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#82

Popular Woodworking

January 1995

Queen Anne Handkerchief Table

p.20

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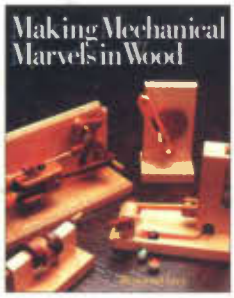

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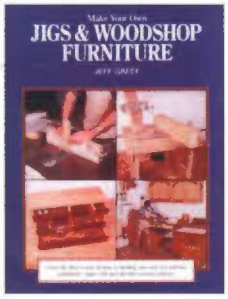

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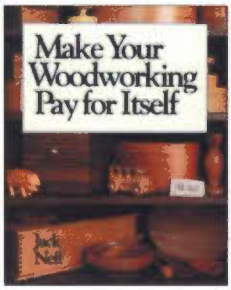

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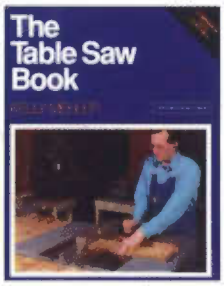

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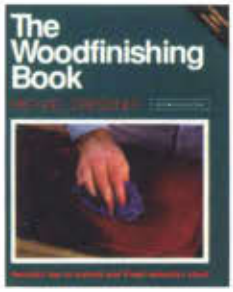

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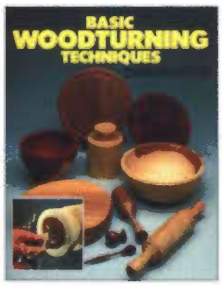

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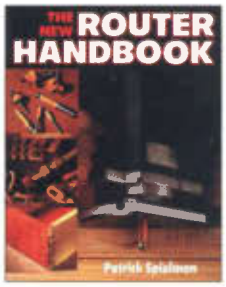

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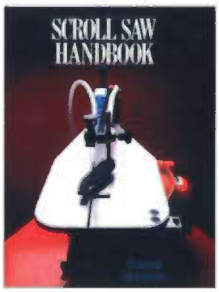

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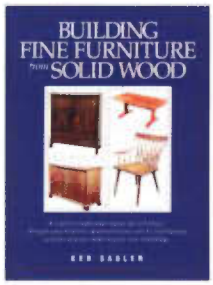

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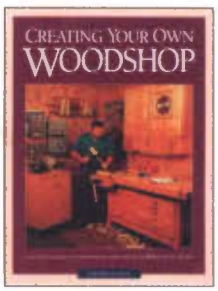

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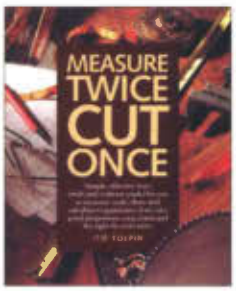

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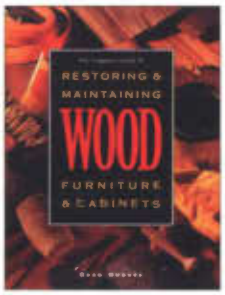

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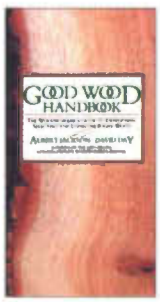

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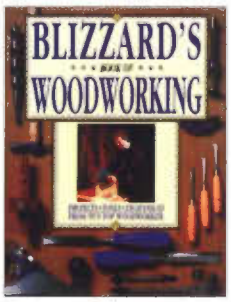

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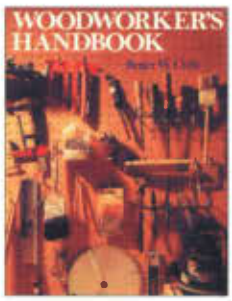

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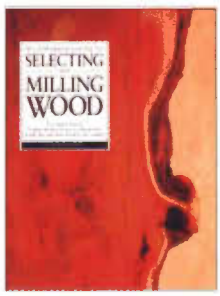

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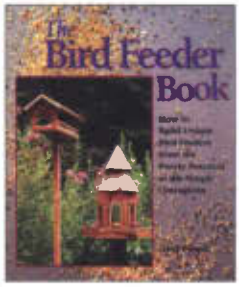

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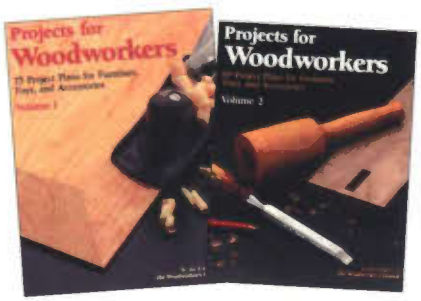

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LAPJ

Contents

Cover Story—**PullOut™ Plans**
Handkerchief Table *by Dean Gutzwiller* 20

Toy Chest *by Jacob Schulzinger* 26

Crafting A Corner Computer Desk *by Charles Self* 30

PullOut™ Plans
Carved Box *by Michael Theriault* 53

A Legless Coffee Table *by Graham Blackburn* 58

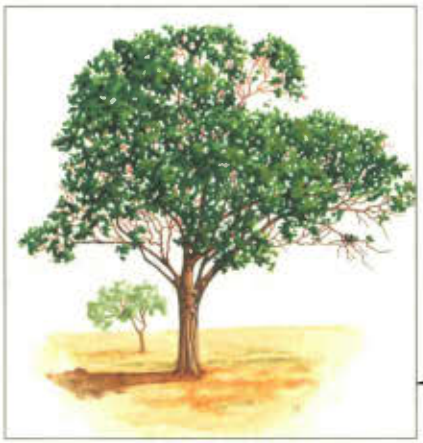
PullOut™ Plans
Tree Mirror *by Michael Theriault* 62

A Dictionary Stand *by Jim Randall* 66

A Slick Trick for Turned Bowls *by Charles Wilkerson* 70

PullOut™ Plans
Nativity Cut-out *by Rick Longabaugh* 74

Wood Types
Bubinga *by Ken Textor* 76



Columns & Departments

Turnings/Letters 4
Tricks of the Trade. 8
Book Reviews 10
Finishing Forum 14
News and Notes. 16
Math for Woodworkers. 18
The Business End 78
Back Issues. 82
Calendar 84
Cartoon Contest 85
Index of Advertisers 85
Classified 86
Out of the Woodwork 88

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!

On the Cover

Dean Gutzwiller's handkerchief table is just one item from a 50-piece line of furniture and custom-designed cabinets. At his King Mills, Ohio workshop, Gutzwiller focuses on reproductions from the 17th through 19th centuries. Keeping in line with the period pieces, and to keep everything as authentic as possible, Gutzwiller only uses period techniques, such as mortise-and-tenon joints and square pegs in round holes. See his story on page 20.

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Turnings

Poets have given winter a bum rap. Victor Hugo bemoaned the cold months, noting that, "winter changes into stone the water of heaven and the heart of man." George Herbert was blunter still. "Every mile," wrote old George, "is two in winter."

Woodworkers know better. In fact, this is *our* season. Freed from the constant nagging of lawn and garden, and inspired by the year-end holidays, we suddenly have both time and motivation aplenty to head to our shops and make sawdust.

That's where this issue of *Popular Woodworking* comes in. There's still time to fill those remaining holes in your gift list, so why not turn to your shop for help? Create craft gifts that grow in value because they represent the work of your hands and mind. The youngsters on your list will surely be finding bounties of new toys under their trees. You can thrill those children (while earning the thanks of their clutter-conscious parents) by building the simple toy chest that Jake Schulzinger presents on page 26. And, given the ongoing explosion in popularity of all things computereze, it's a safe bet that someone you know will be unwrapping a new electronic wonderbox this year. They'll need someplace to set up that computer, as well as a printer and all the peripherals such systems seem to accumulate around themselves, so they'll be sure to appreciate Charlie Self's quick and easy corner computer desk on page 30.

Of course, the holidays are as much a time of decoration as they are a season of giving, and the scroll-saw samurais among you will love the full-size nativity scene cutting patterns included in this issue's Pull-Out Plans.

Once the holidays bid us goodbye, we can look forward to a long luxury of cold, short, *dreary* days; days just made to be spent surrounding yourself with the wonderful sights and scents created when tools meet wood. You might want to use some of that time to stretch your skills by building Dean Gutzwiller's heirloom quality handkerchief table shown on page 20.

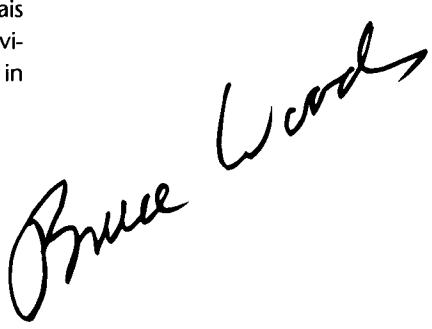
Then again, perhaps you just need a little push to help you see the projects that are already hiding in the wood you have on hand. If that's the case, you'll find inspiration (and a few good ideas) in Graham Blackburn's search for an attractive, easy to build coffee table, described on page 58.

Or maybe smaller projects are more your cup of tea. If so, crank up the lathe and let Charlie Wilkerson teach you how to turn a deep bowl from thin stock, or limber up your carving wrist and tackle Michel Theriault's carved box, shown on page 53.

You'll find our regular and ongoing features inside as well, packed with advice on everything from woodworker's math to fast and fancy finishing; from an introduction to the beautiful wood of the bubinga tree to a humble suggestion for a woodworker's New Year's resolution.

So what are you waiting for? Dig into this issue and then head out to your woodshop. After all, winter won't last forever!

Darn it.



Letters

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.

Rocking Horse Rocks in Style

Enclosed is a picture of my version of the Rocking Horse (*PW* #80). I added leather ears and a tail, in addition to a carved mane. Keep up the good work. I enjoy the articles and projects.

John J. Andrews
Ephrata, PA

Oops!

I enjoy your magazine and building some of the projects you provide patterns for. Robert Calvert's article on "Basic Mathematics for the Woodworker" has been of special interest to me, however in the September 1994 issue (*PW* #80), Mathematics, Part 3, I did discover an error. There are $231"^3$ in one gallon, and not $321"^3$.

Kevin Johnson
Mead, CO

PW Ripped

Regarding the September 1994 issue (*PW* #80), I was extremely disappointed in its appearance and format. It just "felt" wrong. Although it was the same size as the last issue, it did not seem to

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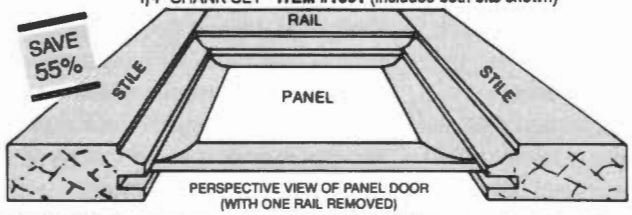

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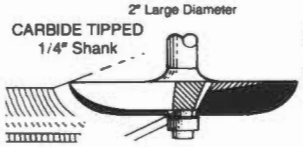

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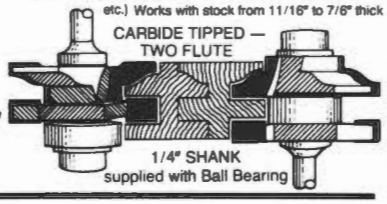

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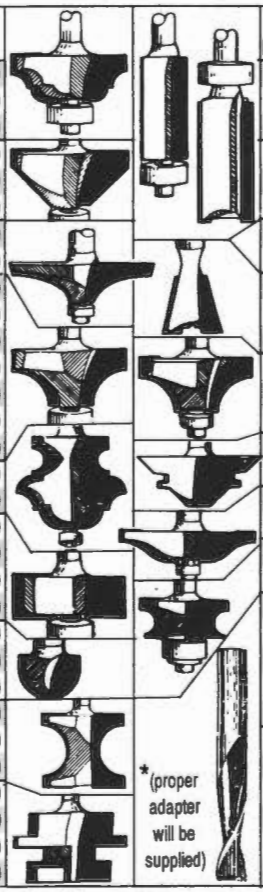

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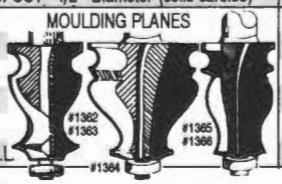

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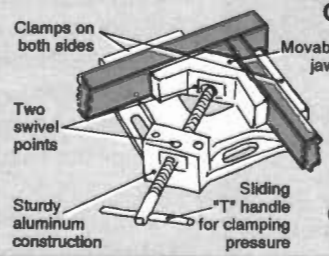

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Letters

be the old *Popular Woodworking* I have been getting for the last two years. I can tolerate some changes in my life, but help me out here. Is there something subtly different with the issue, or is it my imagination?

One thing I can put my finger on that I can't tolerate is typographical errors. This criticism is specifically aimed at "The Tool Wright's Corner" piece. I would expect any reputable publication to proof and spell-check any and all submissions.

I don't believe I have been sniffing too much yellow glue, but if I'm way off here, let me know. I'm off my soapbox now.

S.I. Harris

PW Praised

Last night, I got a chance to read through *PW* (#80). I thought the Hope Chest plans were, of course, great! I think that with the instruction given, even I could build it! The editorial about the compuserve woodworking was neat.

I also liked the article on carving the cowboy in relief. I've been interested in doing some carving as decoration. The nice thing was the article showed which tools did what and how to use them. It saved me from buying a half a dozen books just to get started! It's a great starting point for someone like me.

PW was worth the price (And that's lots of loonies in Canada!)

Meade Helman
Canada

Kit Furniture Reply

In response to Dale Hunt's request for information about the Bedford Lumber Co. (*PW* #81), I inherited a cedar lap desk kit this spring from my uncle. He probably bought the kit between 1978 and 1982. He never assembled the kit—it's still in the box. It had a shipping label with the return address:

Bedford Lumber Co.
Box 65
Shelbyville, TN 37160

I hope this helps.

Wally Higdon
Mayfield, KY

P.S.: *Popular Woodworking* is a classy magazine.

Full-Size Stagecoach Fulfills Reader's Dream

Several years ago, I wanted to build a full-size stage coach. After two very frustrating years of research and trying to get plans, I finally succeeded. But the whole time, no one seemed concerned enough to help me—all I had wanted to do was carry on some of our culture.

If you have a dream such as mine was, just persevere, and it will become a reality. Keep up the great work on the best magazine there is!

Larry Carroll
Tarpon Springs, Florida

Carver Seeks Advice

I'm a 35-year-old factory worker who, during a layoff last year, picked up a block of wood and my previously unused moto tool and began cutting my thoughts into the wood.

I subscribed to *Popular Woodworking* because *I know nothing!* It would be great if you had a section dedicated to those of us who don't know our rosewood from our ash.

I like carving hardwood, i.e. oak, walnut, etc., because I can get a lot of detail. I seal out the moisture with polyurethane.

Do you have any advice?

Timothy Mentz
Cincinnati, OH

From your pictures you enclosed, it seems that you are more skilled at your craft than you give yourself credit for. However, there is always room for improvement, even among the most skilled carvers. You may want to turn to our frequent "The Mallet" column to continue developing your abilities. Practice does make perfect, so if you create the carving projects usually included within each issue, you should be improving with every one!

If you're looking for more information on the wood you're using, check out our "Wood Types" column. Each issue discusses a type of wood in detail so you know what it will do for you.

Good luck, and let us know if there's anything else we can do to help you!

A Tricky "Trick of the Trade"

The September issue contains a "Trick of the Trade" from Lane Olinghouse stating, ". . .it's necessary to drill the smallest hole possible in order to maintain their structural integrity." This is in reference to drilling holes in studs for doorbell wire. Although the statement is 100% correct, I worry homeowners will look at the numerous holes in their studs and joists, and wonder when the house will collapse.

A rule of thumb is don't drill a hole in excess of one-fourth the size of the framing member. That means a standard 2" x 4" wall stud could tolerate a ⅞" hole. A typical 2" x 10" floor joist could safely withstand a 2¼" hole.

More importantly, the carpenter should pay close attention to where the hole is drilled. Holes bored through framing members should always go through the member's center. This area is called the neutral axis, which is under the least amount of stress. Properly sized and located holes will not adversely affect studs and joists.

The tip is a good one, but let's not panic over holes in framing members.

George Vondriska
Hudson, WI

Delta Shaper Parts Reply

In response to the letter from John Brown (*PW* #80) requesting information on a Delta shaper, model 43-110, write or call:

Harold Barker
3108 Klinlger Rd.
Ada, Ohio 45810
419/634-7328

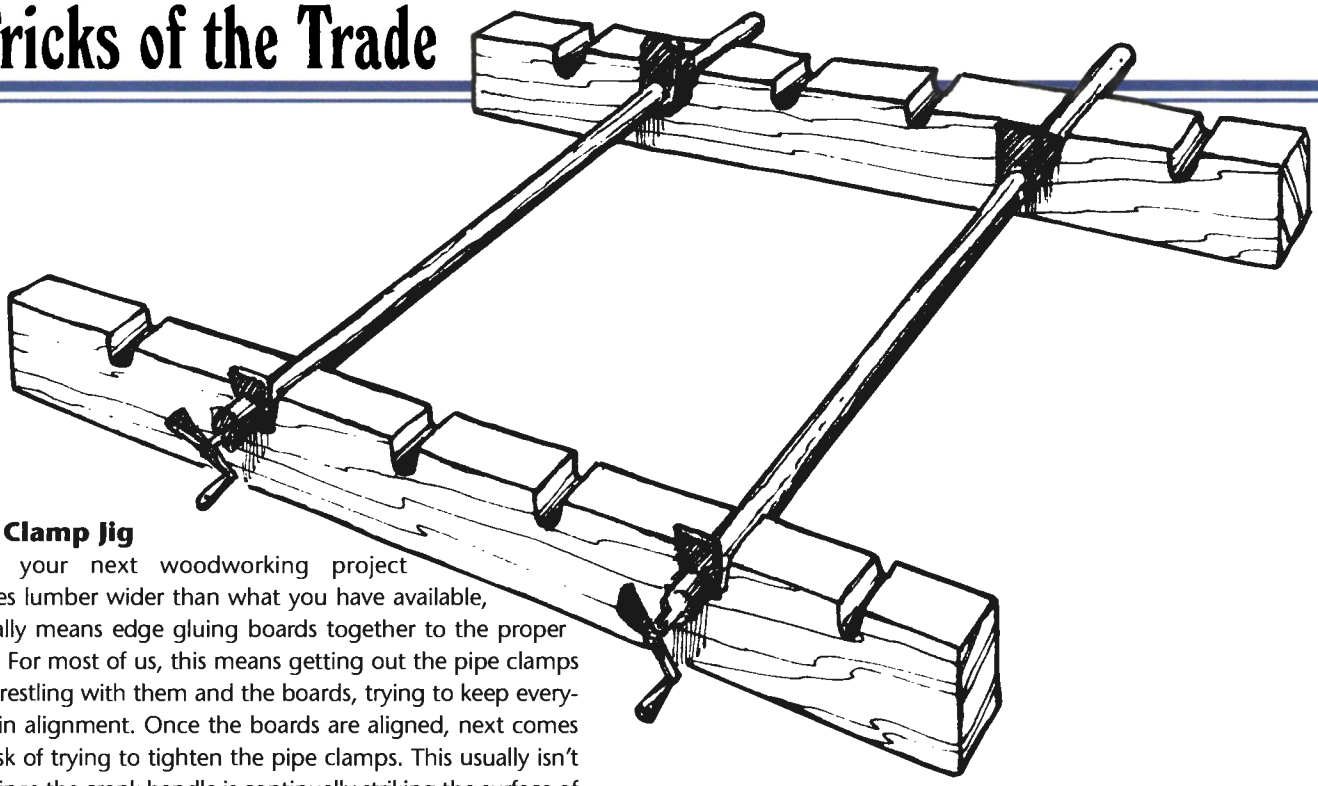
He has many parts for most major woodworking machine manufacturers. He also has thousands of old machinery catalogs and manuals. Send an SASE and $3 for a complete list of catalog titles.

George B. Teall
Dundee, MI

Correction

The correct phone number for The Tool Club's Solid Brass Inlay Kit (*PW* #81, p. 69) is 800-486-6525.

Tricks of the Trade



Pipe Clamp Jig

When your next woodworking project requires lumber wider than what you have available, it usually means edge gluing boards together to the proper width. For most of us, this means getting out the pipe clamps and wrestling with them and the boards, trying to keep everything in alignment. Once the boards are aligned, next comes the task of trying to tighten the pipe clamps. This usually isn't easy, since the crank handle is continually striking the surface of the table or floor. Lifting the entire mess to turn the crank means the boards slip out of alignment.

You can simplify this process by building a quick and easy pipe clamp jig. It eliminates problems when turning the crank, and makes it easier to align the edges of the glued boards.

After finding the smoothest and straightest 8' section of a 2x4, cut it in half and strike a line on the side of each board 1⅛" in from the edge. Measuring along the length of the line from the end, make a cross mark every 6". Chuck up a 1" spade or Forstner bit in the drill press, and drill out the holes in each 2x4 using the cross marks as the center. Mark a tangent line with a tri-square from the edge of the 2x4 to each side of the holes. Cut out the tangent line making a slot with a rounded bottom. With a file or sandpaper, smooth out any ragged areas. Line up the pipes in the slots, and you're in business.

Sidney R. Watts

The Perfect Template

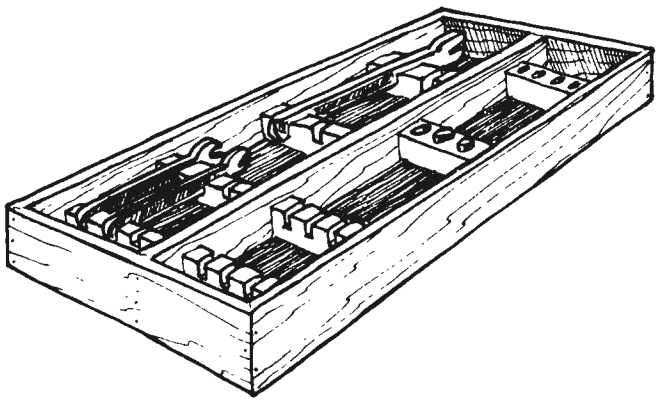
When looking for the perfect template to keep all my patterns on, I came across unused rolls of shelf paper. I found pieces of this to be the most efficient way to store all my patterns into a notebook or use them right on the wood for cutting. The grids on the back work perfectly for enlarging. All information about the pattern can be written on it (paint colors, stains, wood size, source of pattern, etc.). When saved, these templates can be used many times for tracing. What's really great about them is they can be folded up for storage, unlike acetate or plywood templates.

Lisa Fontaine

Holding Veneer in Place

If you find veneer trim difficult to hold in place while preparing to use a hot iron to activate the adhesive, try strapping it down with large rubber bands. If the piece is too large for the bands, try using bungee cords or strips of masking tape.

George W. Earley

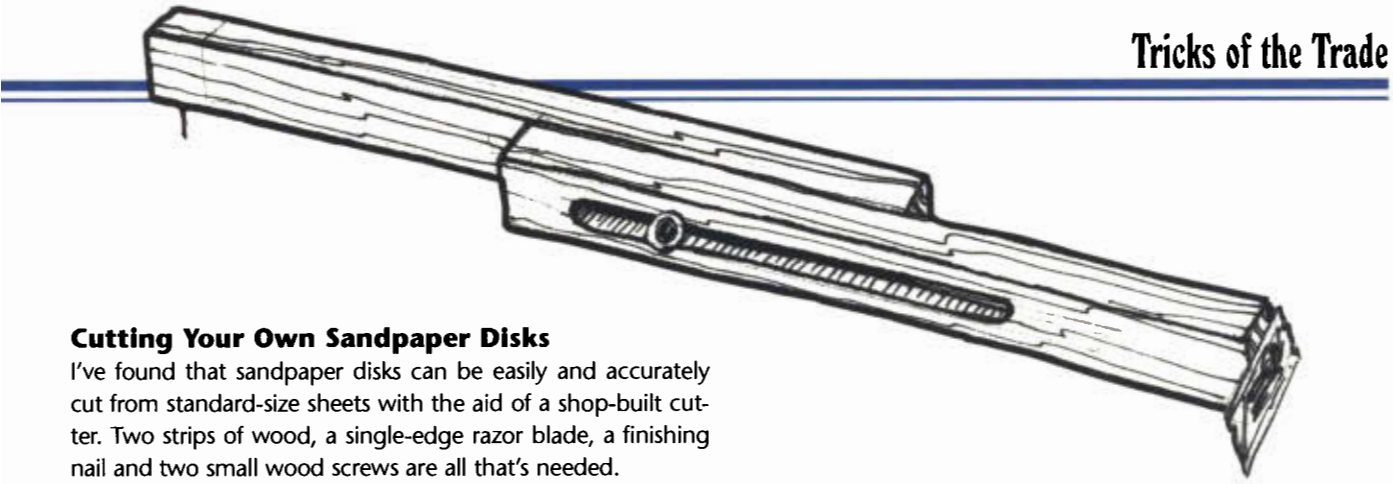


Rattle-Free Tool Storage

While traveling in my car with my tool box in the trunk, I noticed the constant vibrations were causing noticeable marring and damage to the tools as they rubbed together. And the noise was downright irritating. The solution I came up with was to build a divider/holder for my wrenches and sockets in my tool box.

I took a white nylon cutting board and cut it into strips, which I could fasten to the box's tray. Then I cut notches in the strips so the wrenches fit snugly side by side. For the sockets, I drilled the appropriate size holes while leaving a rough surface to better grab each socket.

Robert L. Hirsch

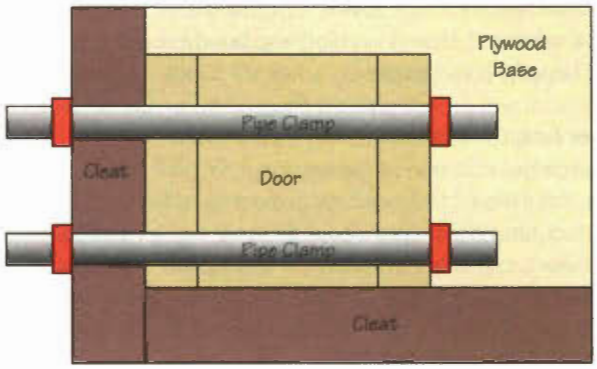


Cutting Your Own Sandpaper Disks

I've found that sandpaper disks can be easily and accurately cut from standard-size sheets with the aid of a shop-built cutter. Two strips of wood, a single-edge razor blade, a finishing nail and two small wood screws are all that's needed.

Cut a long slot in one of the two pieces of wood to a width that will allow it to slide over one of the wood screws. Secure the two strips with a wood screw and drive the finish nail in one end of the stick that doesn't have a slot cut in it. Now fasten the razor blade on the end of the second stick using the other wood screw. The two strips can be adjusted for the radius of the disk, and the blade can be easily adjusted for cutting one or more sheets at a time.

Howard E. Moody



Jig Keeps Panels Square

When gluing-up frame & panel doors, I found it difficult to get a perfectly square fit. I developed a jig that provides an accurate reference when gluing-up panels, which consists of a plywood base with two cleats. It is extremely important the cleats are placed at 90° angles to each other. When using the jig, place each clamp over and parallel to the frame's rails. Apply a little pressure to the clamps, and adjust the frame until it's square in the jig.

Kelvin Kendall

Holding Nails With Clay

When lack of room makes it impossible to hold a nail until the hammer has started it into the wood, press a small lump of modeling clay onto the nailing surface. Then set the nail in the clay, which will hold it steady for the first light taps of the hammer. After the nail has started into the wood, remove the clay.

Lane Olinghouse

Shop Holder

I always have an assortment of short dowel scraps in my workshop, and I'm forever saving them with the idea I'll make something with them. I finally constructed a handy pencil and small brush holder. I cut 15 pieces of 1" diameter dowel to 2½" in length. I then cut a base piece from scrap pine to 4" x 3". Leaving a ½" border all around, I glued the dowels to the base. This is a very handy holder, as the space left between the dowels is just right for holding pencils, small brushes and an old toothbrush used for cleaning.

Howard E. Moody

Sawing Wood Straight

In a mishap I'm glad nobody observed, I managed to ruin my old miter box. . .and right away I needed to saw straight and smooth through a 2x4. Fortunately, I remembered an old trick involving C-clamps. First, I scribed a sawline completely around the 2x4. Then, I C-clamped two small blocks on either side, flush with the sawline. Using the blocks as a guide, I cut straight and true through the marked wood.

Lane Olinghouse

Clean Workbench Drawers

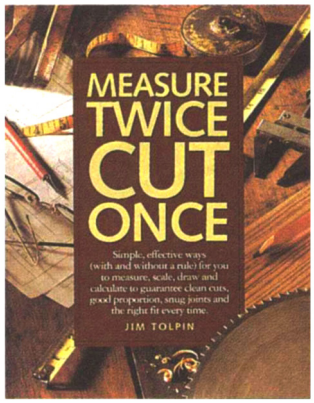
I have found that my workbench drawers have a habit of collecting sawdust and are always messy. I solved this problem by removing the drawer bottoms and replacing them with perforated peg hardboard. Now the sawdust falls through the drawers and onto the floor where it is easily cleaned up. This leaves my tools clean and ready to use.

Howard E. Moody

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 45207. We pay $35 for each TOT we publish.

Book Reviews

Measure Twice Cut Once



Jim Tolpin. Betterway Books, 1507 Dana Ave., Cincinnati, OH 45207; 118 pages, paperback, $18.95.

The book's lengthy subtitle tells you everything you'll need to know to get you out of your chair and down to your book store: Simple, effective ways (with and without a rule) for you to measure, scale, draw and calculate to guarantee clean cuts, good proportion, snug joints and the right fit every time. It almost sounds too good to be true, but in this case it isn't. What I like best about this book is its generous helping of that rare entity called "common sense." Time and again, I found myself saying as I read, "Well, that's so obvious—why didn't I know that?"

Some readers will be disappointed because the book has no projects, so they won't be able to say, "As a result of reading this, I made . . ." But the thoughtful woodworkers among us will be able to finish that sentence with the words, "fewer mistakes."

Three chapters treat concepts of proportion and measurement, drawing techniques, and creating working drawings and cutting lists. Three more chapters deal with measurement and layout tools, the layout process, and cutting to lines. A final chapter deals with preventing and fixing mistakes; these dozen-or-so pages have to be as sagacious a collection of tips as you've seen anywhere—they're so good they alone might be worth the price of admission.

True to his publisher's name, Jim Tolpin has indeed shown us in this book a better way. Here's my recommendation: First the book is going on my nightstand, so I might reread it from cover to cover. Then it's going into the small "library" I keep in the shop—there's valuable stuff here. I'm confident you'll agree.

Jack Hill's Country Chair Making

Jack Hill. Sterling Publishing Co., 387 Park Ave. South, New York, NY 10016; 152 pages, hard cover.

This book offers a collection of plans and instructions for 13 traditional country chairs from British master craftsman Jack Hill. Included here are simple stools, woven-seat chairs and Windsor chairs, all shown in color photos. Some might be tempted to reject this volume in favor of one of the American books on the same subject, notably something by Michael Dunbar; but this book contains lots of chairs of the type that one often finds handmade in the shops of Appalachia, so it might bear a second look if you'd like to make some rustic seating. In 1993 I bought several chairs like those shown here as I traveled through western North Carolina, and the insights this book gives about their manufacture is both interesting and thorough. Those who wish to make their own chairs could probably follow Hill's "recipes" with great success. Overall, this is a very handsome package, particularly if you like an "English style" presentation of woodworking information.

Seat Weaving

Ricky Holdstock. Sterling Publishing Co., 387 Park Ave. South, New York, NY 10016; 152 pages, paperback, $14.95.

Here's another English publication that would make an excellent companion to Jack Hill's book, since it gives far more detail about making and/or remaking seats. I wish I'd had it a couple of years ago when I couldn't find anyone who knew how to reweave the Scandinavian-style seats on some folding chairs we had. Unwilling to try the project without some very good instructions, I regrettably disposed of the chairs, and have yet to replace them with anything I like better. This volume shows how to repair them in terms so simple that I'm quite certain even I can understand. This is the only book I know on this topic, so it's a good thing it's well done. Often woodworkers find themselves stuck with a poor book just because no others are available on the subject. To the best of my knowledge, there's nothing else like this book on the market; happily, it's a dandy.

The Art of Making Elegant Wood Boxes

Tony Lydgate. Sterling Publishing Co., 387 Park Ave. South, New York, NY 10016; 143 pages, paperback, $16.95.

I thought I'd seen just about all there was to making wooden boxes, but other volumes on the subject have done little more than scratch the surface; Tony Lydgate has raised the craft to high art. As you read his book, you'll be glad that so many of the illustrations are in color. Lydgate really builds a convincing argument for the notion that one can build exquisite projects without using much material at all, if one has really interesting designs in mind. More than 30 projects are included, but nearly half are presented in "gallery" form, which is to say no construction drawings accompany the photos. Then again, I think most of the drawings included will be irrelevant for good woodworkers. In many cases the beauty is in the wood more than in the design—or in the juxtaposition of woods to one another in designs that appear to be fairly simple. If you start building these projects, you'll take care of lots of gift needs, and you'll probably start training yourself to work to the very close tolerances the exquisite materials in these sort of projects deserve. If you take this book into your shop, you and it are likely to be lost there for quite some time—and I can't give a higher recommendation.

***Hugh Foster** is an English-teacher, woodworker and author from Manitowoc, Wisconsin, who frequently contributes to* Popular Woodworking.

by Hugh Foster

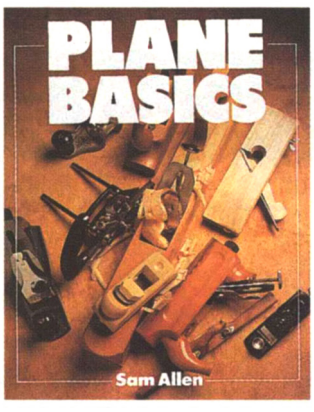
Complete Woodfinishing & The Woodfinishing Book

Ian Hosker. Sterling Publishing Co., 387 Park Avenue South, New York, NY 10016; 168 pages, paperback.

The Woodfinishing Book, *Michael Dresdner. The Taunton Press, 63 South Main St., Newtown, CT 06470; 213 pages, paperback.*

There's probably no more important aspect of woodworking than wood finishing. It's truly a subject of international interest, as evidenced by these two volumes. Hosker's book is very British, and Dresdner's is very American. Yankee readers are sure to prefer Dresdner's vocabulary, and I believe there will be other things they'll prefer about it as well. But there's plenty to like about both books. Hosker does a better job with reproducing or repairing "old-fashioned" finishes. For example, while both authors treat French Polishing, I believe Hosker provides a more thorough treatment. Dresdner does a better job of covering the wide variety of finishes available in this country; his volume even includes a wall chart detailing which varieties of finish work are best under particular conditions. This chart covers 18 separate qualities of each of 32 different kinds/types, not brand names, of finishes. That adds up to 576 bits of information, each of which is covered in-depth. The tone of Dresdner's book is always sympathetic—he proceeds at a speed we can readily absorb. Hosker treats refinishing and "painting" type finishes more thoroughly than Dresdner. While the volumes are about the same general subject, there is little enough overlap, so both might reasonably find homes in your library. Too bad most of us can't afford that. So, contrary to my usual instincts, I'll help you to choose: If I had to select but one, I'd likely choose Dresdner, just on the basis of my familiarity with his terminology; his book seems to be just about the best volume source I know of for finishing reference.

Plane Basics



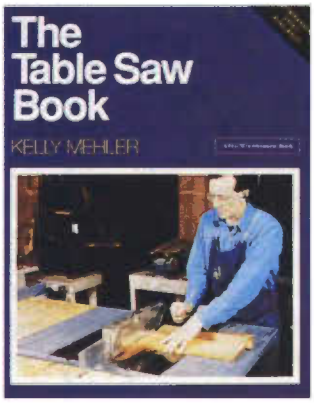
Sam Allen. Sterling Publishing Co., 387 Park Ave. South, New York, NY 10016; 128 pages, paperback, $9.95.

I'm not trying to be negative about this book when I say there's nothing very "basic" about it. Rather, I'm trying to point out that the volume contains a wealth of useful data about hand planes. Much of this type of information is disappearing, as woodworkers become increasingly interested in doing only power tool woodworking. However, any woodworker who reads this book will understand why many of us who consider ourselves to be basically machine woodworkers still collect and use fine planes. They permit us to finesse small amounts of material from lumber in just the way we want to remove it, provided we know what we want. Sam Allen does a good job of helping more of us to realize quite precisely what

we want. With 345 illustrations spread over the short space of 128 pages, his book gives us visual images that are nearly as helpful as working alongside of the author in his shop would be. The book includes a valuable index that will expand your woodworking vocabulary, and help you understand the book's terminology. A project closes the book, demonstrating that it's still possible (and even probable) to build a project "from scratch" with nothing more than hand tools. Some of us may regard a task like this as nothing more than "therapy," but a trained hand tool woodworker can do an awful lot of real work while power tool users are just setting up.

The Table Saw Book

Kelly Mehler; The Taunton Press, 63 South Main St., Newton, CT 06470; 180 pages, paperback, $25.95.



At first glance, *The Table Saw Book* doesn't appear to be about much more than the obvious, a fact which perfectly illustrates the precept that one "ought not judge a book by its cover." Wisdom runs deep in this volume. You may browse the book and think smugly, "I know all that." That's what I did. But when I started to really read it, I knew I'd been deceived by initial appearances.

As I went through a very careful second reading, I started to think perhaps Kelly Mehler had written his own best review in the introduction, where he tells us the table saw is the most important tool in his shop (mine, too, and probably yours). He said too many of us take its simplicity and capabilities for granted, and he would teach us to use it for ripping and cross-cutting both safely and accurately. His discussions on maintenance and safety procedures are first-rate. He doesn't show dangerous procedures—and he names bowl gouging, circle cutting and resawing wide stock as tasks that are better done with other tools, claiming that doing them with the table saw is inefficient at best and plain dangerous at worst. I think we all agree no one should perform any operation on any tool that strikes him or her as dangerous. Figuring out a better way to achieve the same result is the first mark of a superior craftsperson.

Mehler will help you to be the very best table saw operator you can be; by reinforcing your safety habits, teaching how to cut accurate joints on the table saw, and showing how to make jigs and accessories that will help to make your sawing safer and more efficient. It's highly recommended.

Bathroom Remodeling

Leon A. Frechette. Tab Books, Blue Ridge Summit, PA 17294-0850; 274 pages, paperback, $15.95.

I learned the hard way that remodeling a bathroom can be a daunting project. I was confident we weren't getting it right even as we did the project in about double the projected time. I didn't really know how wrong we had it until I read Leon Frechette's amazingly clear text on the subject. Without condescending to the reader in the slightest, Frechette goes through the remodeling process from the beginning, covering all the things so many of us just take for granted (much to our later dismay), and, with text and illustration, clearly shows us how the task should go.

Remodeling a bathroom is definitely more time-consuming than the typical woodworking project, so it's good to know that a guide of this quality exists. Besides basic woodworking, the project will involve plumbing, electrical work, wall board finishing, flooring, and various trimming and touch-up operations. This book provides a useful guide to the skills and materials you'll need to complete a bathroom remodeling job. What's more, the information is presented in a clear, cheerful, and easy-to-read and understand style.

Leon Frechette has done a masterful job of making this daunting task clear—though I'm sure even he wouldn't ever say remodeling is simple. To sum it up, I'd say that lots of woodworking authors would be doing the rest of us a real favor if they made their books as clear as this one is. It's highly recommended.

Willow Chair: How to Build Your Very Own

Joseph S. Stone. Genesis Publications, P.O. Box 1526, Mendocino, CA 95460; 95 pages, paperback, $19.95.

Over the course of 12 chapters, Joseph Stone takes us from willow history to marketing willow furniture. Apart from these introductory and concluding chapters, the book is devoted to instructing the reader about the hows and whys of building willow furniture. Stone suggests that, with proper care, willow chairs can be expected to last for generations. His instructions are clear enough that most woodworkers, even very novice ones, will be able to follow them and produce a whole houseful of this distinctive furniture. If the idea of making rustic chairs appeals to you, you'll value this volume. PW

Finishing Forum

The Finishing Forum is an ongoing discussion about the art of wood finishing. If you have a question or a problem to solve, we'd like to help. If you have a tip or secret to share, or you recently tried a new product, write to: The Finishing Forum, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207.

Refinishing a Southern Yellow Pine Floor

I'm refinishing an old Southern yellow pine floor in my house. The wood has darkened with age, and I'd like to put a finish on it that won't make the floor any darker. I'm also concerned about the fumes, and I'm generally wondering if I've bitten off more than I can chew. Please help.

Ken Kardine
Huntsville, AL

A waterborne acrylic/urethane floor varnish is the answer to your problem. Contact Daly's Wood Finishing Products at 800/735-7019. Ask for their CrystalFin Floor Finish and its CROSSLINKER, an additive to facilitate hardening. This product is virtually odor-free, non-yellowing and non-toxic. It resists chipping and most household chemicals. It can be applied with a synthetic brush, Lambswool applicator or painters pad. For a large room, you might even try a roller for the first coat. You'll find this product darkens your yellow pine less than solvent-based finishes, and it has no amber tone. The first coat may raise the wood grain a bit: when dry, scuff-sand with 220 grit paper, and subsequent coats won't be a problem. I recommend three coats for maximum protection, with a five- to seven-day cure to final hardness. Good luck with your floor refinishing project!

Tom Wisshack

Revitalizing Old Walls

My living room walls are cedar tongue and groove boards that were installed 25 years ago. The wood is still very beautiful, but age and exposure have darkened it. Some of the boards also have received deep cuts from the back of my chair. How can I best refinish the wood and remove the furniture cuts? I don't believe that varnish was used initially to finish the wood. Will it be necessary to sand each board, or is there a way to chemically clean the wood and sand just the cuts? The ideal solution would be to plane the wood, but I'm not able to remove it from the walls.

Ken Lvan
Concord, CA

I can't give you much real advice without actually seeing your paneling, or at least a picture of it. My guess is that in attempting to sand out the cuts in the paneling, you'll be revealing much lighter wood color. This will require that the entire paneled surface be dressed down equally. Trying to sand locally, then treating the wood chemically could be quite tricky, though it is certainly worth a try. You could try a strong oxalic acid solution in hot water, apply it with a sponge, then rinse it repeatedly.

You're right, removing the paneling from the walls and milling it down would be the ideal solution. Why don't you consult an expert carpenter to see if it could be carefully removed, dressed down and re-installed? This would ensure an even color, and I think you'd be much happier with the results.

Otherwise, I think you're going to need a magic wand, and they're getting hard to come by.

Tom Wisshack

Tried-and-True Method for Staining

I noticed with interest R.W. Johnson's request for a stain for black walnut sapwood (May, 1994) and your reply. I would suggest Mr. Johnson try the old tried-and-true technique of using Potassium Permanganate dissolved in cold water. This chemical is a dark-purple salt ($KMnO^4$, used as an oxidizer and disinfectant). The chemical comes in granular or powder form and can still be found in most of the older drug stores. The nice features of this dye are its effectiveness, safety and low cost. I would suggest one teaspoon of $KMnO^4$ be dissolved in half a pint of cold water. The shade may be varied up or down by adding more water or more chemical, according to the finisher's need. More than one application may be required. After thoroughly dry, apply a wash shellac coat over the entire piece. After light sanding, any of several other finishes may be applied. This is an old method that my friends, pupils and I have been using for more than 50 years, and have found it most effective and simple to use. A linseed oil rubbed finish works equally well.

Incidentally, I bought half a pint of granular $KMnO^4$ in one of our local drug stores last week; so it's still available.

J.R. (Dick) Bibb

Thinning Artists' Oil Colors

I read your article concerning thinning artists' oil colors with turpentine and a few drops of Japan drier (May, 1994). I have been using artists' oil colors and boiled linseed oil for many years. I have not been using any Japan drier. The colors dissolve slowly, but do dissolve.

Sometimes you may have some trouble with other finishes holding to the oil-base stain. In the place of oil-base stain, try artists' acrylic colors dissolved in water. Use the same colors for acrylic colors that you would for oil colors.

Dwight Throop

Tom Wisshack *makes and restores fine furniture in Galesburg, Illinois.*

State-of-the-Art Varnish

Your column in issue #79 (July, 1994) was very interesting. Over the years, it has become clear to me there is always more than one way to resolve a problem, though only one optimum way. In particular, the letters from both Mr. Waters and Mr. Waterbury support my theory. International Paint Company's Clipper Clear varnish is the latest state-of-the-art in non-yellowing ["clear"] varnish, with the best UV protection package. This is a recently developed package designed for the marine industry to withstand the rigors of semi-tropical and tropical exposure.

To address the second part of Mr. Waterbury's problem, the conventional method of obtaining proper adhesion of varnish to oily woods by the marine fraternity has been as follows: When ready to varnish, wipe down the oily wood with a highly volatile solvent, adhering to the proper safety precautions, and immediately apply a blend of 60% solvent and 40% varnish. After the blend has completely dried, the following coats of varnish may be applied as specified by the manufacturer. The solvent utilized with the varnish should not be too fast-drying. The mix must have time to penetrate the wood's pores. While my experience has been limited to gunstock finishing and teak on sailing vessels, with 27 years of the latter, the notion of using water "...to open the grain..." leaves me a bit uneasy. I suggest such preparation would not be necessary, and, possibly counter-productive, when using the recommended "marine approach."

Richard Stauffer

Some Health & Safety Tips

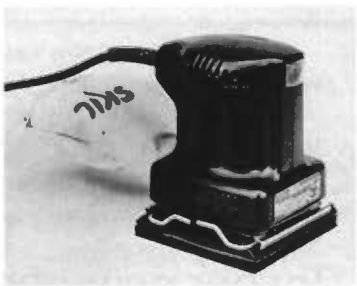
- Remember, some finishing chemicals are poisonous, flammable and possibly corrosive. Please take care when handling and storing.
- Always wear protective clothes and gloves when finishing.
- Never store finishes in old food containers or even anything that resembles one. (Remember how inquisitive you were when a kid?)
- Always keep finishing chemicals out of reach of children.
- Wear a mask to protect yourself against dust when sanding and fumes when finishing.
- Pay attention when disposing of toxic or hazardous chemicals, several of which are used in wood finishing. If need be, contact appropriate authorities to find out where and how to dispose of them.

News and Notes

DeWALT Industrial Tool Company Inc. developed a 12.0 volt ⅜" heavy duty Versa-Clutch R cordless driver/drill kit (DW973K-2). This is the first pistol grip unit to be released in a new line of DeWALT cordless power tools featuring more power and longer run-times. The driver/drill comes with an "XR PACK™" extended run-time battery, which lasts about 25% longer than standard batteries in any application, dual range VSR 0-4550/0-1400 RPM, and a high performance fan cooled motor with replaceable brushes. The new model also offers a Versa-Clutch® to control torque, pressure activated keyless chuck with electric brake and a durable, efficient transmission with five planetary gears. The driver/drill kit includes two XR PACK™ extended run-time batteries, a one-hour charger and a steel case. For more information, contact DeWALT Industrial Tool Co., P.O. Box 158, 626 Hanover Pike, Hampstead, MD 21074. 800/433-9258.

Wilton Corporation has introduced a new line of 14" Tradesman Vertical Band Saws. The gear box design allows Wilton's wood/metal model saws to cut a variety of materials, including wood, plastic and ferrous/non-ferrous metals effectively. The combination metal/wood 14" machine offers cutting speeds of 39 to 278 SFPM for metal and 3300 SFPM for wood. The wood cutting band saw model comes equipped with a single speed drive system to deliver smooth, accurate performance. The saws are capable of contour cutting, straight cutting and resawing. For more information, contact Lisa Borcovan, Wilton Corporation, 300 S. Hicks Rd., Palatine, IL 60067. 708/934-6000.

Bosch's new light and powerful planer (model 3296) features a full 3/32" (2.5mm) cutting capacity with a 6.5 amp, 13,000 RPM motor and a fully-machined base and rabbeting edge for exceptional accuracy. A lock-off button on the switch helps prevent accidental starts. The tool also features a 3¼" cutting width, 15/16" rabbeting depth, a precise depth setting knob, a reversible chip discharge port, and ball and roller bearing construction. Carbide blades are reversible, and long-life holders don't require resetting when reversing or replacing blades. A rabbeting guide and deluxe angle fence are included. For more information, contact Kathy Guarino at Bosch, 4300 West Peterson Ave., Chicago, IL 60646. 312/644-4409.



Skil® is now offering a new dustless palm grip sander for do-it-yourselfers. The Skil Model 7276 Sandcat ¼ sheet dustless palm grip sander has a 1.7 amp motor, delivering 13,000 orbits per minute for fast, smooth finishing. Through-the-pad dust extraction provides for a cleaner work area and flush sanding on three sides to allow room for working in tight spaces. Other features include a compact one-handed design, a dust-sealed rocker switch for fingertip operation, and a paper punch-plate for using standard sandpaper. Also, easy mount paper clamps allow easy paper changing and an 8' cord adds convenience. The 7276 palm grip sander carries a two-year home-use warranty. For more information, contact Gary Goodfriend at Skil®, 4300 West Peterson Ave., Chicago, IL 60646. 312/644-4409.

Products of Interest for Woodworkers

Two new time- and money-saving elevation measuring/leveling and layout devices, the Contractor Grade Compulevel and the Contractor Grade Laser Beacon®, have been introduced by Stanley Tools. The rugged, waterproof Compulevel allows the user to work alone, even around corners, with more than ⅛" measurement precision. Compulevel weighs only 10 pounds and consists of a briefcase-sized unit. The cord allows measurements around visual obstructions and is taken in and out on a reel. The Contractor Guide Laser Beacon provides users with both a 360° rotating light beam for horizontal leveling and a 90° vertical light beam for accurate layout. It allows users to align from ceiling-to-floor, and from wall-to-wall, in one quick and easy step. For more information, contact Stanley Tools at 600 Myrtle St., New Britain, CT 06050. 203/225-5111.

Carter's new vacuum workbench is ideal for holding parts for sanding, routing, drilling and finishing. It doesn't require electricity or external vacuum, and operates from standard shop compressed air. Its sturdy steel and extruded aluminum construction allows portability or easily anchors to the shop floor for increased stability. It also features adjustable pod spacing to conform to a variety of material shapes. For more information, contact Carter Products Company Inc. at 437 Spring St. NE, Grand Rapids, MI 49503. 616/451-2928.

Resource Conservation Technology (RCT) introduces the RCT Cornersealing System, a unique weatherstripping system consisting of the RCT Corner-Grooving Tool and a series of silicone rubber weatherseals. This offers a quick, effective method to weatherstrip both new and existing wood doors or hinged-windows. The tool features a Bosch router motor mounted in a lightweight, machined aluminum body, that's coated with a rugged nylon finish. It uses a spiral router bit to cut a continuous 45° groove in the corner of all sides of the door or window jamb, an ability made possible by the "V"-shaped base and backward-inclined motor angle. No adjustments are necessary, even the depth and angle of the cut are not critical factors. The nose of the tool shields the bit from the operator for safety, while the handle design keeps the cord out of the way to ensure the optimal pressure angle. For more information, contact RCT at 2633 North Calvert St., Baltimore, MD 21218. 410/366-1146.

New products to announce? Send a press release and a color transparency to News and Notes, Popular Woodworking, 1507 Dana Avenue, Cincinnati, Ohio 45207.

A Powerful Tool

Basic Mathematics for the Woodworker, Part 5.

By Robert L. Calvert

In this last and final part of the "Basic Math for the Woodworker" series, we'll make use of simple trigonometric functions, or trig for short. Don't let this term scare you off. We aren't going to analyze why or how it works, but simply use short, easy-to-use formulas. Like a computer, you don't have to know how it works to use it.

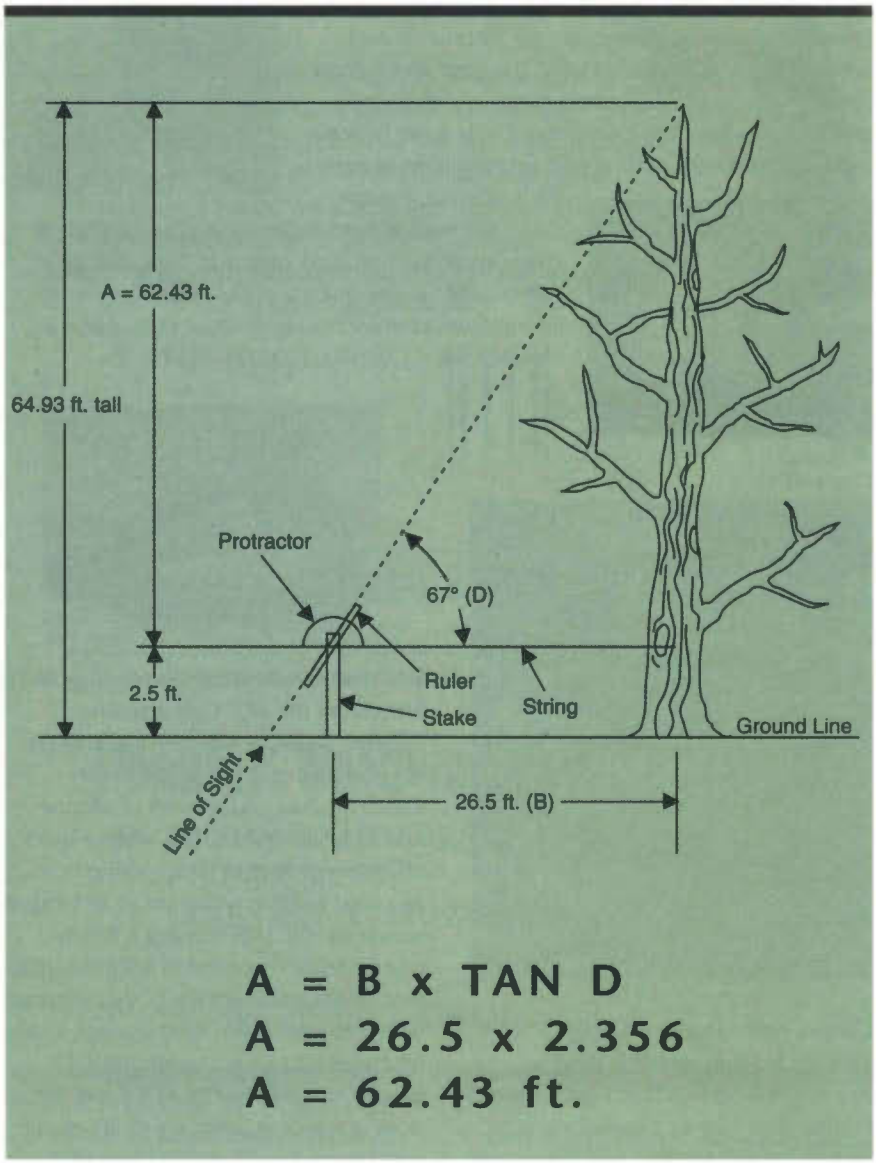
The standard method of using terms like "side adjacent" and "side opposite" can be difficult and cumbersome to use. Since most of you will be using these formulas on an "as needed" basis, these terms will be hard to remember.

To simplify this, I recommend the Simple-Fyer Dial and trig functions book. The dial is on a stiff fiber card stock and has been available since 1943. I've had mine nearly that long. The book, in addition to the formulas, has the trig function tables and other handy charts. The price is $4 for the dial and $3 for the book.

These are available from Derck's Gauge Dial Co., 4506 N. Pennsylvania St., Indianapolis, IN 46205. You may find the book at a tool and machine shop supply house. These normally have advertising on them and are free.

You really don't need the trig tables since you have them all within your scientific calculator. However, I want to keep this as simple as possible. The tables make a handy reference for checking what was just entered on the calculator.

Let's talk about these natural trig functions. There are six of them: sine, cosine, tangent, cotangent, secant and cosecant. The first three are displayed on your calculator abbreviated as SIN, COS and TAN. The other three are inverse functions of these first three. It's important to know their relation if you're planning to use only the calculator, as opposed to the trig tables. Their relation is sine/cosecant, cosine/secant and tangent/cotangent.



For example, let's say you wish to extract the cosecant for 38° from your calculator. Enter 38 [SIN], [2NDF], [x2] and the answer is 1.6243. Remember, the [2NDF] converts the [x2] to [1/x], so all you're really doing is dividing the SINE, COS, or TAN into one to extract the inverse function. Of course, you don't need to know all this if you use the tables, you simply read it direct. Here's a bit of information on reading the tables. You will note when you reach 45°, the table begins to read backwards. The minutes read from the bottom up on the right instead of the left down.

One last thing about using this particular calculator. Let's say the problem was solving for an angle and the answer was the cosecant of that angle. If you were using the tables, you could just look up the angle, but let's use the calculator to do the same thing. Let's say the answer rounded off is 2.155 and is in the display. Punch in [2NDF], [x2], [2NDF], [SINE], [DMS]

Robert Calvert is a retired tool designer and frequent contributor to Popular Woodworking.

and the display will read 27°, 38′ and 52.53″. Rounding this off, it becomes 27° and 39 minutes. If your answer was the SIN, COS or TAN of an angle, the above first two button pushes would not be needed.

Let's say the problem was solving for an angle and the answer was the sine of that angle. If the answer was .464, in the display punch in [2NDF], [SINE], [DMS], and the display will read 27°, 38 minutes, 44″. You do need either the book or the dial for the formulas. Now let's use this newfound information.

First, let's take a look at the formulas in the book. There are many formulas for a right triangle. A is called the height, B is the base, and C is the hypotenuse or simply the long side. D and E are the angles. Any of these values can be determined if you know two of the others. The main formula is listed with an alternate in most cases. Formulas are on the next page for oblique triangles, which have no 90° angles. These formulas are more involved. For ease of use, simply split up an oblique triangle into two right triangles to solve.

Simple trigonometry has many uses, and some are profoundly practical. If you had a large dead tree a short way from your house and wished to cut it down in a single felling, it would be helpful to know if it was going to fall on the house. To determine this, measure the distance, house to tree, and compare with the tree's height, once you have it.

You could climb to the top of the tree and drop a weighted string down to measure its height, but trig is much easier and safer. The best way to measure an angle is with a transit, but I'll assume one isn't available, so you will need a string, stake, level, protractor and a ruler. Step away from the trunk far enough so you have a clear view of the top of the tree. Drive your stake in the ground and stretch the string from the tree to the stake so it's level. Measure the distance from the stake to the tree's center. Write this number down.

Next, hold the protractor and ruler against the stake so the bottom of the protractor is sitting on the string and parallel with it, and the ruler has the top edge running through the protractor's center mark. Last, sight along the ruler's top edge and adjust its angle until it's pointing at the very tip of the tree. Take the reading in degrees from the protractor and write it down. You may want to do this several times to get the best reading. We now can calculate the tree's height.

Referring to the formulas in the book, we see that we wish to solve for side A and we have the angle D and the length B to work with. The formula with B and D known is A = B TAN D, or as it is stated in the book B [X] [TAN] D [=] A. Let's plug in a few numbers and work it through where B = 26.5′ and D is 67°. Enter 26.5 [X] 67 [TAN] [=] 62.43′ [+] 2.5′ for string to the ground. We have a tree just shy of 65′ tall, assuming it was growing perpendicular to the level string. Did we hit the house? Better safe than sorry.

A number of years ago, I built a quaint octagonal gazebo with a pyramid roof that was an exact reproduction of the Giza pyramid in Egypt. A lot of trig was needed to build this roof. It was more involved than there is room for in this article, but the base had a simple problem worth mentioning. I first made the form to pour the concrete base, starting with an 8′ square box frame made of 2 x 6 lumber. I wanted the base to be eight-sided so the walls would fit the square base of the pyramid roof.

Next, I needed four gussets to fill in the corners. These could simply be 2 x 6s with 45° miters on both ends. But when I went to cut them, I realized the length was unknown. You might think just dividing one side into three equal lengths would do, but this dimension is over 7″ short. Or perhaps dividing the circumference of a 96″-diameter by eight is right, but it too is wrong by some 2″. So, I sketched an octagon on paper and drew a center line through one flat and a corner. Since an octagon is made up of eight, 45° oblique triangles, I could see graphically that half of one of these triangles formed a right triangle with the D angle being 22.5°. Since I knew B, or the base, which was 48″, or half of the 8′, I could easily calculate the height for half of the dimension I needed.

Let's plug those numbers in and solve the problem. This is the same formula needed in the above example. A = B TAN D, enter 48 [X] 22.5 [TAN] [=] 19.882. We then multiply this by 2 to get the needed answer of 39.765″. I cut the pieces at a fat 39-¾″ and it worked fine. I'd like to point out that your best ally is your power of reasoning. Like the above problem, the solution wasn't apparent until I made a sketch.

This last problem is one that has plagued many woodworkers over the years. It is how to set your saw in both miter and blade angle to achieve a stave constructed bowl with sloped sides. The formula for the miter is M = TAN - 1 [1/(SIN S (TAN 180/N))] and the formula for the angle is T = TAN - 1 (SIN M, COS S, TAN 180/N). Remember two things when using these formulas. The solution arrived at when solving for M is needed to solve for T, but the answer is not correct for setting your miter. You need the complementary angle, or this answer subtracted from 90°. For example, if your answer was, say 83.5°, you would set the miter at 6½°. The other thing to remember is the slope of the stave is off the vertical center line.

Let's set up for a seven-sided box with a 10° outward slope at the top. Where M = miter gage setting, T = tilt of saw blade or arbor, S = slope of sides and N = the number of segments desired. Also remember the brackets in the formula as discussed in a previous part of the article. To solve for M, enter 180 [÷] 7 [=] [TAN] [X] 10 [COS] [=] 85.2 [SIN] [=] [2NDF] [TAN] [=] 25.3 or 25 1/3°. Use this angle to set the saw blade.

I recently found a simpler solution to the above problem, though it may not be as accurate. Two things must be kept in mind with these particular formulas. First, you get the direct answer in both cases, so a complementary angle is unnecessary. Second, and most importantly, the slope is from the horizontal, as opposed to the vertical. So we have a 10° flair on our bowl, but off the horizontal it is 80°. The formulas are T = 180/N [SIN] S and M = 180/N [COS] S. Working through these, we have T 180 [÷] 7 [=] [X] 80 [SIN] [=] 25.3° and M = 180 [÷] 7 [=] [X] 80 [COS] [=] 4.47°. As can be seen, the M setting is about ½° different. It's difficult to prove which works the best in the actual cutting of wood since the machines are difficult to set accurately. So, the choice is yours.

This concludes the five parts of the basic math article. I hope you've enjoyed it and will find many new problems to solve with the information gleaned. PW

Handkerchief Table

Here's a cherry reproduction for those hard to use corners.

By Dean Gutzwiller

This delicately featured table is a copy of an original dating from the 1700s. It derives its name from its appearance, that of a folded handkerchief! I included this table in my line of antique reproductions because of a problem everybody seems to have ... that one corner in your house which is too small to accommodate most furniture. My solution was this handkerchief table, which fits in a 24" corner and has a drop leaf design. Although the original was made of walnut, I chose cherry because of today's poor quality walnut and high price.

Start by turning (4) offset Queen Anne legs measuring 1¾" x 1¾" x 27¼". This is done by first turning a cylinder to within 5½" from the top. Then, offsetting your turning center points ½" at the bottom and ⅜" at the top, turn the leg down so you have a ⅜" high pad foot ***(diagram 1)***. While the legs are still on your lathe, take the time to finish sand.

Setting the legs aside, I glued-up the two halves (remember, you need two tops because this is a drop leaf) of my top using ¾ surfaced to ⅞". Properly laying out your tops using staggered placement of the boards and "spooning" the two tops will minimize waste. It helps if you make a triangular "mirror image" template measuring 23½" x 23½" x 33½"

***Dean Gutzwiller** makes a 50-piece line of furniture and custom-designed cabinetry in his Kings Mills, Ohio, workshop.*

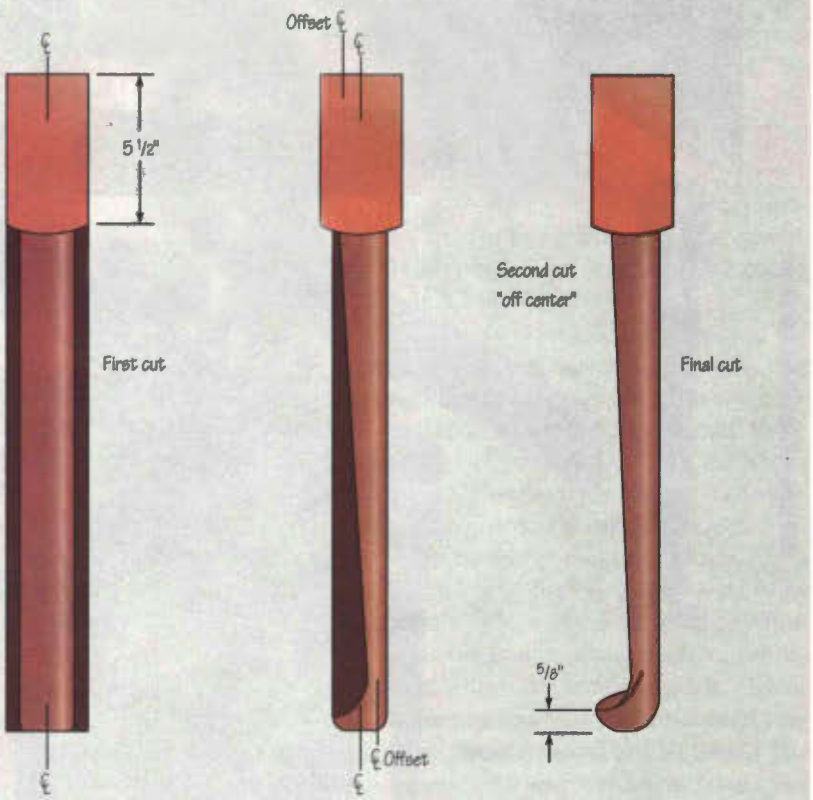
on the long edge. Stagger your boards when gluing and set aside for proper drying time ***(diagram 2)***.

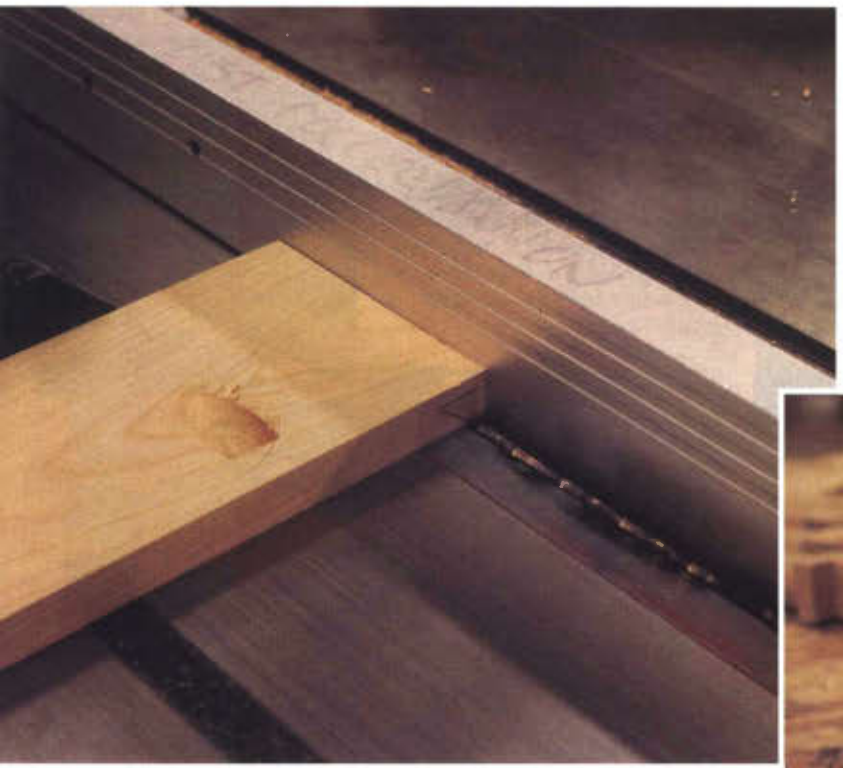
While the top is drying, cut out the aprons. The final thickness is milled down to ¾". The parts measure: (2) 4½" x 17¾" [A & B]; (1) 4½" x 10⅜" [C]; (1) 4½" x 12½" [D]; and (1) 4½" x 24½" [E]. Cut a ¼" thick x ¾" long tenon with a ½" shoulder on both ends of E, and on one end of A, B, C and D.

Pieces C and D are the gates for the swing leg and need only one tenon. Pieces A and B need to have a 45° shouldered tenon on one end and a square tenon on the other end.

For the angled tenon, set the fence for 45°, set for a ¾" x ¼" tenon ***(photos 2 & 3)***. Raise the blade to cut ½" deep so the tenon is off-center. After scoring the angle, return the blade to 90° and move

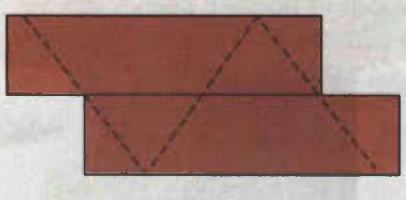
Diagram 1

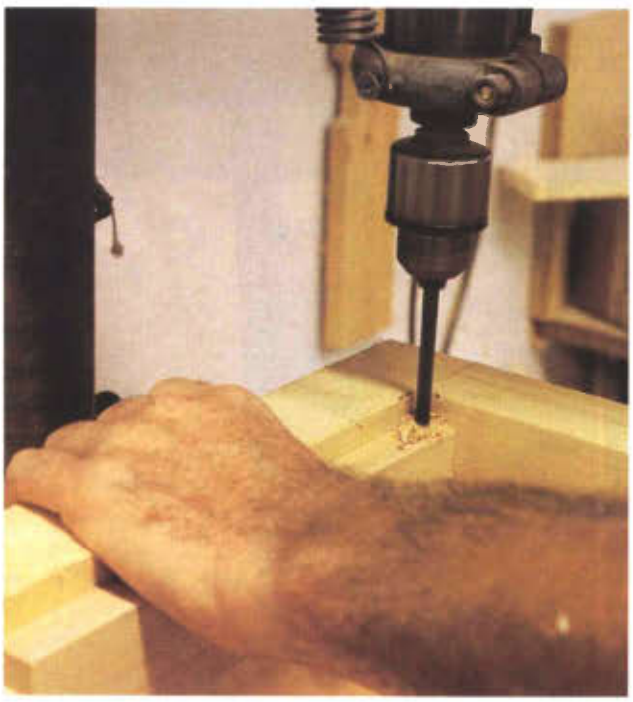




2 & 3. Table set-up and finished view of angled tenon on apron pieces.

Diagram 2

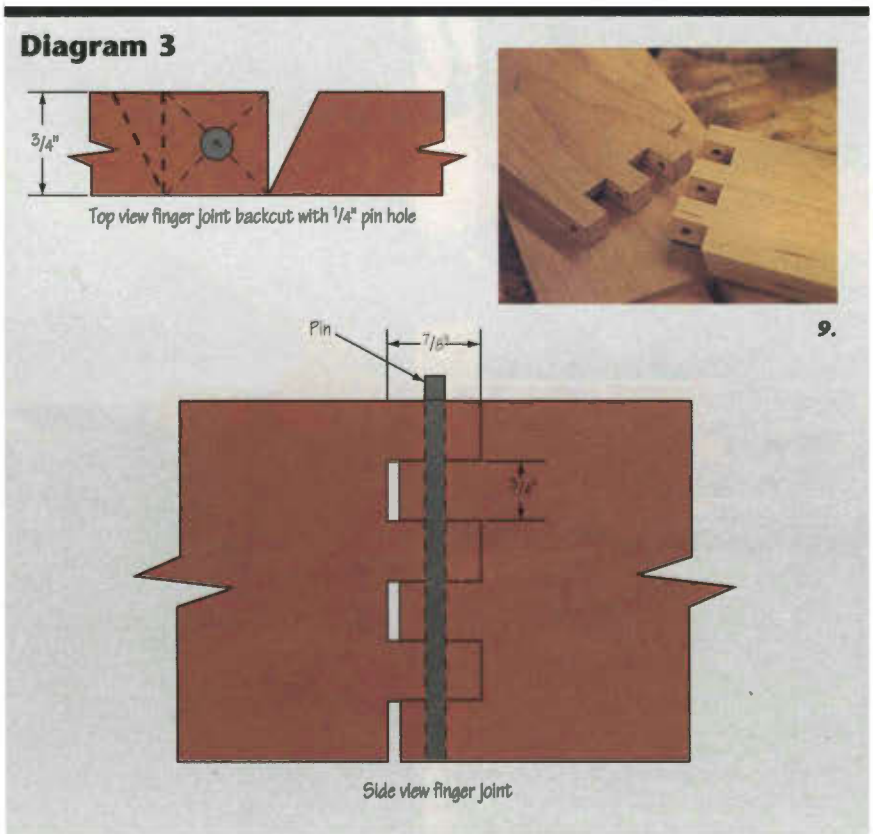




4. Drilling pin-hole for gate (left). 5. Below, detail of the angled screw pockets being drilled in apron for top attachment. 6. Inset shows jig used in making finger joints for gate joint in apron.

7. Preparing to mortise grooves for the apron tenon in the legs.

8. Hold-down jig for angle-mortising on the legs.



9.

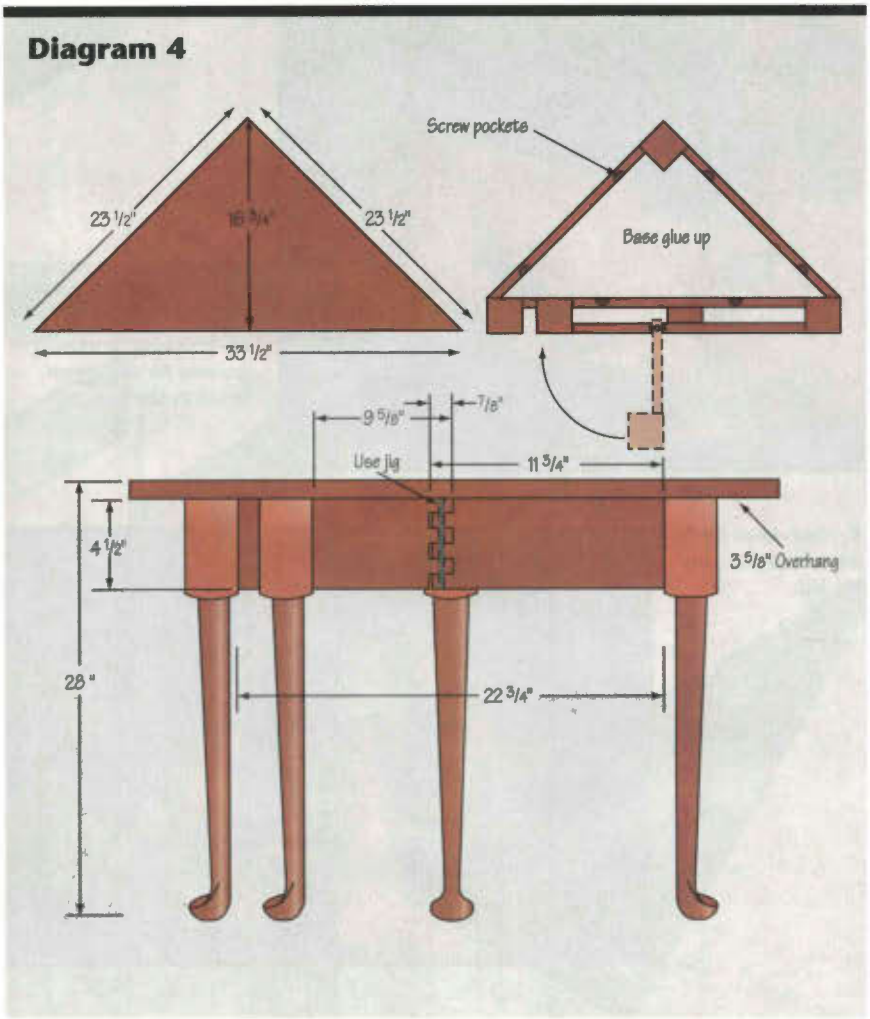
the fence to cut ¼". With the apron vertical, cut the remainder of the tenon. Finish removing the wood in the corner with a band saw.

You now want to cut the gates of finger joints on C and D. I made a jig that aids in cutting the finger joints and back cuts to relieve binding in the joint. Using a piece of scrap wood 1¾" x 2½" x 16", cut a 22° angle on the 2½" side the length of the board. This allows your gate to angle back as you cut the fingers. Cut a ¾" wide x ⅞" high dado in the jig. Now cut a ¾" x ⅞" x 3½" piece of wood which will serve as an indexing guide for the fingers. Attach the indexing guide to your angle push guide ¾"+ to the right of your dado blades (stacked to ¾"+) ***(photo 6)***.

Before making the finger joints, you want to drill a ¼"+ hole through the center line of the fingers ***(photo 9)***. This is how the joint works. It is extremely important to do this prior to making the joints, or your drill bit will wander and adversely affect the operation of the swing, causing the table to rock when the leaf is raised and the gate extended.

Raise your blades to ⅞" and make your first cut. Place the dado cut you just made over the indexing guide and repeat the process twice. You should now have two pieces (C and D) with tenons on one end and fingers on the other.

***10.** Mortises shown ready to receive apron tenons.*



***11 & 12.** Before and after views (above and right) of cutting away the excess material from the gate leg so it will close accurately against the apron rail.*

Photo at right shows finished assembly of gate leg and apron in closed position. The next step is staining and finishing.

Now you want to drill your screw pockets in the aprons A, B and E ***(photo 5)***. I made a jig, allowing the arrows to angle back approximately 11°. Using the drill press and a ⅜" Forstner bit. I measure in from the ends 3" to 3½" and mark. Then, placing the apron's top side down, drill to within ⅜", forming a pocket. This pocket is how you will attach the top to the base via #10 x 1¼" wood screws.

Now comes the fun part. Lay out the legs so you have one facing the rear and two facing forward. Mark where your mortises will go: ***(diagram/photo 10)***. To mortise on an angle, I made a hold down jig. Using two triangular pieces of wood, I formed a cradle or support. Attach two hold downs ***(photo 8)***. Slide your leg in and mortise so your apron will be flush to the outside of the leg. On the right front leg, you need to double mortise on the inside of the leg to accept the gate leg support apron D. A ¼" gap should be between D and E.

Glue-up three legs and A, B and E. Now you will need to cut out a section measuring 4½"+ x 1" at the top of the gate leg ***(photos 11 & 12)***. This allows the gate leg to close completely into E. After cutting this, sand roughness and glue C to the gate leg. Make sure all of the feet on the front face forward.

To make the pin that will fit into the finger joint, I used a ¼" steel rod, cut to 4½" long. I center punch and drill with a ⅛" drill bit to a depth of ⅛". Using a larger center punch ***(photo 14)***, flare out the top so it won't fall through the holes drilled in fingers.

Now glue D to the right front leg using a ¼" x 4½" spacer just behind the finger joints, and glue in place and clamp. While drying, I process the tops. Using a 2" butthinge, hinge tops 3⅝" in from the ends.

After sanding the base to final 220 grit finish, I peg the joints using ¼" x ¼" cherry; drilling (2) ¼" holes in all the joints/legs. This locks the tenon into the mortise of the leg. It is not necessary to drill angled mortises.

Using the stains and finishes of your choice, finish the base and top. Hint: finishing is easier without the top on or gate leg in place. After finishing is complete, tum the top upside down and center the base of the top and attach with (6) #10 x 1¼" wood screws.

When completed, you should be so pleased with the project that you may start searching for a few more small corner areas around your house just so you can begin building another. PW

14. Flaring the top of your home-made pin for hinging the finger-joint gate.

15. Pin in place, this photo shows the working mechanism of the finger-joint gate.

Toy Chest

This project will give a child a perfect place to store the holiday's bounty (and it's sure to last longer than the toys inside)!

By Jacob Schulzinger

There's something about watching a child rummage through a toy chest that creates a wonderful feeling. That's exactly what you'll get when you build your first chest and watch it in use. This is not a difficult project to undertake, and its common pine construction should make it even more attractive to many woodworkers.

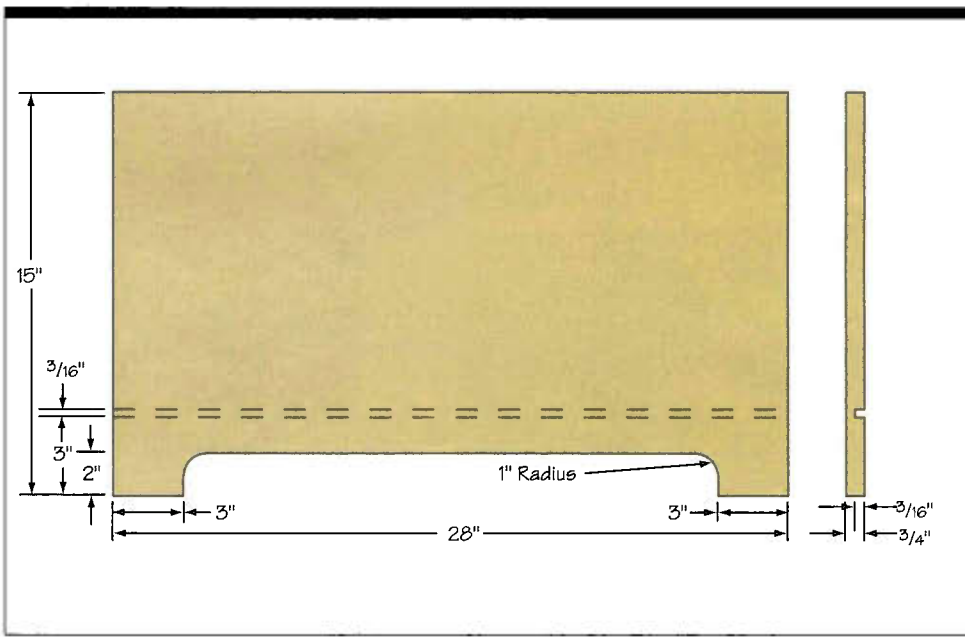
The start of any project is the selection and preparation of the lumber. The pine chosen for this job is standard ¾" x 6" x 6' long #2 grade material purchased at a local lumberyard. Spend some time going through the boards to get the very best you can find. Watch for the usual bends, bows and twists you normally see in this material's grade, and be especially careful to avoid planks with loose knots. Don't worry about the sound knots since they'll add color and character to the finished project.

Process the boards by ripping both edges until they are straight, then glue them together in two separate stages so you never have to work with more than two loose pieces at a time.

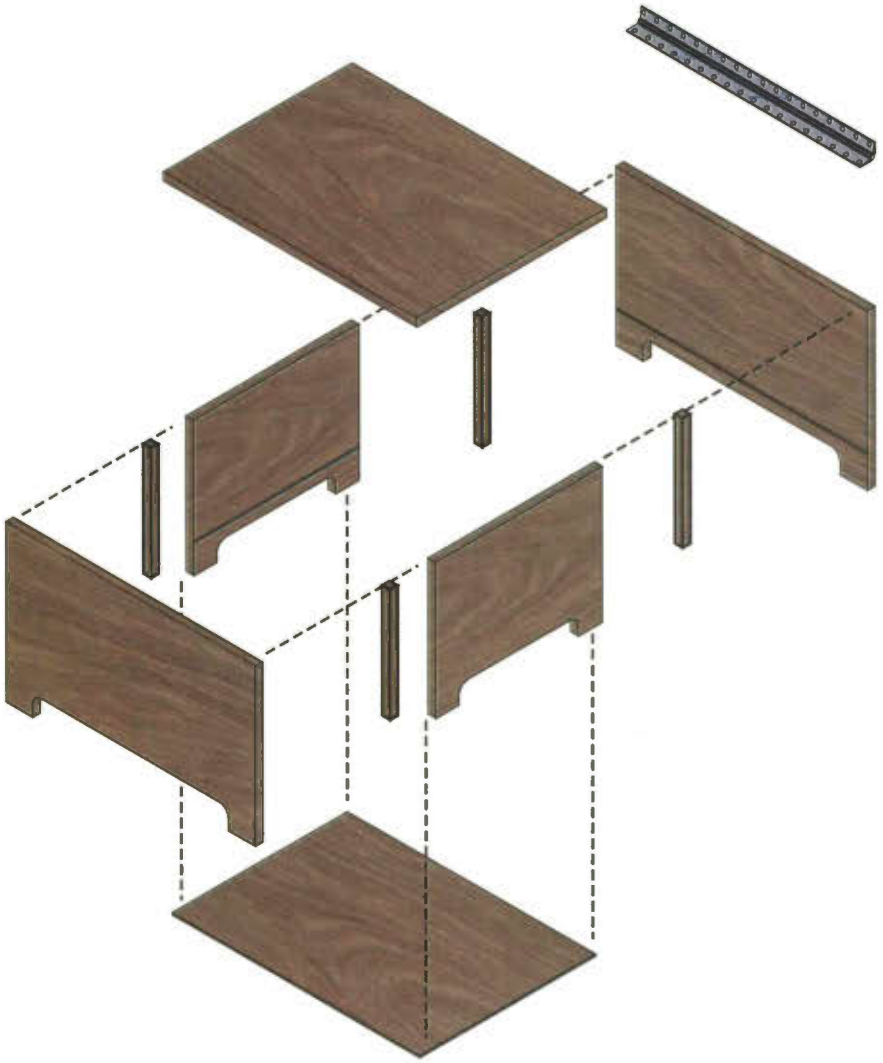
The first gluing operation will make a pair of 10½" planks, and the addition of the third plank will create a pair of the almost 16" wide planks that are needed for the sides and faces. The method I used for making wide planks is the biscuit jointer, but you could just as easily use dowels or plain edge gluing. Once the boards have been glued-up and the glue permitted to cure, dress the boards so the faces are smooth and even.

Crosscut the first glued board assembly so you make a single 30" long front panel and a pair of 15" long end panels from it. The second board will make the remaining 30" rear panel, and the drop piece will be used to make the lid once some additional work has been done to

Another view of the assembly with the child-safe lid support shown installed.



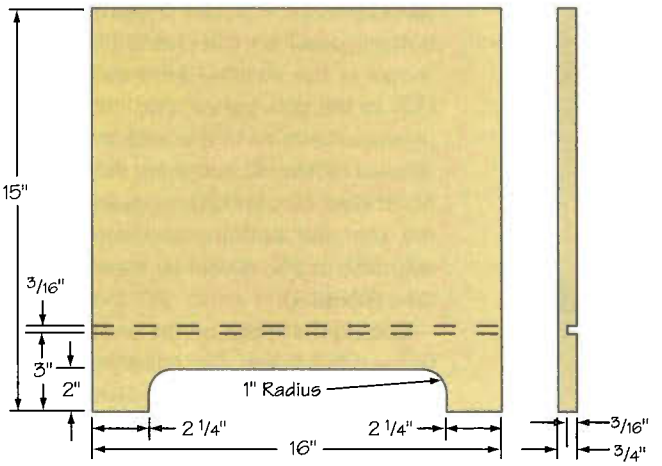
Jacob Schulzinger works with wood—and writes about it, too. He also works full-time as a technical writer in Houston, Texas.



it. Use a good, sharp crosscut blade for this operation since the ends of all the long panels will be visible after assembly. Also, any extra time spent here will only reduce the need for lots of sanding later. Set aside the top panel for the time being so you can continue working on the sides and ends.

Layout the body's four pieces for the cutouts along the bottom most edges. Refer to the drawings, and note that while the assembled piece calls for the cutouts to be equidistant from the corners, the actual layout dimensions on the end boards will be ¾" less because of the two flanking pieces' thickness. Use a hole saw to drill the 2" diameter holes in each of the side pieces, then set the boards aside for the moment. Don't make any additional saw cuts until after the slots for the bottom panel have been completed.

Set up your table saw with a ripping blade for cutting the 3/16" wide x 3/16" deep slots for the bottom panel in each of the four side boards **(photo 1)**. Make the number of passes needed so the ply-



Material List

Item	Description & Size	Quantity
A	Front panel, ¾ x 15 x 28, pine	1 each
B	Rear panel, ¾ x 15 x 28, pine	1 each
C	End panel, ¾ x 15 x 16, pine	2 each
D	Bottom, 3/16 x 16 3/16 x 26 13/16, plywood	1 each
E	Top, ¾ x 18¼ x 28	1 each
F	Glue block, ¾ x ¾ x 90	cut to fit
	Brass piano hinge, 36" long	1 each
	Child-safe, center mounted lid support	1 each

wood panel will slip easily into the grooves. Once these slots have been cut, work can continue on the cutouts at the bottom of the panels. Layout the cutting lines to connect the 2" diameter cutouts, then saw the openings using a band saw or saber saw. Use a fine toothed blade in your saw to keep the cuts as smooth as possible, then dress up the cutouts with a cabinet file and sandpaper.

Because you have cut a full length 3/16"-wide slot in each of the two face panels, and because the ends of the boards will be visible after assembly, it will be necessary to plug these slots. This is done easily by gluing a 3/16" wide x 1/2" high x 1/2" long rectangular plug into the slot at each end of the front and rear boards ***(photo 2)***. When the glue has dried, you'll be able to bring the plugs down to the proper height by using a sharp bench chisel. Finish sand the boards' inside surfaces, and set them aside until the bottom panel has been prepared.

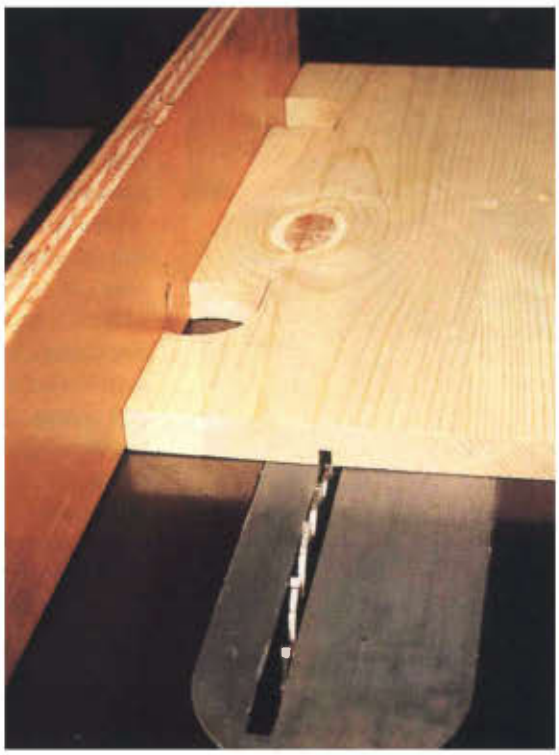
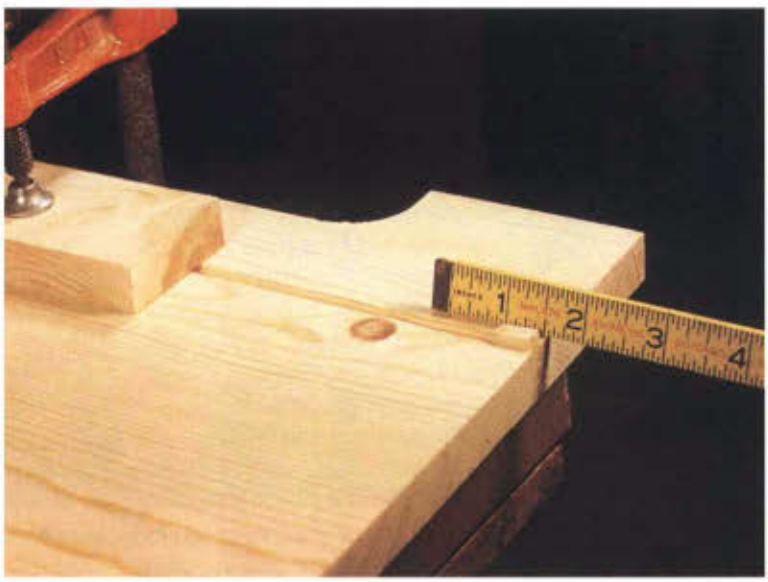


Table saw cuts 3/16" x 3/16" groove to receive chest bottom. The through cut is later filled (see below).



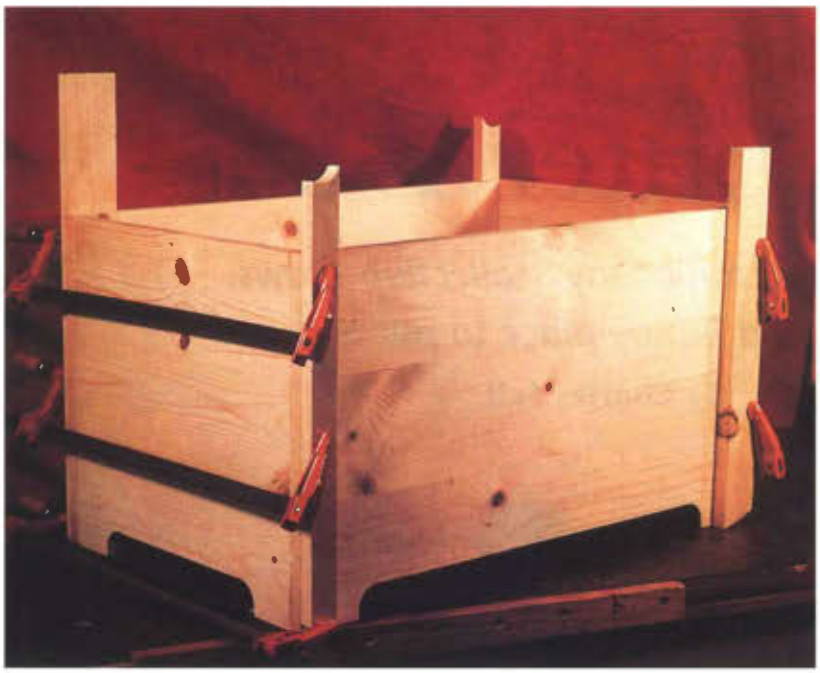
After the 2" holes are drilled on the panels, cut and glue the 3/16" wide x 1/2" long plug into all slot ends on the front and rear panels to fill the saw cuts.

The bottom panel is a single piece of 3/16" thick plywood that has been cut to fit the slot openings. In this case, the board is to be 16 5/16 wide x 26 13/16 long, which allows 1/16" of movement in any direction. Because the corners of the bottom panel may interfere with the biscuits that will be used to hold the assembly together, each corner should be trimmed to a 45° angle with a 1/8" leg. Finish sand the bottom panel and dress the edges so there are no splinters to get snagged on.

The unit was assembled using #20 biscuits that were spaced at 4" intervals, with each of the end biscuits being about 2 1/4" from the ends of the panels. This method is very fast and sure, but you can use almost any other assembly techniques you are comfortable with. Examples of acceptable joints might include dowels, screws, glue blocks in the corners with or without screws, or even dovetails. Clean the parts before you make the assembly, then install the bottom panel so it will help align the parts as the assembly progresses.

Once all of the side and end panels have been assembled, allow the glue to cure a full 24 hours with the clamps in place before you do any additional work. There is always the possibility that the bottom panel might not go deep enough into the slots because of bowing action on the front and rear panels or stay in them because of the excessive load placed in the bottom of the chest. This is easily fixed by gluing full support blocks that are 3/4" square underneath the bottom panel on the chest's inside, as shown in the sketch. Glue these blocks only to the pine panels, and not to the plywood bottom, so the bottom will be allowed to float. At this point, the assembly should be checked for evenness of the top and bottom, and any minor adjustments also should be made at this time ***(photo 3)***.

Cutting the initials on the unit's face is the next task in line. This is easily done by laying out the initials freehand with a soft pencil and using a router with a vee-shaped bit to form them. You can get as fancy as you like with this step by using letter guides or stencils, or you can just try the freehand approach so long as



Assemble the box and clamp up until the glue has set.

Personalize this piece by using your router with a vee-shaped bit to cut the initials on the face of the chest.

your cut is ⅛" deep or less. If you're not comfortable with a freehand routing operation, you can spend about 10 minutes practicing on some scrap stock so you are ready to go. The most important things to remember when performing this task is to take your time, clamp the work securely in place, hold the router with a firm grip and follow the lines you've prepared ***(photo 4)***.

To add a bit of variety to the front panel and hide some problem spots on the wood at the same time, three ¼" diameter walnut plugs are installed at the upper left hand corner on the face panel ***(photo 5)***. Doing this operation is easy—just layout the drill about ¼" deep and glue a 5/16" long piece of walnut dowel rod in each of them. Once the glue has fully dried, the ends of the plugs can be trimmed with a sharp chisel and the surface finish sanded.

The next step is preparing the lid. The panel for the lid is too narrow at this point to fit the top of the chest, so it will be necessary to edge glue a piece of 6" wide lumber onto it. This will make the panel about 21" wide. When the glue has cured the panel may be dressed, then ripped to the desired 18¼" width. This dimension will handle the 17½" width of the piece, plus allow an additional ¾" to stick out past the unit's front for lifting purposes. Use a ¼" roundover bit with your router to prepare the leading top edge to make it a safe handhold, then crosscut the panel to the full 28" length. Finish sand the panel, and prepare to apply the finish to the entire assembly.

The finish selected for this piece was a clear satin coating that would allow the wood's full color to stand out. As everything should have been finish sanded by the time this point has been reached, it will only take a few moments for you to touch up any slight surface imperfections and wipe down the components for the application of the finish. Follow the manufacturer's suggested practices when applying the finish, and observe all safety precautions.

When the full number of finish coats have been applied and allowed to dry, the mounting hardware may be installed. In this case, a full-length piano hinge was used to attach the lid to the body and a child-safe support installed to keep the lid from falling down on a small head or hands. The piano hinge was first cut to the proper length, which is about 1" less than the overall dimension of the chest. Then it was aligned using double stick tape on the lid's back edge. Use flat head screws at least ⅝" long to make the attachment. Position the lid or the chest with a thin cardboard shim under the lid at the back of the unit. This shim will force the lid to slope very slightly toward the front, and will allow it to close without a gap. Install the child-safe support using the instructions provided by the manufacturer, and the hardest part of the job is done ***(photo 6)***.

Once the lid has been installed, there's really nothing more to do except give the chest to your favorite youngster and watch the child's eyes light up. PW

From this angle you can see the three ¼" diameter walnut plugs just above the initials that were used to hide material defects.

Crafting a Corner Computer Desk

As your electronic "toy" collection grows, here's a handy place to put it.

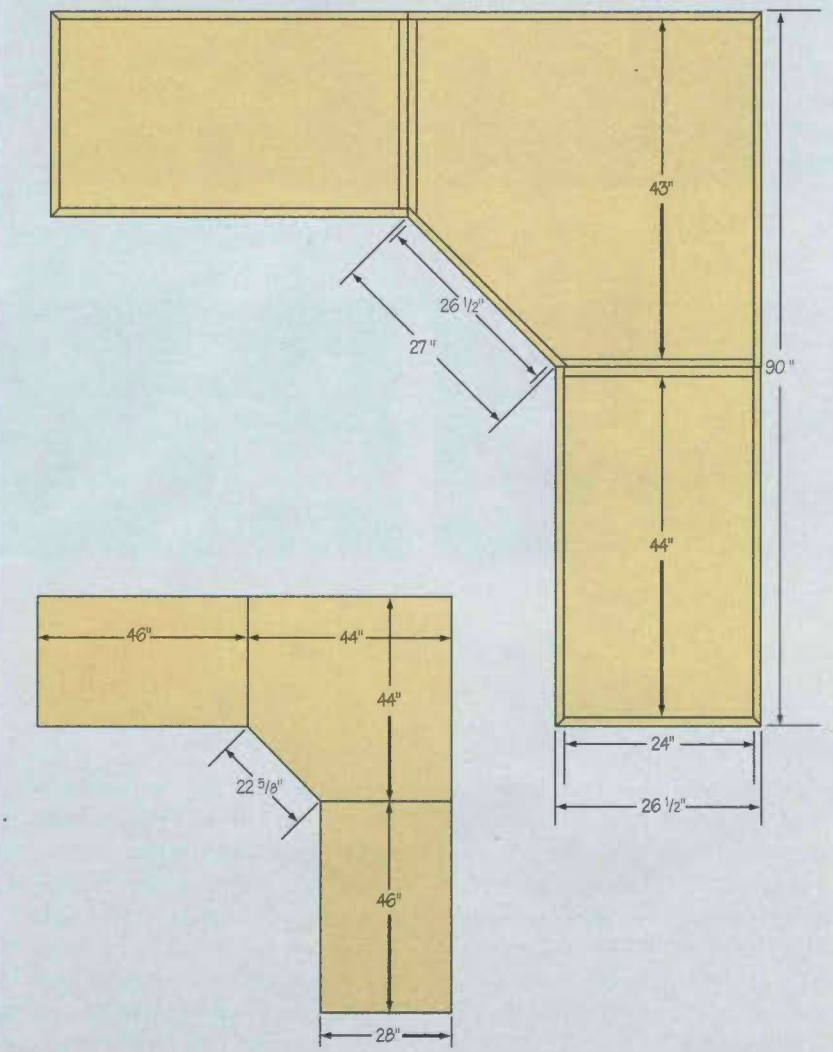
By Charles Self

Designing a computer desk presents a woodworker with some specialized problems. The most common is the need to house a lot of usually bulky equipment in what is almost always too little available space. For the past several years, I've shuffled a computer, mouse, laser printer, plotter and answering machine around an ever increasing pile of paper, disks and manuals. I passed the stage where any of this could be called fun long ago.

To remedy this situation, I designed a corner computer desk that will, I hope, increase my efficiency and put a little fun back into my computing chores. Turning a corner into desk space virtually guarantees adequate depth in the desk's central portion, where the bulky CPU, monitor and keyboard are kept. And free-standing additions allow the builder to choose among various options. I made an addition in the form of a printer cart. You may prefer to make two additions with drawers and doors, or a pair of carts or some other combination entirely.

Charles Self *has written 32 books and more than 1,000 articles. His latest books include* Woodworker's Guide to Selecting and Milling Wood *and* Creating Your Own Woodshop.

Dimensions



Parts List

4 sheets ¾" red oak plywood

2 l½ sheets ½" A-C pine plywood

1 4' x 8' sheet plastic laminate

2 drawer runners, 24877: The Woodworker's Store

1 computer keyboard slide, 64345: The Woodworker's Store

1 keyboard platform, 64352: The Woodworker's Store

(The two units above also are available from Trend-Lines, as a package, KB22.)

Hardwood grommet, oak, 3", 62380: The Woodworker's Store

Cord grommet, almond, 27C14: Woodcraft

4 ⅜"–18 solid brass threaded inserts Trend-lines RN3118

4 ⅜" x 1¼" brass flathead screws Trend-Lines RN31181

(Both of the above come in packs of 25, and are easily installed with the RNTT3118 threaded insert tool.)

4 shelf supports, 27116: Woodcraft

4 twin wheel casters, plate type, 27124: Woodcraft

4 hinges

2 handles for drawers

2 knobs for doors

(Hinges and knobs were purchased locally.)

TOPS

All the tops were made by gluing-up pieces of ½" plywood to make 1"-thick material. (It isn't essential to use glued-up ½" plywood. You could simply use 1", or even ¾", but I just happened to have a surplus of ½" plywood.) You'll want two tops that will size to 23¾" x 46½", and one that will finish up 44" square. Make absolutely sure you have one side where both pieces are glued-up flush, and all the rest will be easy.

Once the glue is dry, cut a ¾" x ½" deep dado along the back edge of one of the 46" tops, 1" in from the edge. Next, cut a ¾" x ½" deep dado from the front edge to the back, 1" in from the right edge (dadoes down). The left edge dado is cut , 10¾" in including the dado cut.

The next top is for the corner section. Take the **44"** square piece and cut ¾" x ½" deep dadoes on the under side, 1" in from all four edges. To define the angled front edge of the corner top, measure 23½" out from two opposing corners toward a third corner. Mark the angle by connecting your points. Cut along this angle, producing a front that measures 27½" long. The keyboard drawer will fit underneath (the resulting drawer cannot be wider than 23"; I made mine 22¼", including edging) once the sides are installed on the corner section.

With that done, let's move to the third top for the door/drawer section. Cut two ¾" x ½" deep dadoes front to rear, and 1" in from each end. Cut another dado, 1" in from the front, all the way across.

On this same top, cut a ¼" x ½" deep dado 1¼" in from the back, the length of the top. This will later accept the ¼" luaun backboard.

The tops' under sides are now finished. Clean up any dadoes, if needed, and make sure all angles are 90°.

1. Preparing to glue-up solid material for the drawer fronts.

2. Laying out the corner for biscuit joints.

3. Cutting biscuit slots on one side of the corner.

4. Cutting dadoes for drawer bottoms.

5. Squaring drawer side ends.

6. Glue-up requires a number of clamps, though not nearly as many if the entire job were straight glue and biscuits.

PRINTER SECTION

For the body of the printer section, cut a 20½" wide x 29½" high piece of ¾" red oak plywood for the partition/back of the bookcase. Cut another piece 45½" x 29½" for the full back, a third 10¾" x 29½" and one more piece 22" x 29½" for the right side upright.

Dado the 20½" and the 10¾" pieces 4" up from the bottom, making all dadoes ¾" x ½" deep.

Then cut a 21" x 10½" bottom to fit into those dadoes.

Using Titebond glue and nails (I used 1¼" finishing nails driven with an air nailer, which saves setting and leaves no hammer marks), assemble the unit, making sure everything stays square.

Next, cut one 20½" x 9⅞" oak shelf, and attach hot melt edging to that, and to all other exposed edges, using a standard iron. I did all edging last, and part way through decided I preferred ¼" x ¾" strips of red oak to the hot melt edging, so my desk is about half-and-half. If I build another, I'll finish all the edges with the ¼" red oak strips.

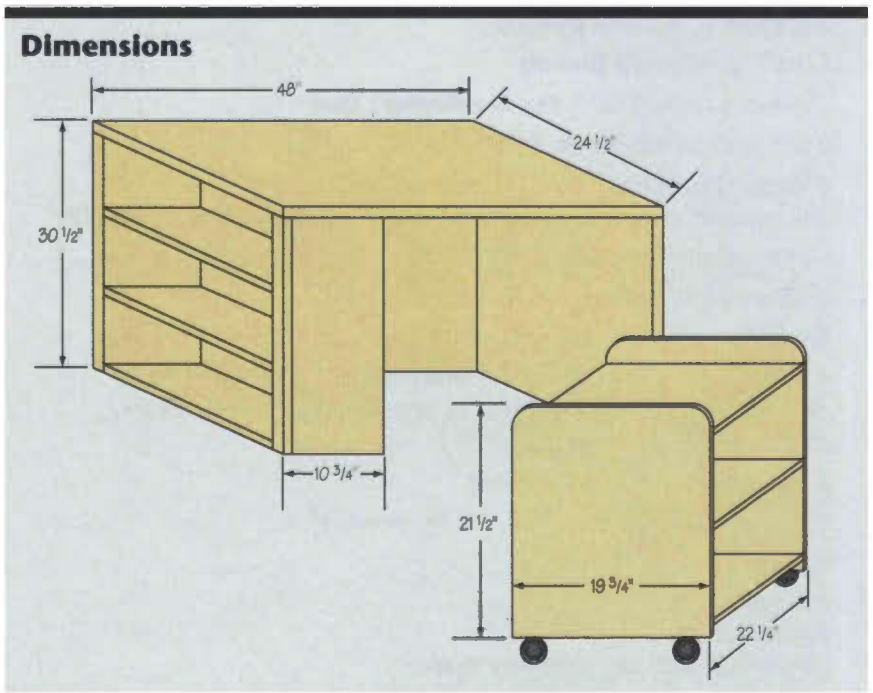
Cut ¾" x 1⅜" strips of red oak for edging the top, and a 21½" x 4¾" high kick plate for the bottom shelf enclosure. Again, assemble the edging and molding, using 1¼" nails and glue. However, do not place the molding around the top's edges until after the plastic laminate is cemented down and trimmed, which is one of the final steps.

The printer cart is an easy assembly. It uses two pieces of red oak plywood 19½" x 21¼", two 21¾" x 19½" and one piece 19¼" x 20¾" for the shelf. Try to run the grain vertically (up and down the 21"-plus dimensions).

Cut ¾" x ½" deep dadoes (on the 21¼" pair) 2" up from the bottom (including the dado), and another dado 4½" (or more if your printer needs the space) down from the top.

Assemble with glue and nails, keeping a very careful check on square. Cut ¼" x ¾" red oak strips to cover edges, then glue and nail in place. After the finish has been applied, add four swiveling casters.

The resulting cart supports my fairly heavy laser printer and two cases of paper (that's 20 reams or 10,000 sheets)



with no problems. It also rolls quite nicely, even when fully loaded.

CORNER SECTION

The center, or corner section, is a little more complex. Because the desk is large, I designed it for easy breakdown, allowing for access through standard (28" or so) door spaces. With an overall height of 30½", a fully assembled unit would require a major fight (and perhaps a bit of cursing) to get through many office or household doors. As designed, this is no problem at all.

Start by cutting two pieces 14" high x 23¾" long (for the sides) with the grain running vertically. Cut one back piece 40" long x 14" high, and the other 39¼" long x 14" high. Glue and nail these pieces into the previously cut dadoes in the top, making sure the assembly is square.

You can now make pieces to match each of those above, but 15" high (again, with wood grain running up the vertical height). These will form the bottom section after attaching to two pieces 9" high x 24½" (two, for each side), and one 40" and another 40¾" section (again, with the grain running vertically). Attach these, using 1¼" nails and glue, to the outsides of the 15" pieces, with 4½" fastened to the lower sides and backs, and the remaining 4½" sticking up.

The unit's top and bottom can now be assembled, and drilled to accept brass threaded inserts. (Those used are ⅜" long and fit in a ½" pilot hole. Please note the simple tool I made to insert them, which I find easier to use than the standard T-handled insert tool.) To fit these inserts, you'll need screws of ⅝" x 18 thread, measuring at least 1" long. Set one threaded insert at each front corner of a side, and each back corner of a side, then countersink the hole for the screwhead. The entire assembly is quite neat, and easy to change over.

DRAWER/DOOR SECTION

For the drawer/door section, cut two ends 20¾"x 29½" high from ¾" red oak. The cabinet bottom is a 20½" x 41" rectangle of ¾" plywood. The shelf is 16½" x 26½", while the upright divider for the drawer and shelf sections is red oak plywood 26½" high x 20½" (the grain should run vertically).

Cut a ¾" x ⅜" deep dado in the bottom 22¾" in from the right side .

On the right end and on the divider, cut a ¾" x ⅜" deep dado 13⅛" up from the bottom on the insides. This is a variable, as you may desire a differently placed shelf—or none at all.

The drawer space divider—dust shelf, if you will—is ¾" red oak plywood (other woods will do, but I had a piece that was just about the right size), 20½" deep x 15" wide. The divider is set into facing dadoes ¾" x ⅜" deep, cut 14¾" from the bottom, including dado.

Assemble the unit after rabbeting the inside backs of the sides ¼" deep x ⅜" wide to accept the ¼" luaun backboard. Mark the center of the divider for the shelf/drawer sections on the top, and on the bottom's under-side edge. Use 1¼" finishing nails and wood glue for the assembly, running a bead of glue up the divider. Use at least three nails. Keep all corners square, and don't install the back board until after the drawer guides are installed.

Now cut and install a ¾" x ¾" front frame piece on the left side of the draw-

7. The joint board for the corner section may be glued and screwed on, or secured with nails and glue.

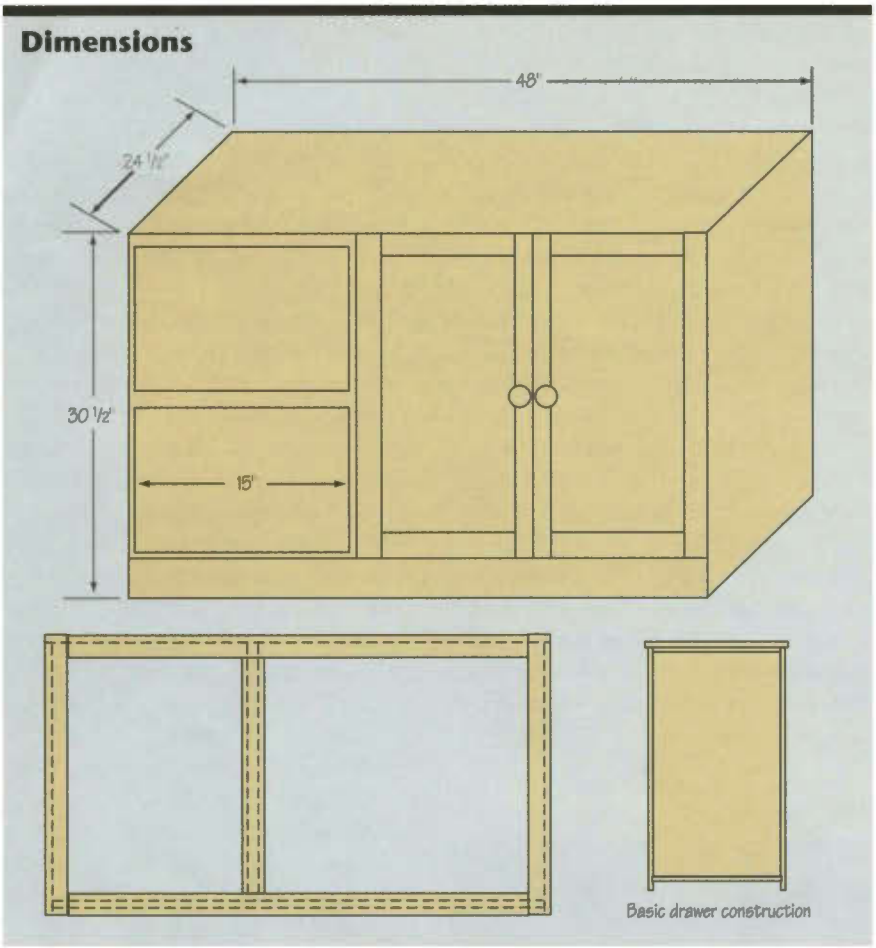
8. Leave the back of the drawer section open when setting drawer guides.

9. Cutting dadoes for drawer backs: It takes a large saw, but the radial arm saw is the best tool for this particular style of dado—close to one edge, where it's hard to get it to ride evenly on a table saw fence, and where it's difficult to get a router to guide evenly. This is Delta's 12" model.

10. Corner braces can help durability in the corner section. This triple brace is from Stanley Hardware, and is helped by two regular L-braces on other parts of the section.

11. Large routers can make a single pass ¾" x ½" dadoes with ease. This is Porter-Cable's 3¼ horse plunge model.

12. I had trouble getting the brass inserts in with a large screwdriver, and didn't have the tool meant for doing the job. Using a 2½" x ⅝"-18 hex head bolt and two nuts, plus two washers, makes a driver tool that works beautifully, smoothly and quickly with two wrenches.



Basic drawer construction

er opening, after gluing a 1½" x 42" wide piece into the top front groove. The smaller piece is 24½" long. Cut two pieces 1⅜" x ¾" x 24½". Install these with the right side piece fitting flush to the outside edge and the left side piece fitting flush to the drawer-side edge. Cut a 1⅜" x ¾" x 14¼" piece and fit it in on the horizontal drawer divider, with the trim piece's top edge flush with the divider's top edge. Again, use 1¼" finishing nails and glue.

Next, cut and install the lower molding piece; it measures ¾" x 3¾" x 42".

DRAWERS

Drawer construction is simple. I made boxes of ⅝" top grade birch plywood, using ⅜" deep dadoes set in 1" from the side's back edge for both drawers.

Sides for the top drawer are 20" long and 10" high, while the back is 14" wide x 11½" high. The front insert, glued and screwed to the back of the front, is 10" x 13¼", and the bottom is ¼" luaun, set into a ¼" x ¼" dado all around, ¾" up from the bottom edge of the sides, back and front.

The smaller top drawer is built in a

13. Drawer bottoms in place.

14. Edging the drawers using a roundover bit.

15. The Veritas tool rounds over the inside edges of the door stiles and rails.

16. Router and roundover bit do the outside door edges. Door assembly, including panel.

17. Door assembly without panel in place.

18. Doors assembled and standing near their positions.

19. Routing the drawer edges.

20. Sanding drawer fronts flat. The random orbit sander does an incredible job for a relatively lightweight sander that also will do a superb job of finish sanding.

21. Brushing works for contact cement.

22. Contact cement may also be spread using a notched spreader. This is a shop-made version of scrap laminate.

23. A rubber mallet does fine to start the contact, but it's difficult to make sure you have covered the entire surface. Follow up with a roller.

24. A good veneer roller works to force contact.

similar manner, with the same width, but its sides are 9½" high and its back 10". The luaun bottoms are 13⅛" wide x 20⅛" long.

I made one major, and one minor mistake when assembling the drawers. The serious error was in attempting to fasten the maple guides after the back was attached. It's much easier to attach the drawer guide pieces parallel to the drawer sides, and attach only the front of the base mounted guide. The minor blunder is even simpler to avoid: I used cabinet knobs for the drawer handles, and they're just not designed to look or work properly. I plan to replace them.

Next, insert the drawer and let it set the position for the guide, which can then be attached. Finally, place the back on the unit. You'll find this much simpler than installing it from the front as I did, which seemed to require something like 500 fittings, with each one demanding that I push the drawer in, and pull it out, and move the guide a tiny fraction.

The drawer fronts are glued-up from red oak, with the bottom drawer front 15" wide x 14" high, its grain running horizontally. I used a roundover bit to decorate the drawer edges and left it set to the same depth for the outside door edges. The top drawer front is 11" high.

25. Laminate trimming bits fit in almost any good router.

26. Trimmed laminate on the corner section.

DOORS

The cabinet doors are of simple frame and panel construction, with red oak stiles 2½" wide and 3¼" rails. The panels are ¼" x 18⅞" tall (the grain should run in this direction) x 8¾" wide oak plywood. Make the dadoes, centered in the stile and rail edges, ¼" wide x 5/16" deep. The stiles are 25" tall, and the rails are 9¼" wide (rails have tenons ¼" wide x 5/16" on both ends).

Assemble, glue and clamp both stiles and one rail for each door with glue. When the glue has dried, insert the panels. Then add the final rail, gluing the rail tenons in place, and clamp the assembly. The panel will be free floating. Use a round-over tool to soften the edges of the inside door frames.

LAMINATE

At this point, the plastic laminate tops were installed and trimmed. I used UGL contact cement, a mallet and a roller to make sure the material adhered properly. When cutting the tops to size, I left an extra inch on each side, which allows some margin for slippage. Because of this, a bit of slop is no problem. The laminate trimmer takes care of any extra, and actually gives you a superior trim. Once the tops were installed, I finished by adding the edge molding for the tops.

FINISH

I used Behlen's Pore-O-Pac for grain filling. The natural hue provided—almost exactly—the overall wood color I was looking for. Once the filler had dried (it's applied as a paste, then scraped off, and

27. Behlen's Pore-O-Pac and water-based polyurethane serve as the total finish. No stain was needed. Use with rubber gloves.

28. The HVLP sprayer comes with a viscosity tester. Follow instructions carefully to make sure the unit sprays the material properly: The Behlen's was just about perfectly mixed right out of the jar.

29. Make sure you filter material carefully.

30. Spray normally, but, no matter how used to a regular spray gun you are, I recommend at least 15 minutes of practice with the HVLP unit before starting the actual work. It's very easy to use, with little dripping and no orange peel, but it does handle a bit differently, at least in part because of the very thick hose.

wiped off, across the grain and, finally, with the grain), I taped off the laminate tops. Using a Campbell-Hausfeld HVLP spray set, I laid on three coats of Behlen's water-based polyurethane in a satin finish, rubbing with #0000 steel wool between coats. (I'd suggest finding a source for either bronze or stainless steel wool if you plan to use a lot of water-based sprays.)

As far as I'm concerned, there's no longer a need for any other kind of spray finish or spray unit for my woodworking. HVLP leaves very little overspray and provides a finish that goes on easily, while the water-soluble finishes lack the stink of solvents, plus most of their other problems (fire danger, potential lung damage, etc.).

Once the finishing was done, I installed the hardware and brought the unit to my office. There the corner base was assembled to the corner top. Once all my computing gear was in its place, the holes for the wiring were drilled. Then the filler units (grommets) were placed in those holes after the wires from the fax machine, answering machine and computer were run. Next, the printer was placed in its cart and a six-receptacle surge protector was positioned underneath the cart section's top. Now the printer was ready to be plugged in.

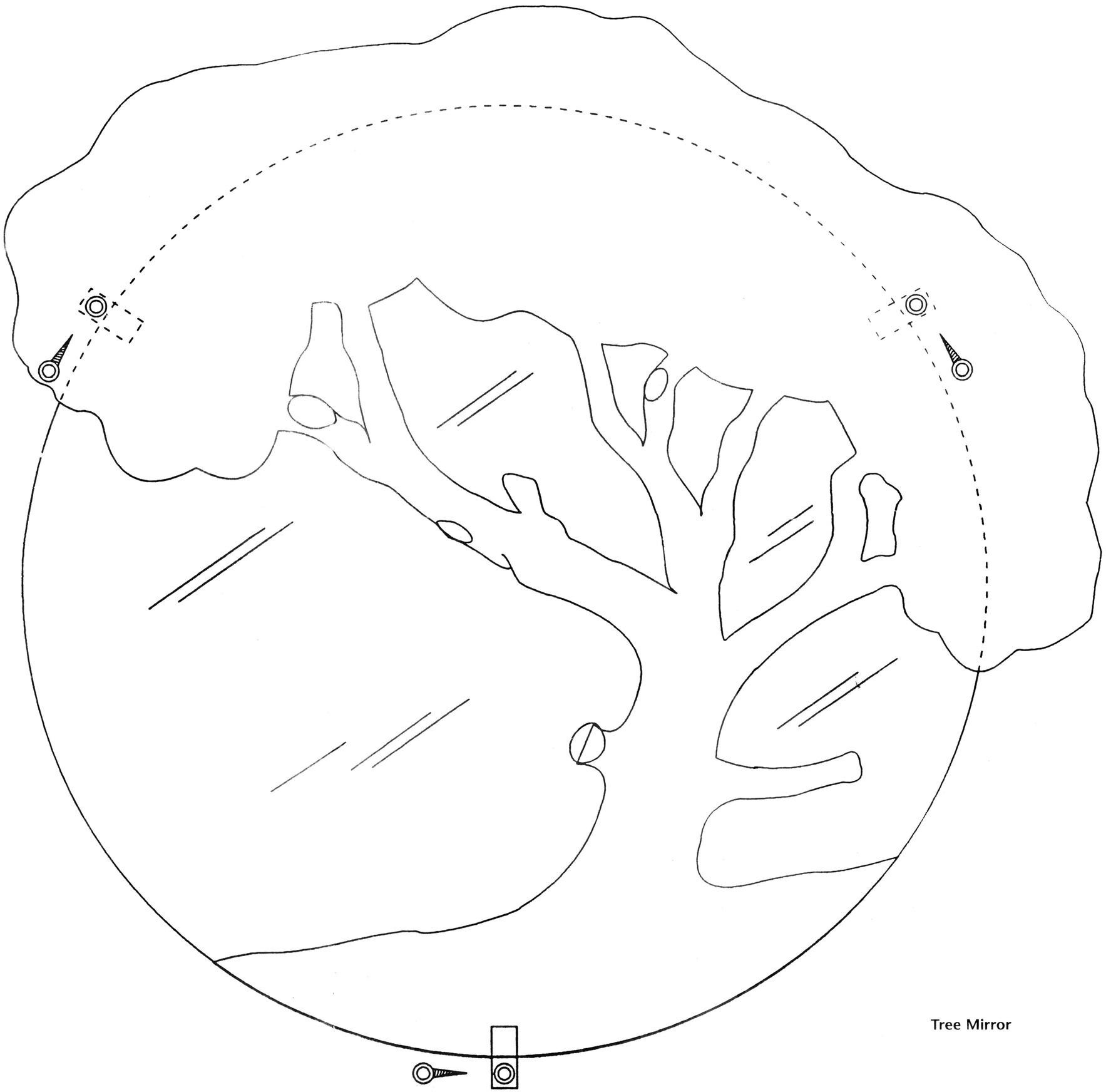
I now get maximum use of my office space with the desk extending along two walls and filling the corner. Eventually, I'll build some cabinetry that will make the corner itself even more efficient than it is now! PW

Sources of Supply:

Trend-Lines
375 Beacham St.
Chelsea, MA 02150
800/767-9999

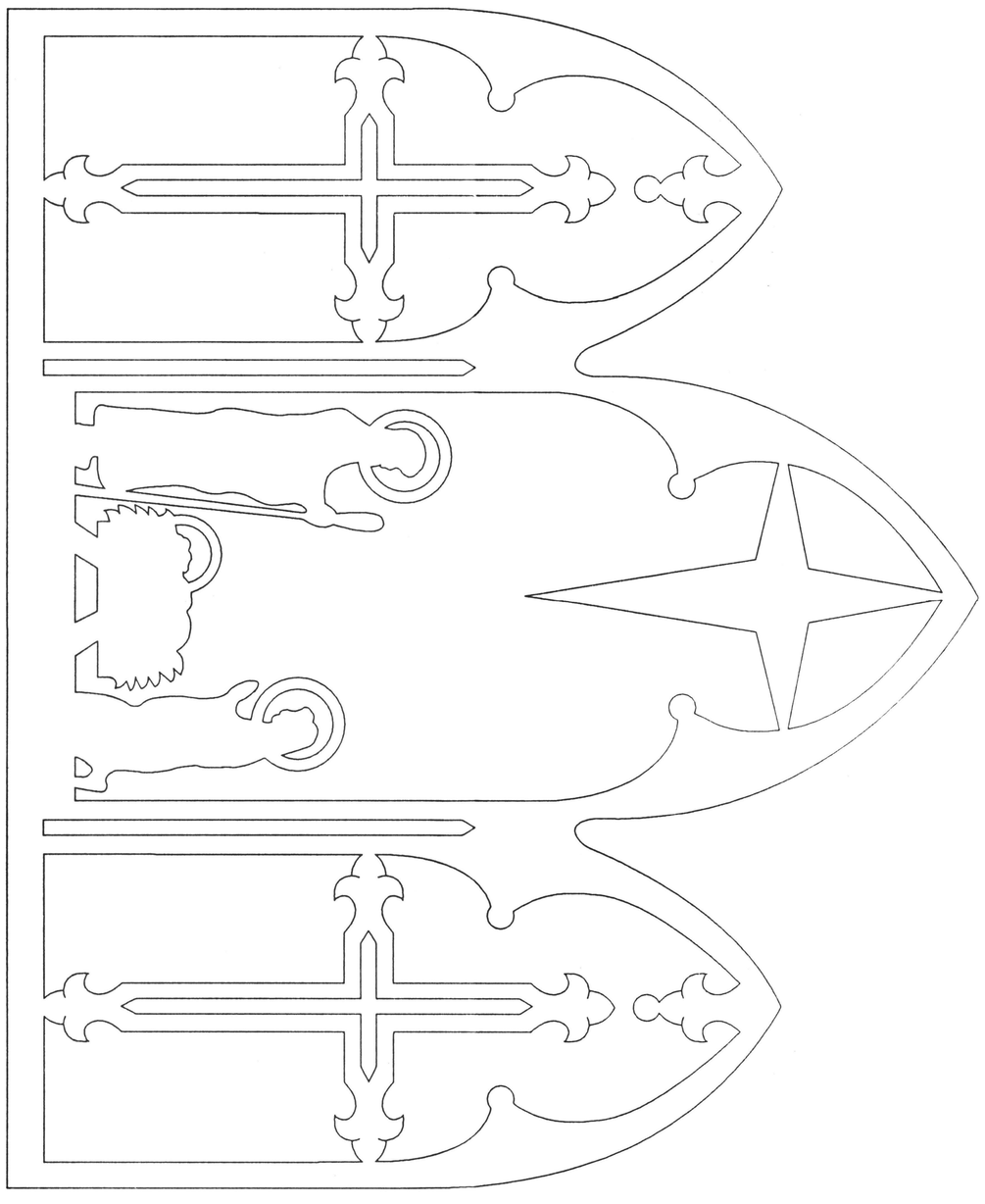
Woodcraft
210 Wood County Industrial Park
Parkersburg, WV
26102-1686
800/535-4482

The Woodworker's Store
21801 Industrial Blvd.
Rogers, MN 55374-9514
612/428-3200

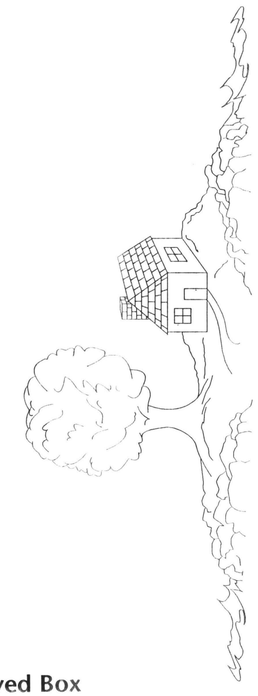


Tree Mirror

Popular Woodworking® No. 82
January 1995 Pages 37-52
PullOut™ Plans



Nativity Cut-out



Carved Box

Carefully open staples to remove plans, then bend them closed again.

Turned & Carved Box

This project is a combination of turning and carving in one!

By Michel Theriault

Now you can combine both woodturning and carving in a functional, appealing project. Whether you are a woodturner interested in carving or a carver interested in woodturning, this project will give you the opportunity to practice both crafts at the same time.

Materials

You will need a square blank of carvable wood such as pine, butternut, mahogany or walnut. The blank should be 3½" square x 6½" long. You can use full thickness stock or glue-up thinner stock if necessary.

Tools

For this project, a ⅛" parting tool, ½" square or round nosed scraper, ¼" gouge and ¾" skew chisel are required for turning. For the carving, you will only need an x-acto knife and a ⅜" or ¼" gouge, however a parting tool is also useful.

It also is important to keep your tools extremely sharp when using soft wood.

TURNING:
The Rough Blank

First, draw intersecting lines comer to corner on each end of the blank, then drill pilot holes at the intersection with a drill bit correctly sized for your lathe centers. Cut off the corners to make an octagon with a hand planer, band saw or jointer to make roughing the blank easier on the lathe.

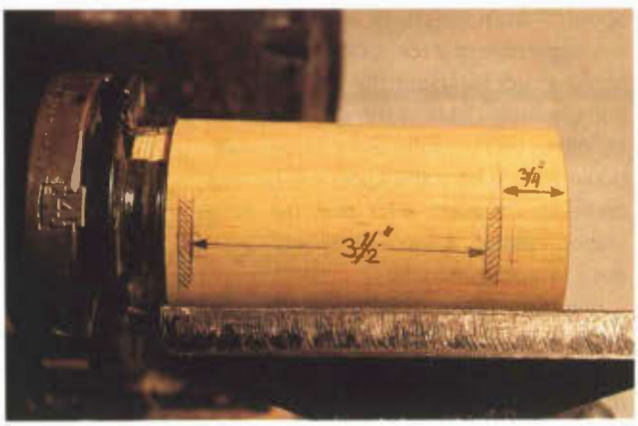
Mount the blank between centers. Using a roughing gouge, rough it down to just over 3" diameter. Finish it off using your skew chisel for a smooth, parallel surface.

Chucking

Decide what method of chucking you'll use for turning the box, and make the appropriate cuts at the mounting end. If you're using a combination chuck as shown, you'll need a larger diameter at the shoulder ***(diagram 2)***.

Mount the blank from the centers, and re-mount it in your chuck on the lathe. Check again to ensure it is running true, and true it again if necessary using

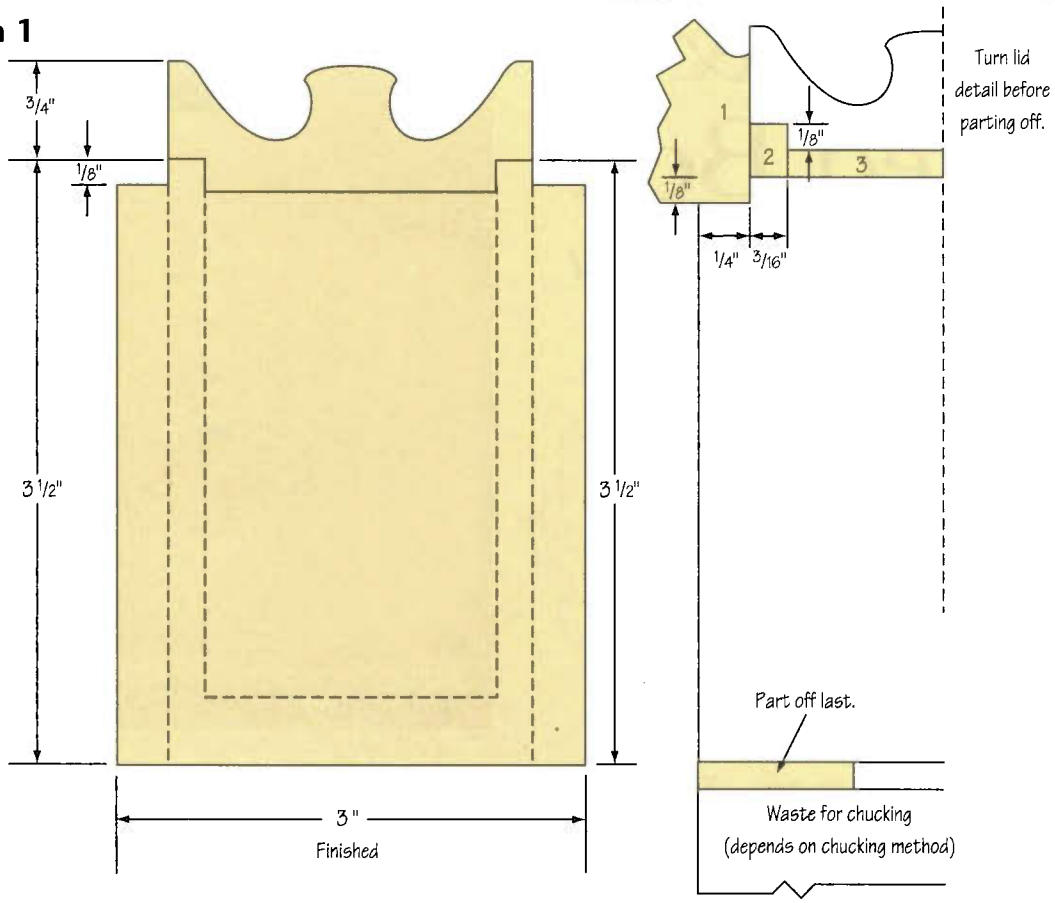
Roughing blank between centers.



Blank mounted on four-jaw chuck with markings on the back.

Michel Theriault *works wood for a hobby, selling what he makes at craft shows and craft stores in the Ottawa area. His interests include cabinetry, carving and turning.*

Diagram 1



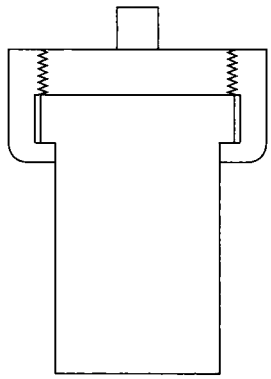
the skew chisel. Referring to the drawing ***(diagram 1)***, mark off the required parting cuts on the blank and part in ⅛". These will serve as reference guides later.

Turning the Lid

To turn the lid, first turn the area down to a 2½" diameter up to the shoulder as shown ***(diagram)***. You will notice in the drawing that a ⅛" shoulder will be left on the box. This is to ensure that when carving you maintain the same diameter as on the lid. Use your ¼" gouge and carefully turn the detail on the end of the lid. Remember, you are working end grain about 5" from the chuck, and a catch or too aggressive of a cut could knock it out of the chuck. Start on the lid's outer lip and gradually cut in to develop the pocket. When you've gone as far as possible, begin from where the knob will be and come in to meet your first cut in a smooth sweep. Use sandpaper to produce smooth contours.

Before you part off the lid, you need to make a shoulder for the lid to fit inside the box. Again referring to the drawing ***(diagram)***, leave the ⅛" shoulder on the

Diagram 2



Combination chuck.

Making preliminary parting cuts as reference lines.

Turning the lid.

Hollowing, using the ¼" gouge.

Finishing hollowing using the ½" scraper.

box end and pare down to a 2⅛" diameter using your parting tool. This area should be about ¼" wide. Next, carefully part off the lid ⅛" away from the main shoulder as shown. This technique gives you a lid with grain which lines up with the box's body. If you want, you also can use a jam fit chuck and clean up the inside of the lid.

Turning the Hollow

Now you are left with the body of the box on the lathe. Keep the lid handy to check the inside diameter, and test fit as you go. Turning a hollow into end grain is one of the most challenging aspects of turning. Remember, you are cutting deep into end grain, and there can be a lot of leverage.

Start by using your parting tool to define the inside lip. Cut in about ⅛" smaller than the inside lip of the lid you just turned. You will cut this to exact size after you've completed the hollow.

Carefully start the ¼" gouge into the wood, using the lip you just cut as a starting point. Gradually swing it in until you meet the centre, and start again. Continue this as far as you can safely, then switch to the ½" scraper. Scrape out the waste to the bottom, being careful not to go too far. Next, carefully smooth the inside walls with your scraper and bring the inside lip diameter to the right diameter for the lid. Check regularly until you get a gently snug fit.

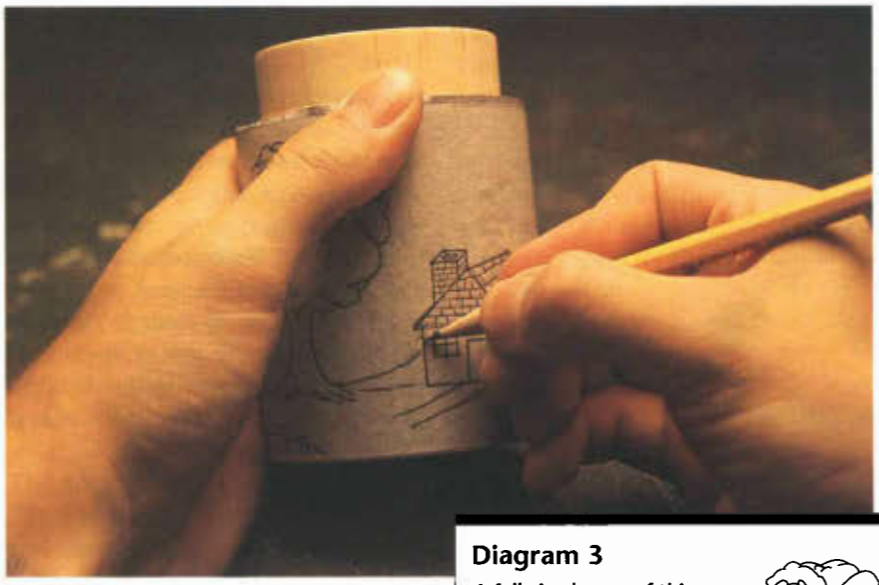
Part the box off the lathe with your parting tool at the location previously marked. Again, a jam fit chuck can be used to clean-up the bottom of the box if desired.

CARVING:

Transferring the Pattern

Now that you have completed the turning, you need to transfer the carving pattern to the body of the box. Photocopy the pattern first, then cut it to size along with a piece of carbon paper. Wrap it around the box, taping it together at the ends. The bottom of the pattern should now line up with the box's bottom edge.

Transfer the pattern to the wood, using a pen or pencil to go over the lines of the pattern. Press hard enough to ensure that the carbon paper transfers the detail. Carefully un-wrap the pattern when finished, making sure you do not miss any lines as you go. Re-do any that you may have missed.



Tracing the patten onto wood (carbon paper under pattern).

Diagram 3

A full-sized copy of this diagram is located in the center pull-out section.

Incising stop-cuts around the detail before paring background.

Paring down the background using the edge of the workbench as support.

Paring down the background - detail.

Carving the tree.

Incising

The first stage of the carving will be to incise stop cuts around the major detail. With firm pressure, use your knife to cut about ⅛" deep around all of the pattern's outside lines. As you cut away the background, you will need to incise again until you get down to the ¼" depth.

Paring Away the Background

Using the gouge, pare away all of the background using shallow cuts. You can use either your bench edge or a block clamped to your bench to rest the box on and push against ***(photo)***. This will ensure a steady, controllable cut. Make sure you don't go too deep or past your stop cut. It may be necessary to cut from both ends as the grain changes direction around the box. Forcing your cut against the grain could result in a large chunk breaking off. Use the step you turned at the top of your box as a depth reference.

Tree

Starting with the tree, use your knife to round the tree trunk and the tree itself. The tree's leaves will not present a truly even, round profile, so you should model this by cutting away some of the roundness ***(photo)***. Remember to cut a small "V" at the top of the trunk to show the major branches. If desired, you can either leave the tree as is or use a power carver or small Dremel with a small 1/16" diameter round bit to create the appearance of leaves ***(photo)*** .

House

The house takes a little bit of care to get the right perspective. You may wish to use a small block of wood with the same proportions as the house to give you a reference point.

The back of the house almost meets the background, so you need to pare the right side of the house and roof at an angle for this. Leave ⅛"-1/16" between the back of the house and the background

Paring the shingles.

and undercut slightly behind the house. Once you have this part in proper perspective, pare the front of the house flat to eliminate the curve left from the original surface you turned. Re-draw the details of the shingles, doors and windows onto the wood with a pencil for later. Refine the line where the house meets the ground next, then start the chimney. As the chimney is behind the front of the house, incise where it meets the roof and pare down the chimney about ⅛". Re-establish the corners on the chimney based on the original pattern, and carve the flat sides and top to give the chimney the same perspective as the house.

Now all the house needs is detail. Start with the windows and door. Incise in about 1/32", and pare away the surface of the door and windows until they're flat. You can incise lines for the window mullions and twist the point of your knife in to the point where the doorknob should be to create this detail.

For shingles, incise the horizontal lines 1/32" deep as a stop cut. Start at the bottom of the lower row, pare down to the stop cut, leaving the shingle slightly angled. Continue this process up to the last shingle. Use a light incising cut to define the vertical lines between the shingles. Remember to stagger these lines on each row. The chimney bricks also should be defined with light incising cuts.

Carving detail in the tree with the power carver.

The Landscape

The final step is carving the land, rocks and water. Start with the land by using the existing detail as a starting point and carving in the slopes, hills and valleys so they look appealing. You can use both the knife and gouge as required for this.

The rocks should first be defined using incising cuts, then carved to shape. Note that in some areas there are more than one level, so the upper rocks should be pared in about 1/16"-⅛" deeper than the bottom rocks. The water should have ripples on it to identify it as water, so use your knife to make deep incising cuts in a regular V-pattern, then cut the waste out. This will create a pattern that simulates wave crests.

Finishing

The background should be sanded smooth with 100, 150, then 220 grit sandpaper, in that order, until it is smooth. This should be done with the lid on to ensure an even transition from the body to the lid. Do not sand the carved areas unless absolutely necessary, as you will invariably sand away some detail. You are better off going over the area with the carving knife or gouge until it is suitably smooth. Apply two light coats of a drying oil, such as Danish oil or Polymerized Tung Oil, ensuring that it gets into all the crevasses. PW

The finished project

A Three-Hour "Legless"

A pair of cantilevered arms provide space and support for this simple-to-make contemporary design.

By Graham Blackburn

Necessity, the mother of invention, can count this piece of furniture among her illustrious progeny. My long-suffering wife demanded that I replace the coffee table (which I'd recruited into service as a piano bench) or face terminal uxorial wrath. The new table would have to be plenty big, and it would have to appear almost immediately. She wasn't in the mood to wait while I worked through another lengthy project that would take weeks to germinate, months to execute, and more weeks to finish.

I went to the shop and gazed unhappily at my small store of coffee-table grade lumber. I loathed to waste such precious material in a quick knock-up, but how else could I construct something that could be completed in a couple of days? Then I remembered the two planks of baywood a friend had brought me from Oregon.

The Path of Least Resistance

Each plank was over 6' long, and rough-sawn to about 2½" thick. The planks weren't straight-sided, but were interestingly curved, wider at one end than the other. I'd been thinking I'd eventually have to muscle them over to a friend's shop and run them through his resaw band saw, saw them into straight boards, then joint and surface them before they could be used for anything.

The prospect of all that work had so far dissuaded me from using the wood at all. But upon examination, one of the planks began to look suspiciously like a coffee table top just waiting to happen.

I laid the plank across the sawhorses and stared at it. It was almost the perfect width for a coffee table, and its length closely matched that of the couch it would sit in front of. Its gentle curves and gradually increasing width would also work well with the way the couch was arranged at right-angles with a neighboring armchair. Best of all, the plank's massive presence would compliment the large stone fireplace that dominates the room.

The Problem of Support

Pleased with what appeared to be an immediate solution to my problem, I started to think about how the top might be supported. It wouldn't be too difficult to cut legs from the second plank and join them to a skirted frame, but doing so would involve making sure the top was perfectly flat so that it would fit securely. Furthermore, since the top would be about 6' long and almost 2½" thick, the supporting frame would have to be similarly massive to restrain any possible warping and provide a solid base. Visions of unwieldy and over-heavy *Flintstone* furniture flashed before my mind's eye, and I rejected the standard construction.

Perhaps sawing the base plank into two slabs that would support the top transversely, one at each end, would work. I played around with this idea for a while, making several drawings. I even took some chalk to the second plank to mark out where these slabs might come from. It wasn't a bad idea, but even if the supporting slabs were mortised into the underneath of the top, the latter component's extreme length and weight would still demand some extra form of connecting support.

It seemed that each solution I came up with also involved significant amounts of additional work. Every time I got close to structural sufficiency, I would find that I'd designed a project that would take just as long as a more conventional coffee table.

Finally I realized the second plank, from which I had been thinking about sawing those various legs, slabs and other forms of support, was massive enough to stand on its edge and support the first plank as is. . .almost. It was about the right height when it stood on edge, and it was certainly thick enough to provide all the support necessary. Also, using just one support would leave the top plank completely free to change dimension with no fear of anything being stressed or pulled apart. Additionally, the extra space for stretched-out feet that "legless" construction would provide

Graham Blackburn *makes furniture in Inverness, California.*

Coffee Table

The "legless" coffee table's simple design blends perfectly with its surroundings.

promised to be useful for a coffee table.

The only remaining problem was how to get the supporting plank to stand securely on edge. It was while I was thinking about how to trim the ends and sides of these two planks that the solution presented itself. Although I wanted to keep the top plank's overall curve, I would still have to saw off a certain amount to produce the most felicitous shape, especially since I was now viewing the two planks as a whole while trying to see how the one might best balance the other, both visually and structurally.

Since my chief aim was to produce something with as little work as possible, I planned on removing the smallest amount I could get away with. This turned out to be a strip barely 3' long that tapered from about 3" thick to 1½" thick. I realized that by sawing this piece in half and T-ing one piece into the bottom of the supporting board to keep it upright, and the other piece into its top edge, I could produce a pair of arms that would thus be supported at three points.

Since one of the advantages of tripods over four-legged objects is they won't rock no matter whether the surface they are resting on or their own individual lengths are uneven, this provided me with an excellent solution to the problem of leveling an object as massive as this coffee table.

The basic design of the "legless" coffee table allows for much more leg room.

The Top and Base

With a design that called for only four pieces and two joints, I felt I had successfully dealt with the structural part of the problem. All that remained was to use the chalk to mark exactly where I would trim the two planks. I wanted to maintain the natural texture of the wood, so, after brushing the surfaces thoroughly before sawing to remove any edge damaging grit or dirt, I discovered that the roughsawn surface was attractive enough to be left unplaned. (This discovery further reduced the amount of work necessary.)

The planks had been sawn out of the tree with a chainsaw mill and the irregular series of fan-shaped marks left were not excessive, were more or less even, and presented an interesting texture. A few very light licks with my jack plane to remove the odd hair and whisker—not enough to produce any smoothly planed patches, but just to the point that you could run your hand over the wood's surface without fear of splinters—and the surface was ready for use.

It was ideal in more ways than one.The mild but attractive grain was visible, and the roughsawn texture was not only visually interesting, but also provided a surface that would be difficult to damage. In addition, slippery objects would be able to get a better grip.

To keep the edges consistent with the surface texture, I also left these as they came from the saw. The edges on the top plank turned out to be all fairly square, but the ends of the plank that became the base had been sawn somewhat out of square, both to the surfaces and the sides. I thought about this and decided the only critical edges were those that would bear against the floor and the top. The oddly angled ends and ends' edges could actually add interest, especially if I positioned the base so the shorter side was down. Since the top was 1' longer overall than the base, this also added to the balance of the overall design and gave the table a profile somewhat reminiscent of an aircraft carrier.

(Above) The sturdy base rest is only 16" long, but it easily handles the top's weight. (Below) The longer, 18" arm is set into the massive plank to support the top.

The only finishing necessary was a small, ¼" chamfer. It was planed by hand with a small block plane that could follow the curved edges around all exposed surfaces. This small chamfer had the effect of making the roughsawn material look nicely finished, and suggested that the shape had been purposely designed that way.

The Arms

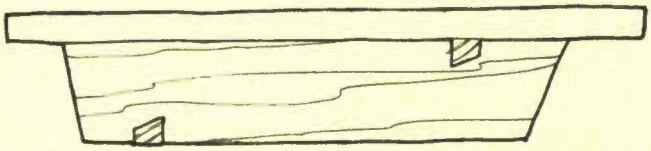
I sawed the strip I had removed from the base into two lengths. The first was 18" long: the width of the top at its narrow end. The second, cut from the taper's thicker end, was only 16" long. The shorter but somewhat sturdier piece I let into the bottom edge of the base, 2' in from the sloping end. The longer pieces, which contained most of the taper, running from 3" thick to a bare 1½", I let into the base's top edge 11" in from the opposite end.

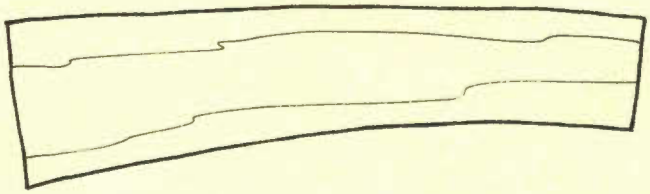
The original strip had one edge out of square, and this angled edge was placed downwards in the case of the top arm and upwards in the case of the bottom arm, or foot. The arms were positioned so the narrow edges of both pieces faced toward the base's respective ends, giving the feeling of forward movement to the "ship-table" as a whole.

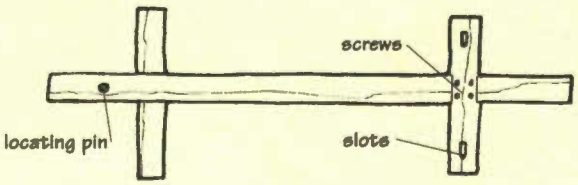
Like the base and top, the arms' edges were given a ¼" chamfer, and their ends were planed smooth with the block plane. These ends were thus the only perfectly smooth surfaces, but their relative smallness together with their inconspicuous placing made this seem an appropriate finishing detail. It also further emphasized the appearance of a "finished" piece, even though the shape was basically natural.

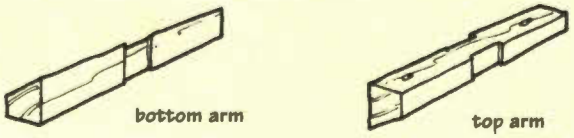
The actual joint used here is a form of double housing-joint. Most of the joint is

Diagrams









formed by notching out the respective edges of the base board, since the notch required does almost nothing to its integral strength. But a much smaller, ½" notch was made in the mating surface of the arms. This keeps the arm securely aligned by providing an extra two bearing alignment surfaces.

Marking the required notches' depth needed to be done carefully since the arms were neither square nor even in profile. But by making the small notch in the center of the arms first, a fixed reference was established from which the various depths of the notches required in the base could be measured. The entire process required the use of only four tools: a rule, a trysquare, a backsaw and a 2" firmer chisel to pare away the waste between the two sawn lines.

The arms were set in place just a trifle proud of the top and bottom edges of the base to allow for any adjustment and guarantee the tripod effect. The bottom edge rose slightly from the end opposite of where the bottom arm had been housed. The base's top edge also is slightly convex and required a little judicious planing at each end and at one side of the supporting arm before the top piece, supported by the ends of the arms and the opposite end of the base's top, would rest securely.

Final Fixing

Although the assembled table was indeed sufficiently massive to be adequately stable, I wanted to avoid any disasters that might occur if anyone were to stand on any part of the top. Consequently, I secured both the top and bottom arms with four 3" #12 woodscrews each, angled into the joint's corners.

The top itself was kept in place by a 1"-diameter locating dowel that projected from the top of the base at the opposite end from the top arm, and fitted into a 1"-deep matching hole in the underside of the top.

Two 3"-long slot-screwed roundhead woodscrews, driven up through the bottom of each end of the top arm about 2" in from the ends completed the fixing and transformed the four parts into a single whole that, when assembled, needed two people to move it.

After a final check with a block plane and a lightly waxed cloth to make sure all surfaces were clean, safe and pleasant to the touch, the project was complete. The entire process had taken less than three hours, and connubial bliss was again ensured. PW

A Carved Tree Mirror

This project is perfect for both experienced and beginning woodworkers (and it allows you plenty of opportunity to reflect on your skills).

By Michel Theriault

A mirror is a perfect accent for any room, and almost every house has an empty wall that needs decoration. The wall mirror that we'll build in this article combines both form and function, making this an ideal project for both experienced carvers looking for a practical application of their craft, and beginners looking for a relatively easy, yet useful, project.

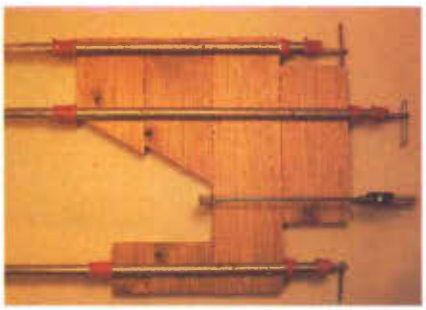
Materials You'll Need

The tree carving is glued up from dressed 2" X 6" X 5' long butternut board (the finished dimensions are 1½" x 5¼"). Butternut is a relative of walnut, and is an attractive, light tan wood with a beautiful grain and excellent carving qualities. Mahogany and walnut also are easy to carve, however you should give consideration to the room you intend to display the mirror in. Make sure your wood choice compliments your decor.

An 18" diameter 5mm (¼")-thick mirror with a bronze tint forms the backdrop for the tree carving. The tint provides a much warmer reflection than a standard silver tint and compliments the wood nicely. (Make sure you get the edges polished to prevent cuts, because the edges will be exposed.)

Standard metal mirror clips and picture wire are used to attach the mirror to the carving and to hang it on the wall. You'll need to bend one mirror clip into an L-shape to hold the mirror at the bottom of the carving.

***Michael Theriault's** woodworking interests include carving, turning and cabinetry. He is based in Ottawa, Ontario.*



1. Clamping the blank. Make efficient use of the wood by using a 5' length of stock.

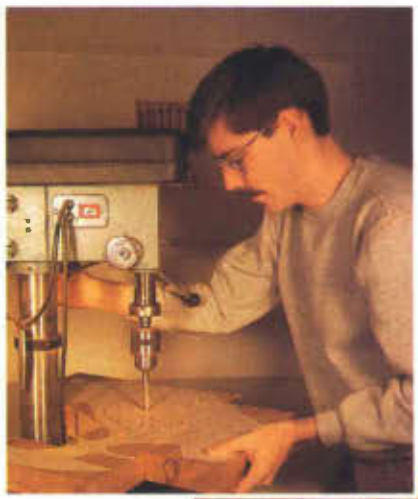
Drawing a Blank

The first step is to produce a full-size pattern from the one shown in ***diagram 1***. You have a couple of options for this. The easiest is to use a photocopier and enlarge the pattern in sections. You can also use the grid lines to reproduce it onto graph paper. If necessary, tape together sheets of paper to make the required size. Before you begin copying the pattern, draw an 18"-diameter circle to represent the location of the mirror, and use it as a reference point. Once you have made your pattern, you can either use it as is, or trace it onto a sheet of tracing paper to preserve your first pattern.

Using the pattern to ensure the pieces are lined up properly, glue the pieces together and clamp ***(photo 1)***. If you don't have enough clamps to do the whole piece at once, glue it up in sections. (Use a scrap of softwood between your clamp and the blank to avoid denting the soft wood.)

Once the entire blank is dry, glue the pattern to it. Use a spray adhesive (available at most arts and crafts supply stores). Follow the instructions on the can for a temporary bond for easy removal of the pattern after cutting. This method will give you the most accurate cutting lines. However, you can also trace the pattern directly onto the blank if you wish.

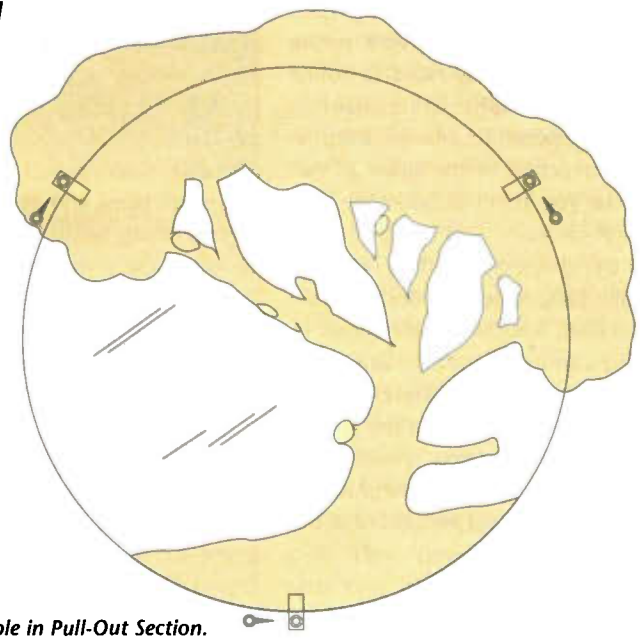
Next, cut out the blank to the outside of the lines. A 14" band saw will work for most of the outside of the tree, but you will need a scroll saw or jigsaw for some of the intricate interior cut-outs. Before beginning, drill a hole large enough to start the cut with the blade you use. The scroll saw will do the job with a fine cut,



2. Drill holes in the blank between branches for threading the scroll saw blade through to cut out the waste.

3 Using the scroll saw to cut the waste out from between the branches.

Diagram 1



Pattern available in Pull-Out Section.

but will be somewhat slow, even if you use an aggressive skip-tooth blade *(photo 3)*. If you use a jigsaw, make sure your blade can manage the 1½" thickness. When cutting, take care at the very bottom of the tree where the radius matches that of the mirror.

Roughing Out the Details

Now that you have a blank to work with, the next step is to rough out the details. A regular ¾" carpenter's chisel is ideal for most of the work, however you'll also need a ½" #6 gouge to work the valleys in the tree canopy surface and a carving knife to do some of the work on the limbs and branches. Because buttemut is a soft wood, it's particularly important to make sure your carving tools are as sharp as possible, so hone and strop them before you begin—and strop them frequently while you work.

Before carving, lay the blank face up on a large piece of plywood. That will serve as a carving platform and save your workbench from stray cuts. You can simply clamp the blank down, or screw the blank onto the plywood from underneath and then clamp the plywood directly to your bench to keep it secure while carving. You may need to rotate the board as you carve to maintain an easy cutting position. Always keep in mind the direction of the grain as you cut so that you don't accidentally chip out a large piece.

Start by shaping the tree canopy. Using solid cuts, either by hand or aided with a mallet, knock off the edges to round the canopy first, then work with the grain to develop a pleasing shape *(photo 4)*. Keep in mind that the surface should not be completely smooth and uniform, but should have hills and valleys to represent the natural placement of the branches and leaves. Every once in a while, set the blank upright and step back from your work. Looking at the carving from a distance allows you to see it as others will see it.

(Photo 4) ***Using a mallet and ¾" carpenters chisel to knock the edges off the tree canopy and rough-out the canopy edges.***

Use the photographs to establish where the branches meet the tree canopy. They're not all on the same plane, and you will need to take this into account when working on the underside of the canopy.

Once the canopy is roughed out, start on the trunk, and work your way up to the end of the branches. First, go over the entire trunk and all branches, roughing them out before going over it again to refine the form. Again, be careful to give a natural appearance to the tree trunk and branches, including any knots, bumps and twists which would exist in the real thing.

You'll need to remove the blank from the cutting board to undercut the trunk slightly and establish its round appearance *(photo 8)*. Do the same with the branches, noting that in many areas the branches are completely undercut and are round in cross-section, especially where they start to meet the canopy. Be careful when carving the unsupported branches so that you don't break them off. If you do break them, use a thick super glue to re-attach the piece before continuing.

Completing the Carving

Once the shape is roughed out, the next step is to finish the entire surface. Using the rough surface as a starting point, reassess the contours and features you want to achieve. Use lighter, more controlled strokes and refine the detail and smooth the surfaces, removing as many flat areas and tool marks as possible *(photo 5)*. Where the tree branches meet the canopy, carefully pare the branch up to the canopy *(photo 6)*, then cut at the surface of the canopy to remove the waste *(photo 7)*.

The tree canopy can be left relatively smooth, as shown in the accompanying photographs, or you can add some detail to represent leaves. One quick way to accomplish this is to use a power carver

(Photo 5) *Smoothing out the tree canopy with the ¾" chisel.*

(Photo 6) *Paring a branch with ½" #6 gouge.*

(Photo 7) *Cutting in to define the canopy where the branch meets it.*

(Photo 8) *Undercutting the branches from the underside of the blank using the carving knife.*

with small burr and roughen up the entire surface of the canopy. Doing this may result in adding lots of nooks and crannies where dust will collect, however.

Finally, sand the entire carving starting with 150, 180 and 220 grit sandpaper (don't sand the canopy if you have roughened it up). Once the sanding is complete, use a tack cloth to remove all sawdust, and finish with several coats of urethane, lightly sanding with 220 grit sandpaper between coats to maintain a smooth finish.

Mounting the Mirror

The mirror is held to the tree carving using three metal mirror clips. Their placement is shown in ***diagram 1***. The two behind the tree canopy are regular clips, the correct size for your mirror thickness plus a felt pad to prevent scratching the back of the mirror (¼" size for the 5 mm.-thick mirror). Reshape the bottom clip into an L-shape with one long side. Screw this into a shallow mortise in the tree carving so that the clip will hardly show and will hold the mirror flush to the wood.

Two eye hooks are screwed into the tree canopy, from behind, next to the mirror clips, and picture wire is attached. The mirror will hang best if you use felt buttons on the mirror clips to hold it evenly out from the wall.

To clean the mirror, it's best to remove it from the carving to avoid breaking the tree and to enable you to clean the mirror's entire surface. Lay it face down on a clean towel, remove the mirror and use regular glass cleaner. While you're at it, wipe any dust off the carving with a damp cloth.

Now your mirror is ready to take its rightful place on your wall. And it's one project that you'll probably look at every day! PW

A Dictionary Stand

Build good reading habits in your home!

By Jim Randall

Every time I asked my mother, "What does this word mean? How do you spell it?" she replied, "Look it up in the dictionary." It became a habit that helped me develop an interest in reading and an appreciation of the power of ideas conveyed by those complex symbols called words.

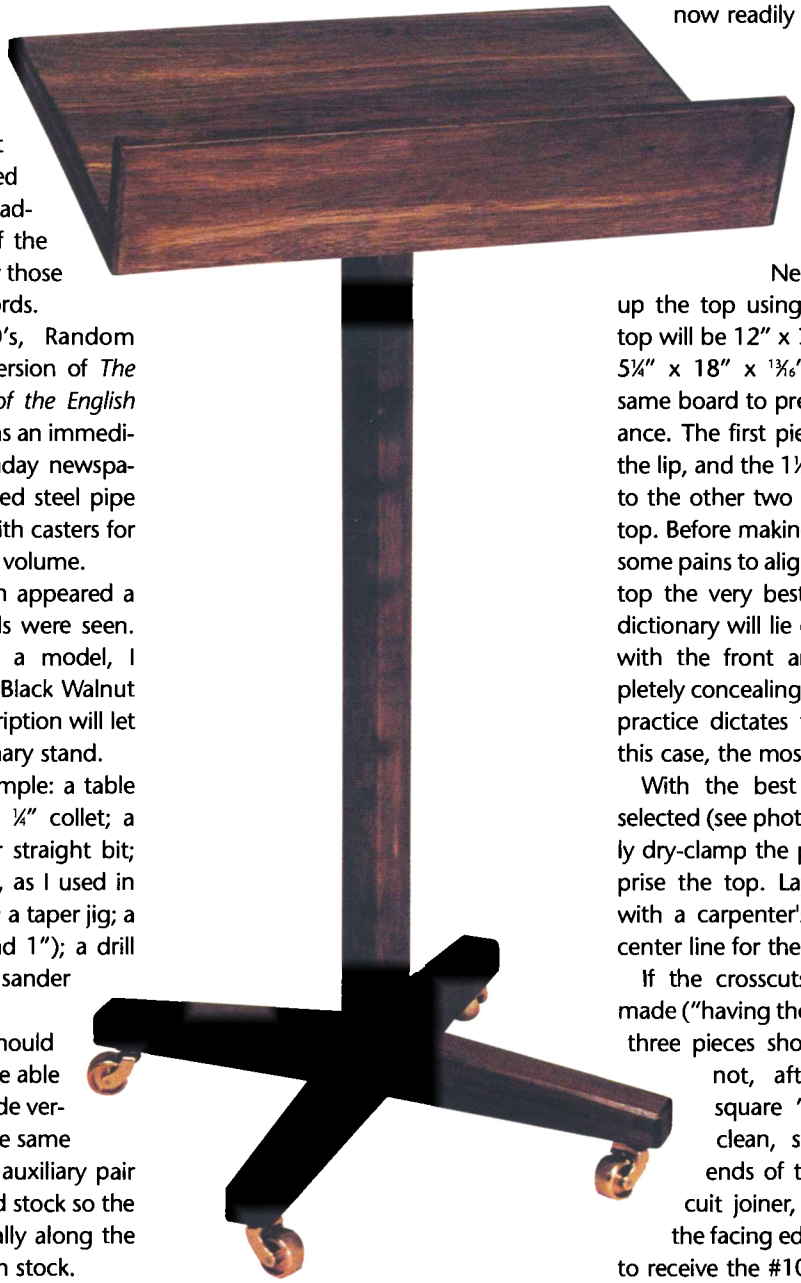
During the late 1960's, Random House published its first version of *The Random House Dictionary of the English Language, Unabridged.* It was an immediate sensation, and the Sunday newspapers carried ads for a welded steel pipe and walnut veneer stand with casters for the twelve-pound, 5"-thick volume.

When the second edition appeared a few years ago, no such ads were seen. So, using the original as a model, I designed a solid American Black Walnut version. The following description will let you make your own dictionary stand.

The tools required are simple: a table saw; a plunge router with ¼" collet; a chamfer bit; a ¾"-diameter straight bit; router pad; a dowel jig (or, as I used in my project, a biscuit joiner); a taper jig; a pair of Forstner bits (¾" and 1"); a drill press; a lathe; and a palm sander completes the list.

A note on the lathe, it should have an indexing head or be able to be fitted with a shop-made version that can be used for the same purpose, provided that an auxiliary pair of ways are made from solid stock so the router can be moved laterally along the axis of the glued-up column stock.

To begin, take three pieces of 2 1/16" x 30" x 1 3/16" and glue-up and clamp to make up the turning stock, (2 1/16" x 2 1/16" finished cross section) for the column. Set it aside to dry.



Remember, during gluing, keep a close watch for any tiny "squeeze-out" or drips which always show up in the most conspicuous places. When they show up during the staining process they're hard to remove, so a little caution beforehand will make the project easier.

Another option is to use the hide glues now readily available in squirt bottles which require no heating. They'll absorb stain with no ugly "glue-shadows," and the bonding strength appears to be comparable.

Next, you'll need to glue-up the top using biscuits. The finished top will be 12" x 30" x 1 3/16". I used three 5¼" x 18" x 1 3/16" pieces cut from the same board to preserve an even appearance. The first piece I ripped at 3¾" for the lip, and the 1½" fall-off is then added to the other two pieces to form the full top. Before making the biscuit slots, take some pains to align the pieces to give the top the very best figure. Although the dictionary will lie open most of the time with the front and back covers completely concealing the top, careful design practice dictates the best aesthetics, in this case, the most appealing figure.

With the best pattern to your eye selected (see photo for my choice), lightly dry-clamp the pieces which will comprise the top. Lay down shadow lines with a carpenter's square, defining the center line for the biscuit slots.

If the crosscuts have been carefully made ("having the line"), the ends of the three pieces should line up exactly. If not, after glue-up, trim to square "a kerf's worth" for a clean, straight edge at both ends of the top. Using the biscuit joiner, the slots are cut into the facing edges and are now ready to receive the #10 biscuits. I didn't joint any of the edges on my jointer since, with a sharp, carbide-tipped saw blade, I get equivalent results.

Now glue-up can proceed. Apply a light film of glue to all butting edges. Use an artist's brush to paint the biscuits and the slots with glue. Then with the three pieces lined up, pay particular attention

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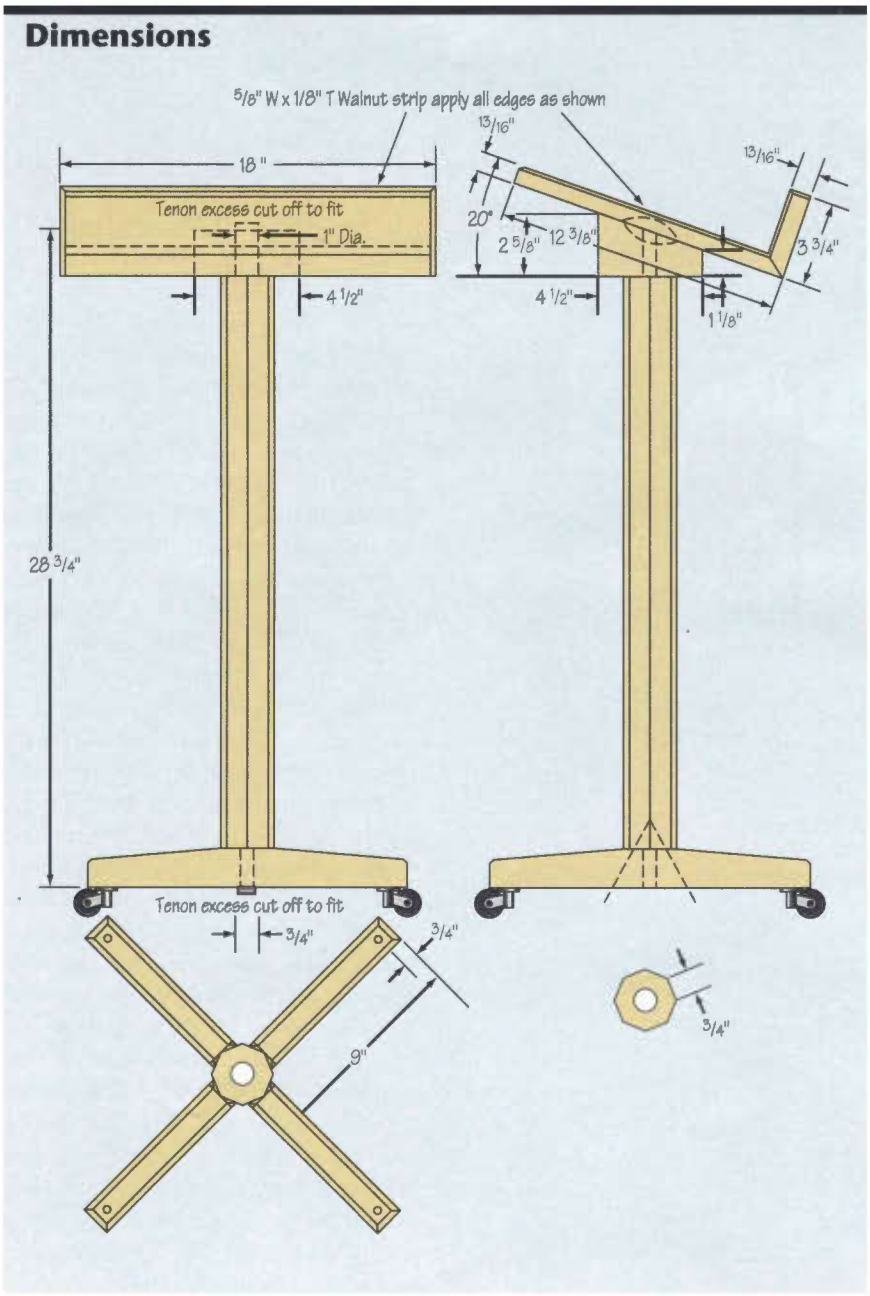
***Jim Randall** was a regular contributor to* PW *until his death last July.*



to the shadow lines for proper alignment. Clamp the three pieces together lightly at three places along the long edge. Use soft wood pads to protect the edges from marring by the clamps. Wipe off any "squeeze-out" on both sides with a damp sponge. To avoid "cupping" of the glued-up piece you may want to clamp the finished product to a flat surface.

While the top dries, turn your attention to cutting the four tapered feet from 1⅜"- (¾) thick stock. You may find black walnut of this thickness is hard to come by, so a glue-up of two 13/16" thicknesses will work just as well. You will be able to get all four feet from one piece of 1⅜" x 10" x 8" stock by making just two taper passes and two parallel rips.

Set up your taper jig for the dimensions shown in the drawing. Run through a sample piece of scrap, (not walnut!), to check dimensions. Make the first taper passes, then remove the taper jig and make a parallel rip using the remaining parallel edge of the stock as a guide. Reverse the stock and repeat the above procedure (see diagram for the order of cuts). You now have four identical feet.

Tilt your arbor for a 45° cut and clamp a wooden shim to the saw fence with its forward edge at a line parallel with the leading edge of the saw blade. All the feet can be butted against it for a precise cut, but the waste will clear without kickback or flying scrap.

Place two of the taper cut feet against the table saw's cross cut guide with the tapered faces together. Note that the outside faces of the matched feet are parallel. Slide the foot closest to the saw blade so it just touches the shim and remains in contact with the other foot along the matched tapered edges. You may wish to clamp the two feet together, but be certain only the forward foot's wide end will engage the saw blade when you begin the miter cut or you will have two miter cuts, with one on the wrong end! Flip the pieces over and repeat this procedure, then repeat for all four feet.

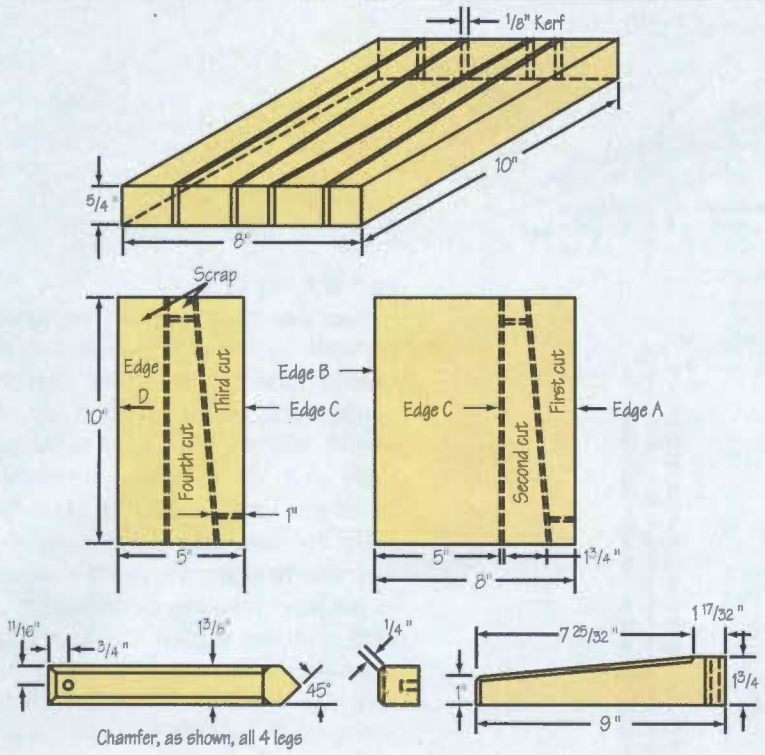
Cut all four pieces to 9" lengths. You'll now have four identical feet with exact 90° angles at the wide ends to be joined in the "four spoke" pattern shown in the diagram.

I set up my biscuit joiner for 45° cuts and made the biscuit pockets on both faces of the 90° end, just deep enough so adjacent pockets didn't interfere. To keep everything square, cut four isosceles right triangles from ¾" pine scrap. In shop English, that's four identical wood scrap triangles with two equal sides and the largest angle a right angle. Lay the four feet on a flat surface and set-up dry. Place the scrap triangles between each pair of legs where they meet, and clamp lightly. Be certain the entire assembly is flat or, when you put the casters on, you'll find you have a very unacceptable wobble!

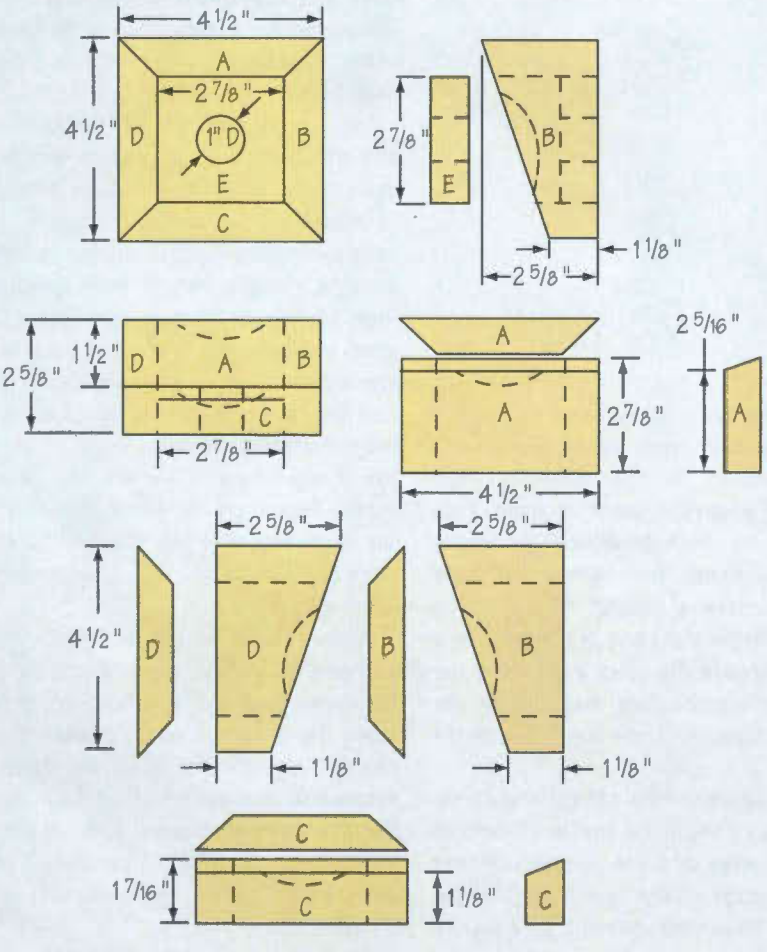
While the pieces are dry-fit and clamped, place the entire assembly on the router pad, and run the chamfer bit along the three top edges of each foot. Also drill the pilot holes for the casters. Before final glue-up, unclamp the assembly and sand all outside surfaces with, successively, 80, 120, 150 and 220 grit sandpaper. Glue-up, verify flatness and set aside to dry.

When dry, sand flat the top of the feet

Cutting the Legs



Cutting the Angle Box



assembly where the four feet join (see diagram). This will provide a space for a flush fit between the column and feet assembly. Next turn your attention to shaping the column. Scrape off any dry, squeezed-out glue on all four sides. Find the center of the square cross section at each end of the column stock with a combination square or from intersecting diagonals. Dimple each center point with a center punch or an awl. Then, with a compass, inscribe a circle 2" in diameter on both ends. This will be the diameter the column stock will be turned to in preparation for routing eight equal width "pencil" flats around the circumference of the turned column stock.

Set the fence for a 2⅜" cut, and lower the saw blade so the cut will just touch the 2" circle. Make cross-cut passes on the same end by rolling the column to all four sides. Re-set the rip fence for an 1¾" cut and repeat the four cuts on the opposite end. You have now defined the shoulders for the tenons you will turn on the lathe. These cuts will maintain squareness with the feet and table assemblies, as well as prevent splintering and tear-out as you turn the stock down to the two tenon diameters.

Now, again set the arbor on the table saw for a 45° cut and rip the square corners off all four sides. This will prevent splintering during turning. Be careful to cut outside the 2" diameter circle. You now have a rough octagonal turning blank for your column stock. Turn the column blank on the lathe to 2" diameter, and the two tenons, one 1" diameter and the other ¾" diameter.

Place the turned column in the router lathe (or equivalent). Chuck the ¾" diameter straight router bit into the router and make a first shallow pass. Each three intervals on my router lathe are the correct setting for an octagonal profile, since the index head is divided into 24 equal sectors. Make the full turn several times, taking off a little more material

Above, top and lip with beveled edge. Below, connecting box assembly with top and column.

each time by lowering the router bit. If you're careful and proceed slowly, the results should be pleasing.

Before removing the routed column from the router lathe, sand the flats with a flat block and, successively, 80, 120, 150 and 220 grit sandpapers.

Set the finished column aside and chuck up the ¾" Forstner bit in your drill press. Bore a hole at the center point where all the feet meet, which is imperative. It also must be at right angles to the bottom plane of the feet assembly, or the column won't be plumb.

Next, cut out the five pieces (four sides and a bottom) which make up the angled connecting box for attaching the completed top to the column. These pieces require some complicated miters, but the finished appearance is a seamless and attractive one well worth the effort. Chuck up the 1" Forstner Bit, and bore a hole in the bottom piece of the angled connecting box ***(see diagram)***. We again use biscuits cut into the mitered ends of the sides to assemble the box. As you dry-fit, then glue the box together, remember the same caveat about "squareness" still applies.

Next, sand the top and lip using the same grit order as above. After lightly clamping the top and lip together in their final orientation, lay out three center lines for the connecting biscuits. At the same time, lay out the biscuit slot positions on the top's underside where the angled connecting box will fit and be oriented around the top's center.

You don't want the cross-cut edges of the top and lip to spoil the dictionary stand's finished appearance. My solution was to rip a ⅛" x ⅜" strip of walnut from the 1⅜6"-thick scrap. After chamfering the top and lip to a ⅜" edge, the strips are glued on to cover the raw edge. The photos show the resulting crisp effect. Here, again "glue shadows" would have been disastrous to the final finish, so use hide glue and a few brads to fix the finish strip in place. Set the brads and fill the brad holes with a filler made of walnut saw dust and hide glue.

Attach the completed top and the angled connecting box with four #10 biscuits. Clamp and let dry.

Next assemble the top, column and feet assembly dry. Lay the dry assembled dictionary stand on its side, and rotate the top and feet assembly so the edges are square with respect to the work surface. Make datum marks in pencil between the column and feet assembly and the column and the angled connecting box. Glue-up both tenons and clamp, making sure the datum lines match up.

When the completed assembly has dried overnight, inspect for any spots needing a sanding touch-up. Now you're ready to apply stain and finish. In my case I used Minwax #2716, Dark Walnut Oil stain and five successive coats of water-based Latex Urethane Acrylic Finish, Clear Low-Lustre #416 00 by Benjamin Moore & Co. The urethane goes on milky, but dries clear in less than an hour. Remember to sand with 220 grit paper between the first four coats.

After the fifth coat has dried, saturate a soft cloth in clean 1‰ motor oil, and dip it in pumice. Rub with the grain, across the grain and in circular arcs. The figure and pattern of the Black Walnut will begin to emerge. Make a fresh pad from the same cloth, dip it lightly into the 1‰ motor oil, and wipe off the residual pumice with several passes. Finally rub-out with a dry pad, folded and refolded.

A word about the casters I chose, Garrett-Wade #14.03 Plate Caster, Brass. I had to cut off about a ½" of the screw stem because they were too long for the thickness of the stand's feet at the floor tip. Fasten the casters and check for level.

Place the dictionary in place, open to the definition for "sublime" and you are ready to make your presentation.

Be ready for requests and orders from those who see your dictionary stand. Since I only build-to-order for loved ones, I have no idea what such a creation might fetch. For me, the joy was in the design and construction, and the delighted look on the recipient's face. I hope you get as much pleasure out of this project as I did. PW

A Slick Trick for Turned Bowls

Use stacked rings to cut down on turning time, and wasted wood, while producing beautiful hardwood heirlooms.

By Charles Wilkerson

As a beginning turner, I taught myself to laminate bowl blanks by simply gluing-up a solid square then cutting the to-be-turned circular blank on a band saw. I often wondered how commercial outfits managed to produce such bowls for sale at even an exorbitant price, considering how much wood winds up on the floor.

Looking closely at the commercial products, I recognized the horizontal lines of the laminations (they looked like those in my bowls), but I wondered about the short vertical lines that seemed to run across some of the laminations. Puzzled, I scratched my head and continued to make my chunky laminations, now and then glancing at the band saw. I'd occasionally feel an idea tickling in my brain, but that was all.

One night I was buying some walnut and maple. The dealer mentioned that he did some turning, and offered to show me some of his work. Holding up a cherry bowl, he said, "This one was done by cutting the circles at 45°. Do you know that technique?" Perhaps it was all the time I had spent wistfully gazing at the valuable walnut sawdust littering my shop, but I did, in fact, know how the bowl was made as soon as he said 45°, which is, of course, the secret. The inside of one level sits on the outside of the one below it.

Here's how to make a deep bowl out of a single square of normal board thickness. On the square, (normally two lengths of board edge-glued, or merely jointed and abutted without glue) use a compass to draw concentric circles, as many as will fit on the square or as deep as you want the bowl to be ***(photo 1)***. I find using more than four circles (or "levels," as you will see) to be impractical. It's important that the distance between the lines (that is, the rings' thickness) equals the board's thickness. (There's a natural tendency to think that if these layers are cut wider, you'll have more room for error; but that's not the case, because the angle through the levels remains constant. In fact, cutting the rings wider accomplishes nothing other than making stacking the rings more difficult.) If the board is an inch thick, measure an inch between your lines. Make sure your smallest circle, which will become the base, is big enough to keep the bowl from tipping over. I made a couple of "rockers" before I got this straight.

Now use a straightedge to draw a line through the concentric circles. You must cut the blank in half to gain entry for the circle cuts. (Of course, if you plan to butt two pieces of lumber into a blank, you can simply trace and cut the circles before edge-gluing.) Don't be sloppy with this line; it should be straight. Also, it's better if it does not exactly bisect the circle because the verticle lines thus created won't be as noticeable on the finished bowl if they're staggered. I usually put it somewhere between a third and a half of the diameter.

Now cut along that bisecting line with the band saw at its normal 90° setting. With that done, set the band saw at 45°. Cut the semicircles, first from one half, then the other ***(photo 2)***. Make sure you are precise. Because the bowl must still be turned, it's easy to discount the importance of following the lines closely. Don't, or you'll risk ending up with a stack that "lists." If the circles are precise, it's much easier to stack them straight on top of each other.

Once the pieces are cut, one merely has to glue them together, which would be a simple and enjoyable little puzzle if it weren't for one thing: how in the world can the halved rings be clamped

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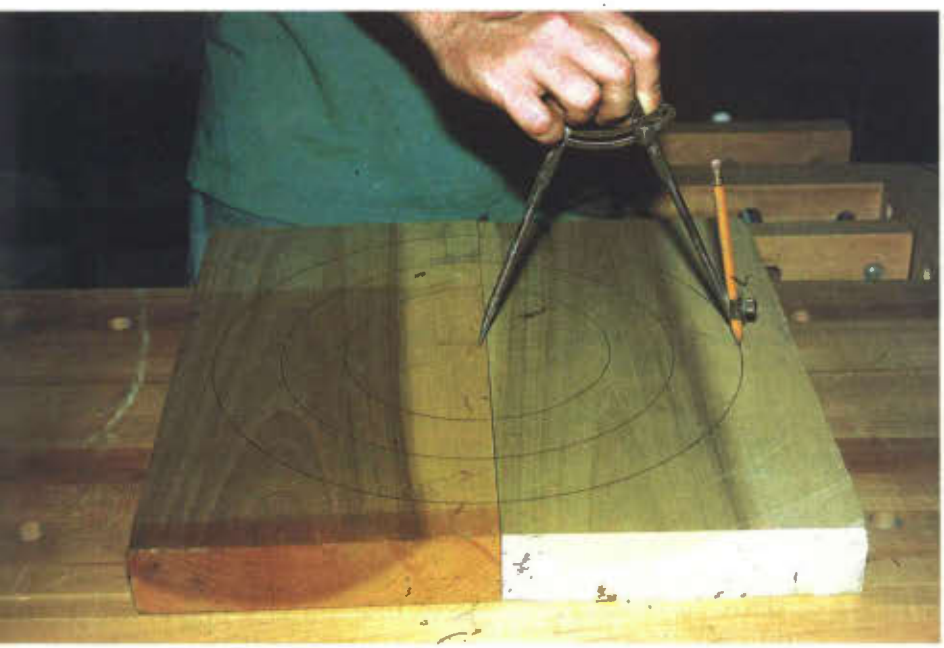
Charles Wilkinson's *interest in woodworking developed into a hobby after he bought a $75 lathe a couple of years ago.*

The 45° cut circles will stack nicely to reduce material wasted, and offers an opportunity for artistry.

back together? (A typical circle clamp would tend to pull down toward the bottom of the bowl, and you'd need four or five of them.) I use staples. I spread glue on the ends of one piece, match it to its mate, and staple them together. Be sure to place the staples on what will be the bowl's outside, because placing staples on top of the rings would make it impossible to glue the levels together **(photo 3)**. However, on the bottom pieces, because I want the joint tight in the center, where it shows, I do place the staples on the top, making sure they're close enough to the center so they do not interfere with the next level. After the glue has dried, I remove the staples. Turning removes the staple holes, and if it doesn't, I just plug them up with sawdust and glue.

Now you have a bunch of stapled circles that need to be glued and stacked one on top of another **(photo 4)**. It's important to center each correctly on the one beneath it. There's enough leeway for slight error, but take care: a seemingly minor goof at the bottom level can lead to a major list at the top, and you'll wind up having to turn off the top of the bowl. With glue squeezing out, it can be hard to tell whether one level is centered on the one beneath it. They don't fit flush, inside to outside; it's a matter of splitting the difference.

Carefully cut the semicircles from each half with your band saw table set at 45°.



Using a compass, draw concentric circles on a single square. The number of circles depends on how deep you want to make your bowl.

Then there's the formidable task of clamping the bowl top to bottom. I experimented with two squares of plywood and four clamps, which is awkward at best. I can imagine jigs that would do the job, but I've never gotten around to making one. My method? I set a plywood square on the bowl and a heavy stump on top of that. Crude, but it works.

If all this cutting and gluing sounds tiresome, consider that the laminated piece you'll return to after the glue has dried will already look suspiciously like a bowl; there's precious little turning to do. In particular, you won't have to face the daunting task of hollowing out a deep bowl, which can be quite the job if

(Photo 3) *Stapling the glued circles on the outside face allows an adequate gluing process and easy gluing on the stacked rings.*

(Photo 4) *Make sure each circle is centered on the one below during gluing.*

Scrape bowl interior to smooth surfaces while forming contour.

(Photo 5) *Changing patterns and placement of wood strips leads to a dramatic finish.*

you're not Richard Raffin. I find this method actually requires less work time than turning a solid piece.

The stacking method also allows considerable opportunity for artistry. Whereas using a solid chunk of Indian rosewood would be expensive (and wasteful), a thin strip of the exotic wood, perhaps edge-glued between two pieces of walnut, is affordable and has a dramatic impact. You'll quickly see other possibilities. I've made many bowls with a strip of exotic wood between walnut or maple. I seldom put the exotic in the exact center, because I think it looks more interesting if asymmetric, but that's a matter of personal taste.

Incidentally, if you're putting three strips together for the blank, don't try to get by without edge-gluing beforehand. You'll find that attempting to staple the pieces, particularly the narrow center strip, will be next to impossible to do without leaving voids.

An easier variation is simply putting two contrasting woods edge to edge. These won't have to be glued (but do make sure the joint is good). Simply put them together, draw the circles, and, when you're making the stack, put light wood on light for a bowl that looks neatly halved, or light on dark for a staggered pattern ***(photo 5)***. You could even "spiral" one type of wood symmetrically around the bowl. (In my opinion, a strictly arbitrary arrangement seldom looks good with just two types of wood, although it will work with three or more.)

It's easy to see that a four-level bowl using this method requires far less wood than one turned from a solid lamination. You also can chuck bigger projects, because the bowl is hollow and thus lighter to begin with.

Best of all, I can now "bowl over" folks on my gift list, without "ringing up" big expenses! PW

Ring Master Speeds Up Turning Bowl Process

If you're interested in turning numbers of bowls, either for sale or to use as gifts, you can reduce both production time and waste with the Ring Master from Porta-Nails Inc. (PNI). This machine can be set at any angle to produce concentric or angle rings from flat pieces of wood of any species or thickness.

The Ring Master's flexibility applies not only to thicknesses and angles, but also to skill capabilities. The range of possible projects stretches over four levels, from flat rings used as picture frames and bracelets to layered projects, which can involve mixing woods and laminating. At any level, the process is so safe that school shops are among the Ring Master's top customers, says Jerry Coleman, PNI's vice president of marketing.

The Ring Master operates by a cutting head driving two cutters. Turning a handle in one direction moves one cutter blade toward the disc, and the other direction advances the other cutter. The finished ring is produced from the disc by first cutting partway through the spinning disc with one blade, then severing the ring by making a second partial cut with the other blade. This process ensures the surface fibers are not torn out, so the rings have clean edges that are defect-free. It also eliminates waste since only the ring is separated from the original wood.

Once enough rings are produced for a project, they can be glued together with any water soluble woodworking glue. The stacked rings can be used to produce bowls, canisters or anything else you can imagine.

"It really gives you an unlimited capability to make anything hollow," Coleman says.

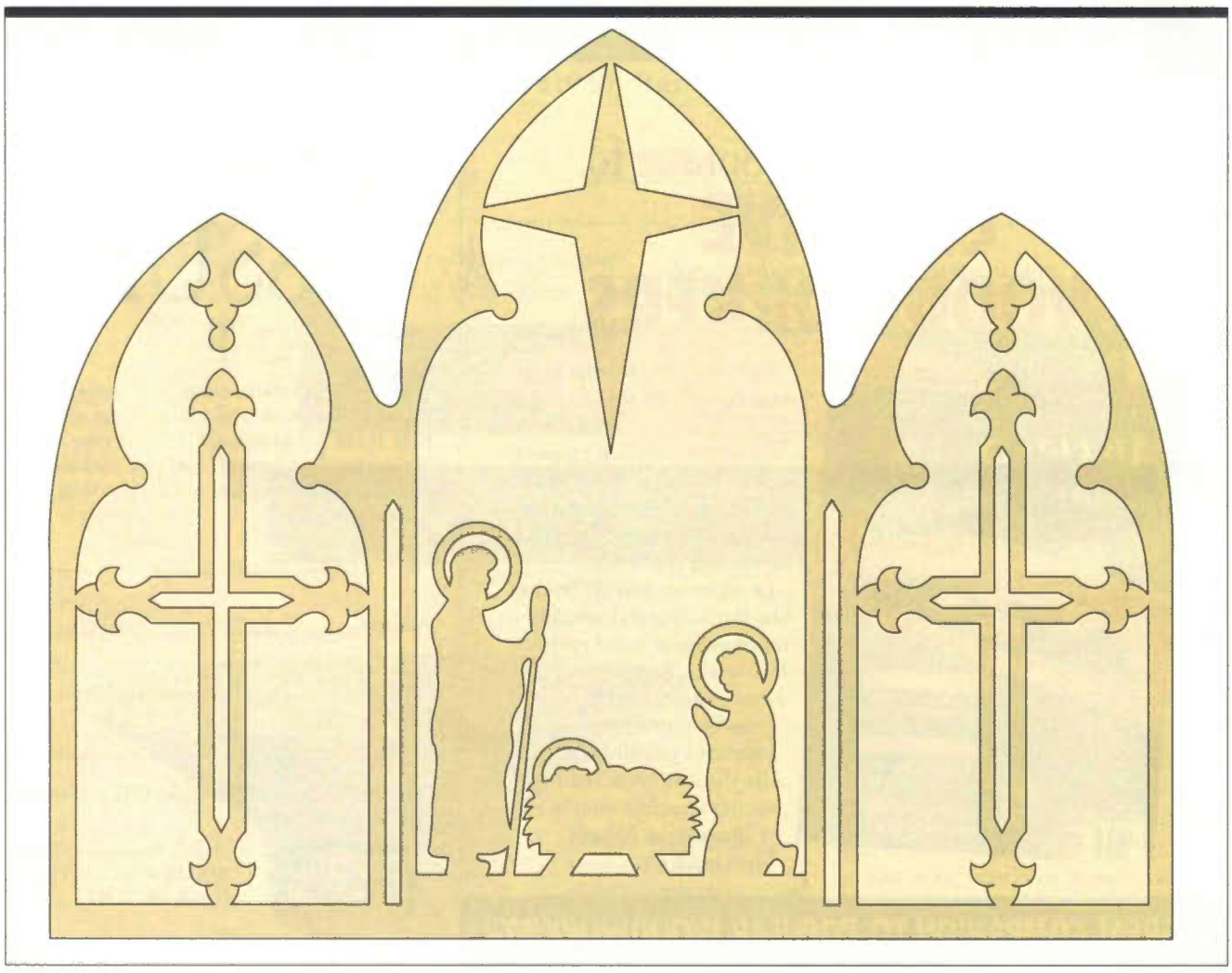
The Ring Master requires a ⅓ or ½ H.P., 1725 RPM motor. It's available with a variable speed drive which controls the RPM from 600 to 1,000. The new model 3 Ring Master can accessorize a Sears Craftsman 12" lathe, and model 2 attaches to the base tubes of a Shopsmith Mark V or similar machine.

For more information on Ring Master, write to PNI at P.O. Box 1257, Wilmington, N.C. 28402.

by Rick Longabaugh

Nativity Cutout

This simple scroll saw project could adorn your mantle top or any other location during the holiday season. The main part of the Nativity scene was cut from ¼" birch plywood. The base was built from curly maple, but any interesting wood will do. To make the scene stand out, the back was painted a very majestic dark blue. Check out the fold-out plans in this issue for a full-scale model. PW



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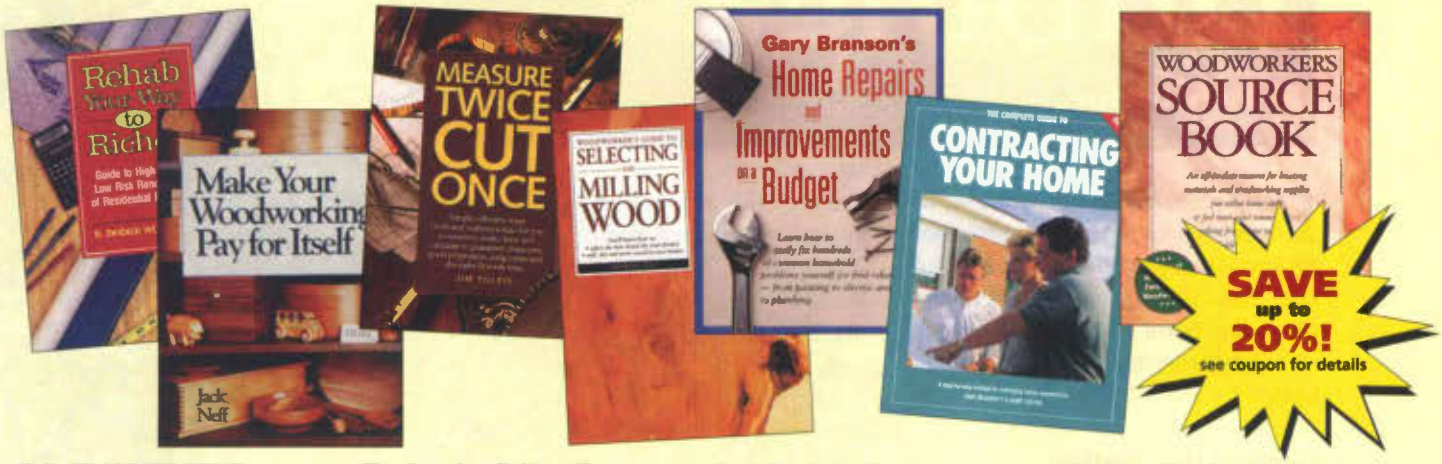

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Wood Types

Bubinga

By Ken Textor

For woodworkers looking for an attractive, offbeat and environmentally-acceptable tropical hardwood, bubinga may be the answer. It's a little expensive, but it still could be included on a holiday gift list without breaking the bank.

General Description

Although it is indigenous to Africa, bubinga (pronounced boo-bing'-uh) actually looks like a cross between Honduras rosewood (*PW* #78) and Philippine mahogany (*PW* #63). Nevertheless, bubinga (guibourtia tessmannii & spp.) is distinctly from equatorial Africa, including the countries of Nigeria, Cameroon, Gabon and others of the Congo River basin. It is in the same genus and grows in the same region as other exotics like benge and ovangkol, which are sometimes mistakenly sold as bubinga. But if you stick to the characteristics of bubinga described here, you should have no problem getting the real thing.

To date, bubinga has rarely been harvested aggressively, in part because of the types of areas in which it generally grows. Dense swampy land, or land that is occasionally inundated, are prime growing sites. This is usually deep in the heart of the Congo River basin, far from easily-accessed shipping ports. The tree itself often reaches a height of 130' or more, usually with a straight cylindrical trunk for nearly half that distance. Pure stands of bubinga are seldom found.

The bubinga wood is uniquely handsome. The heartwood is pink, vivid red or reddish brown, often with purple streaks or veins running through it. These colors tend to darken when exposed to sunlight, but they do retain their basic reddish hue. Bubinga's grain adds to the color extravaganza. It is quite variable and often includes ribbon, mottled and curly effects. Moreover, the fine interlocked grain sometimes acts like American elm (*PW* #40), reflecting light like a hologram and adding a sense of depth to the surface when viewed from various angles.

Bubinga is moderately hard, heavy and strong, about on a par with Honduras rosewood. Unfortunately, its shrinkage and water absorption qualities are not as good as the various rosewoods. Its seasonal movement will be more like a hard maple (*PW* #60) than a rosewood or a mahogany. It also is moderately resistant to rot and termite attack, but only somewhat resistant to marine borers. It is not very shock resistant or resistant to splitting.

Bubinga is sometimes used as a rosewood substitute, and it has been traditionally used in all the applications the rosewoods are prized for. This includes fine furniture, cabinetwork, yacht trim, decorative veneers, fancy turnery, inlay work, knife handles, carvings and so forth. The wood has been particularly popular in Europe.

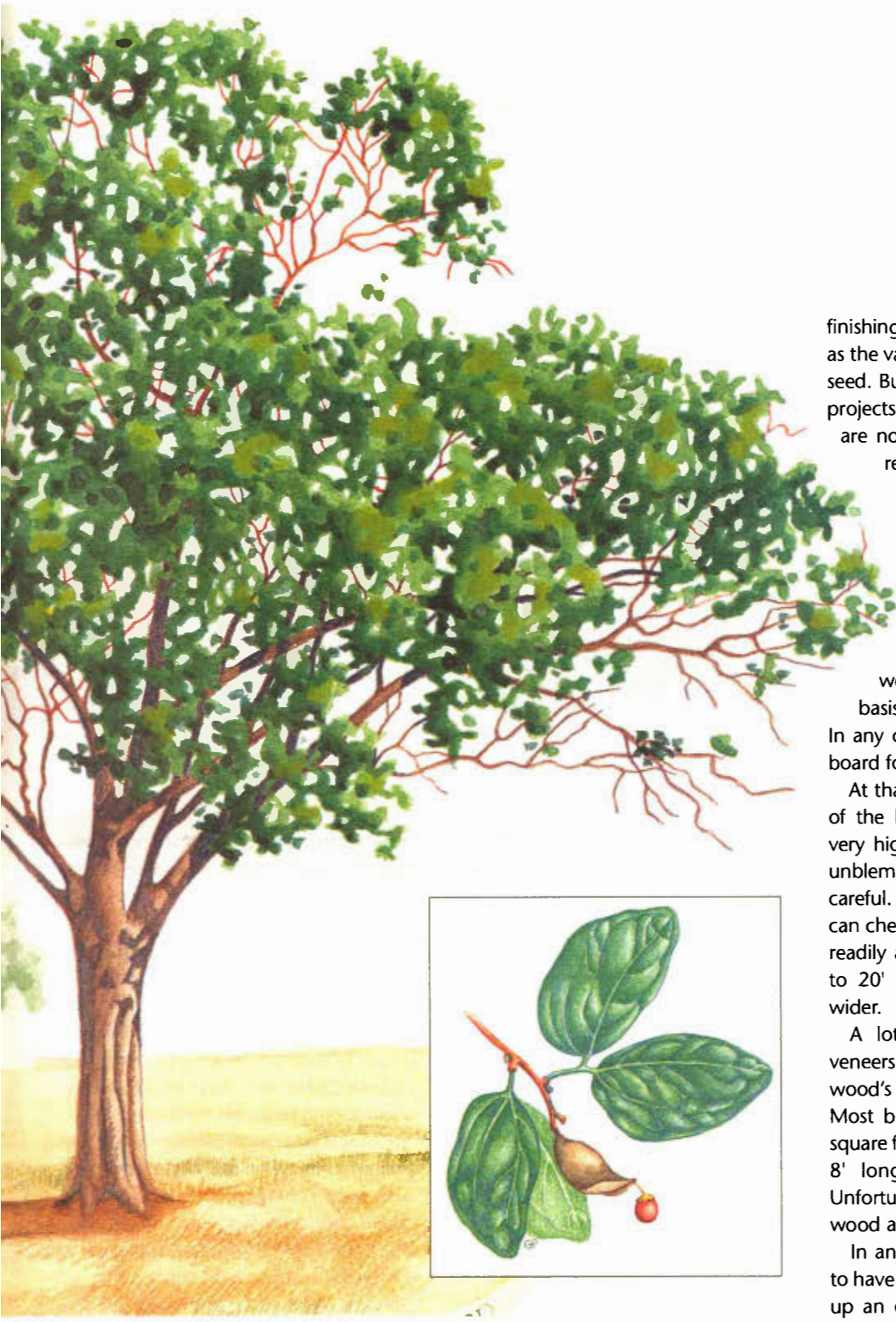
Working Properties

Bubinga is generally easy to work, but some problems do exist. In power planing, for instance, the variable interlocked grain can leave rough spots in unpredictable places. You must therefore take off small amounts, no more than 1/16", on each pass. Fortunately, most of the rough spots can be smoothed over with a sharp hand scraper.

Hand planing, power sanding and ripping present no problems. But cross-cutting and routing can leave a somewhat rough edge. A little sanding should take care of it. Boring holes with hand or power drills presents no difficulties. On the lathe, bubinga is a pleasure. Chips come off evenly and fine details are easy to achieve. There is little dust and no noticeable allergic reaction. There is, however, a distinct odor of dog dung. This disappears in a half hour or so, but it may make you look suspiciously at old Fido until it does.

Fastenings of any kind work well in bubinga. Because this wood tends to split fairly easily, pilot holes for screws will be necessary. But lubricants won't be. In the gluing department, all adhesives work well. The usual precautions about leaving space in the glue joint for epoxies applies. Also be careful that aliphatic

Ken Textor *is an active freelance writer who works with wood in Arrowsic Island, Maine.*



glues don't come in contact with iron clamps during the gluing process. This can leave a blue-black stain in the wood, which must be sanded or scraped out.

Finishing

Anything other than a clear finish on bubinga will send you straight to woodworking purgatory. But because the wood darkens when exposed to sunlight, you should choose your clear finish carefully. A clear acrylic lacquer or varnish will give the best results. But I also got good results with the slightly amber colors imparted by oil-based varnish and shellac. The slightly whitish color imparted by clear water-based finishes detracted from the wood's natural beauty. All of these finishes may raise the grain slightly. But light sanding between coats eliminates any long-term problems.

Polishing and waxing also are good finishing alternatives for bubinga, as well as the various oils—tung, Danish and linseed. But they all should be reserved for projects that will not see hard use. They are not very scratch-, water- or wear-resistant. They are therefore inappropriate for furniture, trim and the like.

Availability

Finding bubinga may be something of a challenge. Small dealers in tropical hardwoods rarely carry it on a regular basis, but the big ones generally do. In any case, expect to pay $7 to $12 a board foot.

At that price, it's good to know much of the bubinga available today is of a very high quality. It is usually clear and unblemished, but you still have to be careful. If this is seasoned too quickly, it can check and distort. In most cases, it is readily available in ¼ and ⅝ thicknesses, to 20' long and 12" wide, sometimes wider.

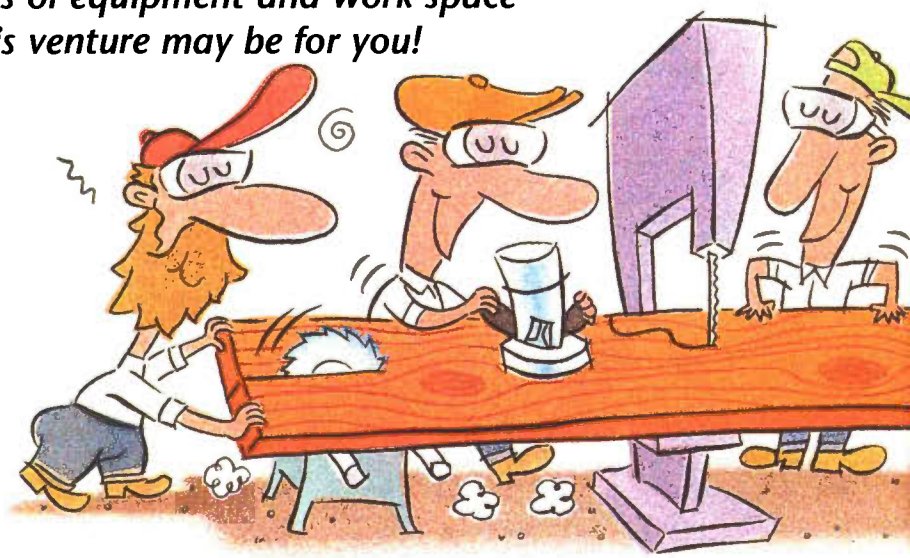
A lot of bubinga also is cut into veneers. This takes full advantage of the wood's beauty without the big price tag. Most bubinga veneer is about $2.50 a square foot, and sheets up to 4' wide and 8' long are often readily available. Unfortunately, suppliers of bubinga plywood are basically nonexistent.

In any case, bubinga is a good wood to have around the shop. As trim to spice up an otherwise common-looking project, it's perfect. Moreover, my young niece was particularly fond of bubinga because, "It's just fun to say." PW

ILLUSTRATION BY: GINNY PRUITT

Co-operative Woodworking

If you'd like to share the costs of equipment and work space with fellow woodworkers, this venture may be for you!



Co-operative woodworking ventures have been around for quite a while, but now they're becoming popular enough that all woodworkers should learn more about them. To understand what the buzz is all about, we need to review a definition that will get us all thinking the same way:

> *Co-operative woodworking is an association of two or more independent woodworkers who share common working and/or sales space. Their separate efforts are used for their individual financial benefits, and the communal part of their association is for reducing overhead expenses and gaining some of the advantages available in larger organizations.*

Now that we have a foundation to build on, we need to explore the many aspects of the co-op system to really understand what it's about. Since all woodworking co-ops do not operate the same way, our discussion will focus on the operating options available, and the overall advantages and disadvantages of co-oping. While this may leave some of you a bit vague on what you can expect to find while approaching a specific group for membership, it will at least give you an idea of what to ask about and look for when evaluating them.

A woodworking co-operative is generally a corporation formed for business and liability purposes. As a corporation, the group has a known, fixed income based on membership fees (rent). It's also probably in a better position to negotiate loans or leases for equipment and facilities than an individual. The responsibility of the co-op does not end with providing the major building and equipment requirements of a business, however, but includes basic utilities such as heat, light, trash collection, water, sewage and power. Because co-ops tend to be situated in a commercial building space, they normally have three-phase power available to them, something the small shop might not be able to get.

Trash collection is a major problem in some communities, but it's the co-op's responsibility to handle this. The total scrap generated by you or your woodworking neighbor might be reduced if one member's small scrap is sold to others for their own small products. Recycling of this type also serves a secondary function, though not necessarily secondary in importance, of reducing these woodworkers' material costs.

A co-op may even include a common telephone system usually restricted to local use. Having a common telephone might prove to be a bit of a problem if you spend lots of time on the phone, but you could always opt to have a private line installed for your outgoing calls so others would have more access to the communal phone line. The common incoming phone line could be a major plus since some folks don't like to leave messages on answering machines. Someone will usually be around to take a message personally.

As a legal entity, the co-op can contract for liability insurance for the facility, and possibly even for the individual members, depending on state laws. Health insurance is another area the corporation has an advantage. It may even be able to negotiate for lower cost group premiums because of its size. Since health insurance premiums for individuals are high, this alone might be the deciding factor on joining.

Corporation membership is usually limited to those belonging to the co-op and, as a result, all members take an active part in running the organization. The total number of co-op members is generally controlled by the amount of personal work space available, but also may be restricted based on the type of woodworking an applicant is involved with. Taking a tip from other businesses, co-ops generally have regularly scheduled meetings for discussing day-to-day operating problems and plans for major changes affecting the organization. Some of the daily functions that must be handled include housekeeping, machinery and building maintenance, schedules for using the equipment, hours of business, and safety rules and regula-

ILLUSTRATION BY JACK DESROCHER

Jacob Schulzinger *works with wood - and writes about it, too. He also works full-time as a technical writer.*

by Jacob Schulzinger

tions. While a few of these tasks may seem unexciting and unimportant, they are all necessary functions that must be performed if the organization is to survive. Some co-ops may contract the housekeeping and maintenance functions to individual members within the organization, while others will assign the tasks on a rotating basis.

Since woodworking has the potential of generating a variety of safety related problems, one of the group's more important functions is enforcing safety regulations so the well-being of the facility, its contents and co-op members are not endangered. This means that shop cleanliness and the proper use of dust collection equipment must be stressed so city and state fire and health laws are complied with. It also means ensuring that spray booth equipment is operating properly and is correctly and regularly used so the city, state and federal air pollution requirements are not violated. Add to this the logistics of disposing of hazardous waste, such as chemicals used for finishing, and you have a formidable amount of technical knowledge and quite a number of specific tasks for a group to keep abreast.

Because of the strict business nature of the co-operative corporation and its financial responsibilities, it is important that each of the co-op members signs a long-term commitment, in the form of a contract. This principally enforces the fees paid for using the space, facilities and equipment, but also includes the basic rules, regulations and restrictions needed to protect the corporation and the rest of the members from possible abuses by a single member. The rent paid to the co-op provides each member with a basic shop that normally includes all utilities, a specified amount of "private" work space, and access to the common work space, as well as to all of the major equipment leased or owned by the umbrella organization.

The private work space is usually used for bench-type work, while large assemblies might be constructed in the common work area. The amount of bench space allocated to each member is determined by the actual building space available and the type of woodworking performed by the bulk of the members within the organization. Members each have the responsibility to fit out their work areas so they'll best suit their needs, just as it is the responsibility of office renters to decorate their own offices. Restrictions may exist on the type of modifications that may be done,

so it's always wise to have your construction plans reviewed by the group before investing your time and efforts in any changes to your work area.

The major equipment available in the facility is where a co-op almost always outshines the average one-person shop. Such large, professional quality machinery is the answer to many small businesses' prayers. Not too many one-person shops can afford enough equipment to significantly reduce the heavy labor portion of the woodworking profession, and very expensive items, like a spray booth that meets EPA requirements, are not affordable for most individuals. The co-ops generally try to lease or rent the major pieces of equipment from their members, which makes joining the group a less traumatic financial experience for those who get into the organization at an early stage of its development. It's obvious that if an existing piece of equipment is in place the group is unlikely to need a second one, so latecomers may either have to sell or store their now surplus machinery. The type of machinery available will, of course, vary from one organization to the next, but you shouldn't be surprised to find a table saw, radial arm saw, panel saw, planer, stroke sander, jointer, shaper, band saw, spindle boring machinery and a drill press or two—all commercially-sized. Add to this fairly comprehensive list a centralized dust collection system and a spray booth, and you have the makings of a first class woodworking shop.

Since there's a greater demand for each piece of machinery in a co-operative environment than a one-person shop, you may be required to schedule your working sessions on a particular piece of machinery. There are always potential minor problems from working with machines operated by a number of different users that you, coming from a one-person shop, should be aware. First is the problem of a long-run job. You may need a machine for two, non-consecutive days during a week to do the same job but, because others will be using the same machinery in the interim, your initial set-up will have been torn down, and you'll need to start from the beginning before starting the second day's work.

Because of the concept that the co-operative venture is a "sharing" organization, you will probably find others available to help with jobs that you physically can't handle yourself. Expect to pay for services like this either in dollars or in trade, by exchanging your labor for theirs, depending on the agreement you reach with each person. Other "sharing" that can be expected in this type of arrangement is subcontracting. When one person gets a job that is too

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large to handle, assuredly, a part of the work will be subbed out. As a business neighbor, you might get a shot at that portion of the job. Learning also is a form of sharing, and there's always something to learn from another group member. Don't expect to find, however, that all members will take the time to teach you a new trick or process. Some may be poor teachers, and others just too busy. The final type of sharing is probably the best of all, a cup of coffee and someone to talk to occasionally.

Co-ops aren't for everyone. Hobbyists might find they would do better with others of their own interest level, as their shop time and shop requirements are much different than those who must earn their living from their craft. It would be tough for a busy, full-time woodworker to give up a spray booth for a late night session just so a hobbyist could finish a project. While we all know that both woodworkers pay appropriate dollar amounts for the space and equipment, but we also know that one person has a livelihood to earn.

Another potential problem with co-ops is you may not get along with everyone there, and a bad interpersonal relationship with one or more co-op members might make the arrangement absolutely untenable for you. Before joining a co-op, make sure you interview the individual members with the same intensity and purpose that they interview you. Joining a co-op is almost like being a member of a large family. You get to know the members very well, and you need to be sure their idiosyncrasies aren't enough to drive you to distraction. Existing co-ops understand the problems that can arise from close business relationships of this type, so they take what may appear to be a very long time to interview and re-interview candidates before selecting new members.

A final word of advice—when considering a co-op, take the contract to an attorney. Make sure the terms and conditions of agreement will not adversely affect you or your business. No co-op in your area? Consider forming your own and reaping the benefits. PW

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Calendar

Events of Interest to Woodworkers

If your group is having an event you would like other woodworkers to hear about, please send us all pertinent information at least four months before the opening date to: Calendar, Popular Woodworking, 1507 Dana Avenue, Cincinnati, Ohio 45207. We will publish the entry for you free of charge.

Arkansas

White River Artisans School: (year-round) Forged toolmaking, wood-strip canoemaking and bamboo fly-rod making for woodworkers. Contact: White River Artisans School, 202 South Ave., P.O. Box 308, Cotter, 72626. 501/435-2600.

California

The Woodworkers' Place: (year-round) Classes offered to build and take home furniture projects. No experience is necessary. Given Saturdays/Sundays. Private instruction also available. Contact: Mark Tudor, 4352 Beulah Dr., La Canada, 91011. 818/952-3177.

Connecticut

22nd Christmas Crafts Expo: (12/2-12/4, 12/9-12/11) The Hartford Civic Center will display 300 different exhibitors each weekend. Contact: 203/693-6335.

Indiana

The Woodworking Shows: (1/27-1/29) Indiana State Fairgrounds, Indianapolis. Contact: The Woodworking Shows, 1516 South Pontius Ave., Los Angeles, CA 90025. 310/477-8521.

Kentucky

Woodturning and Joinery Instruction: (year-round) Contact: Jim Hall, 415 Center St., Berea, 40403. 606/986-8083.

Maine

Center for Furniture Craftmanship: (1/17-4/8) Twelve-Week Intensive Furniture Workshop. Contact: Center for Fumiture Craftmanship, 125 W. Meadow Rd., Rockland, 04841. 207/594-5611.

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Held in Easthampton. Contact: The One Cottage Street School of Fine Woodworking, 413/527-8480.

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The Woodworking Shows: (12/2-12/4) Novi Expo Center, Detroit. Contact: The Woodworking Shows, 1516 South Pontius Ave., Los Angeles, CA 90025. 310/477-8521.

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Wood Carving School: (year-round) Woodcarving classes, including Introduction to Wood Carving and Wittling Angels and Hearts. Contact: Wood Carving School, 3056 Excelsior Blvd., Minneapolis, 55416. 612/927-7491.

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The Woodworking Shows: (1/13-1/15) Garden State Exhibit Center, Somerset. Contact: The Woodworking Shows, 1516 South Pontius Ave., Los Angeles, CA 90025. 310/477-8521.

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Christmas '94 Art & Craft Spectacular: (12/2-12/4) New York State Fairgrounds. Display of 200 juried professional artisans. Contact: 607/265-3230.
The Turned Vessel—Exploring Alternative Forms with Bill Gundling: (1/23-1/26) Contact: YWCA, New York, 212/735-9732.

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The Woodworking Shows: (1/20-1/22) Ohio Expo Center/ Fairgrounds, Columbus. Contact: The Woodworking Shows, 1516 South Pontius Ave., Los Angeles, CA 90025. 310/477-8521.

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The Woodworking Shows: (12/9-12/11) Pittsburgh Expo Mart, Monroeville. Contact: The Woodworking Shows, 1516 South Pontius Ave., Los Angeles, CA 90025. 310/477-8521.

Texas

Woodshop Inc., Woodworking School: (year-round) Full range of classes. Contact: Woodshop Inc., Woodworking School, 1225 W. College, Suite 612, Carrollton, 75006. 214/466-3689.
Ninth Annual Rio Grande Valley Woodcarvers Inc., Show and Sale: (1/20- 1/21) McAllen Civic Center, McAllen. Contact: 210/581-2448.

Wisconsin

International Lathe-Turned Objects: (now through 1/8) Challenge V. Leigh Yawkey Woodson Art Museum will display 67 objects selected from competition to demonstrate a variety of turning techniques. Contact: 715/845-7010.

Out of the Woodwork

continued from p. 88

faces, and lasts much longer than ordinary heavy brown grease. (You can find it in any automotive store.)

Be True to Your Tools

Tools that are no longer useable should be discarded and replaced. If you're pitching any screwdrivers, save one of the old tools and re-make it into a scratch awl for layout work. Keep it at your drill press and table saw: Now you won't have to run to the tool panel to get that awl you need.

Cleanliness is Next to Craftiness

Don't put this off any longer. Give your entire shop a thorough cleaning—from the dust-covered overhead lights right down to the nooks and crannies on the floor. Some equipment (like much of mine) has castors and can be moved out of the way for an elbow-bending cleaning. Also check your electrical connections and plugs. Take time now to install ground fault plugs. Rubberized floor mats are great leg savers if your shop is on concrete flooring. They're also a shock deterrent should you encounter static or a short. If the overhead fluorescents are blinking, replace the bulbs—that stroboscopic effect can lead to very dangerous errors when working around machines. Turn the tube ends around for a temporary solution, but replace such bulbs as soon as you can.

After you've completed these tasks, take a look around your shop. Isn't it a comforting feeling to see it shining, just waiting for you to begin your next project?

Perhaps it's best for you not to consider these necessary jobs as New Year's Resolutions, but as tasks that will add pleasure and productivity to your woodworking in the months to come. PW

Ad Guide

Popular Woodworking Dec/Jan '94

Betterway Books . . .75,79,81
Decorative Artist's Wkbk . .73
DeWalt 12-13
EconAbrasives 11
MLCS 5
PNI-Porta Nails 11
Penrich 15
The Rocking Horse Shop . . 7
The Roudebush Co. 17
Ryobi CVR4
Sugino 6
Taylor Manufacturing 6
Tormek USA 7
Video College of Woodwk . .6
Woodcraft Supply 79
Woodworker Mag. . . . CVR3
Woodworkers Book Club CVR2-1
Woodworkers Store 17
Woodworking Shows 81

Popular Woodworking's CAPTION THE CARTOON CONTEST

sponsored by SKIL

Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking,* Cartoon Caption #10, 1507 Dana Ave., Cincinnati, OH 45207. The entry deadline is February 1, 1995. Entries will be judged by the editorial staff. A winner and two runners-up will be chosen.

The winner will receive the new Skil 8" Drill Press, model 3380. Features include: ¼ HP induction motor, 5 speeds (620-3100 rpm), adjustable depth stop, ½" chuck with 2" spindle travel and 7" chuck to table clearance—10" to the base. There's a conveniently located chuck key holder and a drill bit storage compartment for 20 bits (1/64"—½"). The warranty lasts two years.

The two runners-up will each win a one-year subscription to *Popular Woodworking.*

"Just as I promised, dinner and a movie!"

The Winner of our "Caption the Cartoon Contest #8"

in the September, 1994 issue, and recipient of the Skil 3380 8" Drill Press shown here is:
Kenneth D. Higgins, from Crown Point, Ind.

The runners-up receive a one-year subscription to *Popular Woodworking:*
Michael E. Ferland, from Warwick, R.I., for:
"I'll set the table (saw) for lunch, honey!"

And Skip Farrell, from Brooksville, Fla., for:
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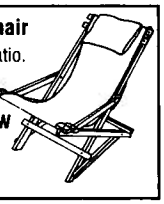

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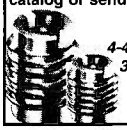

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by Don Kinnaman

New Year's Resolutions

You cherish your tools and your shop, of course, but perhaps they're suffering from a little year-end disrepair. Now's the time to re-establish their original lustre.

The leaves are off the trees (although most are still on your lawn), and a good old-fashioned Nor'easter is beginning to blow through the edges of your storm windows. Your holiday woodworking projects are completed, but you're not quite ready to start work on the cedar planter that will look so good on your deck come summer. In a word, you're getting antsy.

It may be time to sit back and ponder your New Year's Resolutions (or, if you're like most of us, how those resolutions can at least be put on the back burner until "later").

Although you probably make this resolution annually, promise yourself that this year you'll keep your tools in their rightful place and your shop clean (really, you *mean* it this time). Think about all those new tools Santa will bring. Just how will they fit into your already bursting tool storage space?

This also is a fine time to take a hard look at the rest of your equipment. Will your "new" tools offer improvements? Now's the opportunity to take inventory of all of your tool and machine equipment. List names of tools, age (when purchased), cost of each tool when new, and their general condition. This will be very helpful to your insurance agent if you suffer through a fire, flood or theft. (Generally, such equipment is covered on your home-owner's policy, but a check with the insurance company will settle any doubts you may have.)

It Won't Stay Cold Forever

High humidity and dampness in the backyard shed and basement will quickly and silently rust your ferrous metal tools, such as hand planes, chisels, and other iron- and steel-based tools. Now's the time to give them the once over. Use a very fine steel wool or abrasive to remove the rust or corrosion, and protect them with silicone spray or a light penetrating oil.

What about those carving tools and chisels? Are the cutting edges really sharp, or do they need a good dressing down on the hone and strop? Did anyone in your family (or perhaps even you in a moment of haste) grab a screwdriver to open a paint can, possibly chipping the blade or spilling paint on the tool? Although all woodworkers claim to abhor such practices, these crimes do occur! Clean the humiliated tools up and redress the working ends.

Now that you've cleaned, polished and sharpened everything—and protected it all with silicone or oil—grab your oil can and put a drop where needed on hand plane adjustments, clamp screws and vise screws. Don't neglect other tools with adjustments that can stick from lack of lubrication.

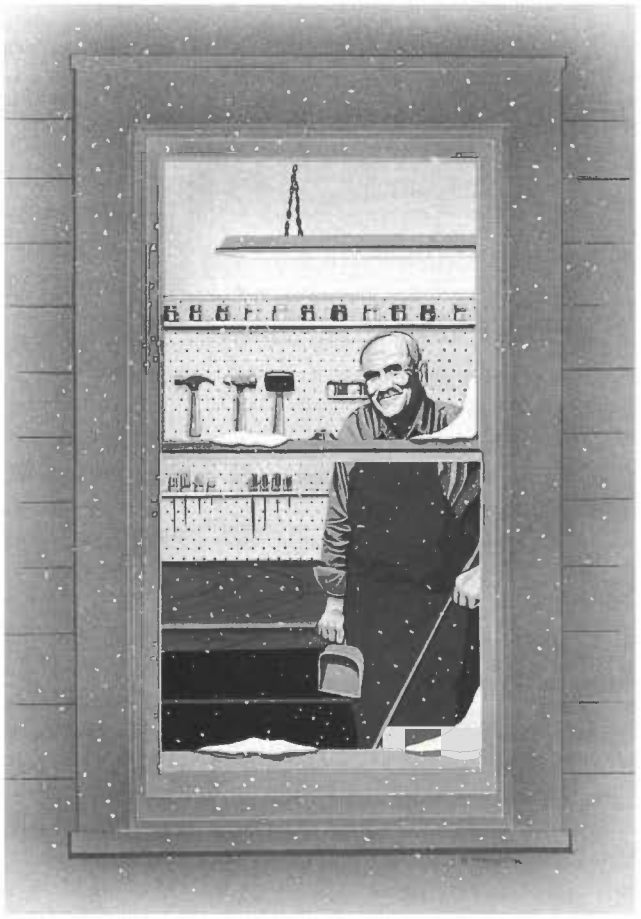

ILLUSTRATION BY BILL NAUGHTON

Get Rid of the Ghosts in Your Machines

While you're at it, thoroughly clean and check your power tools. Aluminum throat plates can be cleaned with steel wool, and the blade slots evened up with a file. Cast iron tops should be lightly "abrasived" to remove rust stains. (Steel wool doesn't work on cast iron very well.) Clean and polish all machine surfaces and apply several coats of a good, hard paste wax. Follow this with a coating of silicone, which will give real slickness and solid protection from future rusting or corrosion.

Next take a look at the working innards under the table. Use your shop vac and blow out or vacuum all dust from trunions, bearing areas and collecting corners. If there's a build-up of pitch on the tilt or raising mechanism, scrape it clean with a putty knife and apply a generous coating of white lithium grease. White grease has a tendency to "plate" working sur-

continued on p.85

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