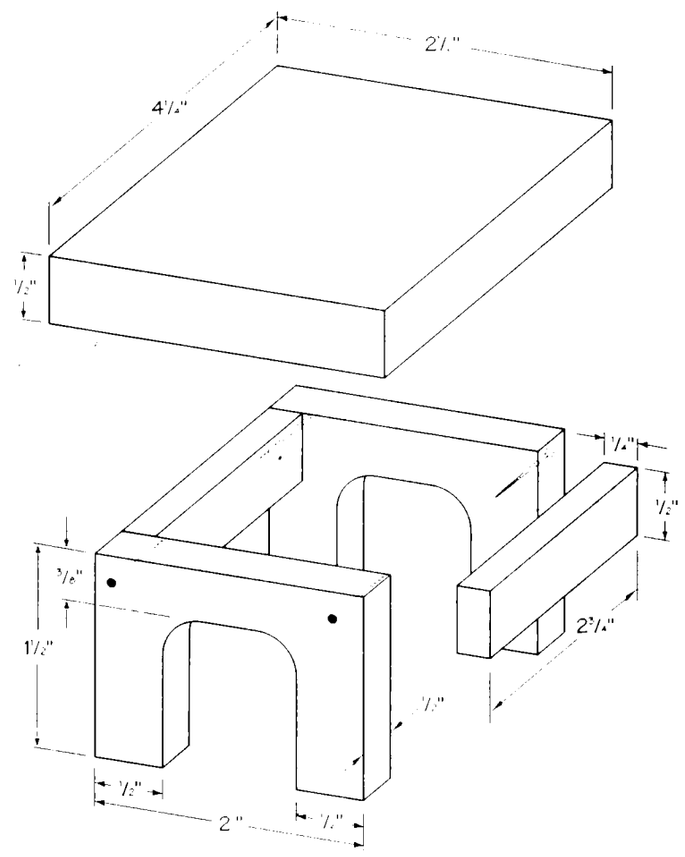
Drive two 1" wire brads, into the top and bottom of each side to strengthen the assembly. Use a nail punch to set the brads, fill holes with wood putty and sand.

Salad bowl finish gives a good, safe finish. If you choose another finish, be sure it's non-toxic and safe for children. Helpful hints: sand both sides of all boards before cutting parts. Make a nail punch by blunting the tip of a big nail on the grinder. Cut out all parts before setting up the drum sander. Drill the holes last.

COFFEE TABLE

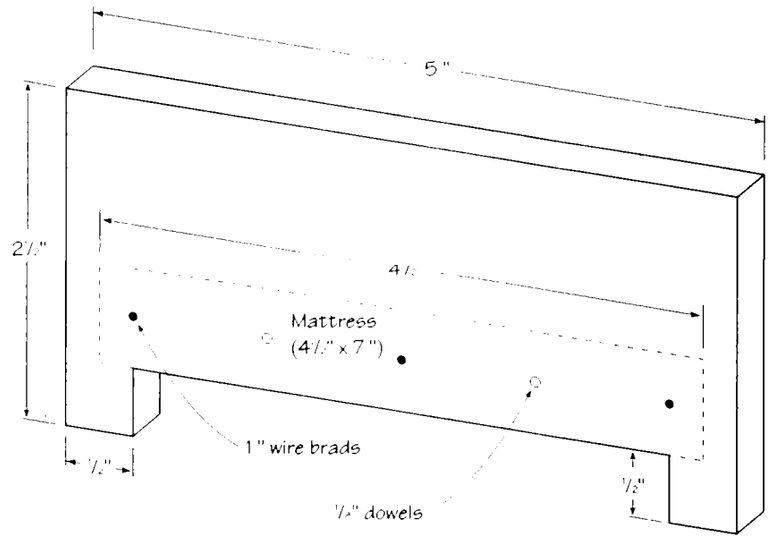
Cut two squares slightly larger than the dimensions given for the legs. Stack together and bind securely with masking tape. Draw the pattern onto the top piece and cut out. Cut top and rails. Sand edges on the drum sander.

Apply glue and assemble legs and rails. Clamp with a heavy rubber band. When the glue is set, center this assembly on the bottom of the table top and mark the position. Apply glue, assemble and clamp with rubber bands. After glue is set, round over all edges and corners.



BED

Cut two rectangles slightly larger than the dimensions given for the bed ends. Bind together securely with masking tape. Draw pattern on top piece and cut out. Cut "mattress" to size. Sand all edges, round over edges and corners. Mark position of "mattress" on bed ends. Glue and nail to one end and then the other. Use a nail punch to set the brads, fill the holes with wood putty and sand.

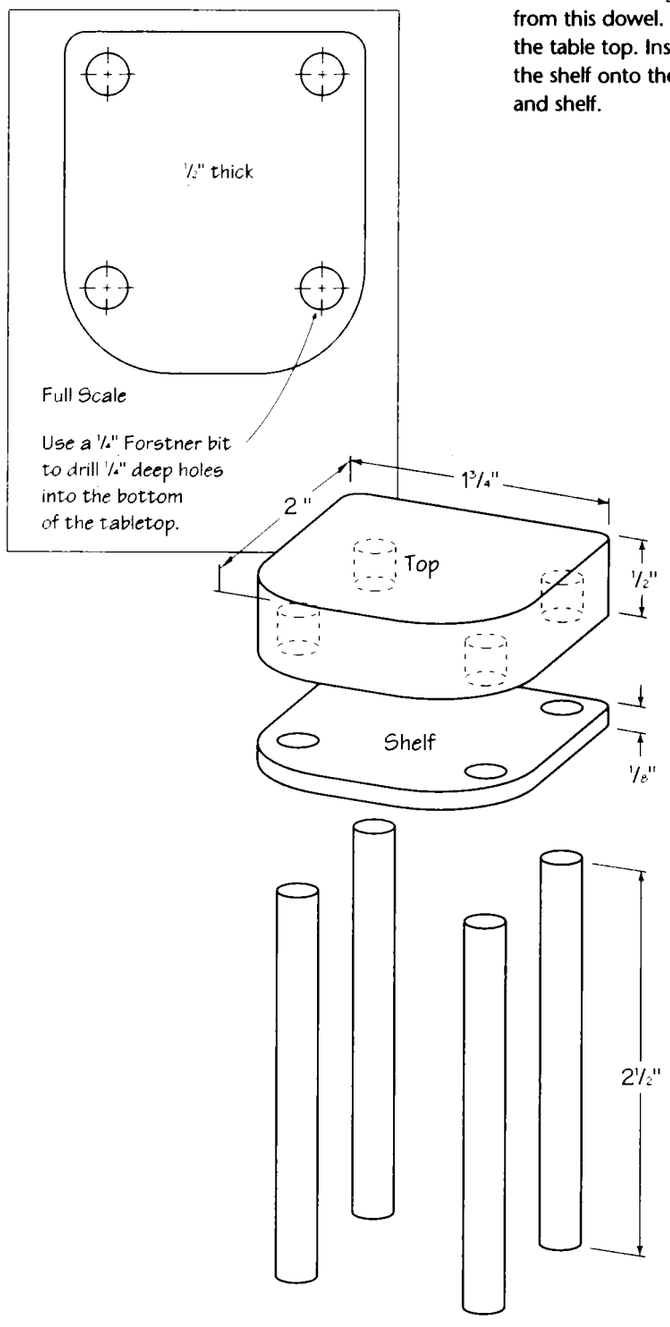


After nailing, drill through the bed ends into the molding with a ½" drill. Then insert a ½" dowel.

END TABLE

Cut squares for two end table tops and two shelves slightly larger than the measurements given. Stack all four pieces and bind them firmly with masking tape across the center in both directions. Draw the pattern on the top piece and cut out on a bandsaw or scroll saw. Separate and restack, one shelf on one top. Rebind with masking tape. Mark the positions for the leg holes on the shelf. Using a ¼" bit, set the drill press to drill ⅜"deep. With the shelf uppermost, drill the 4 leg holes. Repeat with the second shelf and top. Sand the edges with a 1" drum sander in the drill press. Using sandpaper, break all edges and corners.

Pre-sand a length of ¼" dowel. Cut 8 pieces 2½" long from this dowel. Drop a bit of glue into each leg hole in the table top. Insert a dowel piece into each hole. Push the shelf onto the dowels, leaving about ¼" between top and shelf.

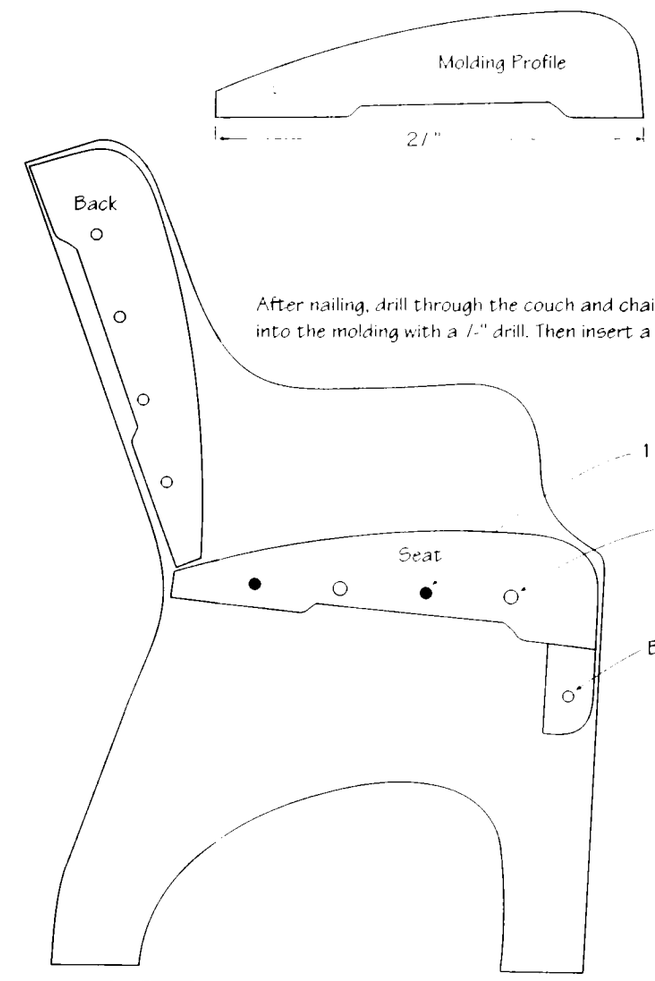


COUCH AND CHAIR

Cut four squares slightly larger than the chair and couch end pattern. Bind together securely with masking tape and cut out. Cut backs, seats and braces to dimensions shown. Mark positions of backs, seats and braces on the chair and couch ends. Glue and nail one end together, then the other. Before attaching the second end, be sure that the couch and chair sets level. Use a nail punch to set the brads, fill holes with wood putty and sand.

Cut "upholstery" material for the couch 6" wide and long enough to wrap around the back, bottom and brace; approximately 12". Test to be sure of the size. Apply a light coat of glue to the surface to be covered and let it become slightly tacky. Beginning at the middle of the underside of the seat, wrap the material around and back underneath. Use a scraper or similar object to push the material down into the junction of the back and seat.

Cut the "upholstery" material for the chair 2½" wide and approximately 12" long. Apply as directed for couch.



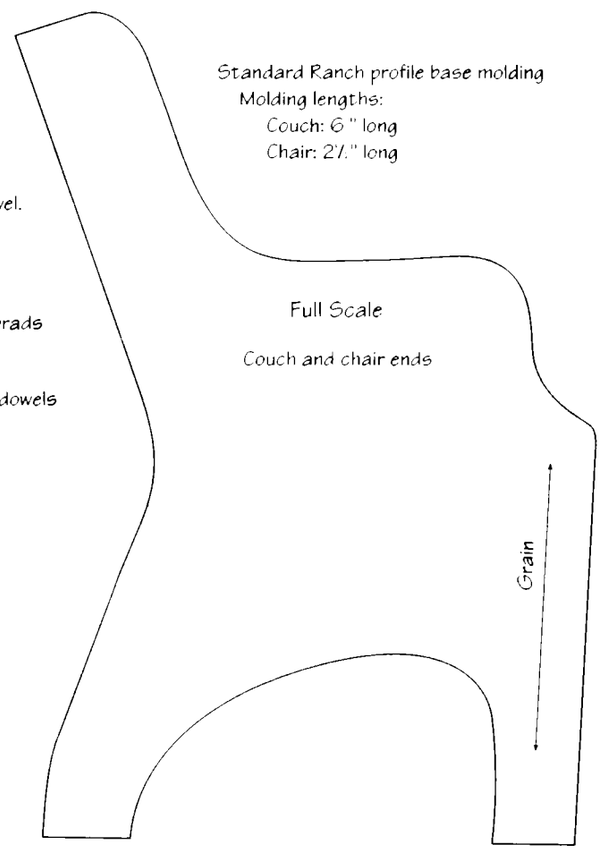


PHOTO BY RON FORTH PHOTOGRAPHY

Shaker Firewood Box

This functional reproduction is a one weekend wonder.

By David Thiel

With fireplace season upon many of us once again, the task of running out to the wood pile and bringing in a few logs has also returned. If you haven't already stumbled on the concept of storing a larger cache of logs indoors, this Shaker reproduction will provide a stylish location for your wood stash.

Using pine, the piece is simple enough to complete in a weekend. First cut all your pieces to length and plane down to ¾" thickness. You'll almost certainly end up having to glue up some boards to attain the 20¾" width. We opted for biscuits to align the boards during the glue-up process.

Once the glue is dry, move to the next step — sizing the boards according to the Materials List. Since you're working with a fairly plain wood and design, the attention you give to grain figure and to matching wood color will make the piece more dramatic.

The next step is to lay out and cut the radius on the top front corner of each side. Use the ***profile view*** to locate the beginning and ending points of the radius. Use trammel points set at a 10½" radius to mark the comer then use a jig saw to cut both sides (***photo 1***). Cut to the outside of the mark, allowing about 1/16" overage to be sanded off (***photo 2***). You may want to clamp the two sides together for a final sanding to make sure the two radii match.

The next step involves cutting rabbets. We used two processes for this step. For the ¾" x ½" rabbets ***(rabbet details)*** we used the table saw, first running the ¾" dimension with the piece flat to the table, then the ½" dimension with the piece on edge. Make sure your waste falls away from the fence to avoid binding between the fence and blade.

After making all the necessary ¾" x ½" rabbets, set up a router with a ½" x ½" rabbeting bit with a pilot bearing. Use this setup to run the necessary rabbets to accept the back pieces ***(see diagram, rabbet details)***.

If you've not already done so, run the six back panels down to ½" and cut for finished size. Then adjust the router setup to cut a ½" x ¼" rabbet and run the opposite long edges of the back panels (F) and one long edge of the back panels (G). These rabbets will give a ship-lapped detail to the back of the box and also allow for expansion of the boards left to right ***(rabbet details, photo 4)***.

The next setup for your router uses the rounded portion of

Photo 1 *Use a jigsaw to cut the radius on the sides. Pay attention to tear out by cutting from the inside of each piece.*

Photo 2 *Sanding the radius with a random orbital will remove the jig saw marks, but make sure you don't round over or lose the square edge.*

Photo 3 *A router with a ½" x ½" straight bit makes quick work of cutting the rabbets on the ends and back edge of the top.*

Photo 4 *The ¼" spacing shown on the back panels is accomplished by rabbeting a ¼" x ½" rabbet on opposing long edges.*

Photo 5 *By using a portion of a roman ogee bit, a delicate detail is added to the radiused edges of the sides. A cove bit with a guide bearing will work nicely, too.*

Photo 6 *Easing or breaking most of the exposed edges with an ¼" roundover bit quickly removes sharp edges and adds a simple detail.*

a roman ogee bit to run a cove profile on the radiused side edges (***profile view, photo 5***).

We used an ⅛" roundover bit to soften the perimeter edges of the door and front (don't round over the mating edges) and the front and sides of the top (***photo 6***).

Before assembly take the time to finish sand all the interior, and any surfaces that will be difficult to sand after assembly. You will also want to sand off any glue or board matching irregularities at this time.

Assemble the box using 1¼" finish nails. Start by attaching the bottom between the two sides flushing up the front edges of all three pieces. Use the top to help establish the spacing while nailing the sides. Next flush the top to the rear edge and nail it in place.

Now that you've established the box, nail the front into place across the bottom edge, check for square and then nail up the sides.

The next step is to nail the back in place. You'll need to pay particular attention to spacing the back pieces to maintain a uniform spacing on the ship lap joints.

To add another detail to the box we used a simple ¾" roundover bit to detail the top edge of the base trim pieces. We then mitered the front corners and tacked the trim into place (***photo 7***).

Mark and drill the locations for the hanging pegs, and glue the pegs into place. Be aware of glue squeeze out or it will show when you put the finish on.

Now sand the entire piece to get it ready for finishing. We opted for a simple coat of clear lacquer to show the natural beauty of the sugar pine while sealing and protecting the wood.

Once the finish has hardened it's time to put on the hardware. To keep with the traditional styling of the firewood box we went with wrought iron butterfly hinges (***photo 8***). The hardware shown was found at a local specialty hardware store, but you can find similar pieces going through the source list.

Once the hardware's in place the only detail left is stocking the box with wood. Then, settle down for the evening in front of a cozy fire. PW

David Thiel *is associate editor of* Popular Woodworking.

Diagram 1

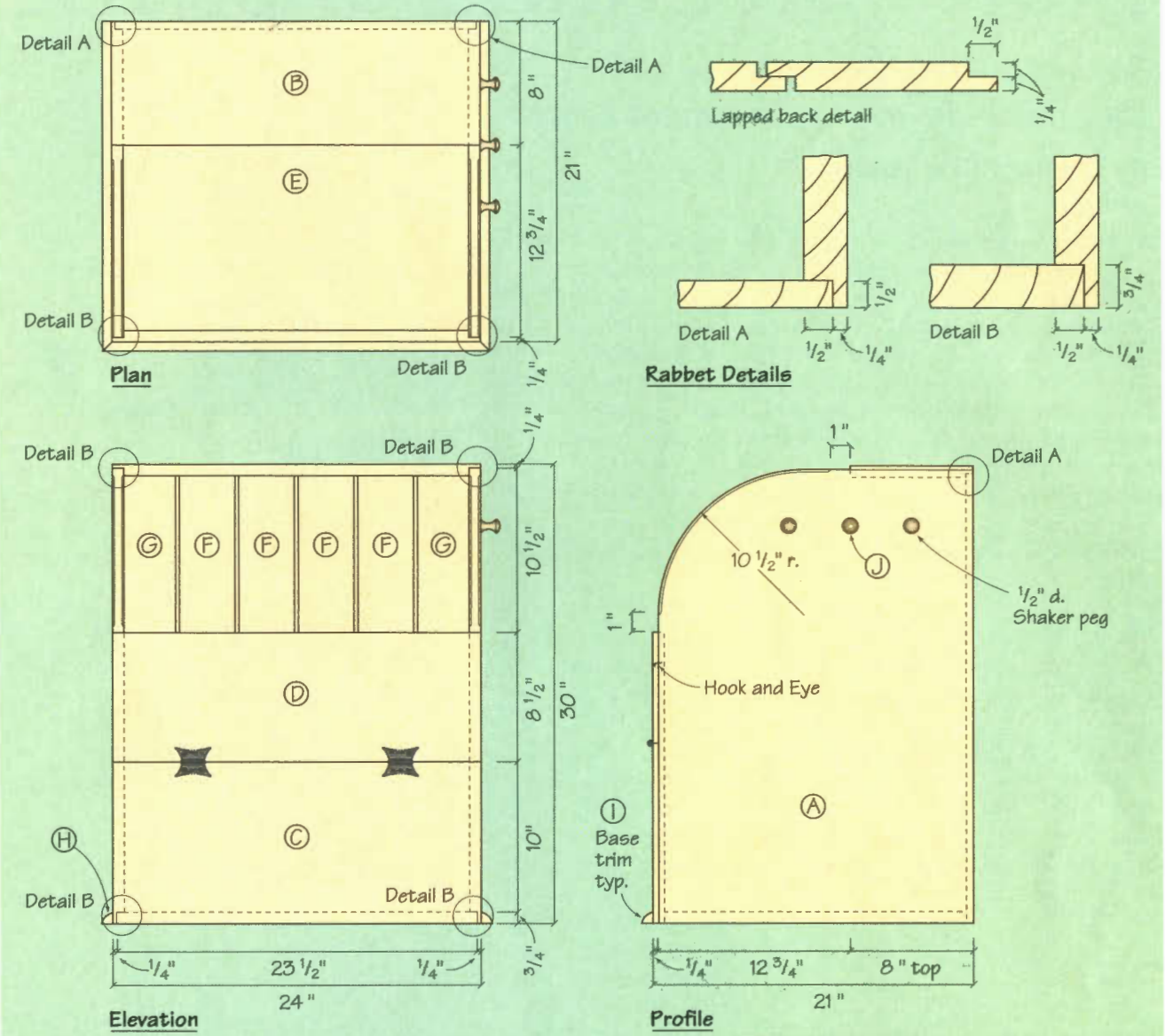


Photo 7 *The simple addition of a base shoe molding helps make the piece more pleasing to the eye.*

Photo 8 *Wrought iron hinges add to the Shaker style of the piece and complete the reproduction look.*

Schedule of Materials

No.	Letter	Dimensions	Item
❑ 2	A	¾" x 20¾" x 29¾"	Sides
❑ 1	B	¾" x 8" x 24"	Top
❑ 1	C	¾" x 10" x 24"	Front
❑ 1	D	¾" x 8½" x 24"	Door
❑ 1	E	¾" x 20" x 23½"	Bottom
❑ 4	F	½" x 4⅜" x 29¾"	Back Panels
❑ 2	G	½" x 3⅞" x 29¾"	Back Panels
❑ 2	H	½"x 1" x 21⅝"	Base Trim
❑ 1	I	½"x 1" x 24¼"	Base Trim
❑ 3	J	½" x 1¼"	Wooden Knobs

Hardware Sources List

Paxton
7818 Bradshaw Road
Upper Falls MD 21156
(410) 592-8505

Horton Brasses Inc.
Nooks Hill Rd. Box 95
Cromwell, CT 06416
(203) 635-4400

Ball and Ball
463 W. Lincoln Hwy.
Exton, PA 19341-2594
(800) 257-3711

Notes on Sound Shelving

Sliding dovetails are the key to this knock-down entertainment center.

By Graham Blackburn

The most satisfying projects are often the result of a serendipitous find and an urgent need. In this case it was the happy marriage of a couple of cherry boards I inherited by chance and the need for a better way to house my stereo components. The cat's habit of jumping on the unprotected record turntable was doing it no good. Stacking the CD player on the cassette player in turn stacked on the amplifier and receiver was bad for the health (too much heat) of these expensive components. I didn't want to build an entire "entertainment center," which might include the television, a VCR and speakers, but I did need to get the audio components off the coffee table and shelve them somewhere convenient and protected.

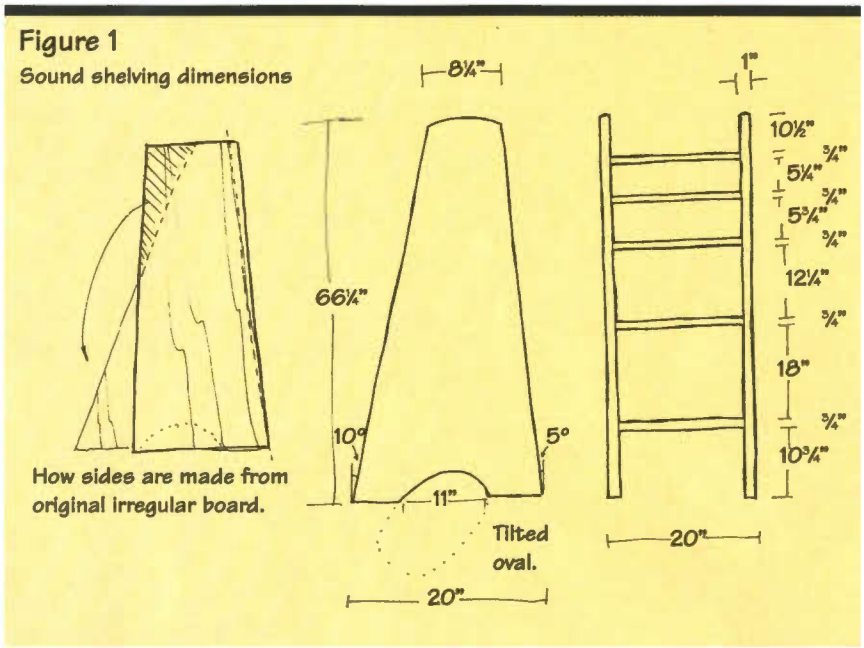
The Materials

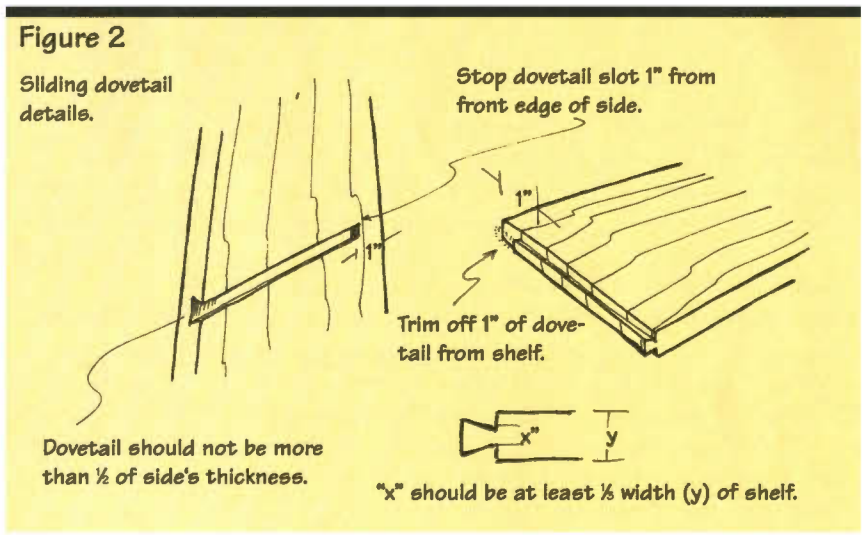
The cherry consisted of two irregular, 6' boards. Both pieces were considerably narrower at one end than at the other, and it occurred to me that by removing a tapered section from the narrow end of each board, reversing it, and joining it to the wider end, I could produce a pair of well-proportioned, sloping sides, as shown in ***figure 1***. The resulting shape had several advantages. Most appealing was the feeling and look of balance. The last thing wanted when designing shelving for electronic equipment is something that might tip over. These sides were sufficiently broad at the base to be almost as stable as pyramids. The sloping front also made access to the different components equally easy, and the sloping back provided room for all the wires and connecting cables while still permitting the unit to be pushed (at its base) securely against the wall.

Since much of the shelving is necessarily covered by what sits on it, buying extra cherry seemed a little wasteful. Pine is cheaper and readily available at building supply houses. The color also provides a pleasant contrast to cherry. All that was needed was a single 14' piece of 1"x12" (a nominal dimension that typically measures ¾" by 11½"). By careful cutting it's possible to avoid most of the small knots that are included in what is usually called "number one grade." Those that were left wouldn't be visible. Buying clear pine would have been considerably more expensive, but is still usually cheaper than cherry. However, in many parts of the country it can be hard to find cherry that has a width equal to or greater than pine.

The Design

Since audio components need to be connected together, the shelves were designed to be backless. A backless shelf unit, however, poses problems of side-to-side stability. One way to solve this problem is to add a diagonal brace. A better way is to provide at least a partial back. By designing the shelving to start at waist level — thereby enabling each component to be





reached without excessive bending — adequate space for a small cupboard was left beneath the lowest shelf. The back of this cupboard provides the needed sideways stability. The cupboard forms a useful storage area for various accessories such as record-cleaning equipment, headphones, or manuals.

One last consideration in this era of transience influenced the design: the need for easy transportation. Knockdown furniture is much easier to move or store than solid pieces and is less vulnerable to damage while being manhandled in and out of apartments and moving vans. Joining the shelves to the sides with sliding dovetails accomplished this and also makes assembly easier. None of the shelves are permanently fixed in place. The dovetails are stopped 1" short of the front edge of the sides allowing the shelves to be pushed firmly into position and guaranteeing that all are equally aligned. The paneled lower door is hinged to the bottom shelf and can be easily disassembled by unscrewing the hinges, or transported folded against the shelf. The paneled back — the key to the entire unit's stability — is secured between the two lower shelves by two screws through each shelf.

Dimensions and Methods

The measurements given here may be altered to suit individual preferences. The exact shape of the sides will depend on the material available. Certain things are relatively standard (such as audio components). Use these measurements as starting points; aim for a pleasing shape while maintaining stability. The dimensions of the sides shown in ***figure 1*** were largely the result of the size of the original boards. One important fact that made the construction of sliding dovetails easy was the full 1" thickness of the finished material, but with a little care the same dovetails may be cut using ¾" material for shelves and sides. It is much faster, and the results are more likely to be evenly accurate, if you cut the sliding dovetails with a router (or on a shaper) rather than the traditional hand method. All other operations and procedures needed to build this unit are easily undertaken using hand tools or power tools according to your preference and the tools at your disposal. Do not feel bound by any particular method.

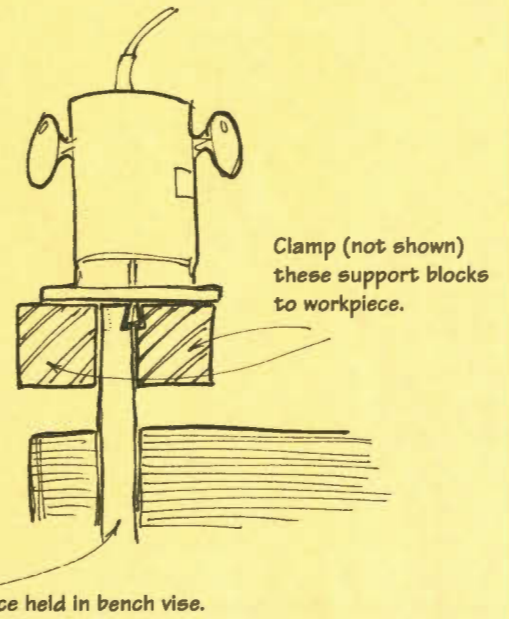
The Sides

Prepare the sides first. Cut and join where necessary and surface both sides to be as flat as possible. Cut out the slightly off-center half-oval in the bases, using a thin lath to lay out the curve on one side and then use this side to lay out the curve in the other side. The bottoms of the sides are left square but the top, front, and back edges may be given a shaped profile. A 1" rounding plane was used on the piece shown, working to lines drawn ¼" in from the edge, a file was first used on the top to produce a gently rounded profile. Other methods include using a block plane to produce a chamfer, or a shaped bit in a router, or even leaving the edge square.

The exact shape and angles at which the front and back slope are not critical, but it's important to make both sides identical. If you decide on dimensions other than those given, remember that most audio components are about 10" deep; leave at least this depth for the top shelf, or whatever stands on it will hang over the edge. Since turntables are the most variable in size, and in any event are at least large enough to accommodate a 12" record, it is best to design the lowest shelf to be deep enough to hold this component. Most components

PHOTO BY ANDREW WAINRIGHT

Figure 3 Cutting sliding dovetail on shelf end.



are about 17" in width; when deciding how wide the shelves should be include an extra 1" on either side of your widest component. It's also important to leave 1" air space above each component for ventilation. You will need more space above the turntable (if this is part of your system) to permit its lid to be raised or removed. Having worked out the dimensions for all the above, design the bottom of the cupboard so that it looks proportionate while being as wide and deep as possible for greatest stability. Make the unit's total height sufficient to give an overall appearance of balance. This is, of course, completely subjective. I like a little space beneath the cupboard — to complement the space between the sides at the top of the unit — but you may prefer to omit the cutout at the bottom of the sides and have the cupboard reach all the way to the floor.

Whatever dimensions you settle on, lay out the positions of the shelves on the insides of the sides as accurately as possible. Double-check by comparing both sides to each other. Use a sliding bevel set to the angle of the slope to determine true horizontal, but remember that you may have different angles at the front and back.

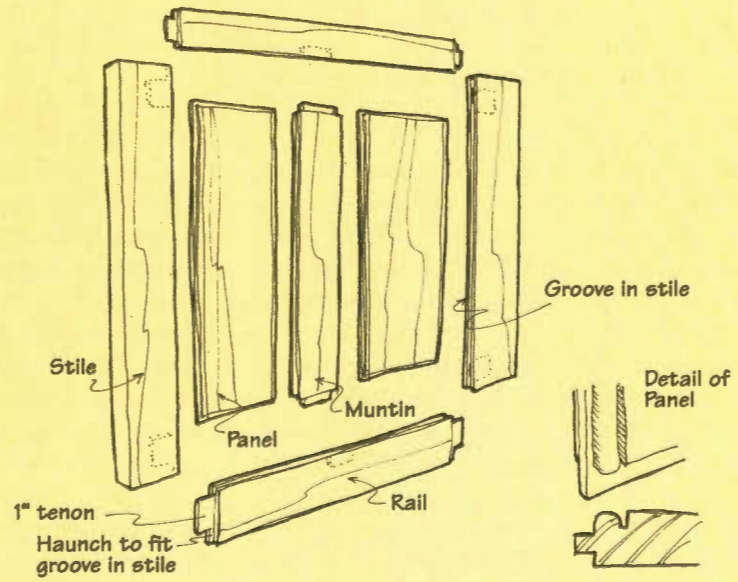
Mark a line parallel to the front edge of the sides across the shelf layout lines, 1" in from the front ***(figure 2)***. The female section of all the dovetails will be stopped at this point, guaranteeing equal alignment of all shelves. Insert a ½" dovetail bit in the router and clamp a guide across the side so that the bit cuts exactly in the middle of each shelf location. Make sure at least a third of the side's thickness remains at the bottom of the dovetail slot.

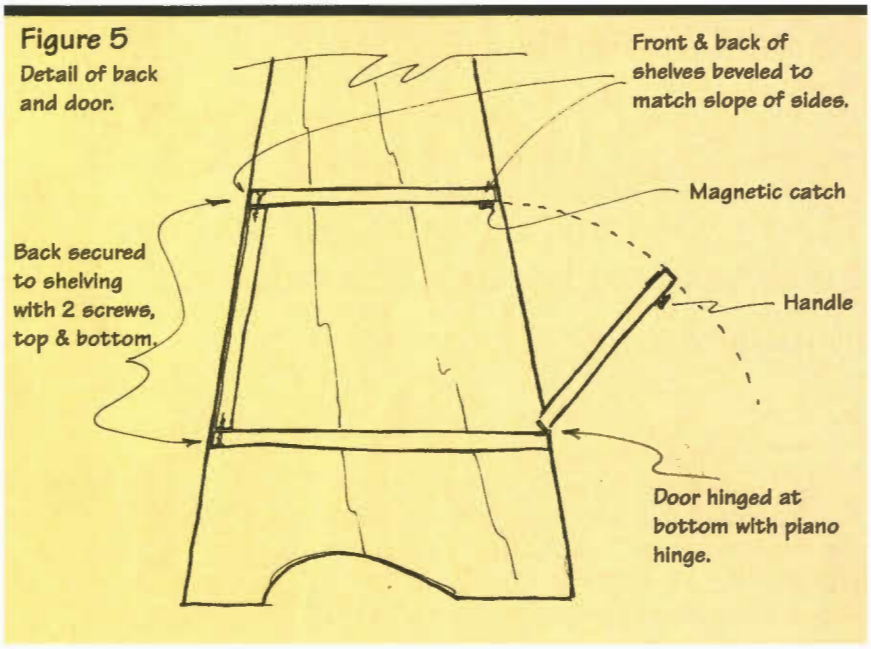
A final sanding of the sides at this point is useful to remove any feathering that may have occurred along the dovetail slot, and then the sides may be considered finished.

The Shelves

Prepare as many shelves as are necessary to the required width, joining pieces where needed to produce the right depth. Bevel their front and back edges to match the slopes of the front and back of the sides. With the dovetail bit in the router at the same depth as was used to cut the female portion of the dovetail, cut the male portion of the joint in the ends of the shelves. This requires two passes, one on each side. Use a piece of scrap clamped to each side of the ends to provide a stable bearing for the router's shoe. Make sure these pieces are perfectly level with the end and mark them so the same piece is always used on the same side. Lay out the position of the dovetail pin on the end of the shelf. After the two scrap pieces are clamped in place adjust the router's fence to cut the bottom side first ***(figure 3)***. Cut the bottom side on all shelf ends before cutting the top side, making sure you keep the scrap pieces clamped to the same sides. This will guarantee that even if the first complete dovetail is less than perfect, all shelves will at least be at the same height. Making a trial joint on a piece of scrap the same thickness as the shelves will demonstrate whatever adjustment to the router's fence may be necessary when it

Figure 4





comes to cutting the top half of the dovetail.

Finally, pare back the first 1" of the dovetail from the front edge of every shelf and test every shelf in its matching slot in both sides (***figure 2***). Scrape or plane every shelf to finished perfection, and assemble everything. Although the joints should be tight enough to require light malleting home (using a piece of scrap to protect the beveled edges), the unit will no doubt wobble somewhat from side to side. The back will take care of this.

The Cupboard Back and Door

Measure the distance between the bottom two shelves and make a mortise-and-tenoned frame to fit (***figure 4***). Allowing an extra ⅛" all round is a good idea since the finished frame can then be trimmed to fit perfectly, especially by beveling the top and bottom edges. This is necessary since the back should slope at the same angle as the back of the sides. This is also necessary for the doors to prevent the hinge from binding in the closed position. To avoid having to join material in order to make a single panel wide enough to fill the frame, and also because I felt it looked better, I fitted a central muntin in the frame and made two smaller panels.

After the various framing members have been cut to length and width, plough a groove in all inside edges to accommodate the panel (or panels). The job is easiest if the groove is centered and also made the same width as the mortises. Working with hand tools, this means using the same width plough iron as mortise chisel, keeping the mortise gauge set to the same width when marking mortises, tenons, and the panel groove, and being sure to use the mortise gauge always from the same face. If you are using ¾" thick material, ¼" centered tenons work well.

Center the ¼" tongue around the edge of the panel and allow a little space for the panel to expand should its moisture content increase — but not so much that should the reverse happen and the panel shrink across its width it will not pop out of the frame. Since a certain amount of movement is inevitable, forming a bead and quirk down both long-grain sides on the face side of the panel will mask any variation in width. A ¼" wooden beading plane is an easy tool to use, and not hard to find at flea markets or antique stores. The same effect can also be produced with an easily made scratch stock. Simply file a scrap piece of steel — an old scraper blade or piece of band saw blade is perfect — to the desired shape, secure it in a stock as shown, and run it down the panel until the bead and quirk have been scratched out. It is also possible, of course, to use a router or shaper bit to produce the required profile, but this is a noisy and dusty way to proceed.

Clean the panels and framing members before assembly. Glue only the mortise and tenons, being careful that no excess glue escapes into the panel grooves since the panels must remain free to float. After the frame is out of the clamps, plane away any irregularities at the joints and trim the assembly to fit between the shelves, securing it with two countersunk screws through both shelves (***figure 5***). The door is made exactly the same way, except that when completed there should be 1/16" to ⅛" space all round so that it will open and shut easily. The door is hinged with a strip of piano hinge along the entire width of its base. There is no real need to mortise the hinge into the bottom of the door, but you may want to do this in the shelf for appearance's sake. Attach a simple handle at the top of the door, and adjust its closing by fixing a magnetic cabinet catch to the underside of the top shelf.

Finishing and Other Possibilities

All that remains is any final scraping or sanding and the application of any finish. The cherry had been hand planed to perfection and required only a light, well-rubbed coat of oil. The pine was similarly treated before the entire unit was waxed. There is no reason why almost any other finish — or none at all — may be used. The only real considerations are how much sheen is desired and whether any protection against grubbiness is necessary.

Similarly, depending on the size of the cupboard and what you might store in it, some adjustable shelving might be provided. In keeping with the piece's knockdown character this should also be made removable, perhaps resting on movable shelf supports inserted in a series of holes bored in the inside walls of the cupboard section. PW

Graham Blackburn *is a furniture maker and woodworking writer in Bearsville, NY.*

What's New In Biscuit Joiners

There's good news in price and features for the mid- to lower-priced machines.

By Hugh Foster

After working just one session with any of the biscuit joiners reviewed here, you'll know why biscuit joinery has become so important in professional and hobby woodworking. It's quick, easy and accurate.

Using a biscuit joiner is simple — mark the joint, align the tool to the mark, plunge the cut, apply glue, insert the biscuit, mate the pieces, clamp. Moisture from the glue swells the biscuits against the walls of the kerf, locking the pieces together. You've made an amazingly strong joint. Accurate alignment can be achieved in the vertical plane with up to ¼" of horizontal play in the other plane. This "forgiveness" is made possible by the shape of the kerf and the fit of the biscuits.

Biscuit joiners have evolved in the last ten years. The choice of tools has become much more complicated. In the course of preparing my forthcoming book, *Biscuit Joiner Handbook*, I shop tested every biscuit joiner available in the United States, and quite a few that aren't.

My benchmark machine remains the Lamello Top Ten, one of the first, and certainly the classiest of the field. As you might expect, it has a price to match. My strongest endorsement for the Lamello: it has survived the most traumatizing test of all, the drop test or, actually, launch test. It was accidentally hurled from about three feet with no damage and no loss of accuracy. I don't recommend you try this experiment at home.

PINECRAFT/BORG 550

The Taiwanese Princecraft/Borg/Jointmatic 550, a heavy model, has a very light cord that's far too short. If I used the machine regularly in my shop, I'd probably replace the entire cord set.

DEWALT/ELU/BLACK & DECKER

Within the past year or so, some of the woodworking magazines tested the DeWalt, Black & Decker, and Elu joiners, which are essentially identical, differing only by popularity and color of motor housing. For a long time, I couldn't understand the appeal of these brands, but now I do. All joiner manufacturers worth seriously considering base their machines on small, hand-held metal grinders.

The grinder that is the base of the Black & Decker family of models has its on/off switch operated by the pinky and ring finger of whichever hand holds the body of the tool. As a left-handed (and perhaps more importantly, left-eyed) user, I'd hold the body in my left hand and the D-handle in the right. But some years ago I damaged my left hand in an accident, making this awkward for me, though I can't blame the tool. The machine is competent, quiet, and very accurate. It's rack and pinion fence adjustment and dust collection system are notable. You could do a lot worse, and you might have to double your budget to do better. Right now these machines appear to "own" the mid-priced market.

THE MAKITA 3901

The new Makita 3901 shows the signs of quality. The rubber cord is more than eight feet long. The 5.6 amp 590 watt motor runs the blade at 10,000 RPM. A dust bag is standard, but the swiveling dust chute also fits the standard Makita dust hose that connects my random orbit sander to my bench vac, which is how I run the machine in my shop. According to my sound level meter, the Makita runs at 92 dB, which places it among the quietest joiners available.

The Makita's castings are beautifully machined, which is important because there's no tolerance for lateral error in biscuit joining. If the cutter is out of square, the error is doubled since the mating slots must be parallel.

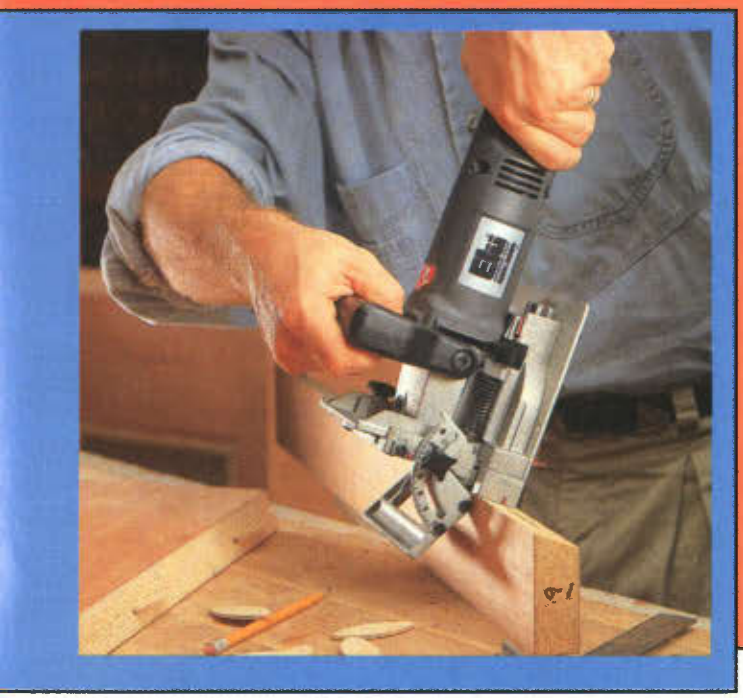
Unlike most other joiners, the Makita 3901 provides easy blade access. The large grip-face is easily removed for cutting splines rather than biscuit slots. What's more, one of the three optional saw blades makes cutting non-biscuit joints much easier. The normal maximum depth of cut is ¾" with the biscuit joining blade, but 1" with the optional blades — an option not readily available from other manufacturers. Six cutting depths can be preset by rotating the adjustment knob — twice the number usually found on most mid-priced joiners.

A large, comfortable tool grip eliminates the need for left handers like myself to have to turn the European style "D" handle around. The front fence adjusts easily from 0 to 90°, which is a great time saver. Most mid-priced joiners require some sort of shimming to achieve angles other than 0 or 90°.

Makita's fence tighteners are on the inside of the mechanism rather than on the outside, so (as with on no other joiner) the center mark for the blade is in fact the center of the tool. Every other tool's lockdowns have the potential to interfere with the work. The flush sides allow you to work in very tight spots. The adjustable fence moves on a square, rack and pinion mechanism that permits precise depth settings. After adjusting for square when first attached, it will remain square through many readjustments.

While some other joiners' angle adjust scales offer a finer gradation of the numbers, the Makita has positive stops at 0°, 45°, and 90°. On the sides of the machine, the Makita has a centerline cast for the blade. The Makita is set up for free-flap cutting in ¾" stock, and a spacer for cutting in ½" stock can be easily added in any shop, especially considering the $300 price difference.

There are two scales on the front of the Jointmatic 550's fence, and they offer English on one side and metric on the other, rather than a pair of combination scales, which might help to ensure more accurate set-up.



On the side of the machine is a line that marks the top of the blade rather than its center. I suggest your moving it down a bit, say 3/64", to make it standard. The Borg push pins can be adjusted in and out from the outside of the tool, which seems like an outdated luxury feature. Back in mid-80s, we would've loved this, but now the rubber push pads found on the Freud, Lamello and especially on the Sears and Makita, are preferable.

Borg's six position depth of cut scale has a positive feel without being too tight. Similarly, detents mark the important angles on the flap scale. Unlike any of its competitors, the Borg features a flap fence that can be tilted past 90°. An auxiliary fence like that on the Freud or Makita would be a real plus. Indeed, I find its absence all but cripples the mitering feature on the machine for those who believe, as I do, that miters should be cut against the outside rather than the inside of the joint.

Unlike nearly all the others, the Jointmatic 550 has a pair of tie-down holes on either side for bench mounting. The only other machine on which I've seen these is the DeWalt.

The castings are very nicely made and the machine has features we may not require, but which no other machine offers. For example, it can be locked to depth for slotting, grooving, or rabbeting. This joiner would be better than most sold for use in North America for cutting the reveals commonly used in European paneled ceilings and contemporary furniture.

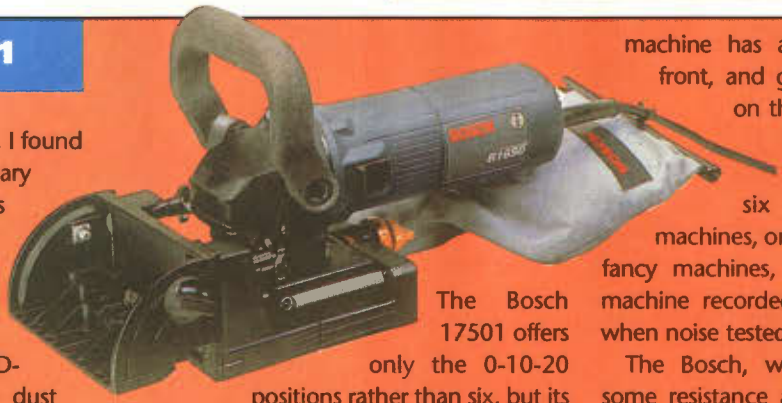
THE SCOOP ON NEW JOINERS

The real excitement these days is in the low to moderate end of the price range of these modern marvels. Just a few years ago, there was no alternative to the Lamello Top Ten. Today, there are a number of machines for half its price or less that perform quite well.

THE FREUD JS 100 AND JS 102

The Freud JS series, introduced a decade ago as the JS 100, has been completely reworked. Many improvements are available in the new version, the JS 100A, available in early 1996 for about $135. The JS 102 is an all new model packed with new features and a higher price tag. The most notable improvement in all models is their noise level reduction. A dust pick-up is now standard on both. Each includes a six depth-stop adjustments instead of an old-style three. Rubber bumpers have replaced the old style positioning pins. And for about $170-180, the JS 102 flops to 90° like the Lamello for joining ¾" stock. Disassembly reveals that the Freuds are made with accurately machined castings. The Freud blade is always a plus. A standard dust bag connects to a large (5⅝")

THE BOSCH 17501



When I first opened the carton, I found many pluses and the customary sense of Bosch quality. I was pleased to see the standard dust bag and the standard glue bottle. The tool's operating handle is far more comfortable than the standard D-handle on most joiners. The dust bag connector is a perfect fit for the Bosch AirSweep system, which I commend. The cord set is of typical Bosch quality. The switch is well-positioned for right-handed users, and not as awkward for left-handers as most. All the knobs are comfortable to use. While I have no doubts at all about the quality of the grinder motor, the joiner mechanism itself is made of fiberglass reinforced blown plastic, which is not my material of choice for hand or power tools. The tool has been torture tested, field tested, and passed a series of serious safety and function reviews. The plastic casting failure rate has been surprisingly low.

The Bosch 17501 offers only the 0-10-20 positions rather than six, but its set-up system makes fine adjustment for precise fits far easier than on most other joiners. A very well-designed flap face gives easy, true vertical adjustment, and correctly cuts miters from the outside. The machine has accurate scales on the front, and good center-of-cut lines on the front, sides, and bottom. The blade has four teeth, in contrast to the six found on most machines, or the 12 offered on some fancy machines, like the old Elu. The machine recorded a respectable 94 dB when noise tested at arm's length.

The Bosch, will probably not price some resistance at $169 the Bosch will not win many fans for the Bosch name. The tool requires 700 watts at 5.8 amps to produce a no load speed of 11,000 RPM. Standard equipment includes a dust bag, a blade, a case, a glue bottle, and 20 biscuits (10 of size #20, and 5 each of sizes #0 and #10). Only the dust hose is optional.

After many years of experience with the tool as my regular biscuit joiner, I believe the Lamello remains the tool of choice unless money is an object, as it nearly always is for most of us. If the middle $200s is your price ceiling, the Makita or the DeWalt should probably be your tool of choice; if you have $200 in your budget, the Freud is your tool of choice; indeed, at $135, the "non-flap" Freud (JS 100) is very likely the best buy out there. Nevertheless, I remember the advice I heard once when getting ready to buy any tool: buy the best you can afford. Five years from now, you'll be less likely to remember the extra expenditure than the amount of swearing (and general unhappiness) that spending too little may cause you. If the tool will see professional use, remember that the tools and materials are the cheapest part of any job — an extra $100 on the price of the tool that saves you five minutes every time you use it repays itself awfully quickly. A single session with one of these quality joiners will forever change the way you approach woodworking joinery. PW

__Hugh Foster__ is an English teacher, woodworker and author from Manitowac, Wisconsin.

orifice at an angle of about 300°, which makes it less likely to clog many of the competing machines. This angle has another advantage— it's not likely to be in the way of your hands. The Freud's D-handle may be rotated for left-handed users, but the switch is handiest for a right-handed user. The machine's 90° accessory fence rides the flap snugly and it's accurately cast, so it can be easily mounted. I used one hand to position it, and the other to tighten it. Duplex scales on the front flap help ensure accurate set-up. Freud's squared-off motor housing seems large, but not uncomfortably so in my hands. You may want to test the joiner before you buy.

The JS102 includes an industrial quality blade with anti-kickback design. The machined blade housing is preferable to many of the other tools, particularly those that are not metal. In my trials, accuracy was good. I believe it's safe to say the quality of this machine overwhelms most other joiners at the low end of the mid-price range..

Both Freuds run at 120 Volts, 5 amps, 10,000 RPM. At 6.2 pounds, it's one of the lighter units, but it still feels quite substantial. Its aluminum fence has scales in inches and metric measure. Even the noise level is better than on the original. My new sample measures 91-92 dB at arm's length. It's difficult to be less than enthused about the Freud models when you see the quality of the improvements over what was really a pretty good machine in its first edition.

CRAFTSMAN 17501

The new Craftsman model 17501 biscuit joiner is the first joiner offered at less than $100. I'm surprised by how well it performs. People who worry about the plastic content of the tool will be glad to know that the adjusting mechanism is metal. There are some really dynamite features on this inexpensive unit. Before I had made more than a few plunge cuts, I recognized the value of the large non-slip pad that covers the entire faceplate. There is more non-slip material on this joiner than on all the competing products combined — and this non-slip feature presents distinct advantages to woodworkers who insist upon accurate joining. The fiberglass loaded nylon fence has a comfortable assist handle. The quality, ten-foot cord is longer than those of most others.At arm's length, the joiner's 6 amp ⅝ HP 10,000 RPM motor runs at only 93dB.

The Craftsman includes a standard dust collection basket that is so convenient to use that one has to wonder why all manufacturers haven't used something like it. On most others, dust collection is an expensive add-on. Needing to empty the basket regularly can hardly be called a liability when some other machines offer no dust collection at all. The joiner's front fence is clearly marked with depth and bevel adjust angles, and, while the joiner can be set to cut at any angle up to 90°, with positive stops at 15° intervals. There are lines to indicate location of cut on the sides, top, bottom, and sides. You'll always know what you're doing with the Craftsman joiner. The carton features instructions that show you how to cut flat miters, bevel miters, edge to face joints, edge to edge joints, and leg and apron joints.

TIP **All but the Sears tool come with a case; most come with a few sample biscuits to get you started, but don't be fooled by the claims that some biscuits are included — it's usually not nearly enough to do even a single project. Some vendors are selling biscuits in packages of 250 or smaller rather than in the packages of 1000 that have been standard for years. I have even seen the biscuits in packages of twenty. I think that if you're buying only a partial or small package, you don't really need the biscuits or the joiner. At the very least, you're not spending your money wisely. Many vendors have reduced the price of a package of 1000 biscuits from around $30 to just under $20; if biscuits can be had for 2¢ apiece, there's absolutely no reason to pay 5¢ or more for them in small quantities.**

Put Your Joiner to Work

How to make the six fundamental biscuit joints.

By Hugh Foster

A biscuit joiner is little more than a motorized plunge cutter that makes an elliptical or oval cut in the wood surface, which simplifies spline joining and makes it safer. Biscuits work like splines and dowels because they line up adjoining surfaces, and since the biscuits swell inside the slots, they reduce clamping time. There are three sizes of biscuits, #0 (⅝"x1¾"), #10 (¾"x2⅛"), and #20 (1"x2 ⅜"). Use the largest biscuit the joining pieces will permit. Each biscuit is approximately .148"-thick, slightly thinner than the 5/32" (.156") circular saw blade that cuts the slots, but they swell rapidly on contact with a water-based glue to approximately .164", large enough to grip the slots tenaciously. Here's how to use your biscuit joiner:

Always clamp the work to be slotted. The cutting or slotting operation is accomplished by pressing the machine's face against the surface to be joined. With one hand on the handle and the other on the joiner's body, switch the motor on, align the machine with the layout mark on the board and push the body forward about one half inch. The motor assembly and the cutter are spring loaded, so with forward movement the cutter will slide out to cut a groove in the wood and retract when released.

When the joint failed, the wood broke and took some of the biscuits with it.

The joiner can be used for making stacked biscuit joints. By the time this is glued together, almost nothing will take it apart without destroying the wood first.

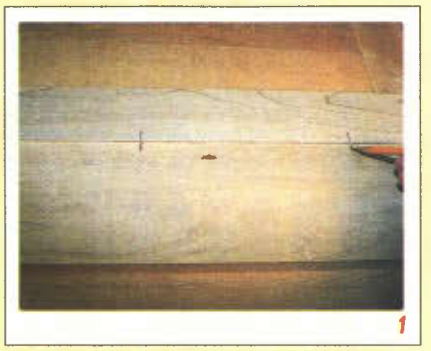
The joiner has three marks — a centerline and two at the outer limits of either side of a cut. The board in the photo probably doesn't need the mark, because most of us could align its center by sighting on the three marks on the joiner.

The best safety practice is to switch the machine on, then position it. Here's what can happen when the joiner is switched on while pushing forward on the blade: note that it walked and dug rather than making a smooth cut. The cause of this was operator error — and it's very dangerous.

The cut that should have been made in photo at left.

In addition to the speed and accuracy biscuit joinery provides, it also helps you organize a project into a number of similar tasks. There are basically only six joints made with the joiner, illustrated here:

EDGE-TO-EDGE JOINTS



1

1 *Laying out edge-to-edge joints is easy. Make a pencil mark 2" to 2½" from either end and equally space others between the ends. Although the lines seem barely visible here, they're really too visible on the actual work — the lighter the line, the less pencil lead to sand off! Beware as you lay out your cutting marks that if you cut through a biscuit you render that end of the board unusable as a finished surface. The joint is as unattractive as it is strong.*

2

2 *With the flap jointer down, line up the cutter with the marks and plunge the cuts.*

EDGE MITER JOINTS

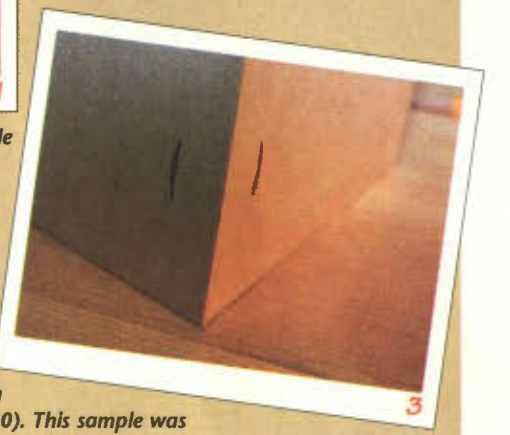
Edge Miter Joints are useful in furniture that isn't built around a frame. The hardest thing about making miter joints is preparing the stock before you begin cutting the joint.

1

1 *After cutting the miters with your table saw, line up the joint like this and mark the insides of the joint.*

2

2 *Set the jointer flap face to 45°, align it carefully, and cut the miter joint.*



3

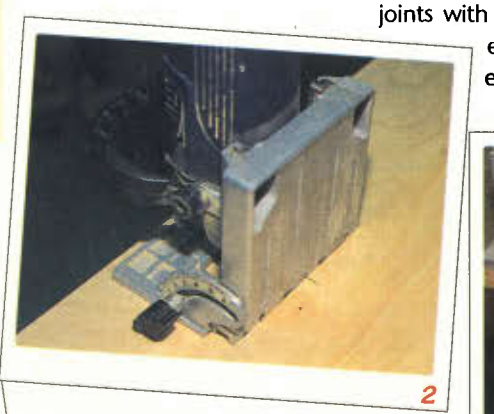
3 *Make edge miter joints with small biscuits (size #0 or #10). This sample was cut for #20 biscuits, then sanded — there's no way to fill the unsightly cuts through the miter!*

T-JOINTS

T-Joints are just like butt joints, but join edge grain to somewhere in the middle of some other piece's face grain. A T joint is typically used in the construction of book cases, where shelves are required. It's used when it's necessary to add support members to strengthen a frame.

After clamping the stock so one edge of the joint is precisely aligned, lay out T-joints with a pencil as you would with edge to edge joints, 2" to 2½" from either end, equal spaced between the end joints.

1



2

1 & 2 *At each mark plunge cut one slot horizontally and the opposing one vertically.*

3

3 *This technique makes a joint that assembles like this.*

FRAME TYPE MITER JOINTS

1 *Lay out picture frame miters at the center of the piece to be joined. As the rule shows, the piece can be no more than 2 ½" on the mitered angle (which is 1¾" wide stock).*

2 *Make the slot in the miter after aligning the machine with the pencil line.*

3 *Ready to glue up. If you're convinced that you can cut this without the slightest lateral movement, you may be able to work in material ⅛" or even 3/16" narrower than I've used here.*

4 *The joint is so strong that the dry-assembled pieces can support themselves even before gluing and clamping.*

BUTT JOINTS

Butt joints give you a way to join end grain in a quick, non-decorative way. This joint is the weakest of wood joints because of its a poor glue surface. However, biscuit joining allows you to create a tenon between the mating pieces that results in a very strong joint.

1 & 2 *Corner butt joints aren't especially attractive, but they can be quite strong. After marking out the joint, cut a slot in the end of one piece, and the face of the other as shown.*

3 *You'll achieve a joint that looks like this before gluing...*

4 *...and like this when closed.*

STACKED BISCUIT JOINTS

Stacked joints like those shown in ***center of first page*** are made by moving the joiner's fence up or down on the faceplate.

For further details about any of these joints, see your joiner's manual or the *Biscuit Joiner Handbook*.

Hugh Foster is a woodworker and author of the Biscuit Joiner Handbook. *He lives in Manitowoc, Wisc.*

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NEW SIZES AVAILABLE

	LIST	SALE
Delta Sidekick 6-1/2"x40Tx5/8"	$149	$ 89
Sears 8-1/4" & Delta 8-1/4"x60Tx5/8"	$170	$ 99
Hitachi 8-1/2"x60Tx5/8"	$179	$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

WOODWORKER I – For TABLE and RADIAL SAW

This trim and crosscut ALL PURPOSE blade gives scratch-free polished cuts on all materials RIP or CROSSCUT UP TO 2".

- ALL 60T AND 3/32" THIN KERF 30° ATB and 5° face hook on 10" diameter and under. 12" and 14" are 20° ATB 1/8"K.
- DOUBLE HARDER and 40% STRONGER carbide.
- THIN KERF: Saves 1/3 wood-loss on each cut, radial or table. Feeds easy when used for moderate rip and crosscut on table saw. Reduces "JUMP IN" for better "PULL CONTROL." Practically eliminates bottom splinter on RADIAL CROSSCUT.
- Totally stops ALL bottom and top splinter on ply veneers in push-cut mode on RADIAL.
- Our STIFFENER STRONGLY RECOMMENDED AGAINST outside blade for best cuts. Made and serviced in U.S.A. for your benefit.

	LIST	SALE
14"x60Tx1" 1/8"K	$224	$159
12"x60Tx1" or 5/8" 1/8"K	$198	$139
10"x60Tx5/8" 3/32"K	$162	$129
9"x60Tx5/8" 3/32"K	$156	$119
8"x60Tx5/8" 3/32"K	$150	$109
NEW!		
8-1/4"x60Tx5/8" 3/32"K	$150	$109
7-1/4"x60Tx5/8" 3/32"K	$150	$109

RYOBI RA200
SEARS TS200
MAKITA 500B NBA
HITACHI PSM8
PORTER CABLE 368-1

SPECIAL FALL SALE EXTRA 10%-20% OFF

BUY 1 BLADE OR DADO AT 10% OFF SALE PRICE
2ND BLADE 20% OFF (EQUAL OR LESSER VALUE)
15% OFF DADO AS SECOND CHOICE.

WOODWORKER II

With this one ALL PURPOSE blade you can RIP & CROSSCUT 1"–2" ROCKHARDS and SOFTWOODS resulting in a **SMOOTH AS SANDED** surface. PLY-VENEERS of OAK and BIRCH will crosscut with NO BOTTOM SPLINTER at moderate feed rates.

- DOUBLE HARD and 40% STRONGER C-4 CARBIDE
- Ends blade changing
- Ends scratchy saw cuts
- Ends second-step finishing
- Ends cutting 1/16" oversize to allow for RESURFACING
- **BUY AND SHARPEN 1 BLADE INSTEAD OF 3**

5/8" holes, boring thru 1-1/4" add $7.50. Larger at Time Basis —Shipping $4.50

WOODWORKER II	LIST	SALE
14"X40TX1"	$215	$149
14"X30TX1"	$195	$139
12"X40TX1"	$183	$129
12"X30TX1"	$162	$119
10"X40TX1/8" or 3/32"	$156	$119
30T 1/8" or 3/32"	$135	$ 99
9"X40T	$146	$ 99
30T	$125	$ 99
*8-1/4"X40TX 3/32"	$136	$ 99
8"X40T 3/32"	$136	$ 99
30T	$115	$ 89
7-1/4"X30T 3/32"	$112	$ 69
**6"x40T 3/32	$136	$ 89

*NEW for Sears & Makita Table Saws **New For Saw Boss

THE ONE BLADE THAT LEAVES A SMOOTH-AS-SANDED SURFACE!

BUY OUR BEST SELLER 10" X 40T FOR ONLY $119 PLUS EXTRA 10%–20% OFF FOR FALL SALE!

ONLY $62 OR $50
NET COST TO YOU AFTER USING SHARPENING COUPONS

RECEIVE WITH EVERY FORREST BLADE OR DADO LISTED, 9 SHARPENING COUPONS WORTH $5.00 EACH!

Outperformed 36 other premium blades, both foreign and domestic!
WOODe Magazine test, Sept. '93, pg. 45

TRY A FORREST CARBIDE BLADE TODAY!

NEW DELUXE DADO-KING!

FROM THE LEADER IN DADO TECHNOLOGY!

"No tearout on all five woods tested"
(INCLUDES MELAMINE)
Fine Woodworking J/A '91, page 51
"Best Value" WOOD Magazine, Oct. '91, pg. 62,63

- **NEW 3/32" CHIPPER**
  - allows twice as many groove widths to match thin plywood
- **FREE SHIMS INCLUDED**
- **NO SPLINTERING**
  - when cross-cutting oak, ply-veneers, and **melamine**
- **PERFECT FLAT BOTTOM GROOVES**
  - not staggered steps or round-bottoms like a wobble-dado leaves
- **CUTS IN ALL DIRECTIONS**
  - rip, cross-cut, miter any depth
- **CUTS ALL SIZED GROOVES**
  - 1/8" through 29/32" in 1/32" increments
- **SUPER-HARD CARBIDE**
  - gives up to 300% longer life, especially good on plywoods and abrasive particle boards

Dado FOR AS LOW AS **$184** (YOUR NET COST AFTER USING SHARPENING COUPONS)

EDITORS' CHOICE 1994

Here is why this great Dado Head has no equal!

C-4 Carbide Tips — 24 on each saw blade — twice as many as most competitors!

C-4 Carbide Tips — 4 on each chipper with special negative face hooks.

	LIST	SALE	10%	15%
6" D. 5/8" Bore **NEW**	$299	$269	$242	$229
8" D. 5/8" Bore	$321	$289	$260	$245
10" D. 5/8" & 1" Bore	$389	$349	$314	$297
12" D. 1" Bore	$499	$449	$404	$382

(Bore up to 1-1/4" Add $25 — Plus $5.50 S&H)

DURALINE HI-A/T FOR TABLE & RADIAL SAWS ALL FLAT FACE

5/8" HOLES. Boring up to 1-1/4" $7.50 extra.
Larger holes–time basis. Shipping $4.50.

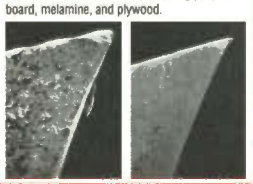
SIZES AVAILABLE	LIST	SALE
7-1/4"x60Tx3/32" K	$149	$129
8"x80Tx1/8" & 3/32" K	$202	$169
9"x80Tx1/8" & 3/32" K	$207	$179
10"x80Tx1/8" & 3/32" K	$207	$159
12"x80Tx1-1/8"K	$212	$181

SIZES AVAILABLE	LIST	SALE
12"x100Tx1-1/8"K	$253	$215
14"x80Tx1"	$232	$197
14"x100Tx1"	$266	$226
16"x80Tx1"	$262	$223
16"x100Tx1"	$294	$243

SPECIAL FALL SALE EXTRA 10%-20% OFF

Above 1" bore standard.
CARBIDE IS THE HARDEST OF THE C-4 GRADES AND 40% STRONGER, NOT WEAKER!
FOR 50% TO 300% LONGER LIFE.

Standard C-2 Carbide (below, left) and FORREST **still sharp** Oxidation and Corrosion Resistant Sub-Micron C-4 Carbide (below, right). Each shown after cutting 3,500 feet of MDF. Similar results obtained cutting particle board, melamine, and plywood.



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FOR BETTER CUTS on all brands of blades, use our large 1/8" DAMPENERS-STIFFENERS against one side.

- **Parallel and flat to .001**
- **Stop vibration, flutter, cutting noise, and blade ring**
- **Tryable and returnable for full cash refund.**

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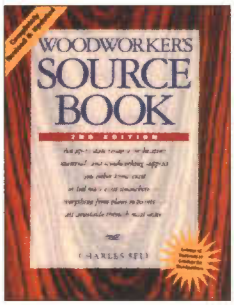

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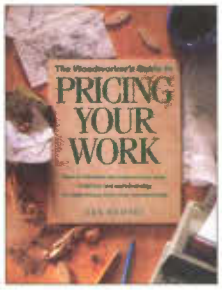

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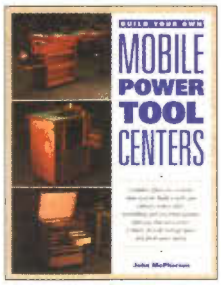

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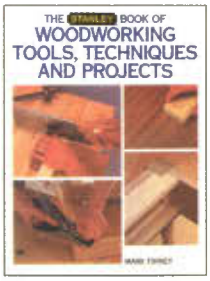

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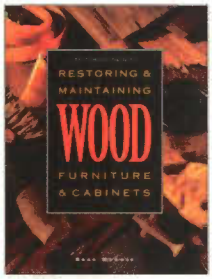

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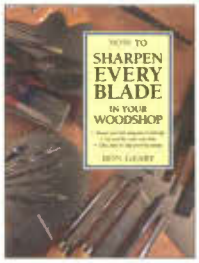

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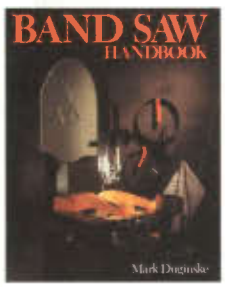

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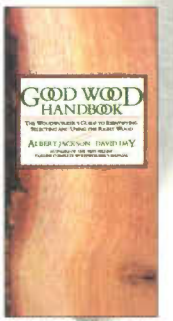

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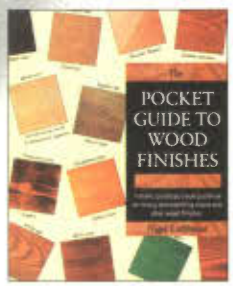

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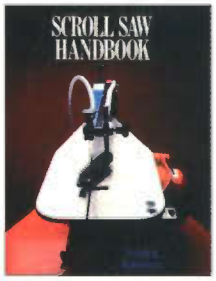

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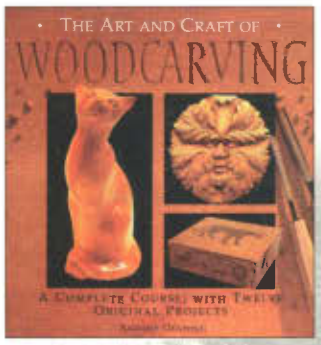

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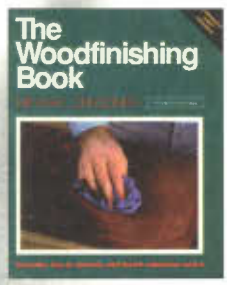

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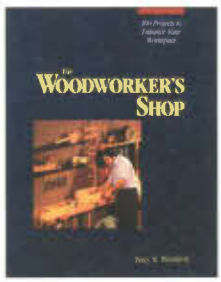

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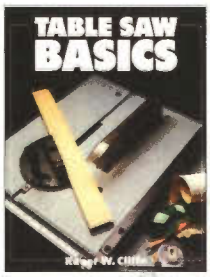

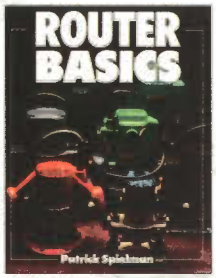

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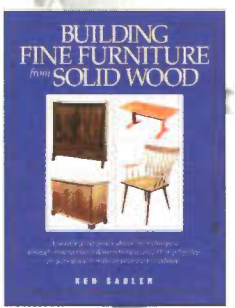

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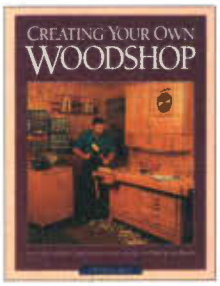

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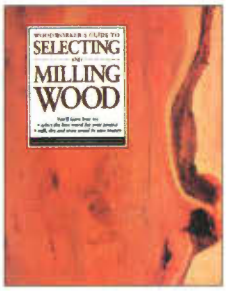

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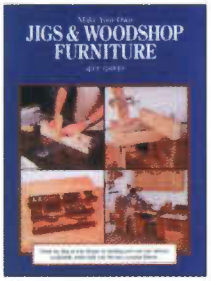

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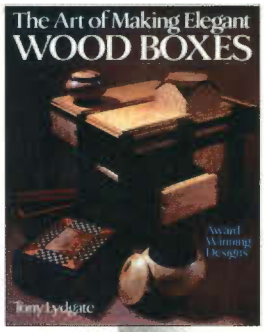

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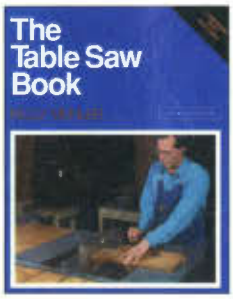

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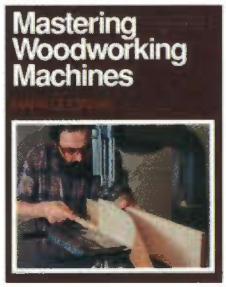

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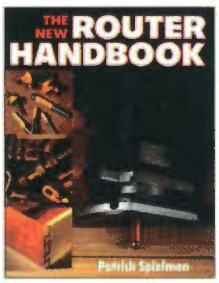

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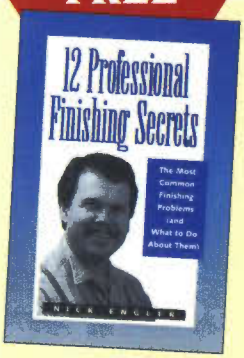

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Miter cutting "unplugged" and a new concept in dado blades.

CHAMPION™ COMPOUND MITER SAW

Happily, the current emphasis on power tools hasn't eliminated the attention paid to woodworkers who enjoy the satisfaction of hand tools. Miter boxes have been available but many lack practical features and precision. Nobex (a Swedish manufacturer) has helped to fill the void by offering the ***Champion Compound Miter Saw*** that, unlike models that work with a backsaw, employs adjustable-tension and replaceable blades so you can choose your cut, even work on materials like aluminum, copper or ferrous steel (***photo 1***).

***Photo 1** Blades on the Nobex miter saw are tensioned in a frame, much like a bow saw. Replacing blades and providing correct tension is an easy procedure.*

***Photo 2** Compound miter cuts are accomplished by tilting the work against the fence. Grooves in the bed provide the position for slope angles of 20°, 30°, 40°, 45°, 50°, 55°, and 60°.*

The blades are held in a frame that glides with minimum friction between front and rear pairs of guide posts that guard against any undesirable "play." Despite its lightweight and compact design, the saw offers respectable capacity. Maximum cutting depth is 7", square cuts are possible on stock up to 8" wide, and 45° miters can be made on material up to 5" wide. There are positive auto-stops at commonly used angle settings; the locking mechanism keeps the saw in position when sawing "off" angles.

The phrase "compound miter" in the tool's name is justified by a unique feature. The bed has seven grooves, each one corresponding to a particular slope angle. Compound sawing is done by placing the bottom edge of the board or molding in the appropriate groove and then leaning the top edge of the work against the fence (***photo 2***).

Other features include an adjustable stop, so you can cut any number of pieces to the same length, and hold downs to keep the work in position (***photo 3***).

The tool is equipped with an 18 teeth-per-inch (TPI) general purpose blade. Additional blades with 10, 18, 24, and 32 TPI are available for about $11. Also on tap is a special 24 TPI blade for sawing ferrous steel. The saw retails for about $125.

For more information, contact The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, Minn., 55374; (612) 428-3201.

***Photo 3** A stop rod, usable on either side of the tool, provides for sawing any number of pieces to the same length.*

LION™ MITER TRIMMER

It's hard not to think of a guillotine when viewing the husky tool shown in ***photo 4***. While essentially a tool for cutting miters, it's quite a departure from the conventional miter box because it works with a pair of razor sharp, heat-treated tool steel blades that shear rather than tear the wood. The miter trimmer is not a new tool. Conceived in the late 1800s and patented in mid-1900, it has eked out a permanent place in the tool world. An interesting note is that the Lion's production is almost a cottage industry, being handled by a family of four. The manager says, "Since there are only four of us, we really care about the quality of our product."

***Photo 4** The gear-driven blades on the Pootatuck Lion miter trimmer move laterally so there is no problem shearing left or right miters. A hefty handle provides considerable leverage.*

An important factor is that the trimmer is not a sawing tool. Most often, approximate cuts are made with any saw and then sheared precisely to leave a cut that is glass smooth (***photos 5 and 6***). It is feasible on softwood moldings and trim stock to make one or two "chop" cuts to remove most of the

By R.J. DeCristoforo

CRAFTSMAN™ EXCALIBUR ELITE ADJUSTABLE DADO

Photo 8 The new dado is called "elite" to distinguish it from other Excalibur units. The teeth of the three blades have multiple hook angles that allow easier feeding and smooth cuts. The 30° angle "scoring" teeth minimize tear-out.

Craftsman's (Sears) new 8" Excalibur Elite ™ Adjustable Dado is an interesting concept with an exotic name, but more important is that its claims are justified. It cuts through various wood species with no chipping and minimum feathering while producing dadoes and grooves with square shoulders and flat bottoms.

The unit's cut-width is set by means of an internal-locking, spiral cam that's controlled by an external hub, which is "dialed" for precise, infinitely adjustable settings between ¼" and 13/16". Cutting is accomplished by two, 22-tooth outside blades and a removable, 10-tooth center blade that might (erroneously) be called a chipper, but is truly a saw blade. As you might expect, all blades have carbide teeth.

Two blades are used for ¼" to ½" cuts: the center blade (quickly added or removed) is used for cuts from ½" up to 13/16".

Adjustments in both ranges can be made without removing the assembly from the arbor. The dado, as supplied, is assembled for mounting on a left hand arbor. So, if your saw, like mine, has a right hand arbor, it's necessary to reassemble the blades for compatibility. It's a minor chore requiring about 15 minutes, but if you must do it, I advise wearing gloves. Those teeth are sharp!

Photo 9 Testing was done on various natural and man-made wood products like walnut, pine, shop-grade plywood, oak, melamine, laminates, and others. Results were impressive enough to award the product quite a few stars.

The product, with storage case and necessary wrenches, is listed in the current Craftsman Tool Catalog at $194.99. For more information, contact Sears Power and Hand Tools, 20 Presidential Drive, Roselle, Ill., 60172; (800) 377-7414.

Photo 5 (left) How much material you can remove with a single cut depends on the density of the wood. You can be more generous with softwood moldings and trim stock than with species like maple or oak.

Photo 6 The final cut should always result in see-through shavings that curl away. This will leave an edge that requires no further attention before assembly.

waste and then do a final slice to finish. Making cuts that remove waste and leave a minimum amount for sanding is also the way to go when rounding off a corner.

Adjustable left and right gauges are lockable at any angle from 45° to 90°, and built-in stops allow the gauges to return to a precise, standard position. The tool will accept stock up to 4" wide for mitering and 6" for square cuts. A "top trimmer" attachment is used for mitering moldings with contours that make them difficult to hold securely. Also available, as an accessory, is a "measuring attachment," so any number of pieces can be cut to the same length.

Since sharpness of the knives is critical, the company offers a next day resharpening and honing service for about $27.

The Lion Miter-Trimmer retails for about $260. For more information, contact the Pootatuck Corporation, P.O. Box 24, Historic Windsor Building, Windsor, Vt., 05089; (802) 674-5984.

R.J. "Cris" DeCristoforo is a contibuting editor to **Popular Woodworking** *who writes about and works with wood from his home in Los Altos Hills, California.*

The Power Curve Cutters

Band saw, sabre saw or scroll saw — which tool is best for the job?

When workshop curve-cutting chores call for more than a coping saw or keyhole saw, it's time to consider a sabre saw, scroll saw, or band saw. But which one? All three power tools are proven curve-cutters, and there is considerable overlap in function, but each has features that make it particularly well suited for specific woodworking tasks. Whatever the project, one of the saws will be best for the job.

A point about nomenclature — sabre saws (sometimes "saber" saws) may be listed as "jig saws," and what were once called "jig saws" are now known as "scroll saws." The tool that hasn't had a name change is the "band saw."

The sabre saw's fairly tight radius of turn makes it a highly maneuverable alternative to the band saw, and a fair competitor for much scroll saw work.

The Sabre Saw

Among the curve cutters, the sabre saw is the only hand-held unit. Its small size and portability are its major advantages. When first introduced, they were touted as portable jig saws. While a quality sabre saw can rival the stationary tools in some areas, it's not a substitute. For starters, blades are secured at one end only so even the smallest blade must be strong enough to provide rigidity. That fact places some limits on maneuverability. For example, the blades can't get around tight radii. For the same reason, kerfs are wider, and tooth-set doesn't promote the smoothest cuts, although sawing with available hollow ground blades can improve results considerably.

An exclusive of the sabre saw is "plunge cutting," a technique that allows one to make internal cutouts without a starting hole for the blade. Hold the tool with the weight resting only on the front edge of the base plate and the blade almost parallel to the board. Turn the saw on and arch the blade slowly and steadily so the blade pierces the work. The procedure can be adopted anywhere; in the center of an 8' panel or through a wall or a fence. Often, plunge cutting is the only way to accomplish a cutout, but in my shop I use a starting hole whenever possible, especially if I can incorporate the arc of the hole as a corner of the cutout.

Advances in sabre saw design include orbital sawing action, variable speeds, sawdust blower, adjustable base plate for bevel sawing, and more. Blade stroke ranges from ⅜" to 1" depending on the model. Average blade length is 3½", but some units can handle blades as long as 6". With the proper blade, the tool can saw ferrous and non-ferrous metals, and there are even knife-edge blades for slicing through linoleum, rubber or leather. Major accessories include a rip guide for sawing parallel to an edge, and a table to mount the saw in inverted position so it can be used somewhat as a scroll saw.

The Scroll Saw

Scroll saws operate with blank-end blades that are tensioned between upper and lower chucks. The tool can function with blades that are almost hair-like in cross section — so fine you must run a finger lightly along the teeth or view them through a magnifying glass to discover in which direction they are pointing.

No other power tool rivals its smooth cut, the fineness of its kerfs, or its capability in applications such as inlay and marquetry. Therefore, people often think scroll saws are "craft" tools. This view is accurate, but unfair. Modern scroll saws are rugged, variable speed machines that can function with blades as wide as ¼" and can saw material as thick as 2".

The scroll saw can use blank-end or pin-end blades and has a variable speed control. Usually, the table tilts for bevel sawing.

Thus, a realistic view is that the tool is practical for general woodworking applications including techniques such as, say, pad sawing six or eight layers of ¼" plywood to produce duplicate parts or making curved components for furniture, even small cabriole legs.

To make internal cutouts, you must supply an entry hole. The blade, gripped in the lower chuck, is passed through the hole before being secured in the upper chuck. This is also done when using the intriguing "bevel-sawing" technique. The idea is to tilt the table to not more than five degrees, then cut a series of concentric rings, always keeping the work on the same side of the blade. Each ring, when assembled, will jam into its neighbor so that you create a bowl shape from a flat board. Many workers prepare stock this way for lathe turning. It makes maximum use of a small piece of wood, which is especially gratifying when the material is exotic and expensive.

Scroll saw blades are identified by physical dimensions — thickness, width, and teeth per inch (TPI). Many suppliers now use identification numbers (generic), and each number refers to a blade of particular physical makeup. In addition to a variety of blades for wood cutting, there are those especially made for non-wood materials such as ferrous and non ferrous metals, leather, paper and plastics. Actually, there will be a suitable blade for almost anything you wish to cut.

The Band Saw

If you ever visit a lumber mill you might see a two-story high "band mill" sawing logs into boards. These gargantuan machines can work with blades 12" wide and easily slice through green wood. Home shop band saws have a similar character, but on a smaller scale. Average depth of cut runs 6" to 7", blade widths start at ⅛" and progress to ½", sometimes ¾".

Like the scroll saw, band saws are

Curve Cutters — How They Rate

Chore	saber saw	scroll saw	band saw
pad sawing	limited	limited	best
piercing internal cuts	good	good	
plunge cuts	good		
resawing		limited	best
halving rounds		limited	best
cross cutting	good	slow	best
ripping	good	slow	best
location work	best		
curve cutting (general)	good	good	best
curve cutting (intricate)	limited	best	limited
fretwork		excellent	
in-the-field	best		
cut-depth	limited	limited	excellent
cut-speed	good (variable)	good (variable)	fastest
compound cutting		limited	best
sanding		*	*
guided circular cuts	most flexible	good	good
filing		possible	
internal bevel sawing	possible	best	
rip cut capacity	unlimited	good**	limited
bevel sawing	good	good	good
inlay		best	
metal cutting	good	good	best***
precutting for lathe work		limited	good
forming slots	good	good	
smooth cuts	good****	best	limited*****

Key

** — Limited ability, with accessory if available*
*** — Better ability here if arm can be removed or swung down*
**** — Best if with variable speed or geared speed control*
***** — Good if used with hollow ground blade*
******— will always have "washboarding that requires some amount of sanding*

The conventional 10" bandsaw found in small shops has a 6" to 7" depth of cut, can resaw lumber and cut tight circles using a ⅛" wide blade. For furniture making, it offers the most versatility of the curve cutting saws.

often judged by an outstanding application — in this case, compound sawing, the technique used to produce furniture components such as the cabriole leg. The procedure starts by drawing the project's pattern on two adjacent sides of the stock. After one side is cut, the waste pieces are returned to their original positions (with tape or by nailing in waste areas) and the second side is cut. The shape of the piece is revealed when all the waste is removed. I like to think this is something like the sculptor who envisions the form that is within a block of marble. Compound sawing is also a practical way to prepare stock for lathe turning since it's a fast way to remove material you would otherwise have to cut away with chisels.

"Resawing" is another band saw exclusive. You can cut a thick board into a number of thinner pieces, but there's more to it. For example: if I need a number of identical shelf brackets, I would saw the shape in a block of, say, 4"X4", and then resaw the block into the number of parts I want. Pad sawing is another way to produce multiple, similar parts. On a typical band saw you can, for example, pad saw 24 pieces of ¼" plywood or twelve pieces of ½" stock!

For curve cutting, the tool rivals the sabre saw, but it has a width-of-cut limitation (the distance from the blade to the arm support) so it isn't as flexible. And the tool can't compete with a scroll saw for intricate curve cutting though, with an ⅛" blade, it can make some fairly tight turns. Internal cutouts are not possible since the blades are a continuous loop. However, extremists don't hesitate to break the blade so it can be passed through a starting hole and then weld it together again for the sawing.

Guided rip or cross cuts are practical so long as the blade is sharp and in prime condition. When the blade "leads" — that is, moves off the cut-line to left or right — it's usually caused by tooth damage or incorrectly set teeth, and should be replaced or reconditioned. Some modern band saws provide variable speed or have a gear mechanism for speed reduction so with the correct blade, the tool cut non-wood materials like ferrous and non-ferrous metals.

Making the Choice

For "housework," such as remodeling, installing an extra window or a skylight, or installing paneling, a sabre saw offers great features. It's also good for outside work such as erecting fences and screens.

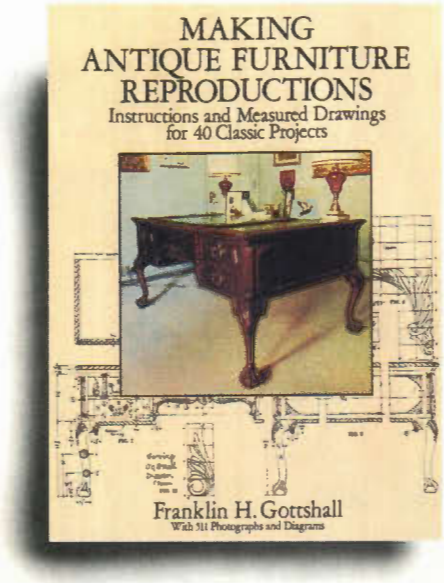
If furniture, whether modern or traditional, was my major interest, a band saw would be my first choice.

If I were in my shop mostly for fun, wanted to introduce a youngster to woodworking, or wanted to establish a cottage industry producing toys and small projects, a scroll saw would be the tool of choice. PW

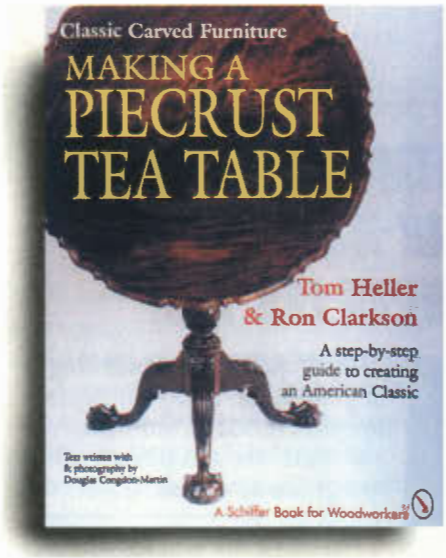
***R.J. "Cris" Decristoforo**, contributing editor for* Popular Woodworking, *has authored more than 30 books, including* Jigs, Fixtures and Shop Accessories.

BOOK REVIEWS

By Hugh Foster



Making Antique Furniture Reproductions, *by Franklin H. Gottshall. 240 pages, paperback, $12.95; available from Dover Publications, Inc., 31 East 2nd St., Mineola, NY 11501.*



Making A Piecrust Tea Table, *by Tom Heller & Ron Clarkson. 144 pages, paperback, $19.95; available from Schiffer Books, 77 Lower Valley Road, Atglen, PA 19310.*

Here's a pair of titles that belong in your shop. Older woodworkers will remember Franklin H. Gottshall from about 25 years ago as one of the best authors of project books. His books specialized in serious projects for advanced woodworkers. *Making Antique Furniture Reproductions* was published in 1971 as *Reproducing Antique Furniture.* This is a Dover reprint of that original edition. Large pages, clear drawings and precise text make this a great book about Early American furniture. All woodworkers will learn something useful by reading Gottshall's first chapter about the fundamentals of cabinetmaking, but you might be distressed by how out of date the second chapter (about finishing) is. The remaining chapters describe about three dozen projects, with the desk shown on the cover being a typical sample. This is a great old book, and I recommend it to serious, advanced woodworkers who are interested in this type of furniture.

For the rest of us, I recommend Heller & Clarkson's *Making a Piecrust Tea Table.* While Gottshall treats a similar, albeit slightly less elaborate, project in four pages that includes two photos, a sketch of a piece of hardware, and a full-page measured drawing, these guys devote the entire book to this one project. I'm a pretty good woodworker, with above average woodworking skills. Even so, like most woodworkers, I wouldn't have a clue about where to begin building a project like this table. But after reading Heller and Clarkson's book, I can honestly say that I'm convinced I can build this table.

These guys present us a one page introduction, which is the only page in the entire book that contains no photos or drawings. Thereafter, the pages have an average of five photos each, and the total number of photos is probably about 700. Each photo is captioned so that we can see exactly what we should be doing at each step of the project. Where Gottshall might tell us to "cut the dovetails on the legs to fit the dovetail sockets on the cylinder," Heller and Clarkson take us step-by-illustrated-step through the whys and hows.

I've seldom been as impressed with a book as I am with this one. The content presents woodworking from a whole

new angle. The authors' goal is to make it possible for as many of us as possible to build really fine furniture. Yes, no matter how new you are to woodworking, you can build this project if you can follow directions. And you'll have a better collection of tools by the time you finish the project. To spread out the tooling cost, I'd seriously recommend building the project with a buddy. Having two of these going in the shop would ensure fellowship, discussion and a pair of superior projects.

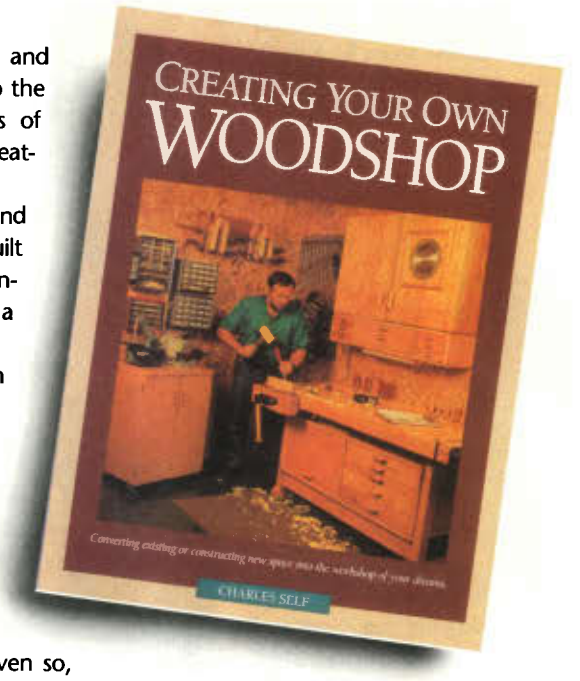
If you're only going to buy one book this year, this is the book you should buy.

Creating Your Own Woodshop, *by Charles Self. 128 pages, paperback, $18.95; available from Betterway Books, 1507 Dana Avenue, Cincinnati, OH 45207.*

Charles Self might be just the fellow to save you a bundle as you build or rebuild your woodworking shop. In friendly, cheerful tone, Self surveys the necessary components of a woodworking shop. He discusses basement, garage and free standing shops. He takes up the pros and cons of various kinds of floors, ceilings, wiring, lighting, heating, and air conditioning.

Self offers dozens of great tips, and had I read this volume before I built my new shop, I'd have saved hundreds of dollars and probably had a better shop to boot.

The book is well illustrated with photos and drawings, averaging nearly two illustrations per page. I've only got one gripe with the book, and that won't affect very many prospective buyers at all. While the book covers a lot of ground, established woodworkers may find the treatment here to lack depth. Even so, the material is a good review even for those who already have a plan quite firmly in mind. PW



***Hugh Foster** is an author, woodworker and high school teacher from Manitowoc, Wisconsin.*

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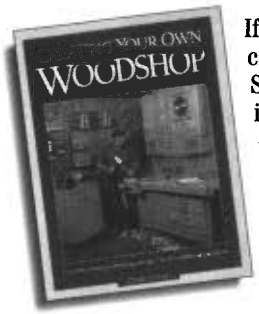

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White River Artisans School. Year-round courses are available. Class selection includes forged toolmaking, wood-strip canoe making, bamboo fly-rod making and more. For more information, contact: White River Artisans School, 202 South Ave. P.O. Box 308, Cotter, Ark., 72626; (501) 435-2600.

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The Woodworking Shows' Southern California Show. October 27-29. Held at Orange County Fairgrounds, Building 10, Costa Mesa Expo Center, Calif. For more information, call (800) 826-8257.

The Woodworking Shows' Northern California Show. November 3-5. Held at San Mateo Expo Center, Fiesta Hall, San Mateo, Calif. For more information, call (800) 826-8257.

Colorado

The Woodworking Shows' Colorado Show. October 20-22. Held at the National Western Complex, Expo Hall, Denver, Colo. For more information, call (800) 826-8257.

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Shaker: The Art of Craftsmanship. September 30-December 3. Held at the Wadsworth Atheneum, Hartford, Conn. Exhibition of handcrafted furniture and decorative arts from Mount Lebanon Shaker Collection, America's oldest and most influential Shaker community. For more information, call (203) 278-2670.

Georgia

Georgia Association of Woodturners Mini Symposium. October 27-29. Held at Red Top Mountain State Park, Cartersville, Ga. Includes demonstrations and auctions. For more information, call (404) 919-8800.

Illinois

The Woodworking Shows' Chicagoland Show. October 6-8. Held at Odeum, South Hall, Villa Park, Ill. For more information, call (800) 826-8257.

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The Woodworking Shows' Baltimore Show. November 10-12. Held at the Maryland State Fair, Exhibition Hall, Timonium, Md. For more information, call (800) 826-8257.

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The Woodworker's Store Classes. Held at The Woodworkers' Store in Cambridge. Ongoing in finishing, veneering, router techniques, chair repair and woodturning. For more information, call (617) 497-1136.

Michigan

Fruitbelt Woodcarvers' Show. November 4-5. Held at Cook Energy Information Center, Bridgman, Mich. Free admission. For more information, call (800) 548-2555.

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The Woodworking Shows' Twin Cities Show. October 13-15. Held at Minnesota State Fairgrounds, Education Building, St. Paul, Minn. For more information, call (800) 826-8257.

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The Woodworking Shows' Western Washington Show. November 10-12. Held at Seattle Center, Exhibition Hall, Seattle, Wash. For more information, call (800) 826-8257.

Wisconsin

Wisconsin Woodworker's Guild. November 1-5. Held at Red Carpet Lanes in West Allis and Jim Hallada's shop in Merton. Instructor Marc Adams will conduct seminars on Furniture Making and Router Techniques. For more information, call (414) 258-3132.

The Woodworker's Store Classes. Held at the Woodworker's Store in Milwaukee. Ongoing classes in basic and advanced carving, woodworking for kids, biscuit joinery and woodturning. For more information, call (414) 774-1882.

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Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*, Cartoon Caption #15, 1507 Dana Ave., Cincinnati, OH 45207. The entry deadline is October 20, 1995. Entries will be judged by the editorial staff. A winner and two runners-up will be chosen.

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Thomas W. Nipper, from Knoxville, Tennessee, for:

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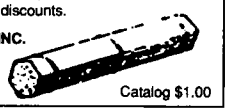

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Woodworking Attitude

A good attitude, common sense and these helpful hints make woodworking a more fufilling — and profitable — experience.

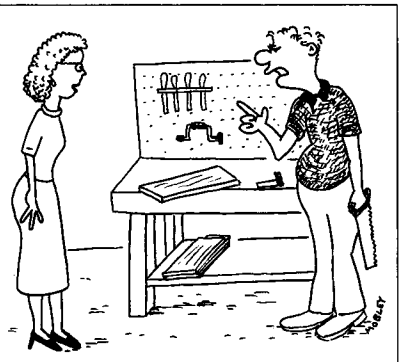
After I graduated from college twenty-two years ago, I decided to go into business for myself, creating utilitarian works of art for others. But, my seven years of college as an art major didn't really prepare me for the real world.

It was that school of hard knocks, however, and a cultured attitude that actually afforded my success in this field.

What are the reasons most of us go into professional woodworking — a demanding business — in the first place? I believe it's love for the work and the need to make your living at something you enjoy.

As I began to taste success during my third year of business, many people would ask me how they could learn my trade. These people had a genuine desire to do fine woodworking for a living. The technical part you learn by doing as much as you can. The way to get the work is never to be afraid of a challenge. It's not about money it's really about attitude. A willingness to be adaptable to your clients' tastes forces you to become very versatile, which opens more doors for the future.

The woodworking business is about pleasing people — producing exactly what they think they want. If you have an idea or concept you believe will work well, there's nothing wrong with selling your client on it. Just remember, your client must be happy when all is said and done.



"For the last time, I make Shaker furniture – not shaky furniture."

Don't be discouraged by a lack of equipment. I started my business with a cheap 10" table saw, a band saw and a few hand tools. Not many of us have the privilege of outfitting a whole shop when we start. Part of the woodworking challenge is to get the most from your tools. It's incredible how many operations can be completed with the tools I just mentioned. You can expand your tools while you work by finding a job to pay for the new tool. As an example, I landed a big molding job that more than paid for my first shaper, which became an asset in my shop. I added every piece in my shop the very same way. It didn't take long before my shop was complete, and paid for.

A picture is worth a thousand words, so keep a portfolio of your best work even if it seems to cost a lot of money. The expense is peanuts compared to what you save by not having to prove yourself over and over to new clients.

When your clients see a photographic record of what you can do they will be more comfortable. A portfolio also helps our creative side by allowing us to reflect on the work we've done.

It's important to do as many commercial projects as possible. These jobs may be a little more stressful, but they make us more efficient and better organized. This will lead to an increase in production. The long term benefits far outweigh the short term headaches. Your private work will evolve from these "exposure type" projects. Always take things at your own pace in terms of workload, but always be willing to pick up speed and efficiency.

I'm a firm believer of following all leads — you never know what might come from that menial job. It becomes impossible to follow up on every lead, but you can learn a lot just in your initial phone conversation. Try and find out the scope of the inquiry. Is it a new house that needs to be furnished? Am I speaking to a contractor in the business of building places that need to be furnished? I'm sure you get the idea. The bottom line is that it doesn't hurt to talk to people, and you can always politely say no.

A perfect business is one that has just enough work to keep you busy at your comfort level. Unfortunately, that's rarely the case for a custom furniture or sculpture shop. We need to make hay while the sun shines. Ask clients what their time table is even when you're busy. If you expect work to slow down in a month, find out if your schedule's convenient for them. Get the work, but be honest about the timing. If they're willing to wait you won't disappoint them.

Safety is an attitude in itself! I have always lived by the motto that power tools only bite one time. In other words, take no chances. Think safety while you're honing your skills. Think about what could go wrong before you begin any operation.

We need to take vacations from our work. I know this seems impossible when you work for yourself, but there's nothing better for a healthy attitude than taking a break. Visit museums and galleries. See what other people in our field are doing or have done. Follow the trends if only to be more aware. The key to a long and successful career is adaptability and a good attitude! PW

***Sal Maccarone** is a woodworker and artist with a degree in sculpture from San Jose State University in California. He's currently renovating a turn-of-the-century mansion in Port Townsend, Washington.*

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Create a perfect edge or a smooth, uniform surface on stock up to 6" wide, on the jointer's 30" table. Tilt the fence to 45° for beveling and chamfering.

Then it's on to the planer for any thickness you like, (1/8" up to 6") on boards up to 12" wide. The two-knife cutterhead makes 16,000 cuts per minute, for perfectly smooth finishes. Four-post design (the only one of it's kind) adds stability and eliminates vibration. This is the most powerful planer in its class. A real workhorse of a machine.

Both units are hefty enough to take on some real woodworking–yet portable enough to be stowed away when not in use.

For the name of the nearest dealer, home center or hardware store carrying Delta tools, call Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

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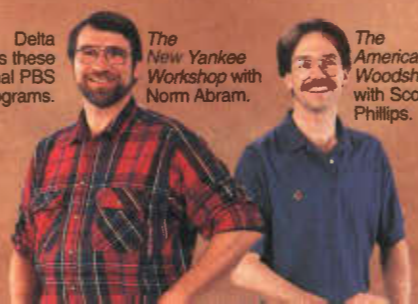

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