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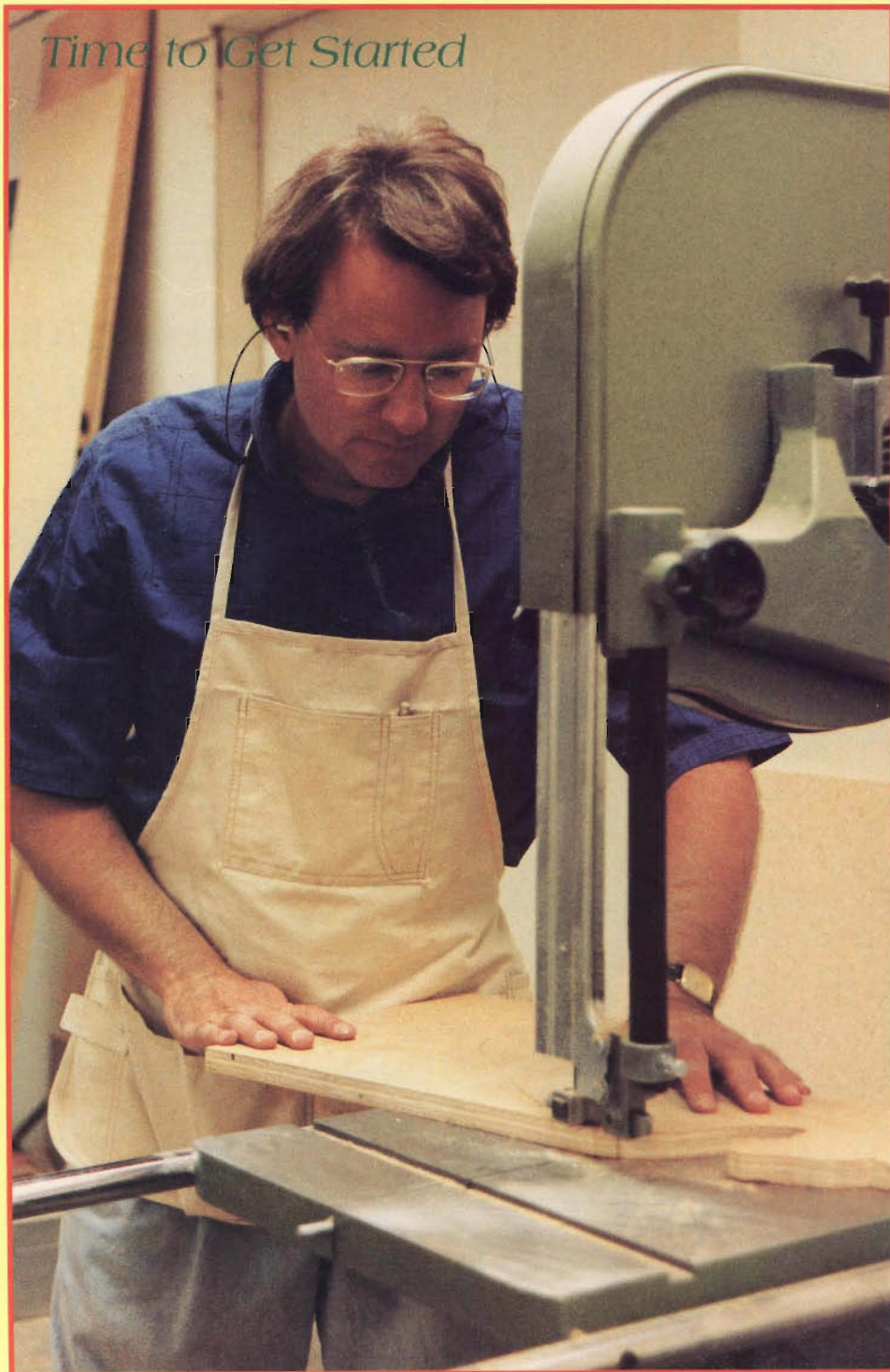
Issue 57, November 1990

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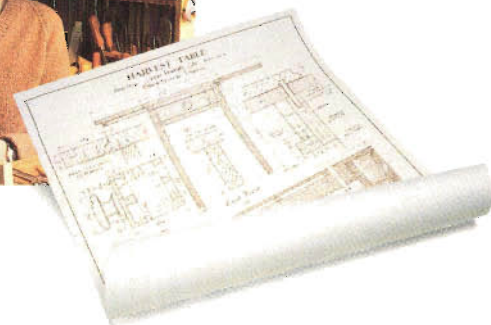
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C—This garden bench, with its gently curving arms, gives you a comfortable place from which to enjoy the beauty of your yard. Step-by-step details start on page 54.



Materials List

PARTS

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B.	Front legs (2)	1 1/2" x 3 1/2" x 21 1/2"
C.	Back braces (2)	1 1/2" x 3 1/2" x 25 1/2"
D.	Seat	1 1/2" x 3 1/2" x 25 1/2"
E.	Upper back support	1 1/2" x 3 1/2" x 21 1/2"
F.	Arms (2)	1 1/2" x 3 1/2" x 30"
G.	Arm braces (2)	1 1/2" x 3 1/2" x 30"
H.	Lower back support	1 1/2" x 3 1/2" x 21 1/2"
J.	Back slats (7)	1 1/2" x 4 1/2" x 25 1/2"
K.	Back seat rail	1 1/2" x 4 1/2" x 25 1/2"
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Editorial Staff

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Contributing Editors

William H. McMaster

Alan Marks

Hugh Foster

John A. Nelson

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Art Department

Ginny Pruitt, Carol Law,

Tom Larson, Don Hole, Robert Chapla

Circulation

Mary Goldthorpe, Suzanne Eriksen

Customer Service

May Fayne, Susannah Harte

Advertising

Deborah Nowak *Advertising Manager*

1320 Galaxy Way

Concord, CA 94520

Tel. (415) 671-9852

Wayne Lin *Publisher*

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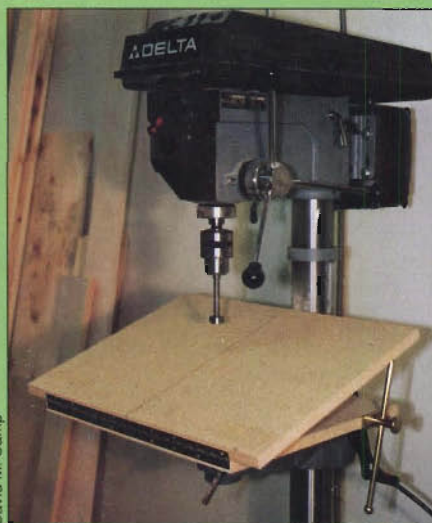
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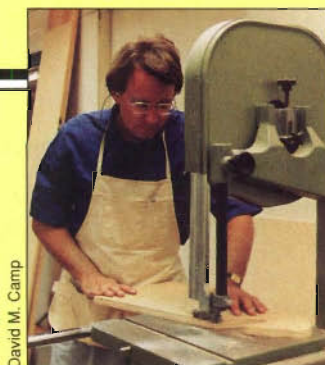


David M. Camp

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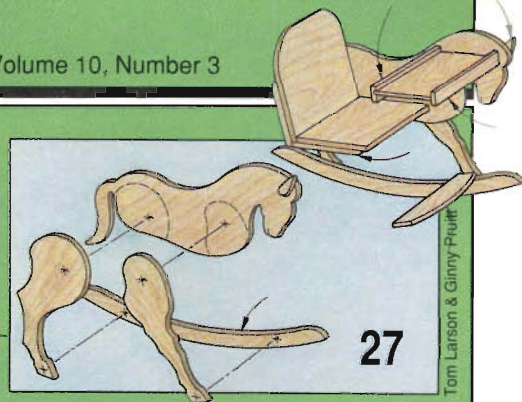
On the Cover

It's time to start making your holiday gift projects. Associate Editor Phil Fischer cuts out one of the body parts for our "Rocking Horse Chair and Tray" project—perfect for the toddlers on your list. Designer Howard French's instructions start on page 27, and you'll find full-size patterns in the PullOut™ Plans section in the center of the magazine.



David M. Camp

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Clear Cuts

We've got lots of fun stuff for you to make this time, and the projects involve some interesting techniques.

That reindeer on the front cover, for instance, is **compound cut** on the scroll saw. You cut out a pattern on the edge of a block, hold the pieces in place, and cut out another pattern on the perpendicular surface. If you use soft wood, the scroll saw will give you quick, smooth cuts that need no sanding. In *Scroll-Sawn Animals* (page 55) we've provided four full-size patterns to get you started making these quick sculptures. They make great gifts, decorations, and fast-selling craft show items.

The country style "Carved Wall Cabinet" (page 30) looks fine as is, but the doors are a perfect place for **surface decoration**. We show you woodburning and carving techniques that will give this project the personal touch.

Warren Asa simplifies **coopering** techniques with his fruit bowl project (page 62). How do you simplify coopering? Well, if the thing doesn't have to hold water, you've got a little leeway in beveling the staves. Glue them all together and *then* cut out the profile; you'll have made a vessel worthy of bearing your Indian summer harvest to the table.

Then there's **compound angle drilling**. For this technique, all you need is a drill press and a jig. I made the jig for our shop (and for the photo on page 4) in less than a half an hour. With it, you can drill the leg and spindle holes for the spindle-back chair project on page 66. The chair project itself takes a bit of time, so if you want to make a set in time for Christmas, you'd better start cutting wood.

For a quicker gift and some good old **straightforward band or scroll sawing**, there's the "Rocking Horse Chair and Tray" project on page 27. It's just the thing for any little ones on Santa's list.

So as you can see, we're full of good ideas. It's up to you to get started on the fun part.

David M. Camp

Letters

We welcome your comments, pro or con, about articles we publish. Send your letters to: Editor, Popular Woodworking, 1320 Galaxy Way, Concord, CA 94520. Letters may be edited for publication.

Grateful Reader

I want to thank you for the "Drill Press Table Counterweight" idea in the March 1990 *Tricks of the Trade* column (PW #53). I have the same drill press shown in the photos, and have always struggled with the table.

Instead of the auto exhaust pipe, I found it easier to purchase a length of entry service electric pipe. It measures 2-1/4" outside so it was perfect. I had the hardware from an old overhead garage door so I used one of the ball bearing pulleys.

With the pipe full of lead, I can now raise the table with only two fingers. This one article made my whole subscription worth the cost.

Willard Bondhus, Bloomington, MN

Ungrateful Reader

I have a complaint about the equipment review of the Makita 2711 table saw in *Tool Talk* in Issue #56 (September 1990). Let me say that I like Makita tools so there is no bias that way, but I have had this saw for a little over a year and have found many flaws that the reviewer overlooked.

To change from cross cutting to ripping the miter gauge is removed by removing two hand screws with 3-1/2 turns of one and 7-1/2 turns of the other. Quite a bit of time for this constant interchange of operations. To raise the 10" saw from zero depth to maximum height require 30 turns of a small 1-3/4" knob. It is very difficult to turn, so that a normal twist of the wrist accomplishes about 1/4 turn. Can you imagine 120 twists of the wrist to raise a saw?

Concerning the saw guard: the device on the saw frame for attaching it is right in line with the saw blade. This causes sawdust to bounce back in the operator's face—a detestable situation.

The stamped-out table has no slots. Many jigs and devices on the market oper-

ate from slots, as do some shop-made jigs featured in your own magazine. Cross cuts cannot be made from the right side of the saw. Unfortunately, I was not able to see the saw before I bought it; the omission of slots was a great disappointment.

The switch is observed through a peep hole that is 2-1/8" X 3-1/4". There are occasionally reasons to stop the saw while materials are still on the table. This means fumbling for the switch or bending down to see it.

The reviewer tested the power of the motor by sawing soaking wet "saturated" wood. He failed to say how thick the lumber was. I have to slowly feed 1-5/8" soft dry lumber because of an under-powered motor.

I wonder if Makita could be persuaded to make some modifications both for future sales and present owners. A replacement top with slots would help (we could supply our own miter gauges).

A quick-action lock for the present miter gauge could correct its problem. At least, fast-thread, short-depth hand screws could be added. A rather large hand wheel with a crank handle would facilitate the raising and lowering of the blade; there is plenty of room for it in that location. The elimination of the sawdust throwback would require more thought.

I like your magazine because many things presented are new and valuable to

me. However, I feel this article was a disservice to your readers.

Maurice L. Bullard, Corvallis, OR

Sanford Wilk replies: Though no table saw is perfect, I chose to write about the Makita 2711 because it did very well in small shop conditions. A woodworker of somewhat limited means and restricted space would best benefit from buying this tool. I personally enjoy using my Delta Unisaw®, but not everyone has the space for a big machine, and when you get to the price tag, well, that makes a lot of people start looking for an alternative.

Before I address your points of contention with the Makita unit, let me say that I agree with all except the last one. It does, indeed, take a few turns of the wrist to remove the miter gauge from the sliding table. We felt that the time spent doing so was minimal, and the advantages of having a "slider" were worth the effort. I also agree with your calculations about the number of turns that it takes to raise and lower the blade. The primary tester of the unit responded that "you get used to it in a short time."

The guard attachment is in line with the blade, but that's part of what makes it work so well. It will toss some dust at the operator but not much—unless you remove the guard. (Perhaps this is what you're referring to?) The airborne particles are toler-

able and typical of other shop machines that are used in milling. While it's true that the tabletop won't accommodate every jig that could possibly be used on a table saw, again, the unit has the sliding table, making most sliding jigs unnecessary. As for the viewing window, in the few instances that it isn't visible from above, you might have to feel for the shutoff switch. Here again, we felt that it was an inconvenience that was neutralized by operator familiarity. I should also point out that no other machine in this class offers this feature; having it is better than not having it.

Finally, we disagree with your comment about the motor power of the tool. One factor in this might be the power line amperage; are you using a long extension cord with the saw? Another factor is the quality of the blade. Our tests were all conducted using rip blades of fairly high quality, and we were satisfied with the rate of speed we got with 8/4 red oak and ash. Might I suggest a new blade, or perhaps a sharpening is due? From what I know about Makita, they strive to make tools with sufficient power to handle the tool's full capacity. In other words, a 10" table saw will have enough power to cut material that is as thick as the full height of the blade will allow. If your saw isn't cutting it, it's possible that you have a defective unit; you should take it to a qualified service shop and have it checked out.

Corrections

In the last issue (#56, September 1990), John Nelson's plans for the "Roadrunner Whirligig" called for the kerf in the propellor hubs to be cut at a 25° angle. Sterling Guthrie, who submitted the idea for the jig to cut this kerf, says that 25° is too straight; he tells us that a 45° kerf would position the propellor blades better for catching the wind.

In the Tricks of the Trade column in that same issue, we published a tip called "Make Your Own Veneer," crediting the wrong person with having submitted the idea. The author of that tip was Mr. John R. Todd Sr., of Holly Springs, North Carolina. We apologize to Mr. Todd.



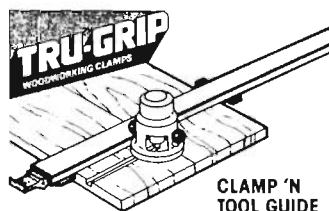
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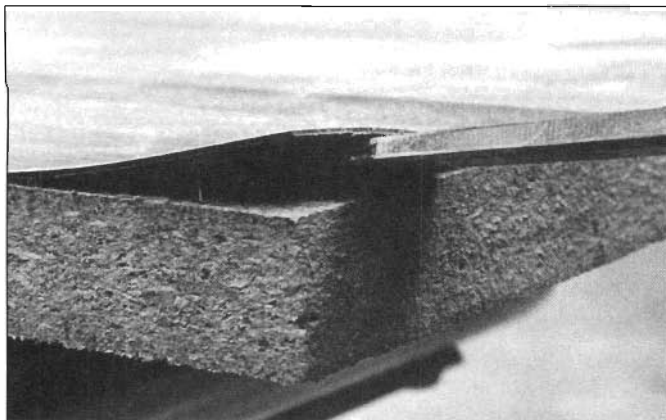


Tricks of the Trade

"Tricks of the Trade" shares readers' tips for making woodworking tasks easier and safer. If you've come up with a trick that would help other woodworkers, send it to "Tricks of the Trade," c/o Popular Woodworking, 1320 Galaxy Way, Concord, CA 94520. Include any photos or sketches that help illustrate your idea (we'll redraw them). We pay \$25 for each trick we publish.

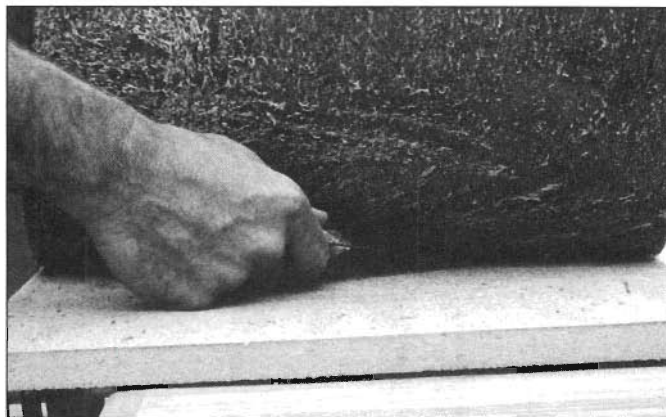
Removing Plastic Laminate

When installing a new moulded, plastic-laminated counter top, there is often a problem of where to get extra laminate to cover the ends or make side splashes. Sometimes there is no sheet material available, or that which is available doesn't match exactly, or the dealer insists on selling a whole sheet when only a small amount is needed.



photos by the authors

The plastic laminate from the sink cutout can be easily removed and used to cover edges or make splashes. Begin at a corner, and drive a sharp chisel between the laminate and the



board to start the separation. Lift the laminate as much as possible without breaking it. This will stretch the adhesive so that a sharp, thin-bladed knife may be slipped in to cut through it. The rest is easy; just keep stretching and slicing till the laminate comes off.

If your new countertop doesn't have a cutout, the dealer may have a discarded cutout that he will sell cheap. Dealers often cut these openings as an extra service for customers, then sell the discarded cutouts separately.

Charles Davis
Jamul, CA

Honing and Rubbing Oil Substitutes

Most craftsmen use honing oil on their stones. A mixture of equal parts mineral oil and lamp oil makes a good honing oil at about one-fourth the cost. The same mix makes a great rubbing oil in conjunction with pumice or rottenstone. You can get lamp oil in hardware stores where it's sold for use in hurricane lamps. Mineral oil is available for medicinal use from pharmacies.

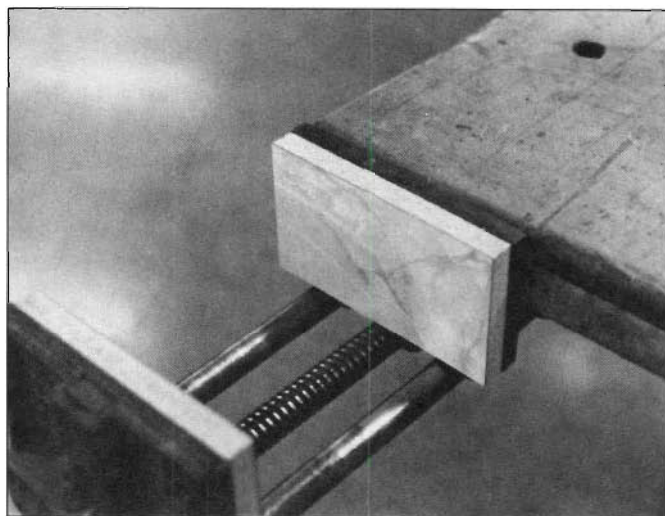
Devore O. Burch
Fort Worth, TX

Small Piece Safety

You can cut a very short narrow piece on the table saw if you fasten it to another board with a few drops of hot glue. I use pine for the larger piece because I've found that it's easier to break the two apart without damaging the small piece.

William P. Nichols
Ravenna, OH

Clean Vise Blocks



Discarded sink cutouts with a plastic laminated surface make excellent vise blocks. Simply cut the blocks to the proper size and fasten them to the vise with contact cement. The plastic laminate won't scratch projects, and woodworking glue won't adhere to the smooth surface.

Richard H. Dorn
Oelwein, IA

Table Saw Disk Sander

To turn your table saw into a disk sander, use a piece of good quality 1/2" plywood to make a disk that is the appropriate diameter. Mount it on the arbor (without any sandpaper) and use a rough file and a sanding block to "true" the disk while turning it by hand. Remove the disk and apply different grits of sandpaper to each side, cutting a clean hole for the arbor.

Do not make your disk from particle board, and be sure to wear safety glasses when using it. Bear in mind that the arbor speed of a table saw is between 3600 and 4000 rpm whereas the speed of a conventional disk sander is about 1500 rpm. Don't press too hard, and keep the stock moving.

Don Kinnaman
Phoenix, Arizona

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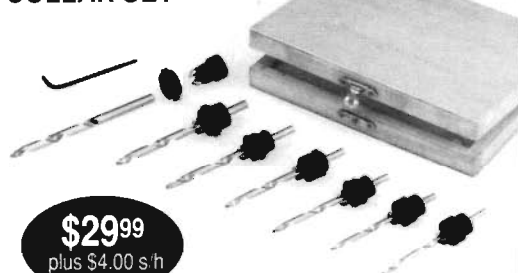


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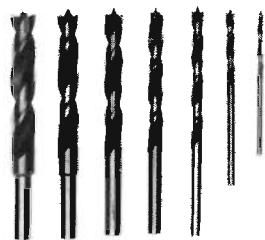


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Widening the Kerf

Drawer bottoms made of 1/8" MDF (Masonite) will usually fit in the saw kerf groove made by a carbide blade. However, sometimes the MDF is slightly thicker, or your saw's kerf might not be wide enough. Instead of moving the fence and making two passes, shim the saw blade. Place one or two strips of masking tape on the flange that surrounds the arbor to give the blade a slight wobble so it makes a groove wide enough to accept the MDF.

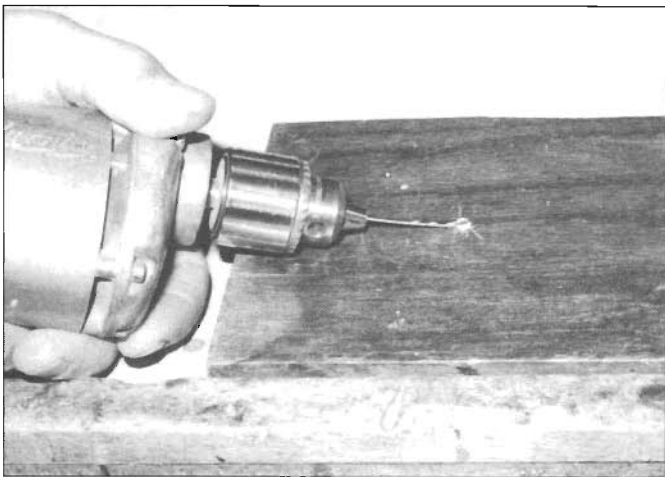
Don Kinnaman
Phoenix, Arizona

A Lubricating Medium

Woodworkers often use candle wax or soap to make moving wood surfaces such as dresser drawers slide easily. A slightly more complicated process will yield even better results. Shave a little wax off a block of paraffin into a coffee can or other storage container with a tight-fitting lid. Add a small amount of fresh turpentine to the shavings. The paraffin will dissolve in the turpentine until it's about the consistency of shortening. Apply it with a clean rag to sliding wood surfaces, and to metal ones as well. It works great on shop machinery and keeps surfaces slippery longer than plain wax or soap.

Paul Shields
Antioch, CA

Straightening Bent Drill Bits



photos by the authors

Straighten bent drill bits by chucking them in a drill and pushing the bit sideways against a hard surface. Bend the bit while the drill is running at full speed. When the side pressure is released the bit will run true.

Alice & Robert Tupper
Canton, SD

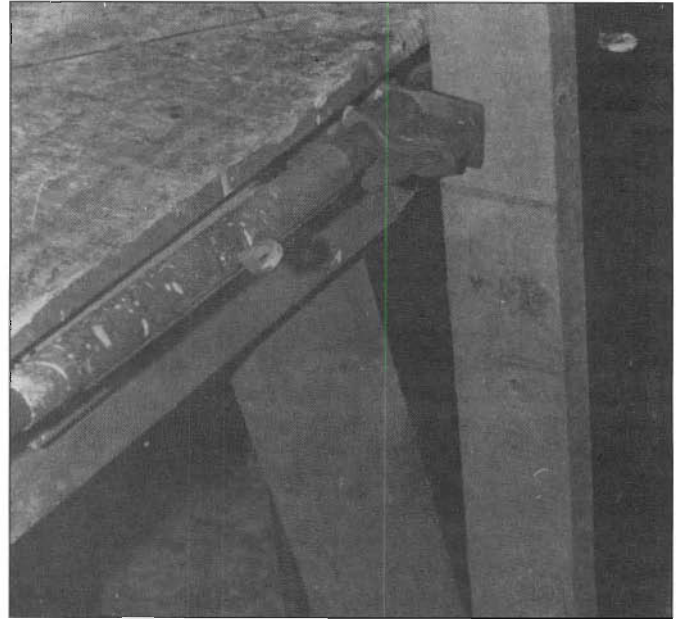
Push Stick Grip

All good woodworkers use push sticks when ripping narrow stock on a table saw; however, wooden push sticks tend to slip around on the stock. I solved this problem by coating the notch of mine with a thin layer of liquid rubber used to repair athletic shoes. Let the rubber cure overnight before using the push stick.

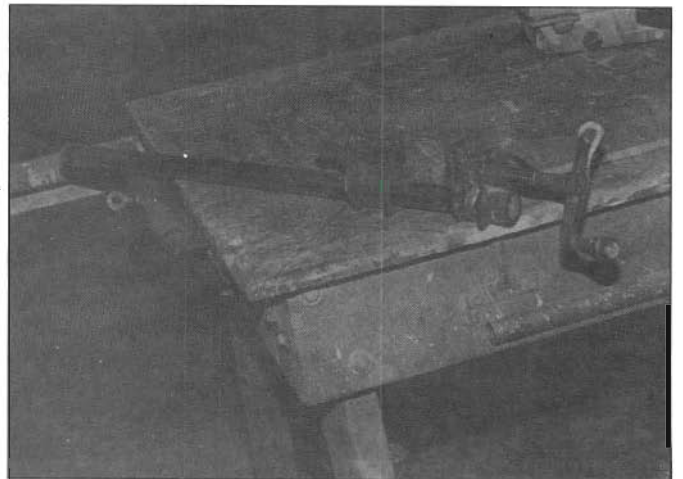
Richard H. Dorn
Oelwein, IA

Versatile Clamp

Here's a clamp that's served me well for over forty years, both commercially and as a hobby helper. The basic idea is to find a length of pipe just large enough so that a pipe clamp will slide inside it. Mine is a 22-1/2" pipe clamp which fits into a 12" sleeve of thin 1" conduit, which is brazed to a piece of angle iron and mounted permanently along the end of my workbench. A locking thumbscrew prevents the clamp from turning when necessary,



and the clamp is easy to remove for service elsewhere. My clamp is made up of 1" hollow torsion shaft stock, available from garage door dealers and repairmen. It measures 1" OD and therefore slides easily inside 1" conduit, which is actually almost 1-1/16" ID.



It accepts threading with ordinary 3/4" pipe dies, but the threads won't cut as deeply as they would in regular pipe stock. Regular 3/4" pipe won't slide into a 1" conduit sleeve, but you can split the conduit, or find some other type of pipe that will fit. The time spent making this clamp will prove well spent.

Don Stutzman
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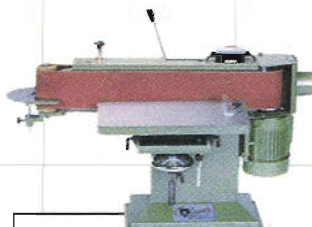
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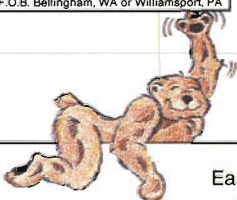
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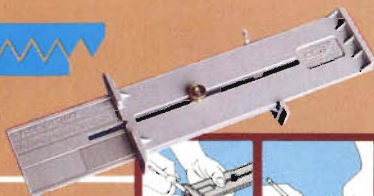
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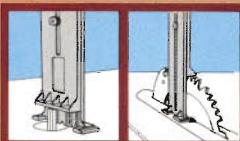
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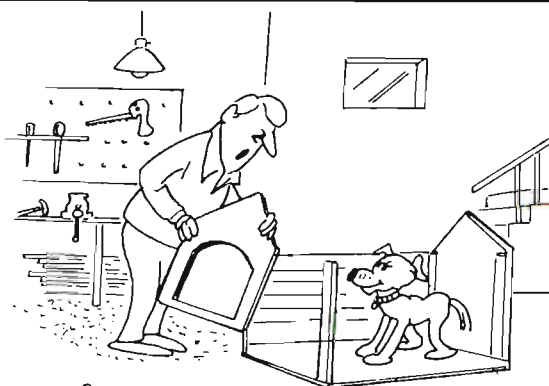
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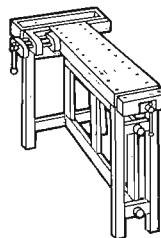
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Ken Sadler is a retired custom furnituremaker in Portland, OR. He also served for four years as a counselor with the Service Corps of Retired Executives (SCORE), a volunteer organization that advises small businesses through the Small Business Association.

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pany. I know, I have had such an experience and so have several of my friends.

What would make someone want to spend twelve hours a day working and twenty four hours a day worrying? The answer lies in three words: pride, challenge, and excitement. Pride in your talent, ability, and know-how that makes it possible to be on your own. The challenge of taking on such a job and making it work. The excitement of creating something all your own. These things build a feeling of confidence that gets you through the discouraging times.

So, here we are back at the first question, why would anyone want to be self-employed? By now you know the answer: security, pride, challenge, excitement, and self-confidence. These things are worth making large sacrifices to get. I know, I've had them for twenty-five years.

Should I Be?

So now you're all charged up and ready to jump right in and become your own boss. Not so fast. There's another question that needs to be asked. *Should* you be self-employed? Not everyone can be successfully self-employed. You need certain characteristics to successfully run your own operation.

Self-discipline is the most important characteristic. This is what makes you do the things you know you should, even when you don't want to. Without self-discipline you will not succeed on your own.

Imagination is important but not vital. It brings a flair to your operation, raises it above the ordinary, tends to create excitement in the daily routine.

Ingenuity is also important but not vital. This is what helps to make the ideas that your imagination dreams up work.

Self-confidence is almost as important as self-discipline. You must be sure, in your own mind, that you can successfully accomplish whatever you set out to do. Without self-confidence it is easy to become discouraged when things go wrong.

Enthusiasm is the engine that drives everything. You must be so enthusiastic about what you're doing that you can hardly wait to get up and get started in the morning. If you're not, why are you doing it? Seventy percent of the people working

today hate the work they're doing. You can't be one of them and be successfully self-employed.

If you feel you have these five characteristics then the answer to "should I be self-employed" is yes.

Am I Ready?

Are you *ready* to become self-employed? You may have the talent, the ability, and the drive but do you have the experience, the know-how, and the understanding to make it work? Many people think that you just buy a business or set one up and start running it. Nothing could be further from the truth nor more dangerous to your financial health.

You need some experience in doing the things it takes to run a business—any business. For example, you should have some understanding of accounting, particularly costs. You can hire an outside accountant to do this. But if you don't understand what the accountant is doing, you won't know whether he's doing it right; sometimes they don't. In the beginning, to keep costs down, you will probably have to keep your own books and it's better that you should. You'll learn by doing.

Whatever the type of business, you should certainly have had some selling experience. Selling is a vital part of any business. You'd be surprised how many people shy away from it or just don't consider it at all.

With a woodworking shop, you're getting involved in a manufacturing business and it's important that you have some of what I call "shop experience." That is, you should have worked in, or helped manage some kind of manufacturing operation. This background will help you with such matters as planning your work-flow, labor requirements, and operating techniques.

Another important area for a manufacturer or processor to consider is distribution. How are you going to get your product to the consumer? There are numerous ways of doing this but it's probable that only one will be right for your business. Volume is an important aspect of this problem. If you make a product that retails for \$5 you're going to have to make an awful lot of them to cover the costs and make a profit. Big volume creates big distribution problems for little businesses.

But, if your product sells for \$500, it will be an entirely different story. You will still have problems; they'll just be different and more easily managed.

Buying properly can mean the difference between profit and loss. If you buy too much raw material, you run the danger of not having enough money to turn it into finished product. If you don't buy enough, you won't be able to make the product in economical lots.

You should have at least a nodding acquaintance with market research. Before you can make something you must find out what people will buy. The story of many failed ventures is the failure to determine what the potential customers wanted. You may have heard the story of the cat food manufacturer that created the world's best cat food. It had only one flaw: cats wouldn't eat it.

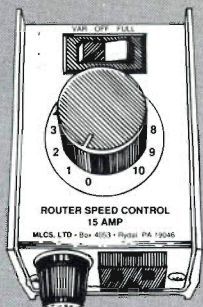
Then there is pricing. The right price is the one that will cover your costs, make a profit, and still be attractive to your customers. How do you arrive at it? That takes understanding, know-how and not a little experience.

I've made it all seem complex and involved. It isn't, really. I just wanted you to be aware of some of the things that are going to confront you when you go into business for yourself. I covered many of these subjects in "What Makes a Shop Run?" (*PW* #56, September 1990).

The more time you've spent doing these things for somebody else, the better off you'll be when you're on your own. You will also learn how not to do them, which is even more valuable. Then there are the mistakes. You're bound to make them; everybody does. It's better to make them on somebody else's money.

So we come back to the question, are you ready? Don't be in a hurry. It's dangerous to jump in before you're ready. I know, because I did once, and couldn't make a go of it. It was a costly experience (one I never forgot). I spent eight more years working for others before I felt ready to try again.

You are the only one who can answer these questions about yourself. You can get other people's opinions and advice, but in the end, you have to face the answers and make the decision. **PW**



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#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
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#402		3/8" Dovetail	8 degree For	3/8"	1/2"	1/4"	\$12.00
#404		1/2" Dovetail	8 degree Leigh	1/2"	1 3/16"	1/4"	\$12.00
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#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	\$15.00
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#472		3/8" Straight	plunge cutting	3/8"	1"	1/4"	\$ 7.00
#473		7/16" Straight	plunge cutting	7/16"	1"	1/4"	\$ 7.00
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#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	\$14.00
#478		5/8" Straight	plunge cutting	5/8"	1"	1/4"	\$ 8.00
#479		3/4" Straight	plunge cutting	3/4"	1"	1/4"	\$10.00
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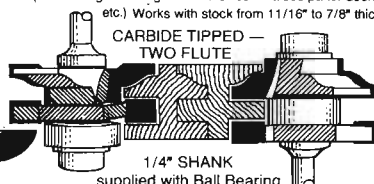
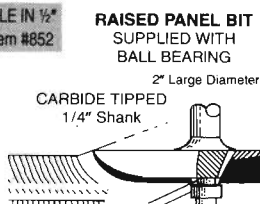
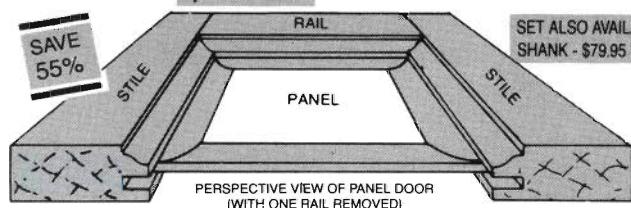
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The Finishing Forum

Wood finishing seems to be the one area of this craft that continues to mystify many of us. Woodworkers must choose from an array of chemicals and natural substances that work in different ways and yield different results. Specific guidelines are few and often contradictory. It's a strange sort of alchemy where secret formulas, traditional lore, and contemporary scientific research come together, often resulting in confusion.

That's why we've started this new column: The Finishing Forum. We want you to participate with us in an ongoing discussion about this enigmatic science, the art of wood finishing.

George Frank, author, lecturer and finishing expert, and others will answer your questions and provide information on topics and problems you raise. We'd also like you to share your insights and your secret formulas on these pages and we'll use the space to tell you about new finishing products.

Write to The Finishing Forum, c/o Popular Woodworking, 1320 Galaxy Way, Concord, CA 94520.

Questions and Answers

Something Fishy

I hope you can help me with a problem. I seem to be getting a lot of "fisheyes" and rough places in my woodwork after I apply the varnish. I apply stain, sealer, and varnish in that order and use Minwax products. It's as if small particles of dust have settled on the wood. I'm not a professional by any means, but try to take pride in the appearance and feel of my projects. If you can give some tips, I will be most appreciative.

Ken Irvin, Nauvoo, AL

You did not mention whether you're working with new or old wood surfaces, so I'll try to cover all bases. Fisheye is a condition more common to refinishing work—especially on old pieces. It occurs when a finish coat is applied over a surface that has small amounts

of silicone present, usually caused by spray waxes that have, over time, forced their way into the wood. They are difficult to remove, even with strippers. One way is to always remove the residue left by the stripper by scrubbing the wood with denatured alcohol and then sanding the wood very carefully. A wash coat of shellac,

Thomas Wisshack is a furniture maker, restorer, and finisher in Galesburg, Illinois. **George Frank** trained in the great wood finishing shops of Europe during the 1920's and 30's. Over the next 40 years he ran his own shops in Paris and New York. He is the author of *Wood Finishing with George Frank* (Sterling Publishing Co., 387 Park Avenue South, New York, NY 10016-8810).

before or after the stain is applied, will seal the surface so that you should have no bonding problems, and if applied lightly, most finishes will stick to it.

The stain, sealer and varnish you are using (Minwax products) should be compatible, but it's just possible that the way you are using them is causing the "fisheye" to occur. Instead of applying a heavy coat of varnish over the stain and sealer, try building up several coats of sealer first. You can apply it with a brush, work it well into the pores, then wipe off the surplus with rags. Some sealers, if built up

in layers, can give quite a lot of protection themselves and are easy to use. If you do want to finish up with a final varnish coat (which, for a table top or much-used surface I certainly recommend), you

can avoid the fisheye problem by applying the first coat of varnish in the same manner as the sealer, brushed on quickly, one surface at a time, and then wiped off gently with rags. After it's dry, you should be able to lay a fairly heavy coat of the varnish on with no problems, since it's going on over itself.

You mentioned roughness caused by particles of dust landing on the finish. You will have to work in a separate finish room in order to completely avoid it. If possible, wet the floor down before applying the finish, leave the room closed and don't come back till the next day. (I have the luxury of a separate finish room in my shop). Be sure your brush is not contami-

nating the work with particles lodged in the heel, and always strain your varnish through high quality cheesecloth—even if it's a fresh can. Few of us have a separate finish room. The solution is to use a type of finish that is not so dust-sensitive. Penetrating sealers and varnishes and oil finishes of many kinds do not leave a heavy buildup on the wood and minimize the dust problem. You can apply as many coats as you like until you have the desired degree of durability. One final word: never expect a glass-smooth finish to magically appear out of a can. You are going to have to use some elbow-grease if you really want your finishes to feel good.

Tom Wisshack

Staining Maple

I have been trying for years to find a method for staining hard maple to an even, medium-brown without obliterating the figure. I have been eager to try logwood extract and potassium chromate. I have been able to locate the latter, but where can I find logwood extract or an equal substitute?

Dave Adams, Baltimore, MD

Logwood extract is hard to locate, but your druggist probably carries its refined form called hemotoxiline.

Walnut crystals or cassel extract with a few drops of ammonia added ought to give you a pleasant brown dye on your hard maple. There are also several excellent aniline dyes that would work.

George Frank

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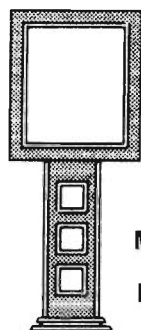
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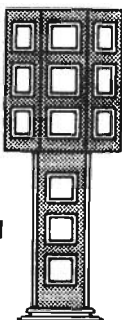
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In this column I'll take a look at two videos dealing with the same topic: stair construction. Laying out and building stairs is a highly-specialized woodworking skill, even though it employs the same tools and machining techniques as regular finish carpentry. It requires mastering new concepts and demands an approach that takes into account varying space and height conditions as well as numerous stair styles and configurations. Additionally, it involves mastering a completely new terminology; one has to make one's peace with newels, balusters, volutes, turnouts, and other peculiar creatures.

Styles vary as well, most noticeably with regard to railing construction and tread and riser configuration as well as in molding treatment and trim. The method of carriage attachment, top and bottom, can also vary, but this is less obvious since it is usually covered up.

Neither of these two videos purports to be an all-inclusive work on the subject, and each has strengths lacking in the other. It is tempting to do a direct comparison of the two, but the differences between them will be apparent as each is reviewed separately below. The first, *Staircase Framing* with Ken Todd, can be considered as a stand-alone reference, even though Todd's book, *Carpentry Layout*, touches on staircase layout in one of its chapters. The tape alone will enable you to complete the project he demonstrates. The second video, *Basic Stairbuilding* with Scott Schuttner is not enough to help you successfully reproduce everything you see him do. I would recommend buying the companion book of the same name, priced at \$14.95, also published by Taunton Press.

Stair Framing with Ken Todd, © 1989 by Craftsman Book Company, Box 6500, 6058 Corte Del Cedro, Carlsbad, CA 92009, \$24.75, 60 minutes.

Todd's peculiar presentation style annoyed me. He speaks so very slowly and enunciates so very deliberately that

I found it very irritating. Granted that a viewer's ability to assimilate information quickly may not top the scale, this viewer found it insulting to be addressed as if he were a seven- or eight-year-old.

Additionally, the camera work was unlike any I've ever seen. Todd alternatively faces one of two fixed cameras. He pauses regularly at intervals for a ponderous three seconds, swivels ninety degrees to face the other camera, and then begins the next segment. This works admirably on Masterpiece Theater when Alistair Cook does it. PBS equips Cook, however, with elaborate furnishings befitting the masterpiece at hand; Todd gets a blank backdrop that looks the same from both angles.

I could not fault the construction methods as presented, but the scope of this video is extremely limited. It will show you how to build a straight run of stairs between two floors enclosed by two walls. The stairs are made of plywood and will eventually be carpeted. No mention of the installation of railings and balusters is ever made.

Todd spends some time demonstrating the calculation of rise and run using a calculator, and I found this valuable. He recommends the use of a calculator which operates in feet, inches, and fractions of inches, such as the Construction Master II, but for this tape he uses a Texas Instruments calculator, the TI 55, and converts decimals to fractions. The graphic intended to explain the terms "rise and run" was not specific enough; I could not clearly see the points between which these measurements were taken.

The lack of music during the presentation together with the ponderous delivery style might bore some viewers. I feel extremely ambivalent about this tape.

Basic Stairbuilding with Scott Schuttner, © 1990 The Taunton Press, Box 5505, 63 S. Main St., Newtown, CT 06470-5506, \$29.95, 60 minutes.

This tape tries to cover a lot of material in a necessarily compressed manner. In order to master the complexities

of stairbuilding, I would consider supplementary reading an absolute necessity. By all means pick up the companion book of the same name. It is well-written and easy to understand. Even though it does not cover everything you might need to know about stairbuilding, it covers considerably more material than can be demonstrated in an hour of tape. Reference numbers keyed to the book appear in the upper right-hand corner of the video screen to let you know where to look for a more detailed explanation. Very handy.

The tape reflects Taunton's usual high standards, and Scott Schuttner does a good job. No trouble with boredom here; we move along at a smart clip with appropriately-placed musical transitions.

What does this tape cover? You will learn how to figure rise and run; you will learn how to build a straight run of plywood stairs. Schuttner shows you how to build an L-shaped hardwood staircase with housed and wedged treads and risers using jigs to rout the carriage. He shows how to miter the risers into the skirt. You will also learn how to fit one type of newel post and how to fit balusters.

Best of all, you will learn how to do all this without building squeaks and groans into your staircase. Creating a quiet staircase, one which behaves itself when walked on, can be a very difficult thing indeed.

What does this tape lack? You will not learn how to build a spiral staircase or a U-shaped staircase with a landing. You will not learn how to install and fit a gooseneck or a volute, which caps the spiral cluster of balusters on the bottom tread of a certain style of staircase. You will not learn how to install rail bolts; this is covered in the book albeit not in enough detail.

What the world really needs is a sequel to this tape, called *Advanced Stairbuilding*. Maybe it wouldn't have universal appeal, but there is an observable trend toward more elaborate interior detail. A beautiful staircase stands as the crowning achievement in interior home carpentry. **PW**

Alan Marks designs and makes furniture and cabinets in Carmel Valley, California and is a Contributing Editor to PW.



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T102B		1/4	1	7/16	1/4	1-1/4	11.00	T303B		5/32	1-1/8	15/32	1/2	1-1/2	15.00						
T103B		5/16	1-1/8	1/2	1/4	1-1/4	12.00	T304B		1/4	1-1/2	21/32	1/2	1-1/2	17.00						
T104B			3/8	1-1/4	5/8	1/4	1-1/4	14.00	T1501B		1-1/4	1/8	1/4	1-1/2	10.00						
T105B			1/2	1-1/2	3/4	1/4	1-1/4	16.00	T1503B		1-1/4	1/4	1/4	1-1/2	11.00						
T110B			1/2	1-1/2	3/4	1/2	1-1/2	16.00	T1506B		1-1/4	1/2	1/4	1-1/2	12.00						
T111B			5/8	1-3/4	7/8	1/2	1-1/2	19.00	T1512B		1-1/4	1/2	1/2	1-1/2	12.00						
T112B			3/4	2	1	1/2	1-1/2	20.00	T601B			1/4	1/4	1/4	1	9.00					
T113B			1	2-1/2	1-1/4	1/2	1-1/2	32.00	T602B			3/8	3/8	1/4	1	10.00					
T200B		1/8	3/4	5/16	1/4	1-1/4	10.00	T603B	1/2	3/8		1/4	1	12.00							
T201B		3/16	7/8	3/8	1/4	1-1/4	10.00	T604B	5/8	5/8		1/4	1-1/8	13.00							
T202B		1/4	1	7/16	1/4	1-1/4	11.00	T605B	3/4	5/8		1/2	1-1/2	14.00							
T203B		5/16	1-1/8	1/2	1/4	1-1/4	12.00	T1602		1/2		1/2	1/4	1-1/4	6.00						
T204B		3/8	1-1/4	5/8	1/4	1-1/4	14.00	T1604		3/4	3/4	1/2	1-1/2	8.00							
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T210B		1/2	1-1/2	3/4	1/2	1-1/2	16.00	T1607		1/2	1/2	1/2	1-1/2	6.00							
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T2502B		1/4	1-1/8	9/16	1/4	1-1/4	13.00	
T2503B		5/16	1-1/4	5/8	1/4	1-1/4	14.00	
T401B		45°	1	3/8	1/4	1-1/4	12.00	
T403B		45°	1-3/8	5/8	1/2	1-1/4	14.00	
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T701		3/8	1/2	1/4	1	9.00		
T702		1/2	1/2	1/4	1	10.00		
T2101		1/2	13/32	1/4	1	6.00		
T2102		5/8	9/16	1/4	1-1/4	7.00		
TC-12B		3/16	1-3/8	11/16	1/4	1-1/4	23.00	
TC-12B 1/2		3/16	1-3/8	11/16	1/2	1-1/2	23.00	
TC-16B		1/4	1-5/8	13/16	1/4	1-1/4	24.00	
TC-16B 1/2		1/4	1-5/8	13/16	1/2	1-1/2	24.00	
T1701	Panel Pilot w/ Drillpoint							
				1/4	3/4	1/4	1	7.00
T2601	Keyhole (T.C.T.)							
				3/8	3/16	1/4	1	8.00



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Dictionary of Woodworking Tools

by Raphael Salaman (revised by Philip Walker) ©1990 (The Taunton Press, Inc., 63 South Main St., Box 355, Newtown, CT 06470,) 520 pp., paperback, \$27.95

This book and I go way back. Over a decade ago I borrowed this book on "inter-library loan," since my local library couldn't afford to own a copy. The \$55 price put it beyond my reach. (In the early seventies, \$55 was really a lot more money than it is now.) Often during the intervening years I have wished to have a copy on hand to check something, for a shop project or an article. Taunton Press offers us this volume now as a paperback for half of the book's original cost—which is probably but a third or fourth the original cost if we allow for inflation.

Every woodworking tool in the English speaking world seems to have been included, and there are many drawings and photos to supplement the text. Whenever there's a woodworking task I can't figure out, a bit of time studying this volume will help me decide what to do, for Salaman explains each tool's origin, purpose, use, and history.

Chinese Domestic Furniture in Photographs and Measured Drawings by Gustav Ecke, (Dover Publications, 31 East 2nd St., Mineola, NY 11501) 161+LXII pp., paperback, \$13.95, (mail order customers add \$2.50 for postage and handling for any number of books)

Chinese Domestic Furniture was first published in China in 1944. It was reprinted briefly in this country in the late sixties or early seventies in a beautiful volume that was replete with silk covers and cost far more than I could afford. I borrowed a copy from the library, photocopied a couple of designs I hoped to one day build, and put them into my "to do" file, where they have languished nearly twenty years. When I happened upon them recently, they reminded me that I had wanted the whole book, so just out of curiosity, I looked it up in *Books in Print*. To my sur-

prise, this \$13.95 Dover edition was available; I ordered a copy at once.

When the book arrived, I was not disappointed. The silk covers of the earlier edition were really pretty, but it was not the kind of book I'd take into my shop. This edition has all the same material on a slightly rougher paper and in a more practical cover. Over 170 photographs illustrate over three dozen projects and their details.

I've seen several other books about Chinese furniture, but this is the only one that offers drawings that permit the woodworker to make the pieces. And what sumptuous pieces these are—constructed of rosewood. Oh, that the book might have been photographed in color!

As I look at the furniture in this book, I see a style that will blend handsomely with almost any decor. I see a grace and flow that, to my eyes, is sadly lacking in most of the furniture that has been created in my lifetime. And I see timeless beauty. In short, if you pick up a copy of Gustav Ecke's *Chinese Domestic Furniture*, you are sure to find a project (or several!) that will delight your sensibilities.

Custom Tools for Woodworkers: Designing & Making Your Own by Joe Petrovich, (Stackpole Books, Cameron and Kelker Sts., P.O. Box 1831, Harrisburg, PA 17105) 226 pp., paperback, \$19.95

My interest in this book began, curiously enough, here in the pages of *Popular Woodworking*. A recent Out of the Woodwork piece about shop safety ("An Attitude," July, 1990, page 90) introduced me to Petrovich's attitude which has to be one of the very best I've ever encountered. If you enjoyed that article as much as I did, know that it was excerpted from this book, and it was by no means just a little teaser! The book is worth its price if all you read of it is the rest of the safety section.

But you'll read more, for you'll learn more about the nature of tools from this book than from any other I recall. As I began to read, I thought about the three volumes on toolmaking by Alexander Weygers, published in the early seventies by Van Nostrand Reinhold. Those large format, full color books were far prettier than this one, but they were far less useful.

They provided just a bit too little information. I wasn't prepared for the amount of experimentation their guidance would have required. Petrovich's book comes from years of experimentation based on the all-too-sketchy beginning those books provided. Clear and conversational, this book is a pleasure to learn from.

Petrovich adds a good bit of romance to his presentation:

With a touch of brass, some rosewood, and a highly polished blade, all of it caught in the drama of muted sidelighting, the humble mortising chisel more closely resembles King Arthur's Excalibur than a tool meant to cut thousands of mortises.

The book's introduction offers this argument for making your own tools:

With the abundance of fine tools available in today's market, why would you ever attempt to make your own? Consider for a moment the distinction between tools of opportunity and tools of deliberation. Any mass-manufactured tool is, in a sense a tool of opportunity—that which is available at the moment. The tool may be well made. It may meet your requirements, fit your hands, your style and technique. It may. That every manufactured tool may meet these requirements is as likely as that a mass-manufactured chair will meet everyone's seating requirements. A mass-manufacturer must aim his product at the largest mass of his market. If he is to be successful, the handle selected for the tool must be generally acceptable. A tool's heft, its weight and balance, is probably a little heavy for some users or a little light for others. But if the manufacturer is smart and successful, the tool is never too heavy or too light for everyone.

Chapter 1 discusses "The Stuff of Steel." Chapter 2 offers instruction about how to equip the metal-working corner of your shop. Forges, anvils, hammers, quench baths, and tongs are treated clearly and completely. Grinding gets nearly twenty pages. The information is presented in such a way that even people who have no intention of making tools should read this

Hugh Foster is a part-time furniture designer/builder in Manitowoc, Wisconsin and the author of The Biscuit Joiner Handbook (Sterling Publishing Co. 387 Park Avenue South, New York, NY 10016).

just to be less fearful of the grinding process involved in maintaining their purchased tools. Files, drills, and torches are also discussed in this lengthy, informative chapter.

The third chapter, devoted altogether to safety, mentions another piece of equipment: "The \$10 or \$15 necessary to maintain a charged (fire) extinguisher is worth the peace of mind, even if you never use it."

The book takes over 100 pages to get to beginning projects. Petrovich defines "beginning" differently from many authors:

Beginning should not be read to mean simple or easy. Beginning, in this case is really the transition between theory and application... between the armchair and the shop. This chapter is intended to provide a logical sampling of commonly used tools and introduce a variety of tool-making procedures and techniques... Each beginning project focuses on a different set of procedures. Once a

basic skill is mastered, you can more easily modify and incorporate it with other skills in making other tools—either from this book or from your own personal needs.

Center punches and marking knives may not seem like exciting projects, but by crafting them, readers will learn the techniques necessary for tackling more difficult projects. These chapters also introduce us to a new "angle" in chisel design; the author presents a convincing argument that we'll do better work with shorter rather than longer chisels, and that there's little reason not to make them ourselves. The triangular dovetail chisels that close the chapter are seldom available even in the best woodworking stores—at any price.

The "advanced" chapters show us techniques for making carving tools, knives, and planes. It hasn't taken much study to convince me that setting up a little metalworking corner in our shops would pay us great dividends; and that this volume merits your serious consideration.

27 Chairs edited by Victor J. Taylor, (The Taunton Press, Inc., 63 South Main St., Box 355, Newtown, CT 06470) 100 pp., paperback \$12.95

Christian Witt-Dorring said, "A Chair is like a piece of sculpture. It is the most difficult piece of furniture to design. You can't hide anything. Chairs are almost like human beings. They reach a sort of unity with a person when he sits down. Each has its own expression."

V. J. Taylor, recently retired editor of the British magazine *Woodworker*, has gone through the publication's 80 years of files, selected the "best" chairs, and redrawn them all. His point of view is, understandably, British, and this may impede some American woodworkers; of course, others will find the British approach inspiring. I'd be more inspired were there some photos of the finished chairs in addition to the drawings. Nevertheless, the book will make an excellent teaching text for those who want to learn chair-making. **PW**

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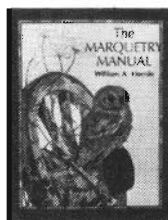


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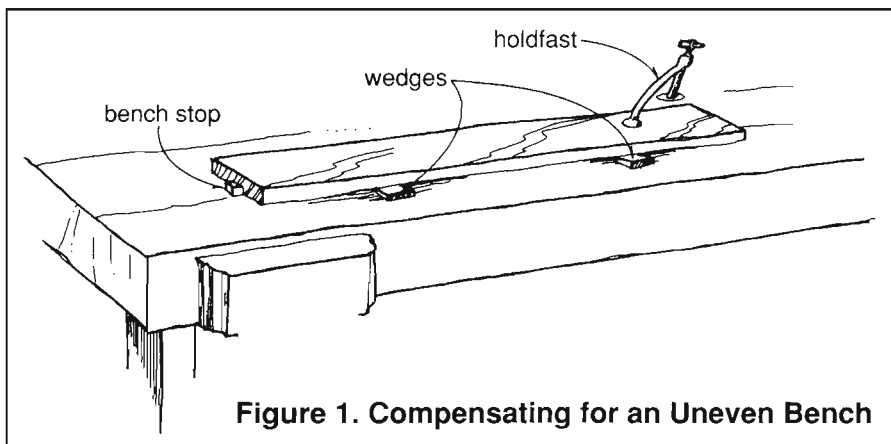


Figure 1. Compensating for an Uneven Bench

Odds on Favorites

When it comes to racing hand planes, put your money on the old ones—provided they're well fettled and in the hands of a skilled craftsman. A contemporary Stanley® or Stanley-type bench plane is no match for a similarly sized wooden or stuffed plane of respectable (but not ancient) vintage. The older ones will win in the straightaway, producing clean, chatterless shavings, and they'll win hands down in the specialized categories, like Thinnest Shaving, Smoothest Cut Against the Grain, Best Performance on Rowed and Interlocked Surfaces, and Longest End-Grain Shaving!

The sport of plane racing, once a part of every cabinet shop, has all but died out. Not so long ago, most finishing work was still done by hand—time-consuming work. To relieve the tedium and to encourage high standards, the apprentices who did most of the grunt work engaged in racing tourneys. Even wagering was not unknown!

It may not be practical to revive this obsolete sport, but using tools of "competition caliber" can be very rewarding, and it makes sense to develop the skills that were common among the competitors. If you keep even a single plane in your shop, then you owe yourself the experience of using it with all the skill, grace, and efficiency it's capable of.

Making the sole of your plane flat is essential—no amount of skill or even

sharpening will yield a surface flatter than the plane itself. Hold the machinist's straightedge against the sole of your plane and you're likely to be amazed at the number of places light shines through. Such a straightedge is expensive (a 3', uncalibrated, single-edged machinist's straightedge costs around \$50), but it will check not only the condition of your planes, saw table, jointer table and the like, but also the accuracy of your work.

Once you've got your plane's sole as

flat—and iron as sharp—as you can, stand at the bench and try a few passes. You may immediately have a problem securing the work. The Japanese manage well with just a knee or toe holding it, and by pulling the plane towards them with the work butting up against a single stop. We are accustomed to using a waist-high bench, pushing planes away from us, and securing the work with all manner of vises, clamps and holdfasts. But no matter how firmly secured the work is, trouble may arise if the bench surface is not flat. The bench itself is a tool and, like the plane, must be fettled. Dressing your bench top is easy—once you're equipped with properly tuned planes and some skill in using them. You may need to address this problem once you've gained more confidence; in the meantime, if your benchtop is hollowed and you can't get a board to lie flat, use shavings or even thin wedges to shim it up (Figure 1).

Edge planing usually occurs in the vise, perhaps with the aid of a deadman (Figure 2), but here too, success depends on how accurately the vise operates. Ideally, the

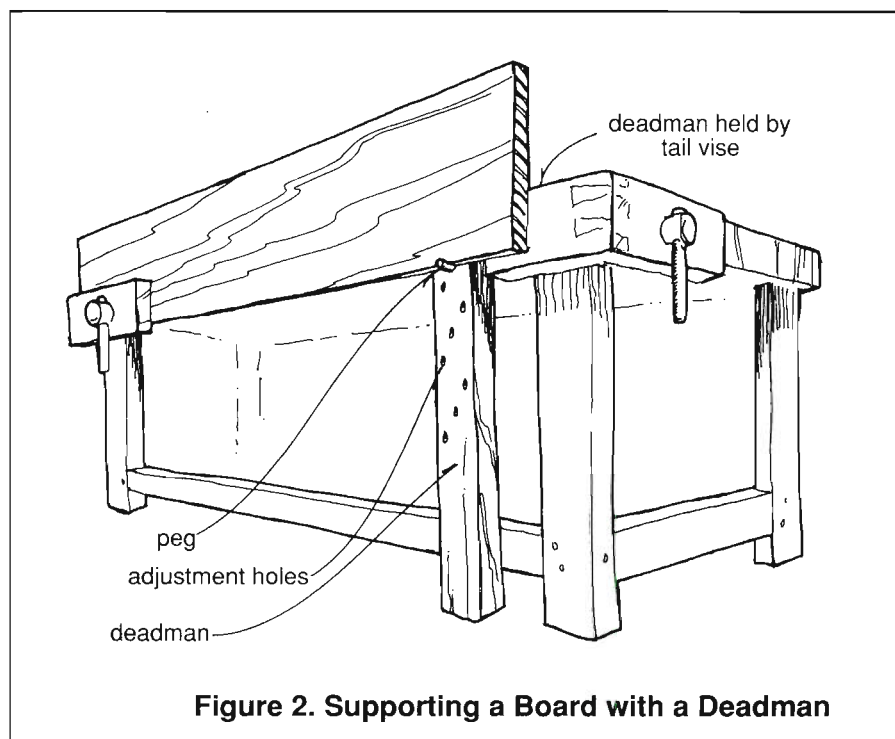


Figure 2. Supporting a Board with a Deadman

vise should be adjusted so that the top surface of the outside jaw (and the inside jaw, too, if it's separate from the bench top itself) is exactly in the same plane as the bench top. The vise when closed should grip a single sheet of paper securely. Furthermore, any board held in the vise should remain perfectly vertical, not with its bottom edge pulled in towards the bench as often happens if the front jaw is not properly adjusted.

Different planes are designed to do different jobs: a jack plane is intended to remove fairly thick shavings from material that's not very smooth or flat; a jointer takes an evenly thickened shaving from the edge of an often very long board; a smooth plane is designed to remove the merest whisper of a shaving. These different needs are reflected in different cutting edge profiles, iron angles, mouth sizes, and capiron adjustments (Figure 3). Every plane should bite cleanly, cut without tearing, and make shavings all day long without choking. If not, the plane needs work.

The Three Orders of Planing

To achieve a flat surface—usually the first requirement in preparing stock—a board may be roughly bandsawn or ripped to size and shape on the table saw. Then

it's usually run through the jointer and maybe the planer. Without these machines, however, life can still go on. If the board is totally rough, a scrub plane will remove saw marks and gross unevenness. Then a jack plane will bring the surface into flatness. Boards may be cupped, bowed, warped, propellored, crowned, twisted—you can observe and measure all these deformities with the use of winding sticks (Figure 4).

Mark the high spots and areas that need reducing to create a flat surface, and use the jack plane in any direction. If just one corner is high, plane across the grain or diagonally. When the area is correct, start planing with the grain. Don't worry about tearing the surface when removing high spots. Your plane should be so well sharpened and adjusted that this won't happen, but in any case remember that all you're concerned about is removing extra material. This kind of planing is hard on the plane, and is also the hardest kind of work. A wooden jack plane is lighter and less tiring than a metal one, and it's easier to keep the sole jointed flat. Since the jack plane needs to take fairly large shavings, frequent jointing and consequent enlarging of the mouth is not a problem. Keep the iron ground a bit convex—about 1/8" proud

across a 2" width—and set the capiron a good 1/16" above the cutting edge (Figure 5). Make sure that the ends of the wedge finish smoothly and there are no obstructions to the smooth passage of shavings up through the throat.

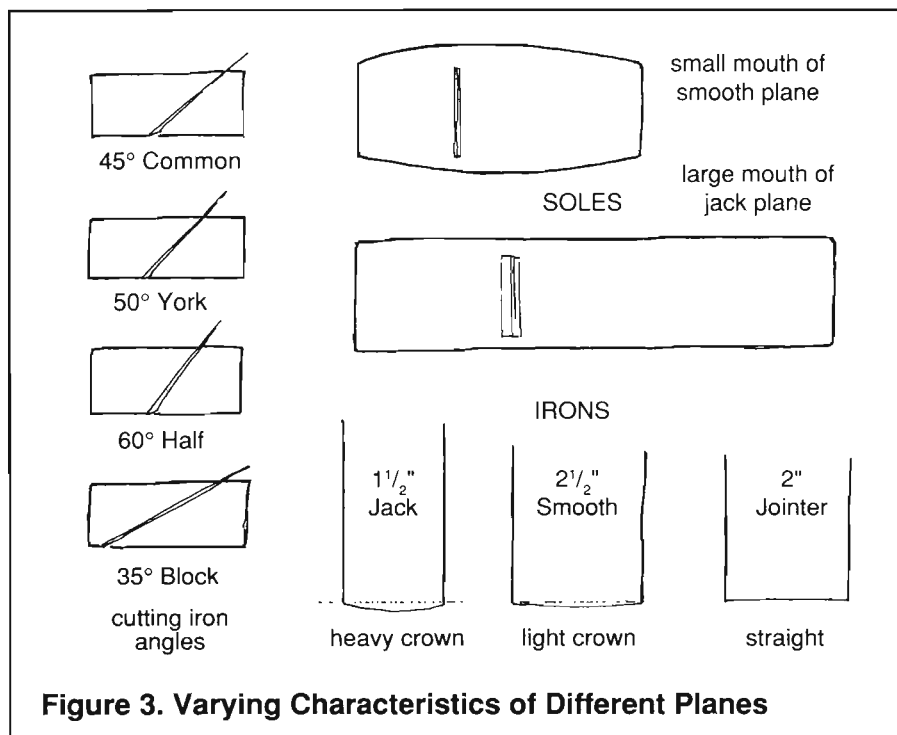
Jointing

After you've established the surface, you need to achieve a straight and square edge. This is what a power jointer—or the jointer plane—is for. A jointer plane is any plane longer than 18", with a flat sole over its entire length and a perfectly square iron (no crown is needed since you'll rarely need to cut any width wider than the blade). A flat sole is easy to achieve with a wooden plane—simply plane it flat using another (perfectly flat) plane. A metal plane's sole is more difficult to resurface. Because of the inherent weakness in the sole's design and extra stresses caused by the frog mechanism right at the weakest part of the body, metal planes are more likely to warp. But once the jointer plane is in good shape, you can set the iron and capiron so finely as to make light and easy work of any grain irregularities that would result in tearout on a power jointer. And the finished cut will be one smooth surface, not a series of parallel knife lines.

It takes practice to hold a 22" jointer squarely on the edge of a 6' board, and holding it slightly askew helps, as shown in Figure 6. Once you've developed the skill, you won't want to trade the control you have with this tool for the faster but riskier efficiency of the power tool. Your skill will advance more quickly if you constantly use the machinist's straightedge to check lengthwise straightness and an exact try square to monitor squareness. Square shorter lengths more easily by shooting them—that is, by laying them flat on a shooting board and using the plane on its side. This, of course, requires perfectly square sides to the plane—easier to achieve with a wooden stock than with a metal plane.

Smoothness

The smooth plane produces a finished surface. The board should already have been made flat and true, possibly cut for jointing, and maybe even assembled. You'll rarely need to finish with sanding; finishing with a smooth plane usually results in a



Illustrations by the author

Figure 3. Varying Characteristics of Different Planes

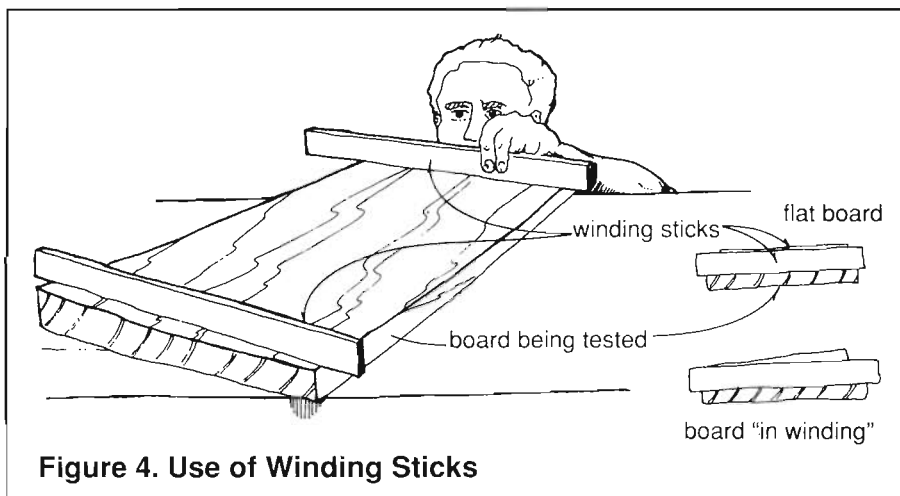


Figure 4. Use of Winding Sticks

better job. Your smooth plane must be in top shape, its sole perfectly flat and square to its sides, the mouth small, the capiron set so closely to the cutting edge that no iron is visible at the corners (with a crown of no more than $1/16$ " across a 2" blade—see Figure 6), and the whole assembly tightly secured in the body with no slop against the bed.

Keeping the smooth plane's sole true is not difficult if you have another well-tuned and sharpened plane, preferably a jointer. Hold the jointer in a vise, move the smooth plane across its upturned sole, and check with the straightedge. Retract the smooth plane's blade but don't remove it in order to maintain the same stresses and the precise shape of the stock. After you've done this a few times, the mouth will become too wide—but a wooden plane is easily remouthed. Such a perfectly tuned plane needs only a wipe or two of candle wax and it will glide smoothly over the work surface, actually creating a certain amount of suction and making it difficult to lift off.

Make sure that the corners of the sole are slightly rounded and that the corners of the iron don't cut into the surface, and you'll be able to take a shaving that is no more than one or two cells thick in the center and disappears completely at the edges. Plane across the grain to start, working your way along the length of the board; then plane in the normal fashion. Any difficulty at this stage usually signals inadequate sharpening, but may be traced to choking. If the plane's throat chokes up with shavings, it's because they aren't

being broken efficiently or because they're meeting an obstruction in the throat.

Capirons were introduced toward the end of the eighteenth century as it was discovered that by presenting the newly cut shaving with a steeper exit angle it

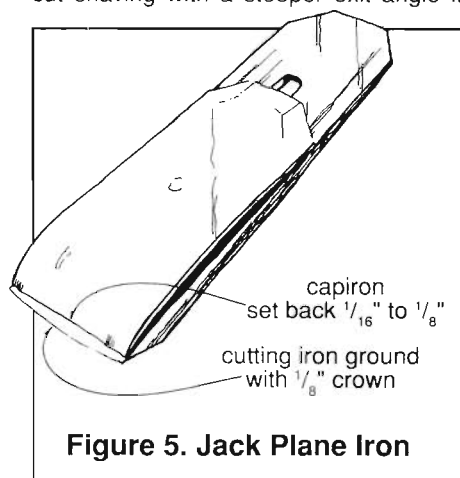


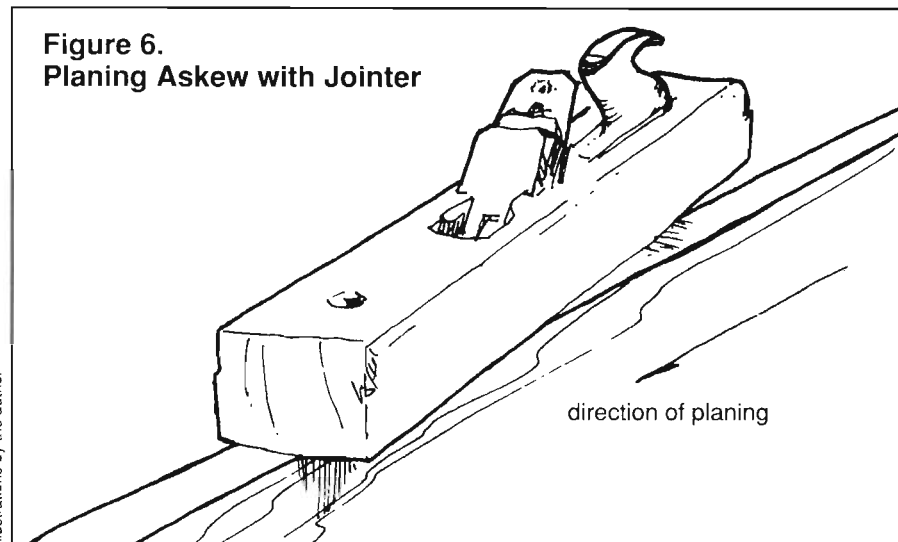
Figure 5. Jack Plane Iron

could be broken and thus prevented from causing tearout. To be effective, the capiron must be positioned as closely as possible to the cutting edge in order to break the shaving at the earliest opportunity. At the same time, its position controls the maximum possible thickness of the shaving, so a very close setting is needed with smooth planes, but a less close setting is better for jointers and jacks. If the front edge of the capiron isn't perfectly smooth—indeed, polished—it can impede the shaving's smooth passage. Similarly, if anything gets in the way of the exiting shaving, such as a less than perfectly tapered or chamfered wedge, the shaving may catch and immediately fold up like a concertina into a throat—choking blockage.

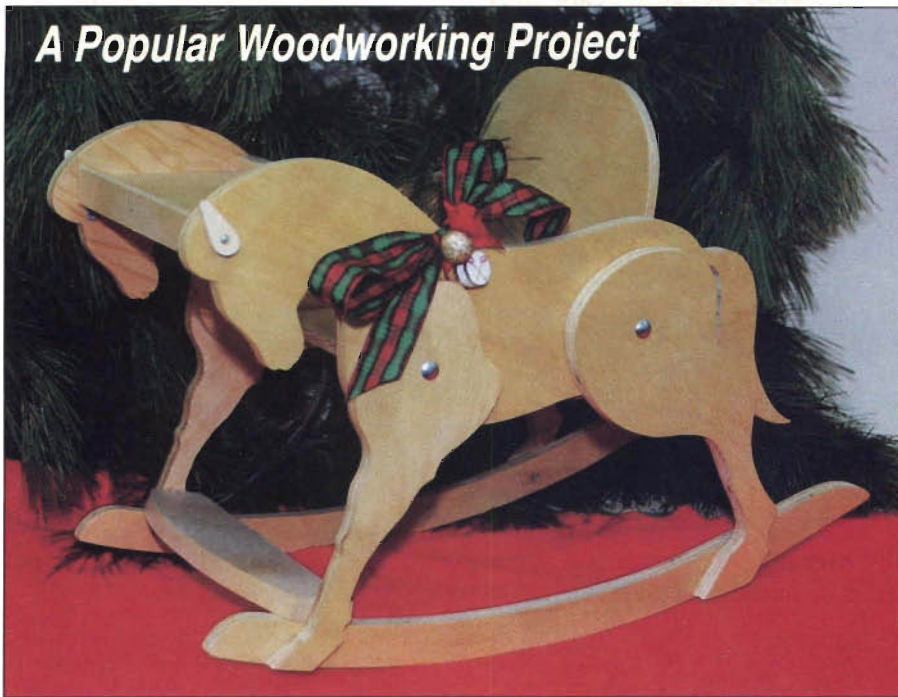
Sharpening

Sharpening is, of course, very important and worthy of an entire separate article. What is often overlooked is that how sharpening is done and the results aimed for will vary from job to job and from plane to plane. Therefore, you'll find it a great advantage to keep several planes, each one set up slightly differently from the other. When properly fettled, however, any smooth plane should be able to remove a continuous shaving from endgrain if the endgrain is first slightly dampened. But the truest test of a racing plane may be the old Japanese trick of placing two plane side by side at the end of a board and slowly tilting the board to see which one will slide away first, taking a perfect, lace-thin shaving as it goes. **PW**

Figure 6. Planing Askew with Jointer



A Popular Woodworking Project



Rocking Horse Chair and Tray

By Howard V. French

This rocker will provide years of service and enjoyment to the diaper and toddler set, and it's fun to construct. It could easily be sized-up to accommodate TV "tooners" who like to eat, rock and watch their favorite shows in deluxe comfort. I made mine from birch and oak, and it's already shown it's durable, rugged and ready to meet the demands of the most energetic little cowpokes.

Cutting and Shaping

Lay out and cut the parts as dimensioned in the Cutting List. You'll find full-size patterns in the PullOut™ Plans section for the body (A), legs (B and C), and other parts. Leave the hooves long; you'll trim them to the contour of the rockers later. Round any sharp corners, and sand the edges smooth.

Cut out the seat (D), back (E) and tray (F) from good quality plywood. Bevel one edge of each 10° as shown on the body pattern. Sand smooth, rounding only exposed corners and edges. Cut the back and seat supports (G and H) from hardwood. Shape them (see the body pattern) and mark the location of the screws joining

the seat subassembly and body pieces. Saw the tray front and back (I and J) from hardwood, and make a 1/4" deep by 1/2" wide dado 1/2" from the top edge of the tray back for the tray. Sand them smooth.

Shape the rockers (K) from 5/8" or 3/4" hardwood according to the full-size pattern. Stack them and tack together with nails while you sand their contours smooth. Then separate and sand them. Cut out the ears (L) and make the footrest (M) from hardwood (patterns in the PullOut™ Plans). Sand these pieces smooth, and you're ready for assembly.

Assembly

Select the best surfaces on the body and legs to face out as you fit them together to form separate right and left subassem-

Transferring the seat and tray lines from the Pull Out™ Plans will help align the subassemblies.



blies. Drill the 1/4" holes as shown on the patterns. Counterbore them on the inside surfaces for the washers and hex nuts. Install the carriage bolts temporarily, tightening them fairly snugly. Stack these subassemblies, making sure they align, and set them aside.

Before gluing the seat and back together, drill holes for finish nails through the back so they'll enter the beveled edge of the seat. Start these nails so they make shallow holes in the seat edge before gluing—the glued pieces will line up easily. Glue and nail them together in a 100° angle and set aside to dry.

Study how the subassemblies go together and pre-drill nail holes in all the supports. If you don't have a fine enough bit, cut the head off one of the finish nails and chuck it in the drill.

The contour of the lower edge of the tray back (J) makes tray access easy and maximizes the strength of the subassembly. Spread glue into the dado, slip it onto the rear edge of the tray, and finish nail them together. Spread a little glue on the front edge of the tray, and nail on the tray front. Turn the completed subassembly upside down and mark the locations of the four corner angle brackets on the tray. One "leg" of each angle must be flush with the tray edge. Secure them with #6 X 1/2" flat head wood screws. The back and seat supports (G and H) are identical, so take care when drilling to end up with matched pairs—rights and lefts. Glue and finish nail them to the seat assembly, aligned as shown on the body pattern.

Place one of the body and leg subassemblies on a flat work surface with the outer surfaces down. Position the seat and back subassembly on it, and transfer the locations of the three #8 X 1-1/4" flat head screws from the seat and back supports to the body. Drill holes and attach the subassemblies together. Then place

Unscrew the front end of the rocker so you can drill the pilot hole for the footrest.



Howard French lives in Abilene, Texas. His projects appear frequently in the pages of *Popular Woodworking*.

photos by David M. Camp

the tray into position, taking care to keep its top surface parallel and 5-1/4" above it. Locate holes for the angle brackets on the body, drill, and screw the tray subassembly to the body. Now place the remaining body and leg subassembly on the work

surface, outer surfaces down, and position the assembly you just completed. Drill screw holes and secure it to the tray and seat. Check for square and alignment.

The project should now stand upright on its own feet. Secure the hooves to the rockers with four small C-clamps and check for overall balance and alignment. Rocker placement is critical for squareness and an even, level balance. When the assembly is at rest, the seat and tray should be parallel to the floor. Drill and countersink through the rockers and into the hooves, and join them with #8 X 1-1/4" flat head wood screws. Trim the hooves to conform

Screw the ears on last. If you taper them, be sure their tips are well rounded.



photo by David M. Camp

to the arc of the rockers.

Fit the footrest between the two front hooves so that each end rests on a rocker. Drill through each end of the footrest and slightly into the rockers; install the footrest with two #8 X 1-1/2" flat head wood screws. Drill screw holes for the ears, too. You might want to carve the taper on the ears. Secure them with #6 X 1-1/4" round head screws and a little glue.

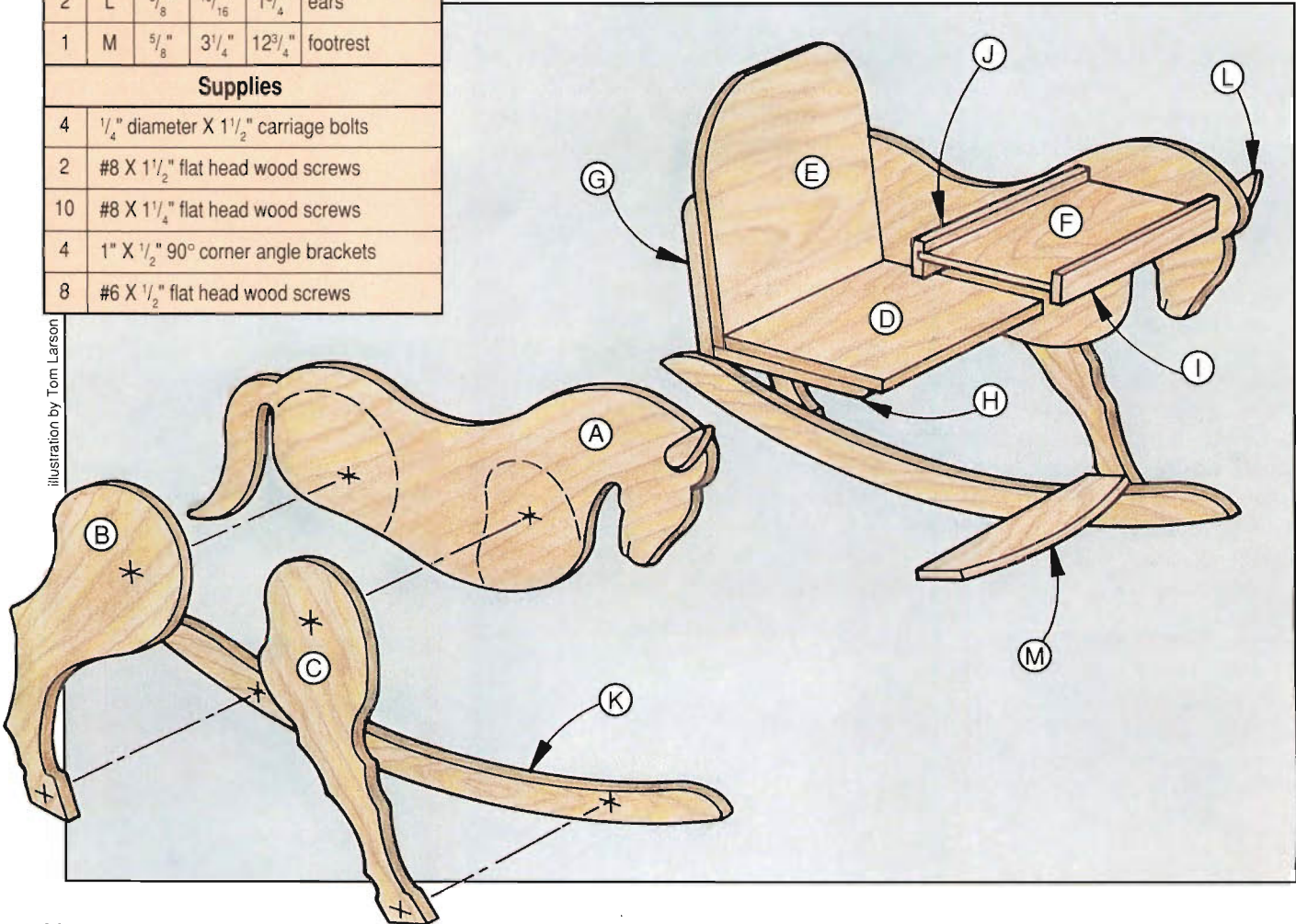
Right now you can still make minor changes to refine alignment, balance and appearance. Enlist the expert aid of a pint-sized cowpoke to test ride the horse before permanent final assembly and finish. But make sure you separate horse and rider—if you can—before proceeding!

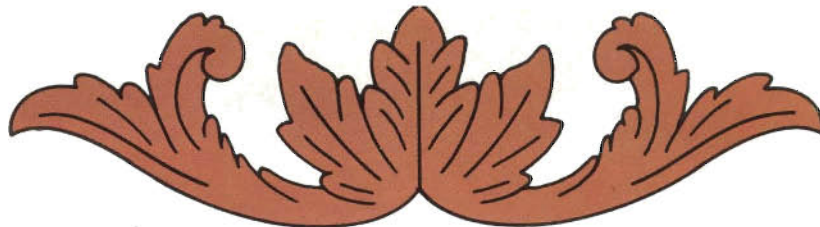
Disassemble screws and bolts, apply glue to the mating surfaces, and reassemble. Apply the finish of your choice. To lessen the chance of the tails breaking, they should overlap the hind hocks by about 1/4". Drill through them at about 30°—so as to intercept this overlap—and partially into the hocks. Apply a drop of glue and drive a finish nail through the tail into the hock.

Ride 'em, cowboy! **PW**

Rocking Horse Chair and Tray					
Cutting List					
Qty	Part	Rough Size			Piece
		T	W	L	
2	A	3/4"	8"	23"	body pieces
2	B	3/4"	5 3/4"	12 3/4"	rear legs
2	C	3/4"	5"	12 3/4"	front legs
1	D	1/2"	7 1/4"	11 1/4"	seat
1	E	1/2"	9 5/8"	11 1/4"	back
1	F	1/2"	5 5/8"	11 1/4"	tray
2	G	5/8"	3/4"	5 3/4"	back supports
2	H	5/8"	3/4"	6 7/8"	seat supports
1	I	1/4"	1 1/4"	11 1/4"	tray front
1	J	5/8"	1 3/4"	11 1/4"	tray back
2	K	5/8"	3 1/4"	26"	rockers
2	L	5/8"	13/16"	1 3/4"	ears
1	M	5/8"	3 1/4"	12 3/4"	footrest
Supplies					
4	1/4" diameter X 1 1/2" carriage bolts				
2	#8 X 1 1/2" flat head wood screws				
10	#8 X 1 1/4" flat head wood screws				
4	1" X 1/2" 90° corner angle brackets				
8	#6 X 1 1/2" flat head wood screws				

illustration by Tom Larson





Decorating Wood Surfaces

By Walter Morrison

With a steady hand and a little dexterity, you can decorate wood surfaces using a woodburning tool or a rotary hobby grinder. These simple tools can't produce the same results as carving chisels in the hands of an experienced carver, but the effects you can achieve with only a little practice are very pleasing.

After smoothing the surface, transfer a simple sketch, or perhaps a more complicated freehand figure like the vine on page 30, by taping down one side of the illustration and slipping carbon paper between it and the wood. With only one side taped, you can fold the paper back to see how well the figure is transferring. Trace with a soft pencil, using little pressure so you don't emboss the wood with the pencil.

Select the tool according to the kind of line you want. For a deep, wide figure that is more a carving than an illustration, use the rotary hobby grinder and its assortment of cutting tips or burrs. A sharp, dark line can be achieved with the woodburner.

The Woodburning Tool

My woodburner—a feather detailer used to make duck decoys—is called the Detailer CUB (Colwood Electronics, 715 Westwood Ave., Long Branch, NJ 07740). It has interchangeable tips and a heat intensity control. Experiment on your wood to find the right tip and heat setting. Softer woods burn more quickly than hardwoods. Intricate patterns require low tip heat because curves and changes in direction require that you move the tool slowly. If the tip heat is too high, the lines widen as you slow down. If the tip is too cool, you may not get enough burning action.

A wide variety of woodburning tools are available, but not all

Walt Morrison enjoys woodworking, art and landscape design in Northport, NY.



have interchangeable tips or heat control. Being locked into a fixed temperature makes surface detailing more tedious, but good results can still be achieved with patience. I began with a 25-watt soldering iron with its tip filed to a point, so I know it can be done.

Work on a well-lit table, with ample slack in the power cord to allow unlimited motion of both tool and workpiece. I rest the forearm of my tool hand on a block of wood to raise it above the table. This gives me better control and less hand fatigue.

I hold the tool in a pencil grip and draw it towards me with slow, firm motions, like I'm cutting out the figure with a knife. A steady motion is im-

portant—inconsistency will show up as wide spots in the lines. Work carefully—if you go over a line twice, you risk making it wider. Keeping the tip perpendicular to the work will help. If it wavers from perpendicular, its side may burn the surface, creating wider lines.

If you want a wider line, go over it several times. Achieve bolder images without increasing the heat by first drawing the line, then redrawing it as you tilt the tool to the left, and redrawing again while you tilt it to the right. Turning up the heat works, too, but can ruin the figure because the faster burning rate requires quicker movement—and a lot more control. After burning, lightly sand the surface by hand to remove any raised or charred areas.

The Rotary Grinder

For a figure that is obviously carved, use the rotary hobby grinder. Since this technique yields wider and deeper lines, it's better for simple images with few details. The carved figures go deeper into the surface of the stock and appear more dramatic than burned images. The small drawer front in the photo above shows the effect of both these techniques together. The carved

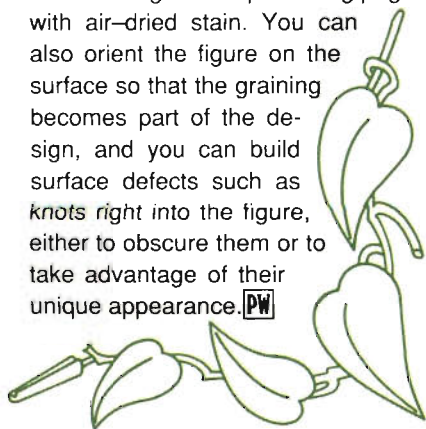
appearance produced by the rotary grinder gives the object a handcrafted look.

I rest my forearm on a block of wood to elevate the tool above the work. Holding the work against a slanted surface may also make carving easier because the slant complements the natural extension of your arm better than a flat surface. You don't want to reach out to carve the design's outermost parts because fine control of the wrist becomes difficult. I hold the grinder with a pencil grip and use a cylindrical or conical burr to remove material for deep carving. The tool should be nearly parallel to the work so the side of the burr does the cutting. To define the edge of a carved area, turn the tool nearly perpendicular and use the tapered tip. You can go over the edges of the figure with a sharp razor first. Deep figures will stand out since the edges are cleaner than those produced by the grinder.

The tool does the cutting and your hand should only guide it. The very high speed of the typical hobby grinder yields a clean cut if you don't force it. The burrs must be sharp, clean, and appropriate to the material. If they're dull or clogged, the work is likely to burn and the tool may overheat. Clean clogged burrs with the point of a straight pin.

Finishing usually involves staining and varnishing. Because the surface is carved instead of burned, the image may be less prominent when stained, especially with darker stains. To avoid this problem, I use light stains like MinWax® Golden Oak and Puritan Pine. The darkest I use is a medium American Walnut.

Sometimes the wood shows an area of exaggerated grain. Fine lines can be lost and the carving won't stand out. To compensate, you can paint the recessed areas with stain and allow them to dry instead of wiping the stain off. This will bring the figure up and out of the background. I've added some highlights to the duck carving on the preceding page with air-dried stain. You can also orient the figure on the surface so that the graining becomes part of the design, and you can build surface defects such as knots right into the figure, either to obscure them or to take advantage of their unique appearance. **PW**



A Popular Woodworking Project

Carved

By Walter J. Morrison

Early American woodsmen built simple wall cabinets for storing hunting supplies, often adorning them with carving. This slim version has adjustable shelves, a top trimmed out with crown moulding, and a woodland scene carved on its doors. The carving was done with a rotary hobby grinder, and utilized techniques described below and in "Decorating Wood Surfaces" on page 29. I used single pieces of plain sawn pine because I

photo by the author



Wall Cabinet

wanted a “single-board” look faithful to the materials a hunter might have had a century ago. Wide boards can cup from changes in humidity, so I selected stock from materials stored for over a year in my shop, using only pieces that exhibited the least tendency to cup. To ensure stable construction, however, I recommend that you use narrow stock glued up to the panel widths. Try to match color and grain from piece to piece so that glue lines and transitions in grain pattern between adjacent boards won't detract from the carved scene.

After cutting the pieces, shape the two sides (A), a right and a left, using the full-size pattern for the curved section in the PullOut™ Plans. Smooth the curves with a drum sander or by hand. Mark the locations for the shelf clips (see the Figures on the next two pages) and drill 1/4" diameter holes deep enough to accommodate the length of the pin on the clip. Use a stop gauge or masking tape on the bit to prevent drilling too deeply. Now rout the outside edge of the side pieces with a 1/4" round-over bit, and cut the 3/8" deep X 3/4" wide dadoes for the top (B) and bottom (C) pieces. Note that the bottom dado is stopped and must be trimmed square with a chisel (Figure 2).

Cut the top, bottom, and lower and upper face pieces (D and E) to size. Rout the front lower lip of the lower face using the same

bit you used on the cabinet sides. Now finish—sand all the pieces. Glue the top and bottom into the dadoes in the sides and clamp the overall assembly. Keep the clamp bars away from the front to avoid damaging the routed edges. Before the glue sets, put the assembly face down on a level surface. Use a carpenter's square or measure diagonals to check for square. Tack a piece of scrap wood diagonally across the back to keep it square until the glue has set.

Rout a 3/8" X 3/8" rabbet into the back inner edge of the sides, top and bottom to accommodate the back panel (F). Next, attach the lower and upper face pieces to the sides with glue and nails.

Cut the back panel from 1/4" cabinet grade plywood and secure it in place with glue and nails. Now determine the exact lengths of the three 1-5/8" solid crown moulding pieces (G) and install them around the top of the cabinet, mitering the edges where the face and side pieces meet. Make the top of the moulding flush with the top of the cabinet. If you can't find solid crown moulding, substitute a combination of other mouldings for it. Build up an equivalent trim piece using hollow crown moulding and a triangular filler piece.

Cut the two shelf pieces to size (H). Check their fit with the
(continued on page 33)

Carving the Scene

By Walter J. Morrison

Once you've assembled the cabinet, you can begin carving the doors. A full-size pattern of the scene shown here is included in the PullOut™ Plans, or you may have your own plan ready to transfer to the doors with carbon paper. If you want to develop a scene right on the doors, lightly sketch the main elements on the surface with a soft lead pencil, taking care not to emboss the wood. Developing a scene is a trial and error process, so erasing and redrawing will be necessary. Hard pencil lines remaining on uncarved surfaces will detract from the finished scene—use a good quality eraser.

Planning the Scene

On a traditional piece like this one, a realistic scene is best. Establish the path or “eyeline” the viewer will follow from foreground to background. Embed the main subject at mid-depth in the scene. The “eyeline” for this project is shown in Figure 1. I've tried to capture the flight of the two ducks leaving the marsh in the foreground towards other ducks in the background. The eyeline

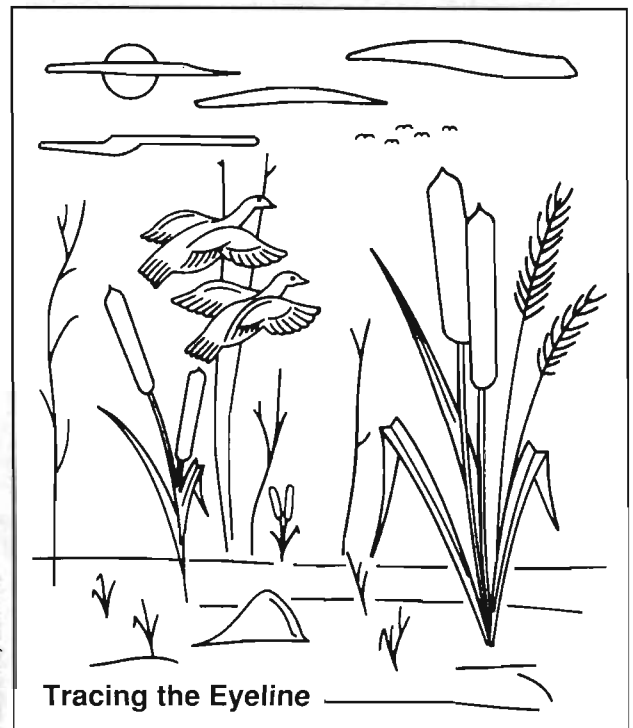
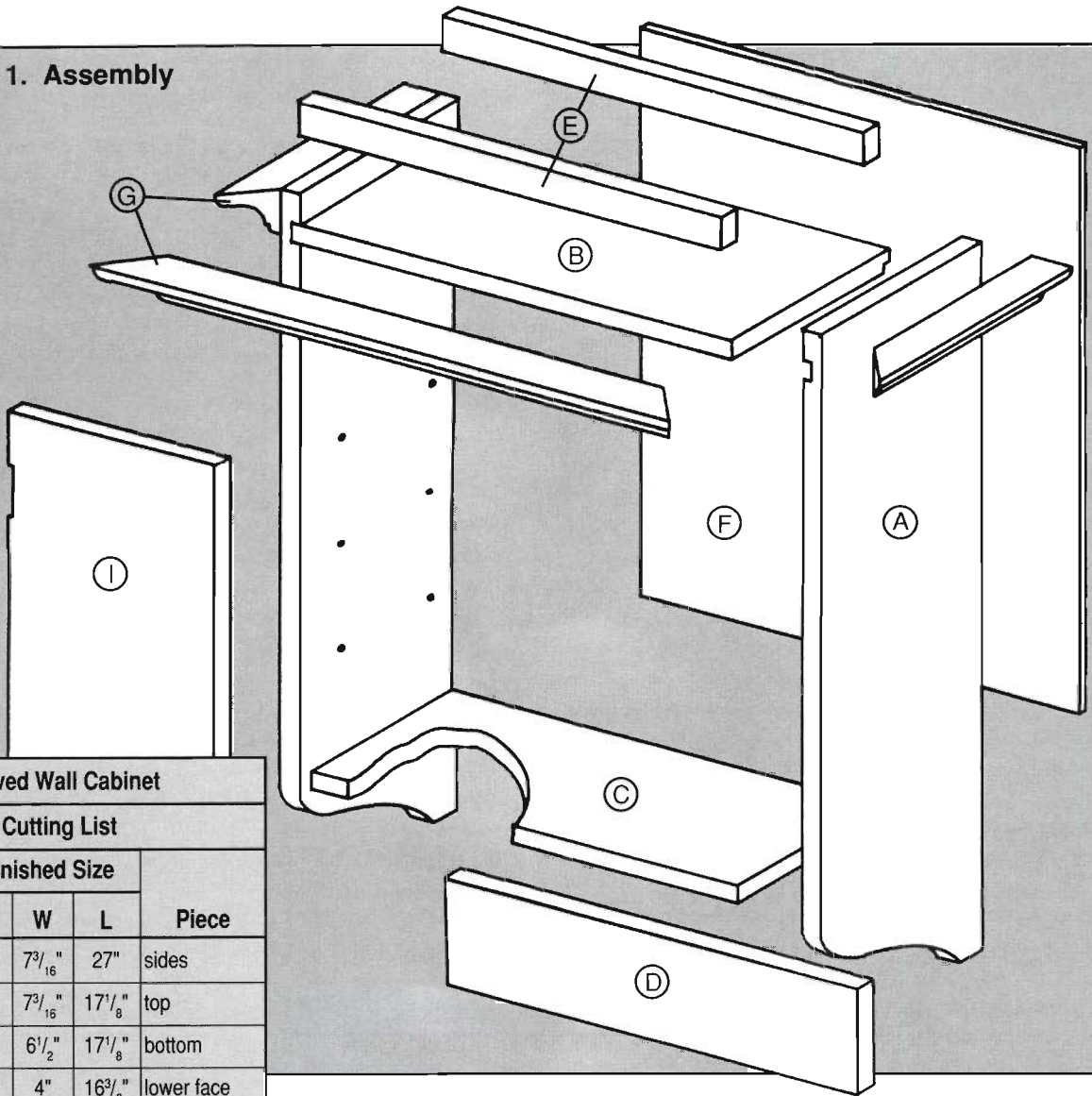


Illustration by Don Hole

Figure 1. Assembly



Carved Wall Cabinet

Cutting List

Qty	Part	Finished Size			Piece
		T	W	L	
2	A	$\frac{3}{4}$ "	$7\frac{3}{16}$ "	27"	sides
1	B	$\frac{3}{4}$ "	$7\frac{3}{16}$ "	$17\frac{1}{8}$ "	top
1	C	$\frac{3}{4}$ "	$6\frac{1}{2}$ "	$17\frac{1}{8}$ "	bottom
1	D	$\frac{3}{4}$ "	4"	$16\frac{3}{8}$ "	lower face
2	E	$\frac{3}{4}$ "	$1\frac{1}{8}$ "	$16\frac{3}{8}$ "	upper faces
1	F	$\frac{1}{4}$ "	$17\frac{1}{2}$ "	$21\frac{1}{2}$ "	back
1	G	$1\frac{5}{8}$ "	$1\frac{5}{8}$ "	36"	moulding
2	H	$\frac{3}{4}$ "	6"	$16\frac{3}{16}$ "	shelves
2	I	$\frac{3}{4}$ "	$8\frac{1}{16}$ "	$21\frac{3}{8}$ "	doors

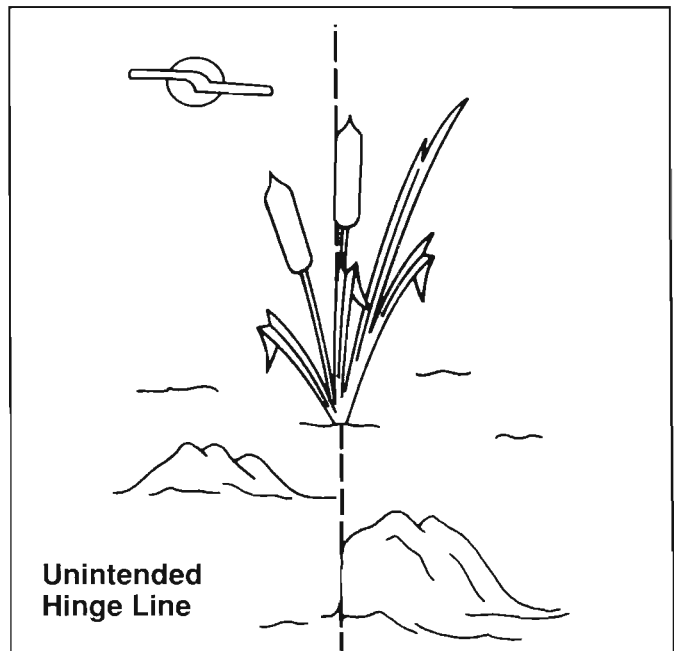
Supplies

2 pr	$\frac{3}{4}$ " X $1\frac{1}{2}$ " antique brass cabinet hinges
8	shelf supports with $\frac{1}{4}$ " diameter pins
	dowels or finishing nails

begins at a cattail in the lower right foreground and proceeds up and left, turning right at the two ducks, the scene's midpoint. It then goes into the background to the flock in the upper right. The eyeline is the main thread connecting foreground and background. Establishing it

first makes planning the scene much easier.

The eyeline moves back and forth across the doors as the scene goes from foreground to background. The viewer's eye takes a circuitous path, adding to the perception of depth. To maximize this perception, I made the scene as wide as possible and avoided applying any trim on the doors that might compete. A chance to further the illusion of depth comes during the carving: carve foreground objects with more detail and greater depth than background objects.



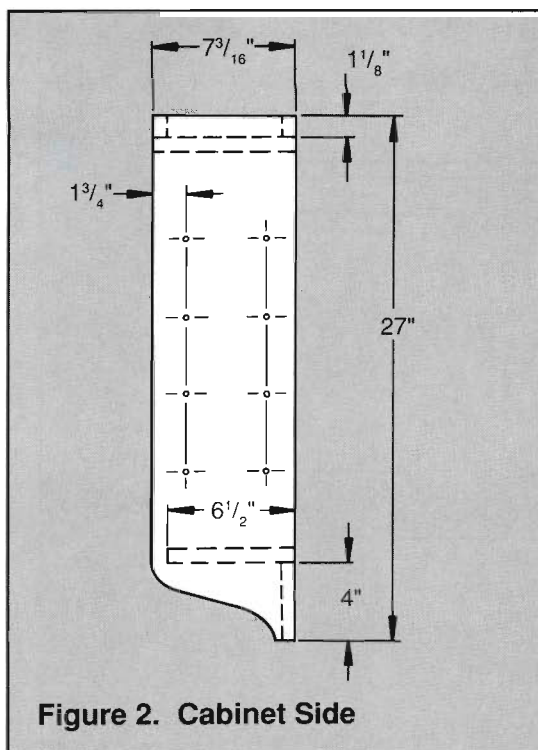


Figure 2. Cabinet Side

shelf clips, and adjust if needed.

Cut the door pieces (I) to size and rout their front edges with a 1/4" round-over bit. Mark the locations of the hinge mortises on the outer edge of each, starting 2" from the upper and lower edges. Cut the mortises to the correct width and length, and to a depth twice the thickness of one hinge plate. To make door installation easier, and to avoid hinge binding between the doors and sides, I chose not to mortise the

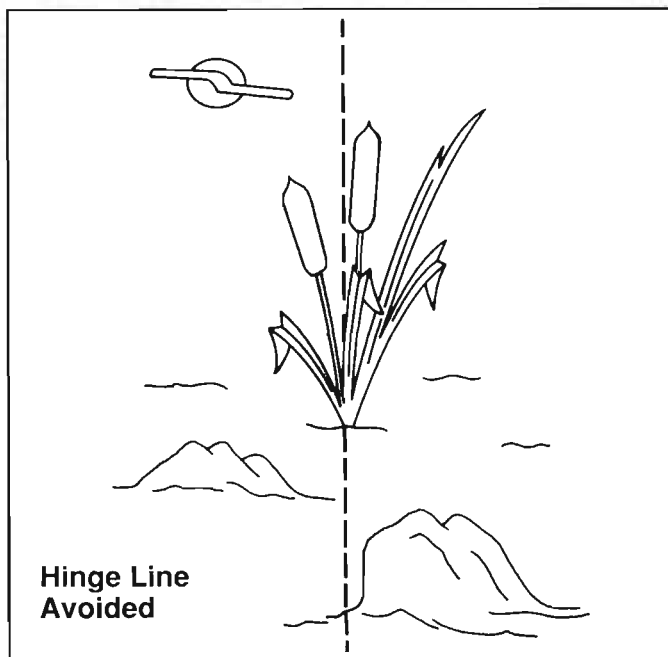
cabinet sides, which is why the door mortises are deeper than the thickness of one hinge plate. Fit the hinges to the doors and place them on the cabinet. Adjust so there is at least 1/16" clearance around the doors, and space their rear surfaces about 1/16" out from the bottom. When mounted, the doors should protrude beyond the cabinet front by about 1/4". Holding the doors in place, mark where the hinges will go on the cabinet sides. Remove the hinges from the doors and hold them on the sides, mark and drill holes for the mounting screws, and install the doors. To keep them closed, I used magnetic catches mounted to the underside of the cabinet bottom. The doors are sized so their bottom edges extend below the bottom, eliminat-

ing the need for pulls that would distract from the scene to be carved on the doors. If you don't want to carve a scene, apply finish. Otherwise, remove the doors from the hinges and follow the carving instructions.

After carving, prepare the cabinet by filling all nail holes with wood filler and sanding it smooth. Vacuum off the dust and remove any remaining particles with a tack cloth. Now apply your stain and allow

it to dry overnight. Keep in mind that lighter-toned stains work best on carved surfaces. They may absorb a larger amount of stain, making them darker than you expect. Furthermore, carved figures don't stand out as well when the surface surrounding them is dark. You also want the option of applying an extra coat of stain, allowing it to air dry to subdue areas of excessively dominant grain. The areas of air-dried stain should wind up darker than the surrounding areas to establish the proper contrast—but this works only if the background tone is sufficiently light to begin with. Once staining is complete, I usually apply two coats of polyurethane, allowing a full day of drying between coats. Wipe the cabinet with a tack cloth before applying the first coat; when dry, sand with the grain, using 320-grit paper to smooth any air bubbles and remove any trapped dust. Vacuum all surfaces and tack the cabinet again. After the second coat of varnish, use #0000 steel wool to rub the finish to a dull appearance, rubbing only in the direction of the grain. Vacuum again and buff with soft terry cloth until a fine luster appears.

As the cabinet is fairly heavy, I mounted it with screws through the lower and upper face pieces into a wall stud. Heavy duty hangers mounted to the rear of the cabinet, used with heavy wall anchors, will also work. Remember to account for its weight and for the use it will see when selecting wall anchors. **PW**

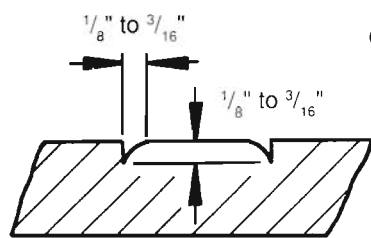


Illustrations by Don Hole

Scaling the scene's elements from foreground to background also adds to the appearance of depth. Since the eyeline goes from larger, foreground objects to smaller, background ones, use its path to determine their sizes. Scale the elements in the scene—the cattails, ducks, and distant flock—by adjusting their height and width to get a sense of depth. When done properly, the picture will have an obvious foreground and background, and the transition between the two will appear to occur smoothly.

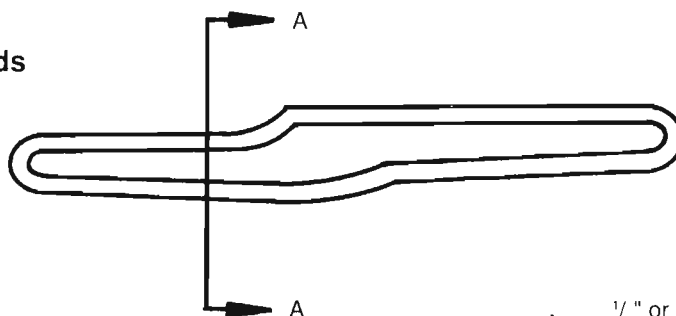
Now take a look at the scene before carving to see if it appears natural. In order for it to work, the scene has to be realistic and true to form overall. Make sure that the motion and orientation of the figures are as they would be in nature, or the perception of realism will be lost.

Take care never to create a "hinge line" across the panel that will allow the carved surface to cup. Look at your completed drawing for any obvious grooves that go from figure to figure within the scene—carved-out areas that together create a groove or channel along the grain lines from one end of the surface to the other. The surface is likely to cup around this hinge line over time due to uneven stresses between the front and back surfaces of the panel. If you see this appearing in your sketch, rearrange the

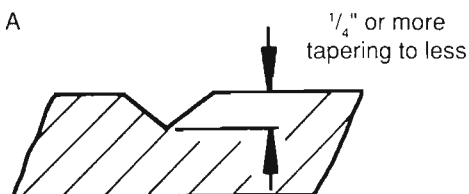
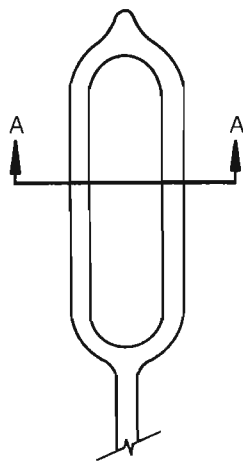


section A—A

clouds

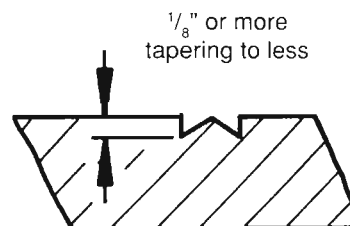
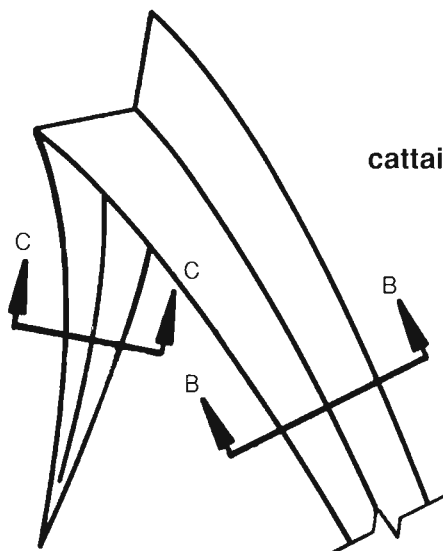


cattails



section B—B

cattail leaves



section C—C

Carving Details

objects. The far left illustration shows a scene with a hinge line unintentionally created by the cuts on the left side of the cattail, the groove down the center of the long slender leaf, and the left side of the rock. The illustration to the left shows the elements relocated to eliminate the hinge line.

Carving Techniques

This type of carving is quite different from traditional relief carving. Typically a relief carver would use stock much thicker than that used here, achieving the same sense of proportion among the figures by cutting away material to varying depths. The doors of this cabinet are not thick enough—as a rule of thumb, I try never to carve any deeper than 1/4 to 1/3 the thickness of the stock.

The technique here removes material from within the figure to create it, with the more prominent parts remaining flush with the surface. In relief carving the artist removes material around the figure, relieving the background instead. Here, this would reduce the thickness of the doors too much and cause instability. But the rotary hobby grinder can be used to advantage. The carving done with it could perhaps be called “inverted

relief.”

When carving a scene as large as this one, start with a rough cutting burr—one with a pointed end and large cutting surface. Rough out deep areas first. Stay away from outlines because the rough burr won't produce a sharp, finished edge. Go over the scene with a finer burr and work the figures until their outlines and interior surfaces are fairly smooth. The fine burr I use here has almost a pear-shaped profile, with less cutting surface. It's less aggressive, easier to control, and good for figures like the ducks—carved only about 1/16" deep across their bodies.

Objects such as water lines and the sticks in the background are formed with grooves 1/16" to 1/8" deep and wide. The cattails are a bit more complicated—the outlines of the tops of the larger ones are 1/8" to 3/16" deep. Their slender leaves rise up, widen, and fold back down. For their rising portion, carve a V-shaped centerline about 1/4" deep. After the fold, carve the edge lines 1/8" deep and leave the center untouched. Like the cattails, the clouds all have their centers in the same plane as the surface, and their edges carved. **PW**

Three Northwest Coast Indian Figures

By William H. McMaster

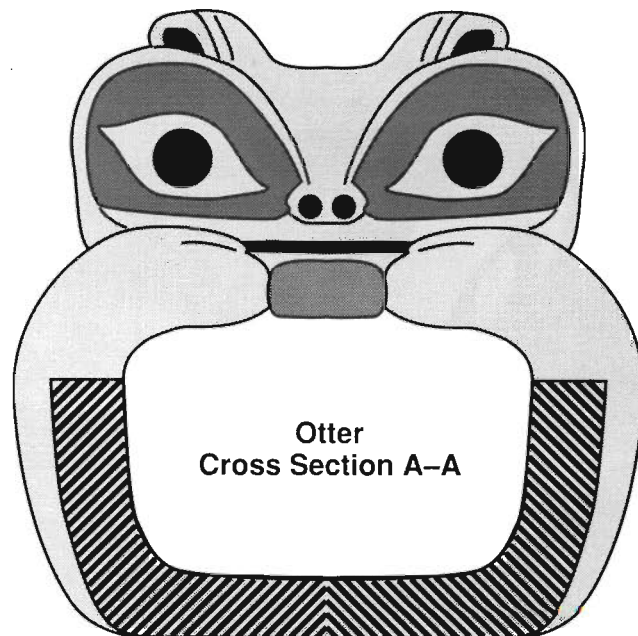
The carvings of the Northwest Coast Indians are simple yet strong in design and fun to carve. They often caricature animals native to their region—otter, beaver, owl—and show interest in form rather than pictorial realism. The patterns here, based on the work of Chief Don Lelooska, require a block 3-1/2" square and 8" to 10" long. An extra inch will provide a tab that can be held in your vise (and removed later). These projects are fine introductions to in-the-round carving and need only a few tools. The bold designs are easy to carve, but the results are impressive.

The native species of the Northwest include redwood, alder and cedar, or you can try Honduras mahogany or Eastern black walnut. I used 4 X 4 kiln-dried redwood. It splits easily, so take shallow shaving cuts; when stop-cutting, slant your first cut across the grain.

Sea Otter Bowl

The stylized sea otter bowl is reminiscent of a Tlingit Indian bowl. Sea otters are among the most appealing creatures, and one floating on its back clutching an abalone on its chest is animal charm at its best. They're among the few animals that use tools. An otter will dive and break the abalone's grip on the ocean floor

William H. McMaster is Chief of the Education Division of the California Carvers' Guild. His "Focus on Carving" is a regular feature in Popular Woodworking.



by smashing the shell with a stone, then come to the surface carrying the stone under its forearm. Floating on its back, balancing the stone on its furry stomach, it shatters the shell on the stone to get the meat. This pattern uses this pose to fashion a unique bowl. The Indians used bowls like this to hold seal or candlefish oil for cooking, but mine's for candy or nuts and has proved a hit at woodcarving shows. Note the caricatured features, especially the enlarged and prominent eyes. The tail is stylized and elongated to make a handle.

Begin by drilling the large hole in the tail region. Bandsaw the

outline to remove the shaded areas (Figure 1), and drill out the space below the head. From here on you'll use hand tools. To shape the bowl cavity I used short, bent #8 and #3 gouges. It takes a little practice to get used to carving with these tools due to their high angle of attack. Try to maintain their cutting angle as you gouge out the wood by moving the gouge forward without changing the angle. Keep the side thickness uniform. Carve the outside first and then match it on the inside using either your fingers and sense of touch or an outside caliper (Figure 2) to check the thickness. The final carving step should be the facial features. Use a sharp knife and make sharp edges.

You can use a real shell instead of carving a wood one for your otter to chew on. I stained the bowl walnut, the eye and ear recesses black, and oiled the unpainted areas. In many native American carvings certain features are painted black, white or red. When you've finished you have a useful item which is also a conversation piece. As you see him lying there with his belly full of candy, you can almost hear him say, "You otter have one!"

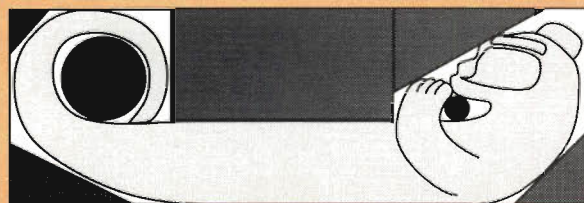


Figure 1. Blocking Out the Otter Bowl

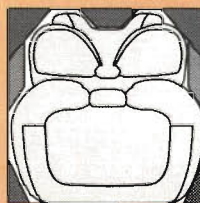
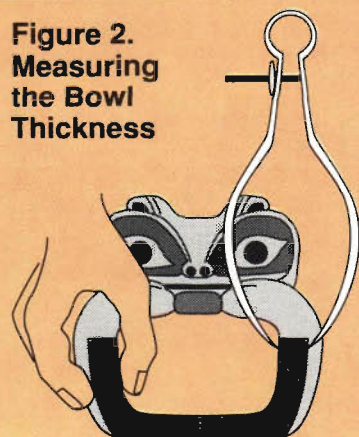


Figure 2. Measuring the Bowl Thickness



illustrations by the author

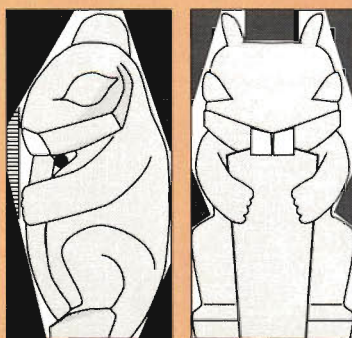
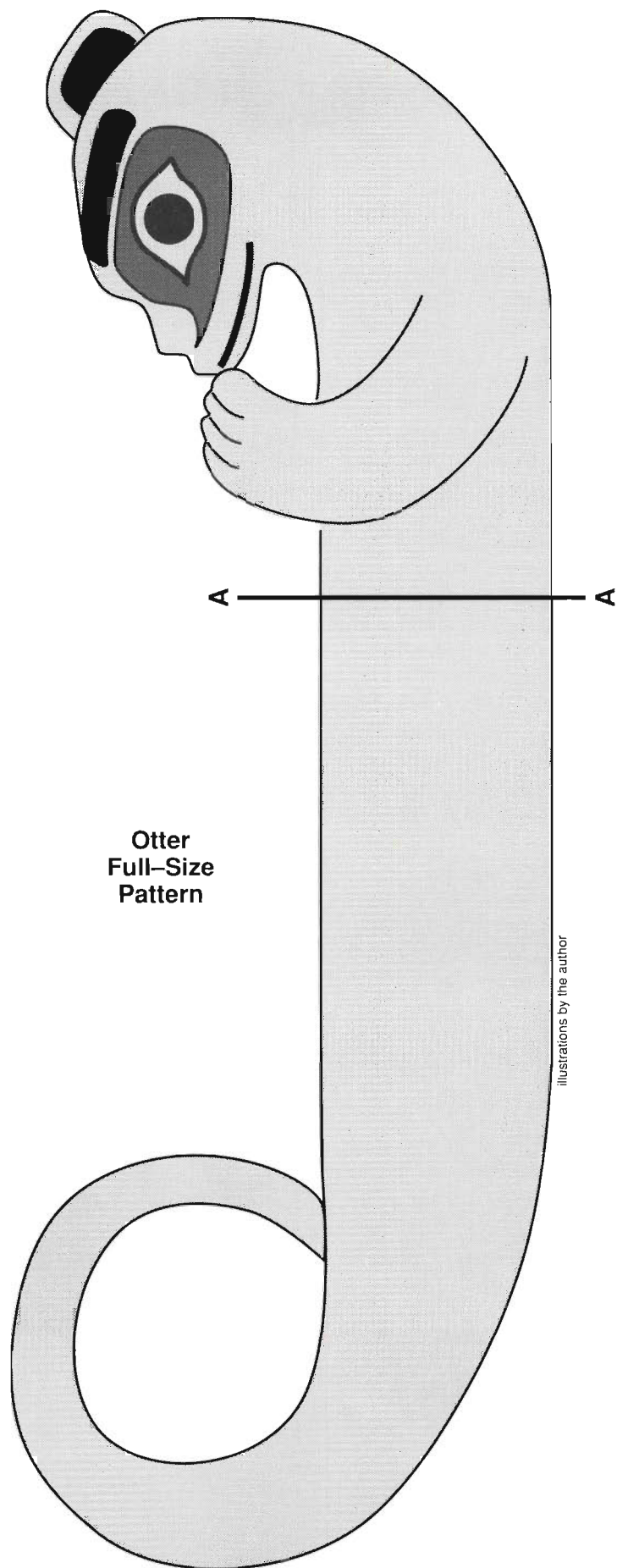
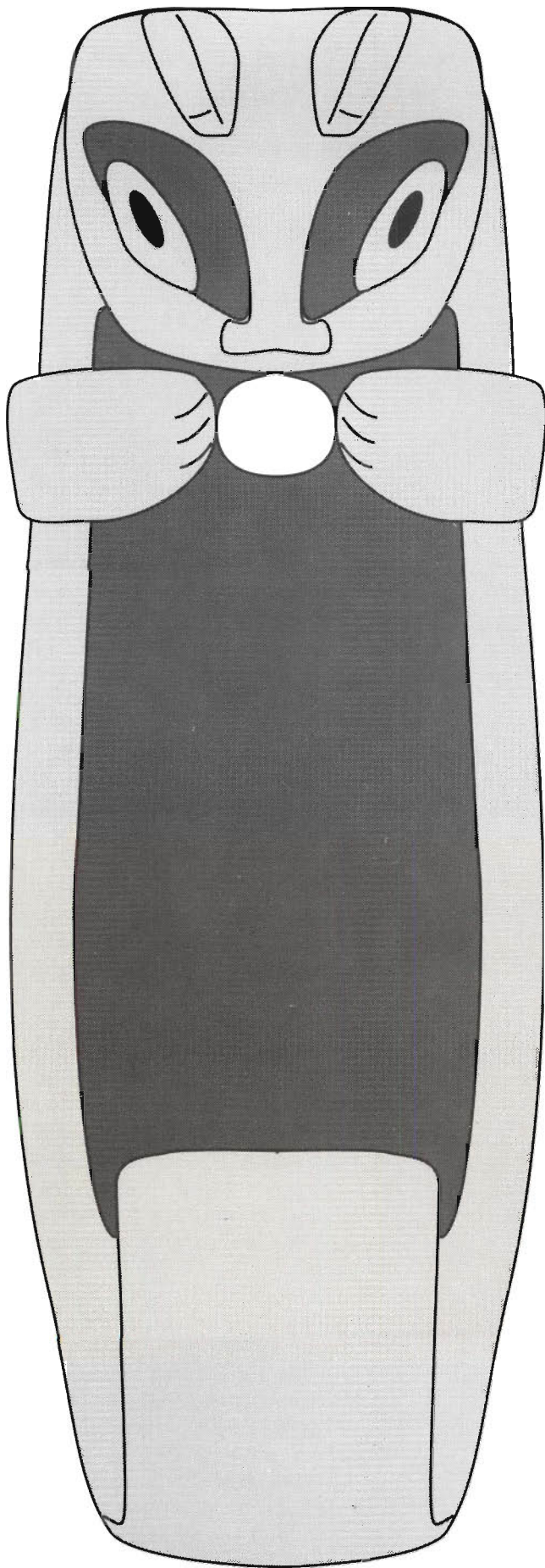


Figure 3. Blocking Out the Beaver



Otter
Full-Size
Pattern

illustrations by the author



photo by Phil Fischer

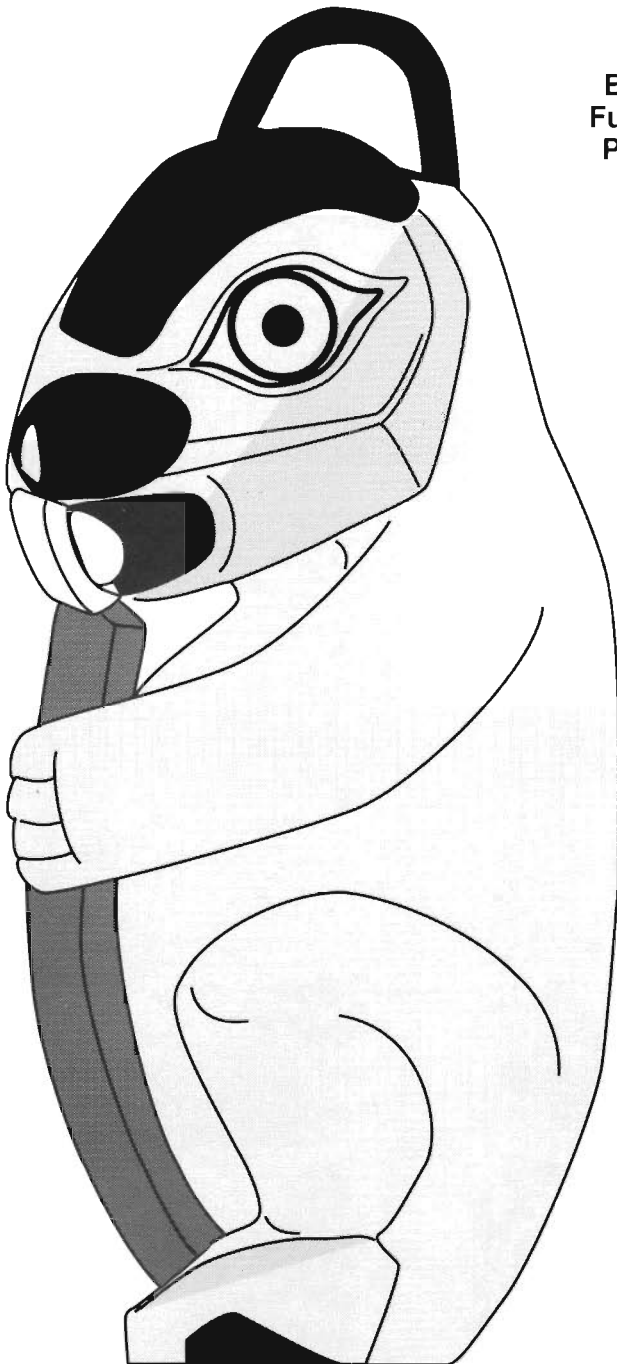
Beaver

In this carving, a beaver with large incisors humorously chews on the tip of his scaly tail. It's based on a beaver design carved on Haida totem poles.

First block out the figure by removing the shaded areas shown in Figure 3. This can be done just as easily with large gouges as with a band saw. Drill a hole to start the void underneath the chin. Place this hole accurately since it sets the lower boundary of the head. The opening is small and the hole makes it easier to use small gouges or rasps inside—after roughing out the tail and arms. Make the open space behind the teeth with gouge cuts from each side until they meet. A deep gouge between a #5 and a #8 works well. Smooth using both rasps and files once the opening has been formed.

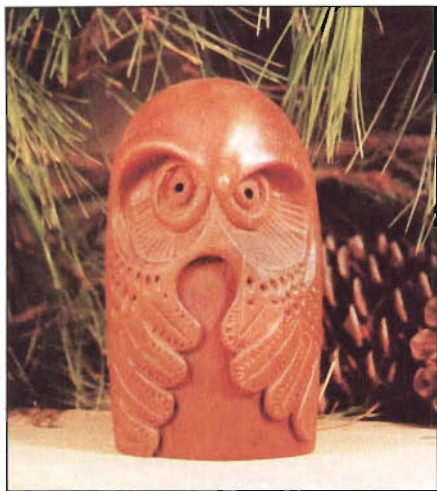
After blocking out, mark the features and incise them with a V-

Beaver
Full-Size
Pattern





photos by Phil Fischer



tool before carving. Make stop cuts so your tool won't run along the grain. Work all around the figure so that you can maintain its symmetry. Carve the facial features with definite edges for emphasis. Use a V-tool to incise the grooves for the tail pattern. Stain the tail

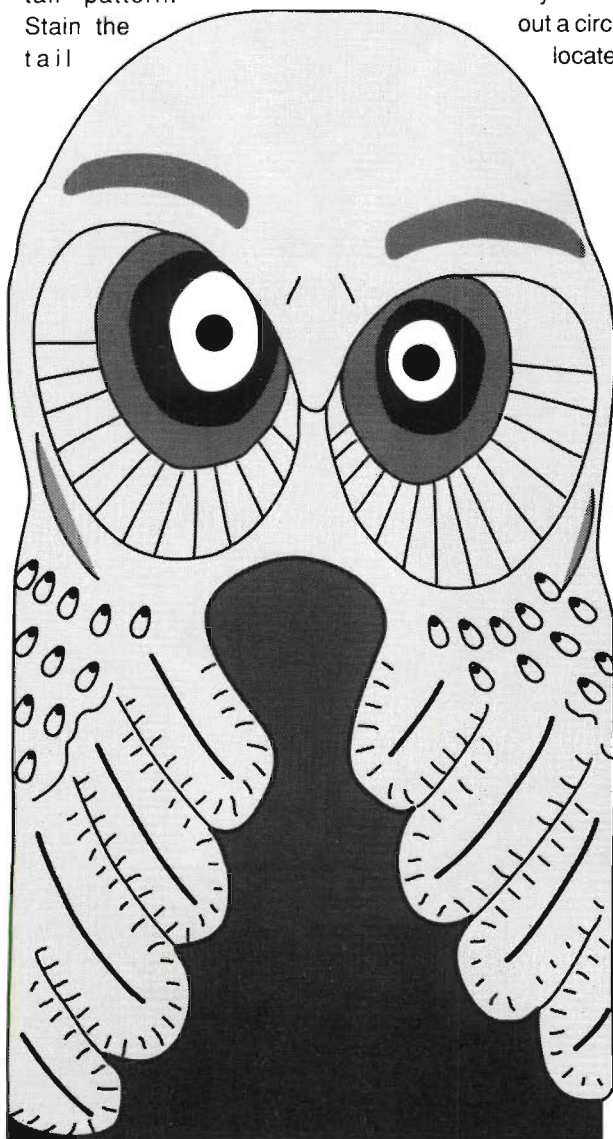
dark walnut and paint or stain the darker areas of the pattern black. Make the teeth light or even white for emphasis.

Owl

The owl makes a nice companion to the comical beaver. It's quite straightforward and you won't need a detailed plan. Lay out a circle on the top of the block and locate the beak at one corner,

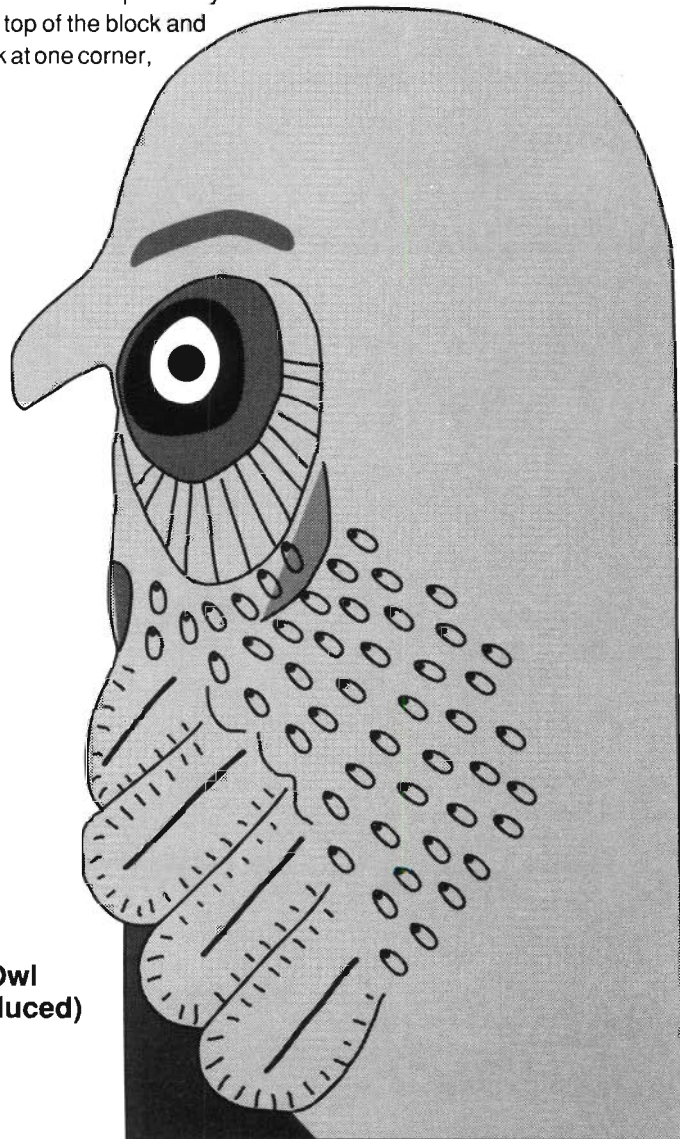
block it off, and round off the rest with a carpenter's chisel or a large, nearly flat gouge. The larger the tool, the easier it is to round off the wood, and the larger the gouge, the smoother the cut. Put in stop cuts for the beak, eyebrows and wings with a V-tool.

Use a deep gouge to boast out the eye sockets. The texturing around the eyes is done with a 3mm U-tool. I burnt in the indentations representing feathers with a pyroelectric pen (woodburner). There's no need to pre-cut them—the burner does an adequate job. The teardrop holes representing smaller feathers were drilled with a cone-shaped bit in a rotary power tool such as a Dremel or Foredom. If you don't have one of these, then a small U-tool rotated in the wood will do the same job. Make these holes at a shallow angle and burn them inside at the apex to provide a dark, contrasting color. **PW**



illustrations by the author

Owl
(Reduced)



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

PullOut™ Plans

Popular Woodworking #57

November 1990

Pages 39—54

leg

③

se Chair & Tray

e Pattern

Carved Wall Cabinet

Full-Size Pattern

Ⓐ side (curved portion)

Rocking Horse Chair & Tray

Full-Size Pattern

Rocking Horse Chair & Tray

⊗
C

front leg

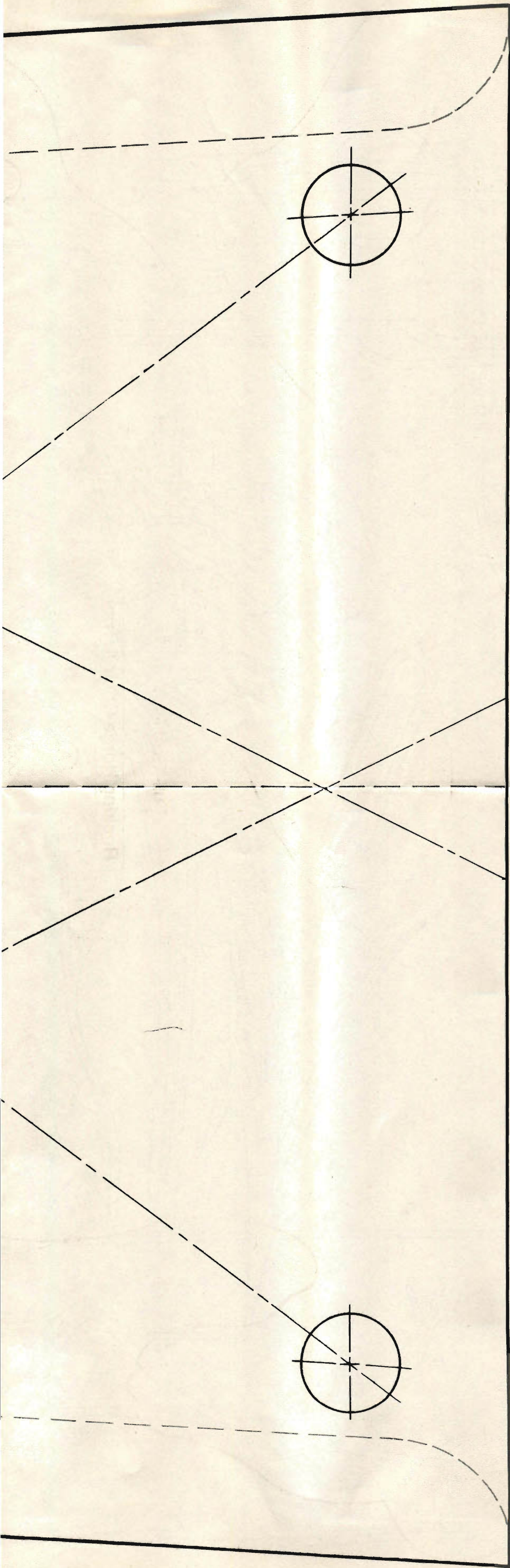
Full-Size Pattern

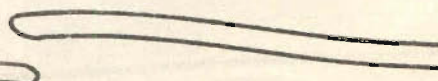
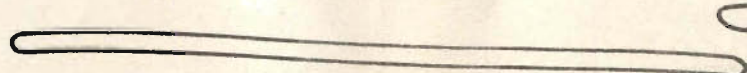
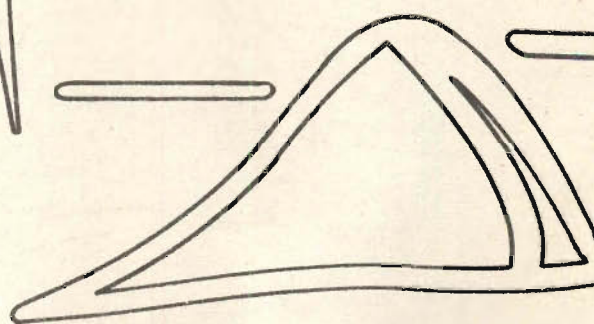
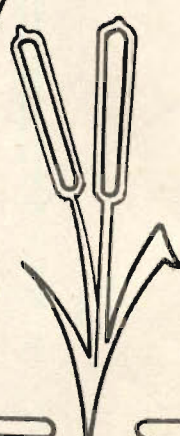
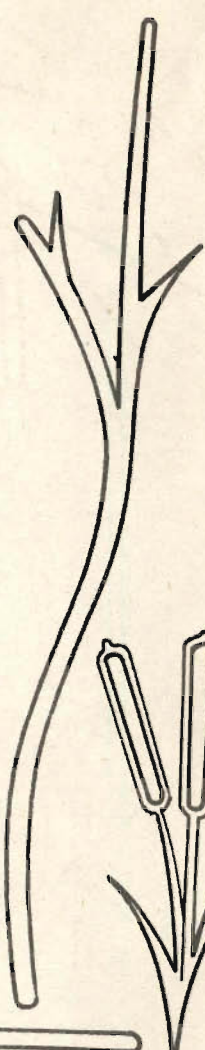
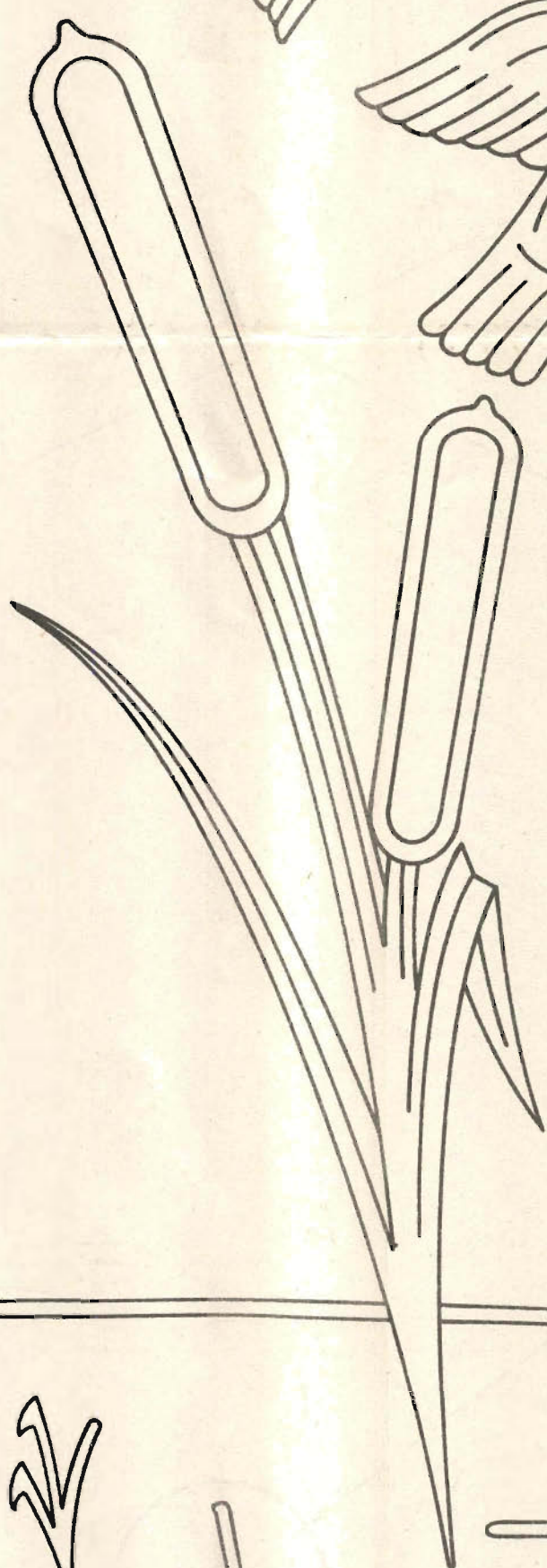
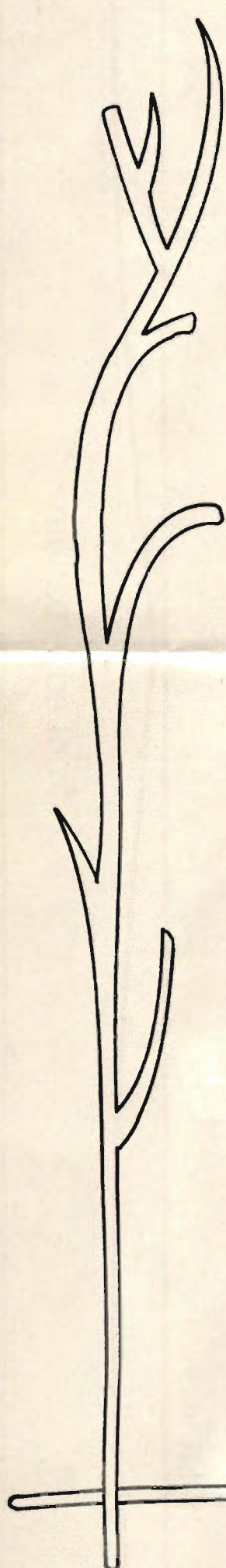
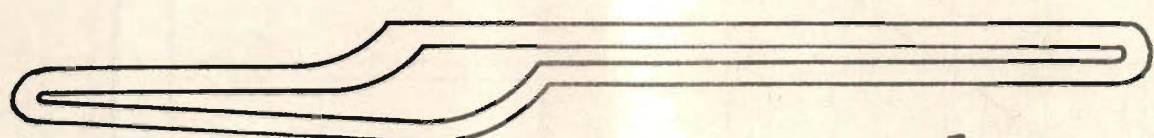
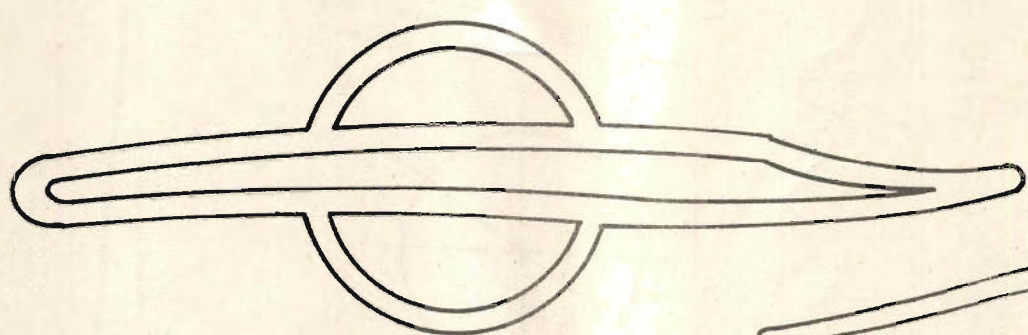
Rocking Horse Chair & Tray

⊗
A

body

front edge pattern





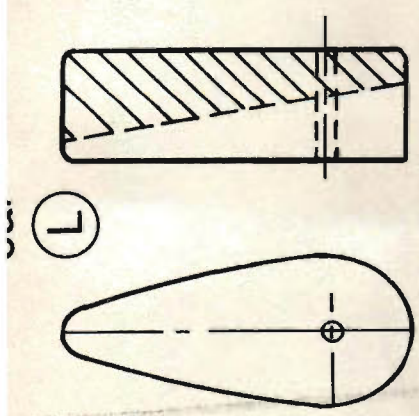


Carved

Full-S

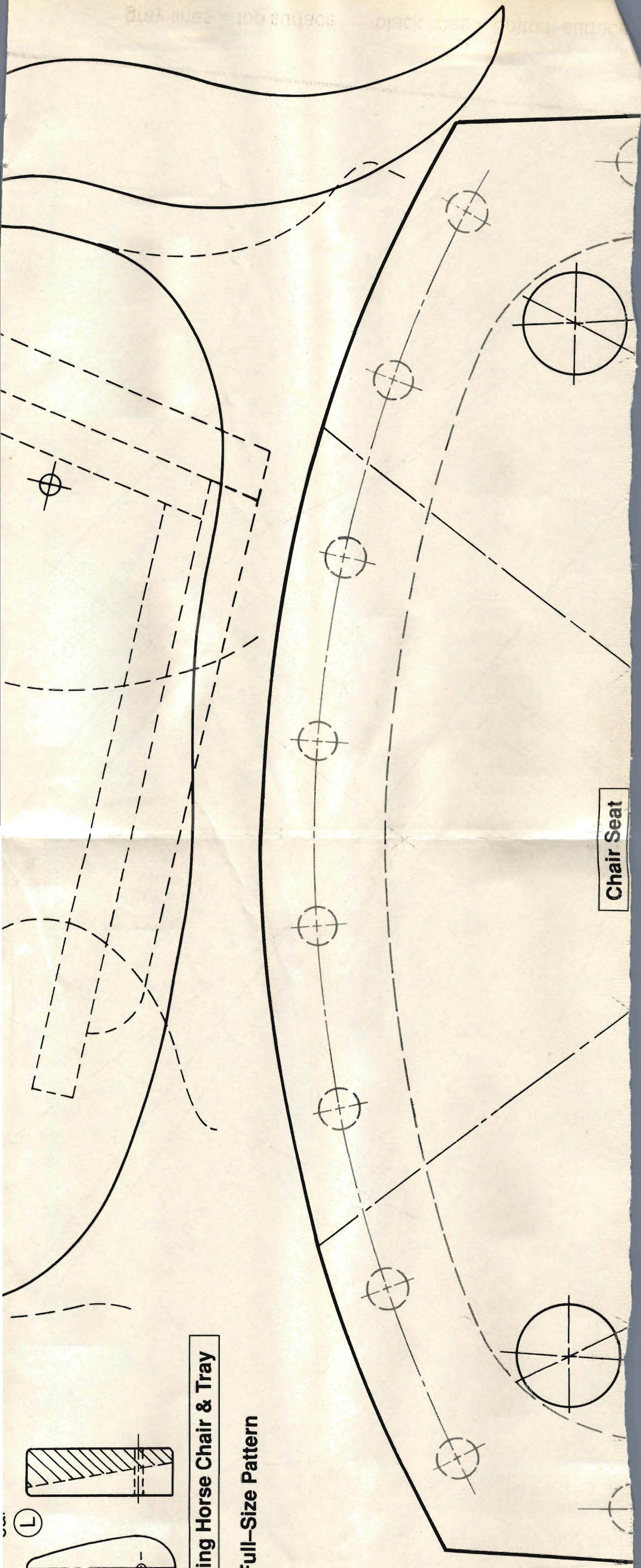
gray lines = top surface
black lines = bottom surface

Full-Size Pattern



Rocking Horse Chair & Tray

Full-Size Pattern



Chair Seat



back

Rocking Horse

Full-Size

Rocker Full-Size Pattern

Full-Size Pattern
Chair Back

Rocking Horse Chair & Tray

(M)

foot rest

Full-Size Pattern

Wall Cabinet

for carving

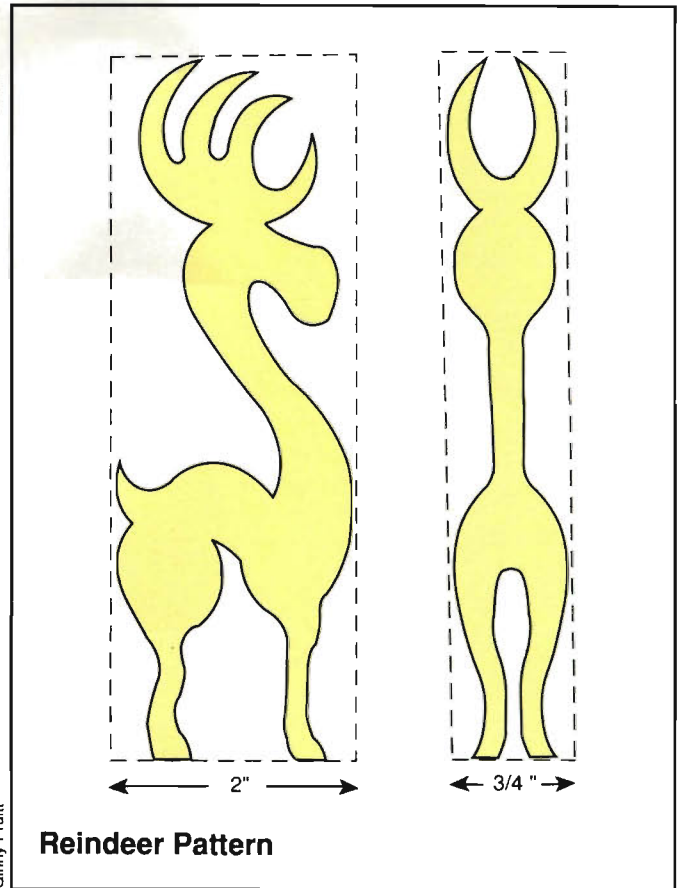
Pattern

Scroll-Sawn Animal Figures



David M. Camp

Ginny Pruitt



by Hugh Foster

Here's a quick, fairly easy project that can be a real crowd pleaser at Christmas bazaars and the like. Not only are the results enchanting, but the process of making them will make you a better all-around scroll-sawyer, for cutting these animal figures will improve both your concentration and your hand/eye coordination. Steve Vorndran, Midwest sales representative for Sakura USA (a scroll saw manufacturer) showed me how he makes these nifty little critters.

Your scroll saw must be set up properly if you're to have much success with this (or any other) project. If there's much vibration at all in your saw, loosen the bolts in its stand, stick the stand to the floor with inverted loops of duct tape, run the saw for a second, and then retighten the stand; you'll find now that it runs much better!

Steve uses #5 blades (15 teeth per inch) for this project because their .038" width and .016" thickness permit tight radius work. As you're cutting you'll find that these thin blades sometimes stretch, so they must occasionally be re-tensioned. He says that

cutting 3-D animals is both harder and easier than it looks: it requires fierce concentration and more strength than you might suspect. There is lots of blade deflection, and you have to cut at a very high speed. Pine and other softwoods cut better at this speed than do hardwoods. Set your saw for 1400-1800 strokes per minute. On the 21" Sakura saw Steve used, his choice was 1400 one-inch strokes per minute.

The animals you cut can be any length and as much as 2" wide and 2" thick (depending on the depth of cut capacity of your saw; 2" is typical).

After you get the hang of cutting these you'll find yourself able to cut them without drawing the patterns on the wood. We've provided some pattern ideas on these pages to get you started. You can photocopy the patterns and paste them on the wood with rubber cement, or just sketch them on with a pencil.

To make the reindeer, draw the narrow pattern on to the edge of a 3/4" X 2" wide piece and cut it out first. Cutting into this thick end grain is the toughest part of the project. Be careful not to throw any of the parts away, for they are all re-inserted for the next round of cuts; keeping them in place greatly reduces the changes of breakage. Tape the sides back onto the block (or just hold them in place) so you can follow the pattern on the flat

Hugh Foster is a part-time furniture designer/builder in Manitowoc, Wisconsin and the author of *The Biscuit Joiner Handbook* (Sterling Publishing Co., 387 Park Avenue South, New York, NY 10016).

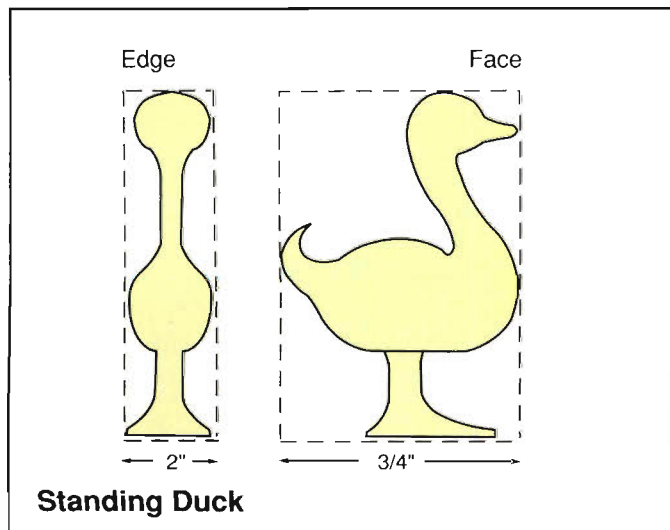
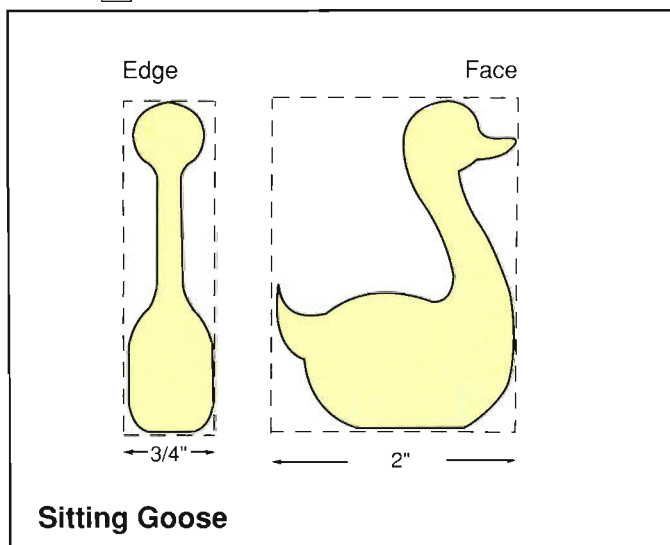
surface of the wood.

While this cutting is basically just an exercise in following a line, it may be worth noting one of the main differences between indifferent and excellent scroll sawing: your object should be to keep the wood moving at a constant speed. Each time you hesitate, you leave a visible mark on the wood.

Cutting the duck or goose is much easier than the deer, and it goes much more quickly. You can slow the saw down on the thinner cuts (those on the flat face of the wood) so you can follow the line more easily.

The figures can be finished naturally, or you can seal them with a coat of varnish and then decorate them with acrylic paints. The base colors can be sprayed on or the figures can be dipped. The lesser-used colors are then applied over the base coat with an appropriately fine artist's brush. A clear acrylic spray coat might be an excellent way to complete figures that will be handled a great deal.

The first few of these you make will be very difficult. After you get good at it, after you have become a good saw pattern visualizer, you'll be able to cut perhaps as many as thirty of these in an hour. After they've been painted, they can be sold for about \$4 each (wholesale). I know of no other project that will generate perhaps 20 completed projects from a single board foot of material. **PW**



Deborah Porter

Small Bird

by John Nelson

Most everyone has heard of big bird—well, here's small bird. This project is made with a few drilled holes and three simple compound cuts. The body and the tail are actually one piece with only the beak, eyes and feet added.

Cut your material to 1-1/2" X 2" X 4-3/8" long. Draw or paste copies of the top and side views on the top and side surfaces of the block. Cut the 1/8" wide slot for the beak as shown on the pattern. You might want to check the slot against the 1/8"

John A. Nelson is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of 26 books on various subjects, including *Colonial Classics You Can Build Today* (Stackpole Books, Cameron and Keller Streets, P.O. Box 1831, Harrisburg, PA 17109).

Cut out the pattern on the edge of the block first. Keep all the pieces together to provide support for making the cuts on the face of the block.

It's kind of fun to take apart the pieces when you're done cutting and see the three-dimensional animal emerge.



photos by Hugh Foster



thick material you will be using for the beak. You should have a snug fit; take care not to make the slot too wide.

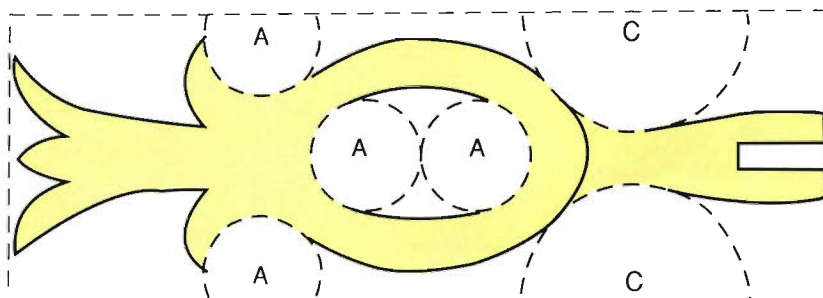
Using a prick punch, carefully punch the center of all 11 holes. Use Forstner bits to drill the holes, taking care not to tear through the back side. Use a 5/8" bit for the holes marked "A," a 1" bit for the "B" holes, 1-1/4" for "C," 1/4" for "D," and 1/8" for "E."

Disconnect the saw blade and thread it into one of the inner, 5/8" diameter holes on the top view. Carefully cut out the oval in the top view; this is the only inside cut required. Remember, in using a constant-tension scroll saw you should straddle the line as you cut. You do not have to sand down to the line as you have to do with other saws.

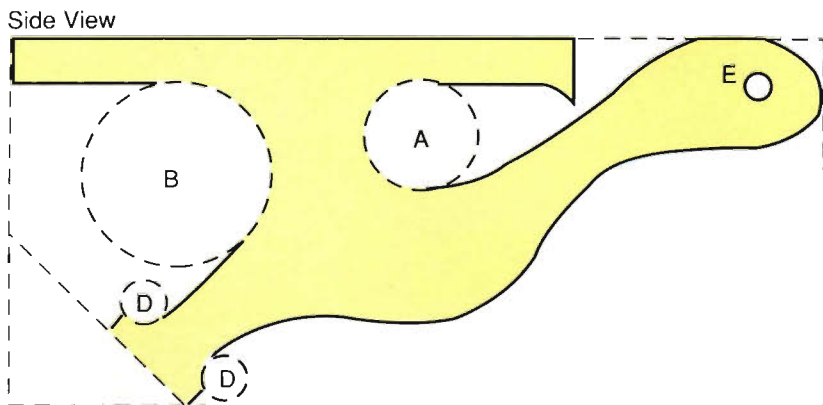
Carefully cut out the bird as seen from the top view. Tape the two sides back on the block. Take care not to cover the pattern on the side surface. Then make the final side cuts to complete the bird.

Glue the full-size patterns of the feet and beak to your 1/8" thick material, cut them out and glue them to the body. Cut a 1/8" diameter dowel 5/8" long for the eyes, drill through the head and the beak, and glue it in place.

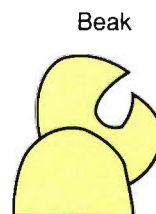
I painted the beak and feet black, the eyes white with a black dot in the middle and applied two coats of Deft® lacquer. Lightly steel wool with #0000 and apply a coat of paste wax. As they say at Thanksgiving, "Your bird is done." **PW**



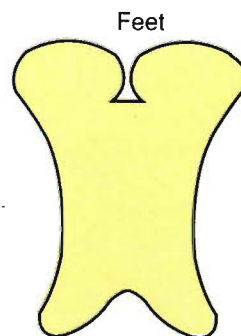
Top View



Side View



Beak



Feet

Full-Size Pattern



backyard trees—peach, apple, pear, grapefruit, lemon, avocado, even large old rosebush stems—can provide interesting material. If your scrapbox doesn't lend enough color and variety to suit you, many mail order and specialty wood suppliers sell thin samples and small pieces of exotics and hardwoods in boxed lots. These can be mounted on less expensive woods for use in mosaics, as long as they're thick enough to be sanded (veneers ranging from 1/28" to 1/64" are not suitable). Many colors are possible. Reds can be had naturally from beefwood, vermillion, padauk, tulipwood, aromatic red cedar, and manzanita. Cocobolo can provide orange (use a good dust mask when working with this and other exotics), and yellow can be found in Brazilian pine, lacewood, strawwood, and limba. Green

The high school seal to the left was made by students in the author's shop class.

In the 48" wall hanging below, the outside calipers, university seal and lettering were cut from contrasting woods.

The Prussian color guard at bottom was enlarged to 30" X 40" from a 2" design in an old Life magazine. The background tiles are white ash.

Wood Mosaics

Your Answer to the Scrap Box

by Don Kinnaman

There comes a time in the life of every woodworker when a decision must be made to deal with a never-ending dilemma—what to do with all those great pieces of domestic and exotic hardwoods overflowing the scrap box. Do any of us actually clean up regularly and toss them in the kindling pile? I doubt it, and if we do, we invariably find a good use for them *after* the flames have done their work. Wood mosaics can solve the problem, as well as provide easy, entertaining projects suitable for participation by the whole family.

A Palette

Mosaics of colored stones and tile chips have been unearthed by archaeologists from ancient sites around the world. Wood mosaics, like most other wood artifacts, have not survived, but it's probable they were crafted by early civilizations

right along with those of more durable materials.

Woods of every type can be used. Hardwoods, exotic woods, softwoods, plywood, particle board, flakeboard, tempered hardboard—all have their place in the wood mosaic project. Wood knots can be put to decorative use, and the limbs of



Don Kinnaman is a retired high school shop teacher from Phoenix, Arizona and a frequent contributor to Popular Woodworking.

can be had from khorina and poplar. Blue is probably not to be found, although a form of "blue" wood can be obtained from a species of ponderosa pine. A fungus known as "blue stain" growing in the wood doesn't harm it but does sometimes add varying shades of blue-gray to the grain; the color is enhanced when you apply finish. Purpleheart, rosewood and other exotics supply purple, while white comes from ash, maple, and hackberry.

The Raw Materials

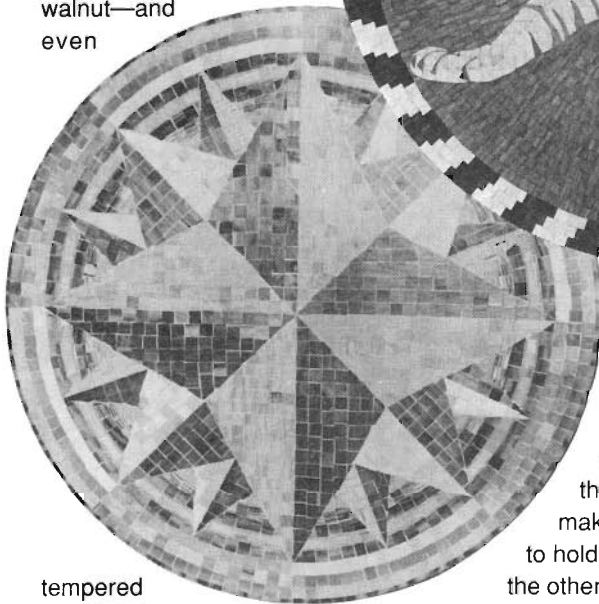
All mosaic blocks are 3/4" or 13/16" wide, so if your scrapbox contains cut-off strips from the edges of one-by-stock, and the strips are at least 3/8" thick, you've got the perfect material. If the strips are the right width, but not quite 3/8" thick, they can still serve as excellent boundaries between design elements. Darker woods like black walnut—and even

photos by the author



The tiger mosaic design at left was taken from a book. Panels of 3/8" thick walnut are lying next to the enlargement above and some of the tiger stripes have been cut and glued in place. The finished piece is a 48" table top with a 3/4" underlayment. In addition to walnut stripes, the darker fur is naturally pink common fir, the white parts ash, the mouth vermillion, and the eye pupil ebony. Padauk, satinwood and rosewood are used in the background and border.

The compass wall plaque is made from walnut, ash, cedar, ponderosa pine, maple and mansonia. The third row of points features crosscut birch plywood and black willow (note the laminations).



tempered hardboard—
are especially good for this purpose.

Once you've accumulated plenty of blocks and strips, sort them out according to wood type and saw them. They can be cut on either the table saw or the band saw with a very sharp, fine-toothed blade. When cutting such small pieces, however, safety must be kept in mind constantly. Here are some pointers to help you work safely and efficiently. If you don't have an auxiliary fence for your table saw, make one and install it against the rip fence. Cut a new throat plate for the blade from hardwood or plywood. Hold the insert down with a push stick and crank the blade

up through it. The single kerf-sized slot will prevent thin stock from getting away from you. Sometimes commercially-made safety guards do not lend themselves well to strip cutting, so make a pair of feather boards—one to hold the stock against the fence and the other to hold it down to the table. And always have eye protection and push sticks handy.

Scrap stock 10" to 12" and longer can be cut very nicely on the table saw, but smaller blocks are best cut on the band saw using a rip fence. Strap longer strips together with masking tape or large rubber bands. Scrap blocks 3" to 4" wide and 3/4" thick can be "resawn" (pushed through the band saw blade *on edge*) to 3/8" and left wide. Set them aside for some specialized cutting later. If you have pieces of particle board, hardboard or various kinds of plywoods (3/4" stock is the best), cut several strips 3/8" wide and band them together after cutting. The end grains of the ply-

wood, when laid like floor tiles at 90° to each other, provide excellent background material. Fir, ash, birch and walnut plywood scrap all work and blend well. Some particle board, when cut into 3/8" strips and laid flat in 3/4" X 3/4" X 3/8" tiles, gives the impression of a "herringbone" design. Cut everything you've been saving through the years into strips and mark the bundles as to type of wood and possible hues. Remember to save some blocks in their 3" to 4" widths.

Cut your 3/4" X 3/4" X 3/8" square tiles on the band saw—when the tiles are this small, a circular saw can easily hurl them back in your face. The band saw blade travels in one direction only—downward—and is much safer to use. Set the fence on the left side, 3/4" away from the blade, and be sure the guard is about 1/8" above the work you're cutting. Now use a miter gauge to push one or more strips at a time through the blade, cross-cut fashion. Don't push the strip ends into the fence hard, and since the blade travels

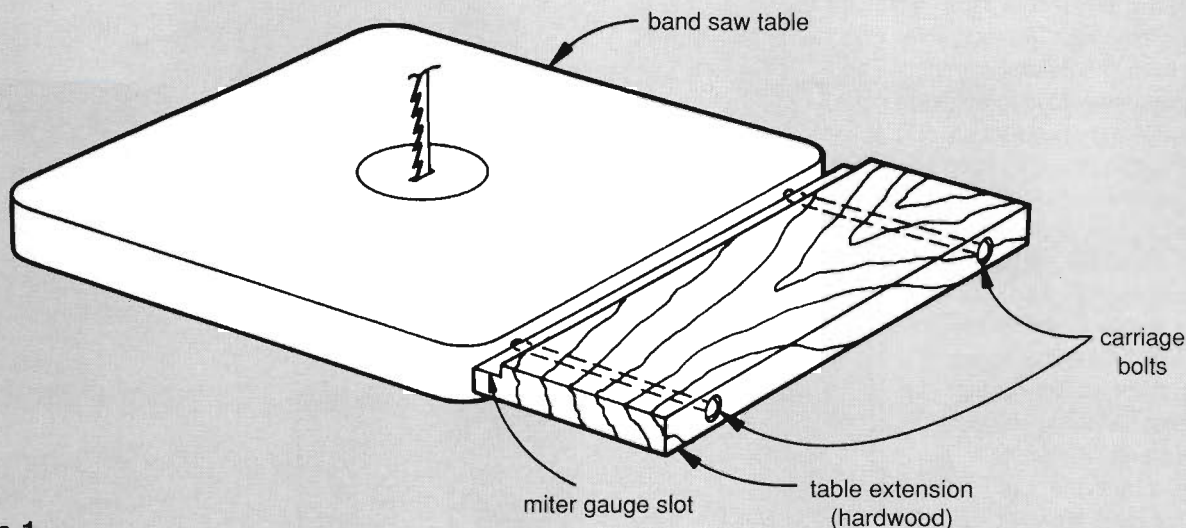


Figure 1.
Band Saw Extension Table

downward, there is little chance of a kickback even though you're using both the fence and the miter gauge at the same time—something you don't usually do, especially on the table saw. If your band saw table is small and doesn't have a miter gauge slot, construct the add-on extension shown in Figure 1.

Use a push stick to clear the blocks as they come out; it also helps to make a chute from tubing, scrapwood or even cardboard which permits the tiles to pass next to the fence, down the chute, and into a box on the floor. Store the tiles in cans or plastic tubs, labeled as to type and color.

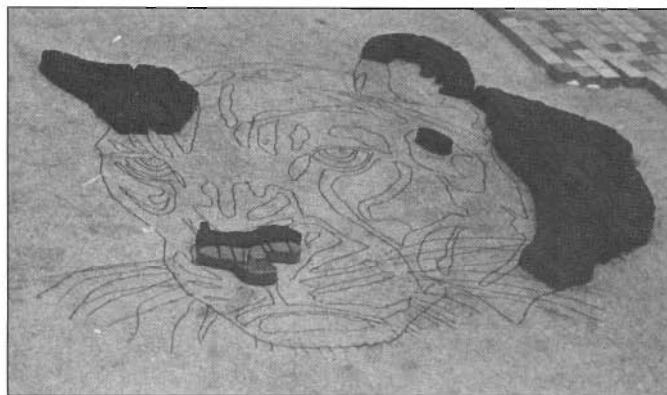
The Design

If you haven't already decided on a design, there are many good idea sources. You can use designs from archaeological discoveries, or geometric designs, or find drawings of animals, scenes, famous portraits, or emblems of your school or other organization. Don't take on a complicated picture the first time—simplicity is a virtue, especially when making a mosaic that will become part of a table or other furniture piece.

After you've determined the subject, make a full-size pattern. The underlayment can be nothing more than 1/2" or 3/4" particleboard or plywood. Do not use stock that will move with changes in humidity. If the mosaic will be a tabletop, you'll need to build up the rim to achieve the "bulky" look suitable for a tabletop.

Wall plaques don't need this extra thickness and can be any shape—circular, semi-circular, rectangular, square or free-form. Wood mosaic is also easily adapted to turned wood bowls *that may* have broken in the turning process. The blocks and "grout" (more on this later) are applied to the outside of the bowl once it's re-glued, and the bowl is then re-turned on the lathe. Mosaics can also be used for lamp bases and other craft items.

Transfer the design directly to the particleboard underlayment and determine which wood blocks will go where. Highlights and shadows can be approached with a good deal of control by using the right wood types. When a particular subject occupies the central part of a design, it's important to keep the background tiles



A black leopard design is laid out on particle board. Gaboon ebony will form most of the fur, with red cedar and vermillion for the nose. The whiskers are very thin strips glued in place between tiles. The background will consist of all kinds of hard and softwoods.



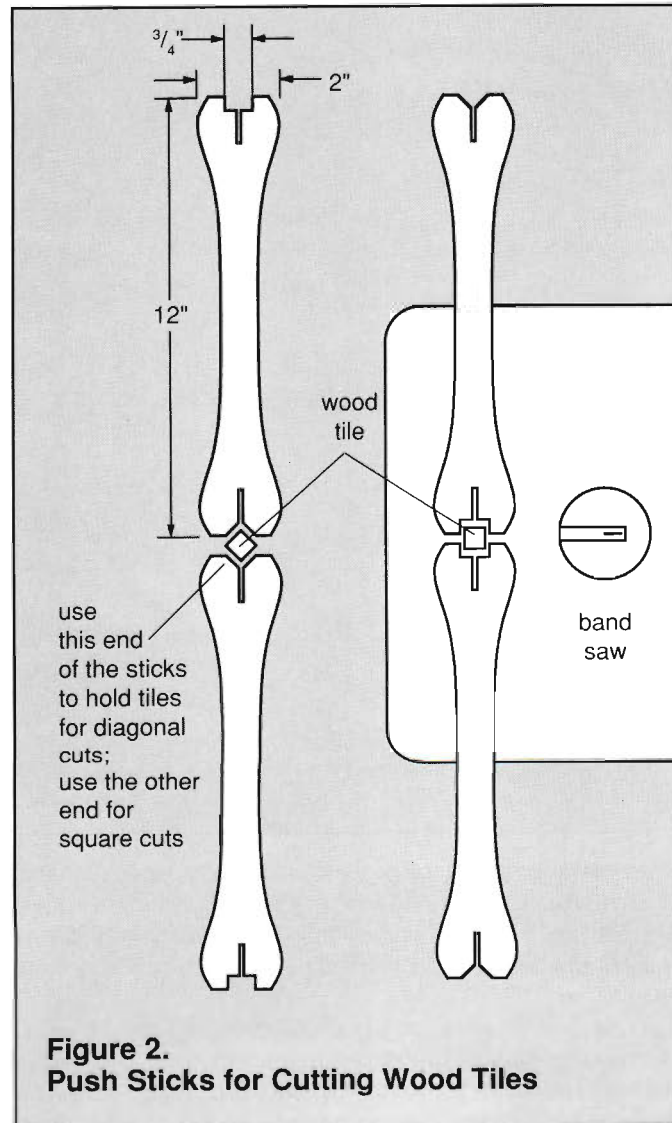
in a perfectly symmetrical pattern. You'll need to cut small tiles to fit particular design elements, and to accomplish this, make and use the pair of special push sticks shown in Figure 2. Don't use your fingers—the twin push sticks are just as accurate, more efficient, and far safer.

An alternative to filling shapes with small, individually sawn

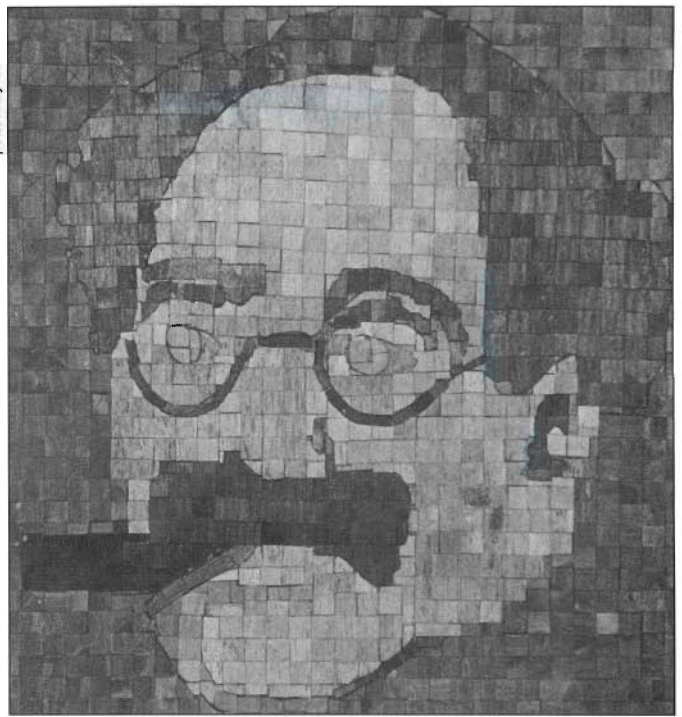
tiles involves transferring the outline of a particular design element to a strip of wood wide enough to accommodate it. Cut out the shape on the band saw, and then kerf the surface of the piece with a very thin, fine-toothed back saw. You'll achieve the appearance of mosaic once the kerfs are grouted later.

The gaps between tiles should be consistently sized, usually about 1/16". On very sharp curves and specially-shaped pieces you may have to sand slightly to get them to fit while maintaining the right space between them. Save even the smallest scraps from the band saw for "piecing in" the odd places on your design. Pieces requiring sanding can be done on the *down* side of the belt or disk sander, and the tile held with an old pair of pliers—not with your fingers!

If you're working with a geometric design, like the compass points in the photo on page 59, you'll have straight lines to contend with. Glue the square tiles right up to the line so the line is covered. Then use a back saw and straight edge to cut diagonally through the tiles along the line. Save the corners you cut off. You can use thin 1/8" tempered hardboard or dark wood strips to set off these lines and enhance the design. Use as many small pieces as possible to fill the voids between blocks, but your work does not have to be absolutely perfect—that's the beauty of mosaic art.



photos by the author



Groucho's hair is black walnut, the face coloring and the shading are maple and white ash, the cigar is ebony, and the background vermillion.

"Grouting" and Finishing

When the design is tiled throughout and the glue dry, sand the entire surface and outer edges with a 60- or 80-grit abrasive. Sand until all the blocks are even with each other. Then hand sand or use a 120-grit belt or finishing sander to complete the job. Vacuum the loose dust from the surface.

Mosaics done in ceramic tile take a mortar-based grout between the tiles, and it works well for that material. Do not use tile grout on wood, however. It dries too fast because the wood absorbs the moisture out of the grout, and the result will be cracks. I've found that the best material to use is a water-based wood putty such as Durham's Rock Hard®. It looks like wood, it's made for wood, and it's made out of wood. You should be able to find a similar product at a wood floor finish supplier.

Depending on the size of the project, mix about a pound of the powder with enough water to make it the consistency of thick gravy. You can slow the curing process by adding a small amount of vinegar to the water-and-powder mix. Work the grout down into the crevices between blocks, getting as much in as possible. Once it begins to set up, use a spatula, putty knife or flat hand scraper to remove excess. Check everywhere and refill where needed. When it's dry and hard, go over the entire surface with a belt sander and 100- or 120-grit paper, making sure that only the crevices contain grout and none sticks to the wood surface. Hand rub it with fine sandpaper to get the smoothest surface possible.

Wood has a tendency to darken over time, and while this is desirable in some woodworking, it usually isn't in mosaics. Apply a coat or two of sealer to slow the process. Sand lightly between coats and follow the sealer up with several coats of sprayed clear lacquer or urethane. Rub out the final coats with steel wool, and apply several coats of carnauba wax with the steel wool, buffing to obtain a high luster. Sign and date your work—or burn it in—and display it. **PW**

Coopered Fruit Bowl

By Warren Asa

My first try at coopering was making wooden buckets with bent wood hoops, as described in the February/March 1988 issue of *Popular Woodworking* (#41). I wanted to explore coopering further, but didn't have any ideas until I saw these impressive-looking fruit bowls while on a trip to the southern Appalachians. They're usually made of oak, and are flared out more than wooden kegs or barrels. This gives the bowls a delightful shape, and it gives the woodworker a chance to try his hand at forming the metal hoops that must be used. Fashioning something from staves and hoops may not be everyone's bucket of buttermilk, but this project provides all the fun and unique woodworking tasks of coopering for those adventurous enough to try it.

Wooden barrels and buckets intended to hold liquids are usually made from one of the white oaks, or from what the Swiss call "white woods"—the European white pines. Dry cooperage, like nail kegs, can be made from almost any wood. For the fruit bowl, I suggest oak if you can find some old, already shaped barrel staves. If you must cut yours from lumber, try a softer wood like white pine, ash, poplar or Philippine mahogany. I do all my coopering in yellow pine because I get partially shaped staves at no cost from discarded cable reels. Staves should be from 1/2" to 3/4" thick. You'll also need a piece of 3/4" stock for the bottom. I glued mine up from pine scraps.

Figure 1 shows the dimensions I used, but you can make your bowl a bit larger or smaller, and can vary the flare-out angle somewhat from the 20° I settled on. If you have barrel staves or pieces from cable reels, much of the shaping has been done for you; if you start with lumber you'll have to do all the shaping. Use a curved drawknife, a curved spokeshave, a scorp, or a large gouge to make the inside of the stave concave. The convex shaping of the outside can be done with a straight drawknife, spokeshave, or plane.

On my first coopering project I used a bandsaw jig to taper the staves from top to bottom, but it's simpler and easier to mark each

stave with a template (see page 64) and saw its taper freehand. Tilt the bandsaw table 10° to achieve the bevel on the side edges. After sawing, plane the edges smooth. The number of staves you'll need will depend on their width, but it will probably be from 18 to 24.

I salvaged two metal hoops from a small coopered container. My top hoop is 45-1/2" in circumference, including a 2" overlap. I removed the rivets from the other hoop, shortened it to 36-1/2", including the 2" overlap, and drilled and riveted it. To make these

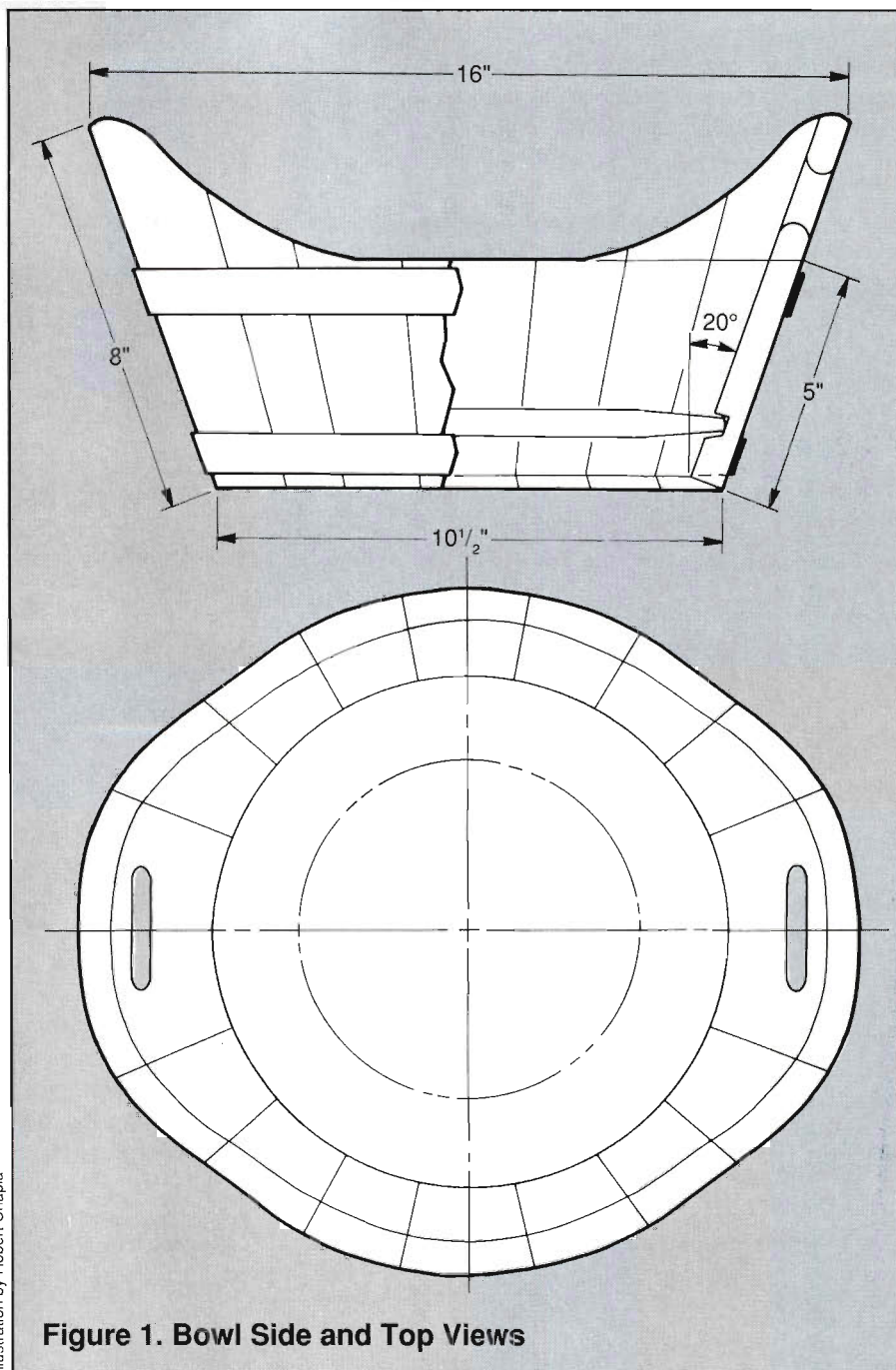
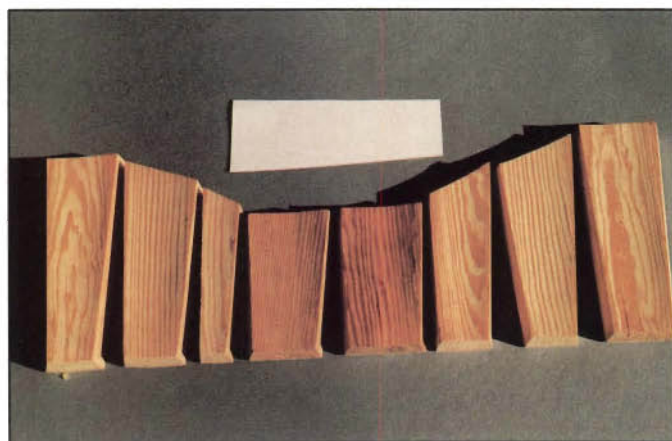


Figure 1. Bowl Side and Top Views

Illustration by Robert Chapla



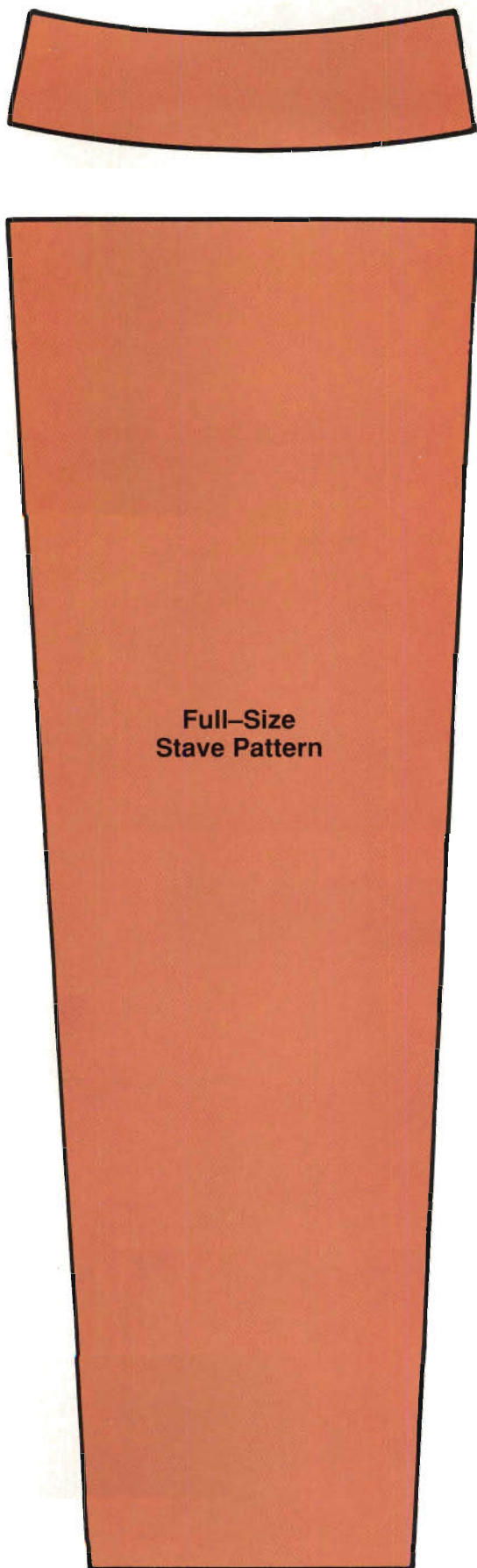
photos by the author



The template and stave blanks for one side of the bowl are laid out. Note the bevel on the sides of the staves. In the photo to the right, a curved spokeshave shapes the inside faces. The curved scraper is for finishing. Below, the staves and hoops are test-fitted.

hoops serviceable for this project, you'll need to flare them out. Strike the bands with the flat surface of a small ball pein hammer on a solid surface. Wear a face mask and use the flat surface of a machinist's vise, a piece of railroad rail, or an anvil. By striking repeated blows on the top half of each hoop, I was able to change the flare—out from the original 10° to the needed 20° (see Figure 2). If you can't salvage any metal hoops, make your own from steel bands of the sort used to secure large boxes and crates. Look for steel bands about 1/32" thick and from 3/4" to 1-1/4" wide.





You'll need to measure, cut, drill, rivet and flare the steel to 20° before proceeding further.

With the staves roughed out and the hoops made, you're ready to put everything together for a test fit. The method I used was to secure some of the staves to the hoops with clamps. Now's the time to change the taper and angle on individual staves for the best fit. Number your staves so you always have them in the same spot when checking for tightness. If you plane off so much wood in the process of tightening the joints that the construction becomes loose, just incorporate another stave to take up the slack. My object during the test fittings was not to cooper a watertight bowl, but rather one with neat, good-looking joints.

After achieving satisfactory joints on all the staves, start work on the bottom. Bandsaw a circle 10-1/2" in diameter from 3/4" stock and taper back the edges with a spokeshave for about 2" on both sides. The resulting edge should be about 3/8" thick. Now use a marking gauge to mark the base of each stave at 1" and again at 1-5/8", and chisel out a groove between the marks so the edge of the bowl bottom will fit (see Figure 1). Then assemble the bowl with the bottom in place for a final dry run before gluing.

Glue the staves to each other with the bottom in place, but don't put any glue in the bottom groove. I believe that the bowl will be stronger if the bottom is allowed to expand and contract on its own. Apply pressure on the glued joints by forcing the staves into the hoops and holding everything in place with clamps. Perhaps some way of using strap clamps could be devised, but my method works so I recommend it.

When the glue is dry, remove the hoops and trim the inside and outside of the bowl as necessary. For major shaping on the inside, I favor a large gouge, and for fine cutting, a spoon-bottom carving plane. A spokeshave or block plane works well on the outside of the staves. Check the fit of the hoops as you trim. The ideal locations are one hoop near the top of the bowl and one near the bottom. This provides maximum strength and makes for a handsome finished product.

When you're satisfied with the roundness of the bowl, the neatness of the joints, and the placement of the hoops, fasten the hoops with brass escutcheon nails. I used two nails in the wider staves and one in the narrower staves. Drill through the hoops for these nails—with the hoops in place. I backed up each stave with a heavy hammer during the nailing. Place the hoop overlaps anywhere you like, although they probably look best adjacent to each other.

A spoon bottom carving plane is ideal for smoothing the inside of the bowl.



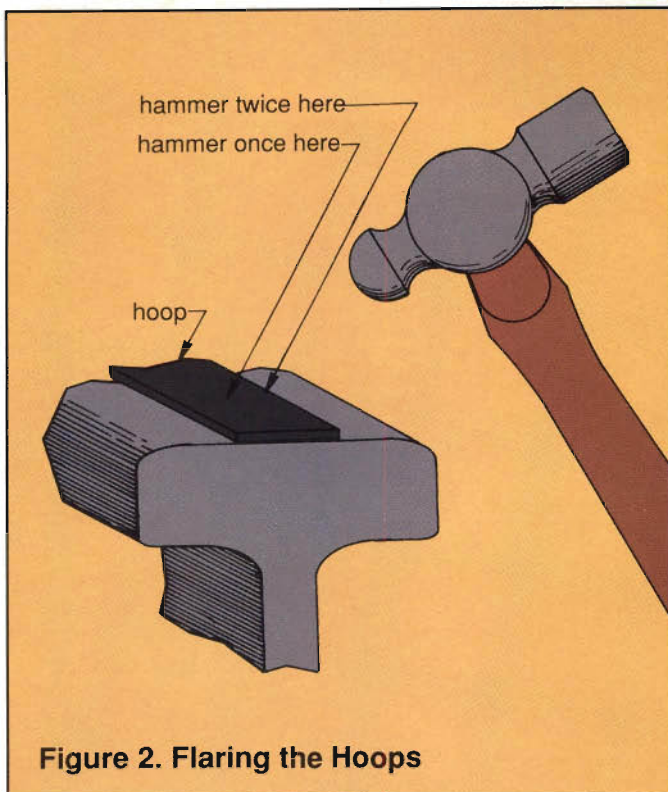


Figure 2. Flaring the Hoops

Hammering the hoops in place is made easier by backing up the point of impact, in this case with a maul.



photos by the author

The fruit bowl is now structurally complete, and needs only to have the rim trimmed and the handles cut out. These last steps really bring the bowl to life. The object is to give it a handsome shape with a smooth, flowing rim. I worked up a cardboard template for marking the staves for the rim and handle cuts, which I made with a coping saw. You can give the rim an original shape, but I suggest that you don't deviate too far from the design shown here. Rasps and a belt sander are excellent for smoothing the rim and handle holes. Final sanding should be accomplished by hand with padded sanding blocks and with sandpaper wrapped around dowels. The contrast between the spring and summer wood in the pine I used was quite striking and became more pronounced the smoother I made it. I ended up finish sanding the rim with 400-grit paper. I then applied a coat of salad bowl finish to seal the wood and protect the steel hoops from rust.



Cut the tops of the staves to their finished shape with a coping saw.



Stand back and take a good look at your work. The base is round when seen from above, but the bowl has a pleasing oval shape because of the higher handles. If you view it from the side you see the smooth line from the handle moving down into the swale and back up again. From any angle this bowl has flair, and it's a fine example of the cooper's art.

You'll find it's also very versatile. Not only is it great for storing and serving fruit, but it's strong enough to carry around and use for gathering in the garden. And there's no reason why it can't serve crackers, chips or popcorn, or hold a centerpiece arrangement. But the fun of coopering, with its unique shaping and fitting tasks, is, of course, the woodworker's true reward. **PW**

Have a Seat

by Ken Sadler

Yes, do have a seat. You'll find the one I'm offering to be handsome, versatile, simple to build, and above all, comfortable. Of course, comfort is the most important quality in any chair and the one so often lacking. This simple design allows it to fit in at a dining table, at a desk, or for occasional use in any room in the house. In fact, you'll find it so useful that you may want to build more than one.

As far as the seat and the top rail are concerned, almost any wood is suitable. However this is not true of the spindles and the legs. The spindles must be made from a strong, straight-grained wood that has considerable flexibility. Oak, hickory, ash, maple, or walnut will do the job nicely. The legs, because they stand alone—without bracing—need to be strong. Oak, maple, or walnut are best here and a reasonably clear, straight grain should be chosen. If you decide to use different woods for the various parts, avoid sharply contrasting colors; you might not like the result when finished.

I suggest that you read this story all the way through and study the drawings carefully before embarking upon the project. You should also read through the accompanying articles "Here's an Angle" and "Turn 'Em Long and Thin." You will find the project easier and more fun if you do.

Start by making the top rail. The top rail holds the entire back together and gives it strength. Consequently, it must be strong. It's a curved piece, and if you were to cut it from a solid thick board, it would be weak. The answer to this is to make it by laminating three thin pieces of wood in a bending jig to give it its curved shape.

Figure 1 shows how to make the jig. Use 1/2" particle board for the base, and cut the curved pieces that make the form from two pieces of 2 X 6 fir. Attach these to the base with glue and screws. Be sure that these two pieces present a smooth face when you've put them in place. The main clamp block is cut from a piece of 4 X 4 and the two smaller clamp blocks are made from 3/4" plywood scraps. You will

Ken Sadler is a retired furnituremaker in Portland, OR.



photos by the author

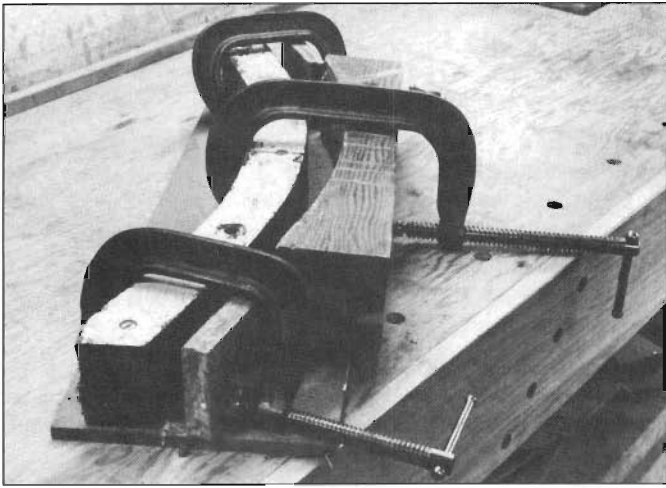
need one 6" and two 4" C-clamps to complete the setup. Mark a heavy line on the top of the form and the top of the main clamp block to indicate the center of both.

Cut the laminations for the rail from a 1" X 3-1/2" X 22" piece. First joint one face and both edges, and with the jointed face against the rip fence, cut three pieces 1/4" thick. As you cut them, keep them in order so that when you put them together, they will be in the same relative positions. Take a light cut off the outside face of the last piece on the jointer. Just enough to remove the saw marks. Do not do anything to the mating faces.

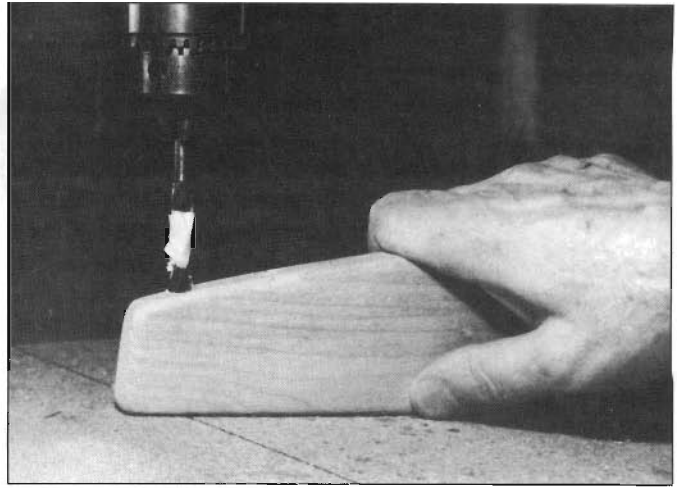
Before beginning the actual laminating process, get the clamp blocks and clamps ready, and line the jig with wax paper.

Tape it to the front of the form and over the front edge of the base.

Put the three laminations together and mark the center of what will be the top edge. Now, apply glue to all the mating faces. Use an old 1-1/2" paintbrush and sort of scrub it on. Put the laminations in the jig in the proper order, matching the center marks to the marks on the jig. Put the large clamp block in position, and, setting the 6" clamp at the center, begin to tighten it. Keep tightening until you have the form, the laminations, and the clamp block all touching each other at the center. If the laminations try to move, push them back in place as best you can. Put the two small clamp blocks in place with the 4" clamps and tighten them as tight as you can. Put



Make the back by laminating three thin pieces in this bending jig.



Use tape on the drill bit to mark the 3/4" depth of the spindle holes.

this assembly aside and let the glue set up for 24 hours.

While the top rail blank is drying, turn the spindles and legs. There are eight back spindles and two brace spindles. Cut the blanks according to the sizes given in the cutting list on page 71. Note the five lengths for the spindles and the difference in length between the front and rear legs. The technique for turning both of these parts is thoroughly covered in "Turn 'Em Long and Thin" which starts on page 68.

By the time you get the turning done, the top rail blank will be thoroughly dry. You'll find that the edges and the ends are not flush. Decide which edge is to be the top, and joint it flush and square with the back face.

At this point, you should make a template of the top rail from the full-size pattern in the PullOut™ Plans. Make it out of light illustration board. Mark the location

of the spindle holes on this template. Trace the pattern onto the inside surface of the rail blank, the top edge flush with the top edge of the blank, and the centerline aligned with the center of the blank. Band saw the shape leaving the line, and use a spokeshave to clean up the sawn surfaces and to slightly round all corners and edges. Put the template back on the rail and mark the location of the spindle holes on the bottom edge with a pencil. Set your marking gauge to 3/8" and, with the stock against the outside surface of the rail blank, make a small indent at each hole location.

Drilling the spindle holes requires a couple of special setups. For the 3/8" back spindle holes, you will need a board clamped to the drill press table that will support most of the rail no matter which of the eight holes you're drilling. A piece of 3/4" X 12" X 30" particle board held with a C-clamp will do nicely. (I use particle

board instead of plywood because it stays flat. Today's plywood rarely does.) Use a brad point drill bit so it won't wander off the mark when starting the hole. The 3/8" holes should be drilled 3/4" deep measured at the edge of the blank. Check this with a depth gauge. Better a little too deep than not deep enough. The 1/2" brace spindle holes have to be drilled at an angle of 5°. To do this, use the angle drilling fixture described in "Here's An Angle" (see page 72). Place the rail on the table so that the convex side is facing you and the two ends are parallel with the front edge of the table. Drill these holes 3/4" deep; then sand the entire piece starting with 80-grit and finishing with 150.

The most difficult part of this project is the seat. Make it from a blank that is approximately 19-1/2" X 21"; the starting thickness must be at least 1-3/4". Glue up three, four or even five pieces. Cut them all

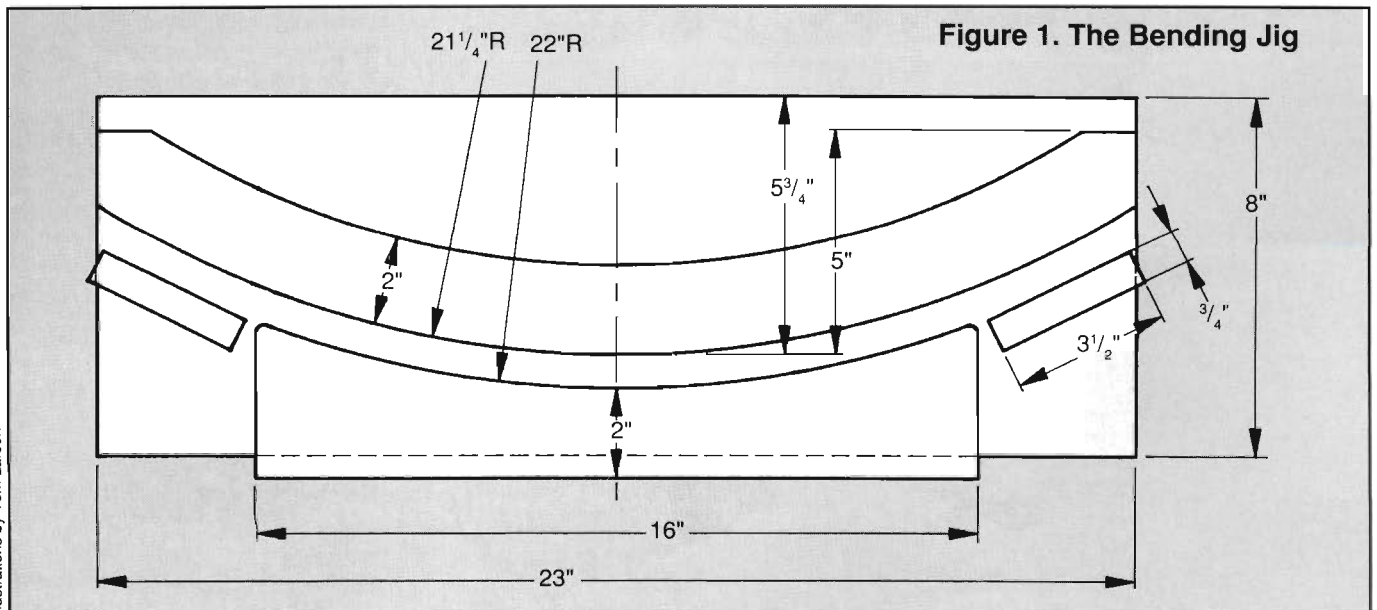


Figure 1. The Bending Jig

to 19-1/2" long, and joint the face that will be the bottom of the seat. Then joint both edges square with this face.

On the edge of each piece, measure up from the bottom and mark 1-3/4" at what will be the rear of the seat and 1" at the front. Draw a line between the two points and cut this taper on a band saw or by hand. If you don't have a band saw and you don't want to do the job by hand, you can still make the seat as I will describe in a minute. But first, it's time to glue the pieces together. To do this right, you'll want a flat surface and two uniform sticks about 3/4" square and 24" long. Put down some newspaper, and then place the sticks far enough apart so as to support the front and rear edges of the seat. Apply glue to both faces of each joint and put them in position, making sure that the front edges line up flush and that the bottom is flat. Set a single clamp across the blank, and pull it up so that glue is squeezed out all along each joint; then put the blank aside to dry. When it has dried, clean up the bottom face and be sure it's flat.

If you skipped sawing the taper, glue the pieces together as described above. In this case, reduce the thickness to 1-3/4". When the blank has dried and you've flattened the bottom, draw the taper on the side edges and carry the line across the front edge. Clamp the blank between bench dogs with the high end of the taper to your left (if you are right-handed). Use a jack plane across the grain to reduce the taper to the line. Then turn the blank 90° so the high end is facing you, and finish planing with the grain. A really smooth finish is not

necessary because this surface of the seat still has to be carved. If you bandsawed the taper, that surface is apt to be uneven; even it up with a jack plane and you'll be ready to move on.

Make the seat template from the PullOut™ Plans using the same illustration board as with the top rail template. Lay out the outline and top face of the seat (those lines that are gray in the PullOut™ Plans) on one side of the template. Cut the illustration board to the outline, and, turning it over, lay out the bottom face (the black lines). While you're at it, make the template for the front edge of the blank.

Clean up the front edge of the seat blank; make it straight, flat and 90° to the bottom face. Be sure you get all the saw marks out and create a smooth finished surface. Trace the template onto the top surface; then cut to it, leaving the line. Plane the sides smooth and clean up the back edge with a spokeshave, putting a slight radius on the bottom edge.

Tape the template back on the top surface so that it can't shift. Using a sharp awl, press through the template marking each of the spindle hole locations. Mark them deeply so you won't lose track of them. Remove the template and draw the inner lines shown on the template onto the top surface. From the center point of the front edge, draw a heavy perpendicular line 10" long. These lines will be your guide when carving the seat contour.

Turn the seat over, and turn the template over. Tape the template in place and mark the leg hole centers as you did for the

continued on page 72

Use a jack plane across the grain to rough taper the seat blank.



Turn 'Em Long and Thin

by Ken Sadler

The fixtures I'm about to describe are necessary for making this spindle-back chair project, but you'll also find them handy to have around for other spindle work you may do in the future. These setups make it quick and easy to place the blank in the lathe, turn the full length without constantly readjusting the tool rest, and replace the blank accurately if additional turning is needed once it's been removed.

Shop-Made Accessories

For turning the chair spindles, you'll need to make three small fixtures and rig up two special tool rests. The fixtures go on your 3" faceplate; they automatically center and drive the turning blanks. We'll make one each for 1", 1-1/4", and 1-3/4" square blanks. They're all made the same way so I'll just describe the 1" jig.

Start with a piece 1-1/2" thick by 3" square. Attach it to the 3" faceplate on center, and mount the faceplate on the lathe headstock. While turning the headstock spindle slowly by hand, bring the tailstock up and make a mark on the piece with the point. Remove the faceplate and draw a 1" square around this center point you just marked. Using the square as an outline, cut a 1/2" deep mortise. Put the faceplate back in the lathe and turn the block to the diameter of the faceplate. Now mark one corner of the square mortise with a marking pen. This will be the reference mark for rechucking the blank. The 1" jig is now complete and you can make the other two the same way. All three jigs should be interchangeable on the same faceplate.

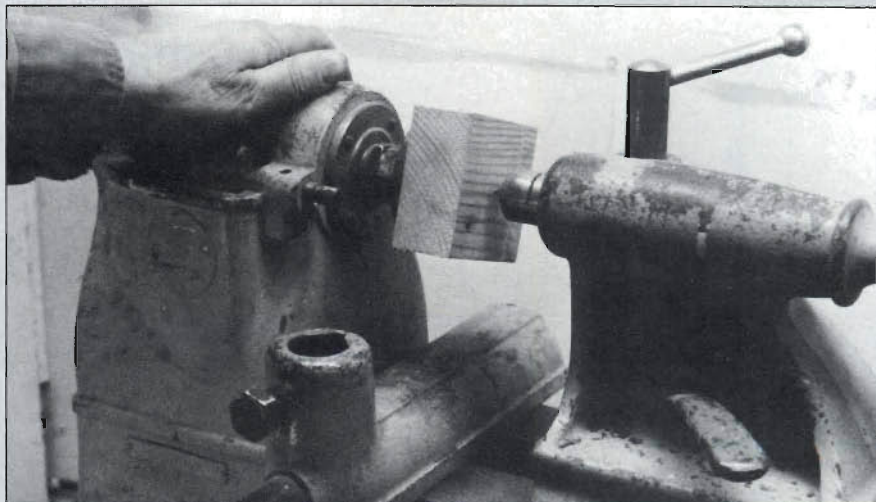
To make the two special tool rests, get three pieces of 1/2" galvanized pipe that are 32", 24", and 3-1/2" long. Also get a 5/16" x 4" hex head bolt and a 5/16" flat washer. On one end of the 3-1/2"

piece of pipe, file a curve so that it will fit snugly against another pipe at 90°. At a point 2" from one end of each of the two longer pipes, drill and tap a 5/16" hole. To assemble the tool rest, pass the bolt through the washer, then through the 3-1/2" length of pipe and screw it into the tapped hole in either of the long pieces. The 32" rest is for turning the spindles and the 24" one is for the legs. Put the short pipe in the tool rest base and clamp it so that the top edge of the rest is just a little below the centerline of the headstock spindle. Position the base so that the end of the tool rest almost touches the face of the jig. Move the tailstock back so as to allow easy insertion of the turning blank into the square mortise in the jig, and lock it there. Push the other end of the tool rest against the tailstock, place a small block of wood under it to bring it level, then clamp the tool rest to the tailstock with a C-clamp. If you're using the right rest for the job, the outer end will not interfere with the feed handle of the tailstock.

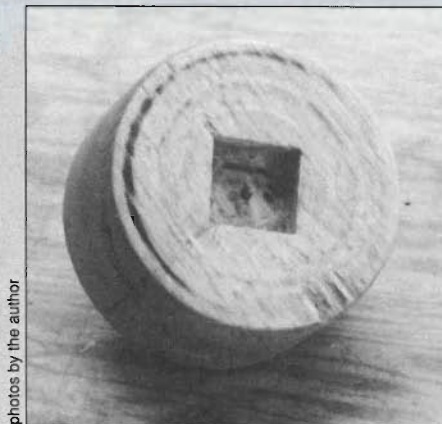
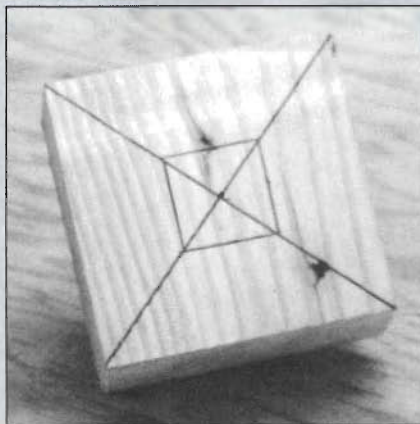
Other Tools

You'll also need a steadyrest. They come in different forms; mine supports the piece at three points; some are only two-pointers. The steadyrest is clamped to the lathe bed at the point of the largest diameter of the spindle; in this case 10" from the face of the jig.

You'll want a 3/4" deep—flute roughing gouge, a 1-1/2" chisel, a 3/4" wide square-face scraping tool, and a parting tool. In most cases, 1-1/2" chisels have their cut-



Locate the center of the block by rotating it as you bring up the tailstock.



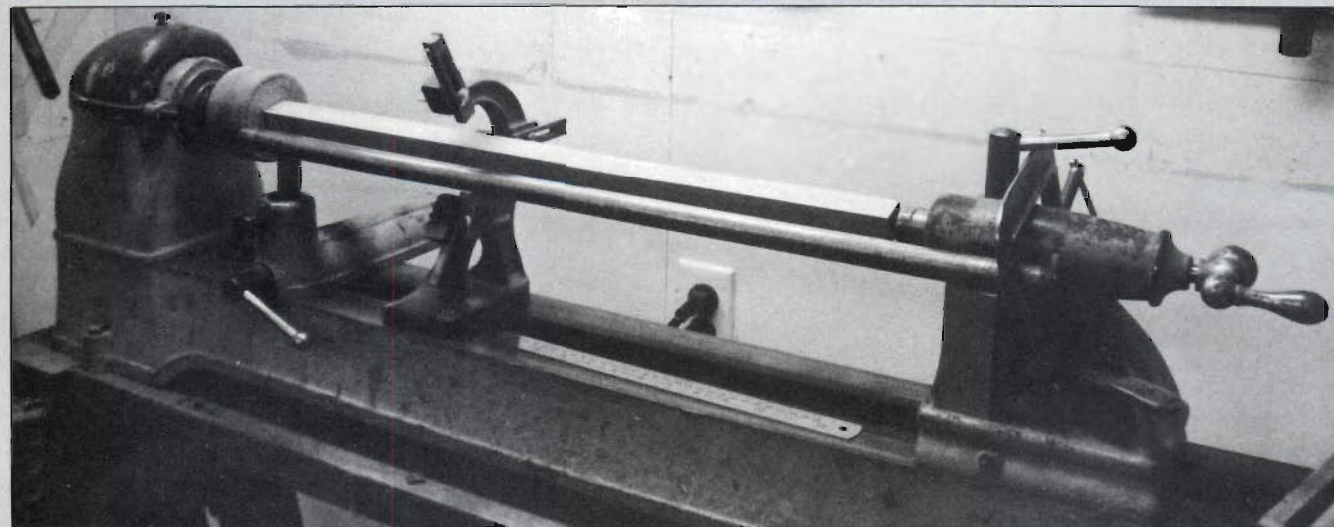
photos by the author

Draw a square the size of the spindle blank around the center of the block; then cut out this mortise and round the block.

ting edges improperly ground when you receive them from the store or catalog house. The angle is much too abrupt, and they won't cut properly. Figure 1 illustrates the way they usually come (a) and

the way they should be ground (b). They can be ground flat, but the edge will last longer if they're hollow ground. If the surface comes out convex, they won't cut at all. This tool must be sharp, so hone it

Make this extended tool rest to simplify and speed up the process of turning the spindles.



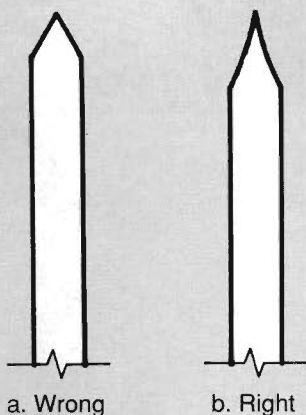


Figure 1.
The Scraping Tool Bevel

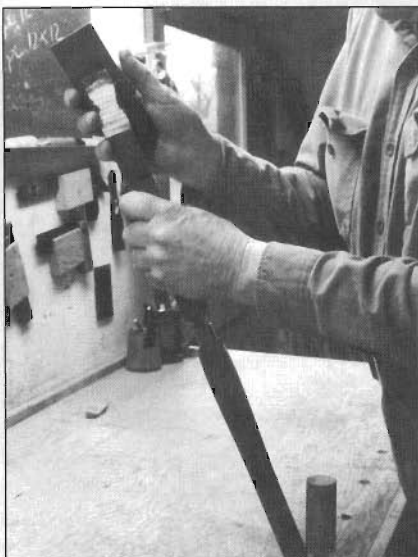
frequently using a good sized flat stone. To maintain the bevel on the tool, hold it as shown in the photo above, and stroke it with the stone moving sideways across the edge, not up and down.

To do your measuring without constantly resetting calipers, you'll need three ordinary calipers and two vernier calipers. I'll explain why as we start the turning process.

Turning Spindles

For the spindle—back chair you will be making ten spindles—two each of five different lengths. I'll guide you through making a sample of the longest and thinnest one. For this trial run, it doesn't matter what kind of wood you use, just so it turns easily. Cut a 1" square, 27" long blank that is straight, without even a slight bow in it. Decide which end will be the top, and mark the center point. Put the bottom end into the square mortise in the jig and bring the tailstock up and press it slightly into the mark on the top end. Turn on the lathe, and continue to advance the tailstock until it's firmly seated. This action will also press the blank firmly into the jig. Lock the tailstock so it can't back off. I've found that running the lathe too fast is dangerous and too slow makes turning difficult and produces a lousy job. 1450–1500 rpm seems to produce the fastest and best job.

Next, set the calipers. Set one to the spindles' maximum diameter of $\frac{3}{4}$ ", one to about $\frac{1}{32}$ " over $\frac{1}{2}$ " and one to $\frac{1}{32}$ " over $\frac{3}{8}$ ". Set one of the vernier calipers to exactly $\frac{1}{2}$ ", and the other to exactly $\frac{3}{8}$ ". These last two dimensions are im-



To hone the straight scraper, hold it upright and stroke it with the stone.

portant because the spindle ends are going into drilled holes. If they're too big, you'll have to size them by hand; and if they're too small, you're in trouble.

The first step is to turn the $\frac{3}{4}$ " diameter at the point of the steadyrest. The steadyrest fingers should be withdrawn as far as you can get them at this time. Using the roughing gouge, turn the blank down to $\frac{3}{4}$ " diameter about 1" to 1- $\frac{1}{2}$ " on either side of the center line of the fingers. Do this slowly, taking light cuts until you get it fully round. Once it's round, you can work it carefully down to size and smooth it up. Remember, the gouge is a cutting tool not a scraping tool. When you're working on a round surface, the tool should ride on the bevel and the cutting action is controlled by slightly raising or lowering the butt end of the tool, pivoting on the tool rest. When you have the $\frac{3}{4}$ " section turned, set the steadyrest fin-

Once you've established the wide section of the spindle, cut the taper working from the high end to the low end.



gers. Lock them as tight as you can; use a wrench if necessary. Be careful that you don't bend the blank by pushing it off center.

The next step is to turn the upper end of the spindle—the end to the right of the steadyrest. Rough the entire section to approximately $\frac{3}{4}$ ". Go to the outer end of the blank, say $\frac{1}{4}$ " in from the end, and, with your parting tool, make a cut down to the $\frac{3}{8}$ " plus setting on the calipers. Now rough out the taper with your gouge, always working from the large diameter to the small end. As shown in Figure 2, this is not a straight taper but a curving one that has to be gauged by eye.

To finish this end of the spindle, use the $\frac{3}{4}$ " wide scraping tool, and turn the end to the $\frac{3}{8}$ " setting on the vernier caliper for a length of 1" from the end. As I mentioned before, be careful not to cut this too small. Finish the taper from the center to this $\frac{3}{8}$ " section with the chisel. Hold it at an angle to the work, and, like the gouge, ride on the bevel, pivot on the tool rest, and control the cut by raising and lowering the butt end. Watch that upper corner; keep it well away from the work. If it digs in, you'll have trouble—anywhere from a little nick to flipping the entire piece out of the lathe. Don't be afraid of it, just watch it. The amount of work you'll have to do with the chisel depends on how far you went in the roughing operation. I found that I could go far enough so that the finishing only took two or three light cuts. I also found it easier to create the curve with the chisel. As I said before, you're doing this by eye, and you want to make all of the spindles look alike. On subsequent pieces, work-

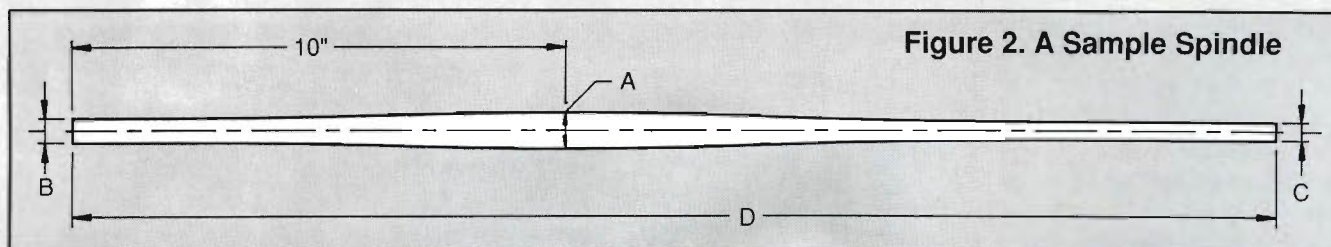


Figure 2. A Sample Spindle

ing down to a matching shape sometimes takes a few extra cuts, and the chisel does it best. You can now sand the upper end. If you've been good with the chisel, you can use 150-grit and finish it off. If, on the other hand, you haven't done a real smooth job, best start with 80-grit and then 150. Be careful not to sand the straight $\frac{3}{8}$ " section that goes into the hole.

The lower end of the spindle is done just the same as the upper, only it's easier because it's shorter (see Figure 2). The last operation is to retract the steadyrest fingers and sand the center section, blending the upper and lower ends together. Because the center was finished with the gouge and because there will probably be some marks from the steadyrest fingers, use 80-grit paper first.

Before removing the spindle from the lathe, put a mark on the square section of the blank corresponding to the mark on the jig. If, having taken the piece out, you decide it needs more work, you can put it back in the jig, matching the marks, and it will run true.

Turning Legs

The setup for turning the legs is similar to the one for spindles, except that the jig on the faceplate has a $1\frac{3}{4}$ " square

Spindle Name	Qty	Indicated Dimensions				Blank Length
		A	B	C	D	
back spindle #1	2	$\frac{3}{4}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$23\frac{1}{2}$ "	24"
back spindle #2	2	$\frac{3}{4}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$23\frac{3}{4}$ "	$24\frac{1}{4}$ "
back spindle #3	2	$\frac{3}{4}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	24"	$24\frac{1}{2}$ "
back spindle #4	2	$\frac{3}{4}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$24\frac{1}{2}$ "	25"
brace spindle	2	1"	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$25\frac{1}{2}$ "	26"

mortise, there is no steadyrest, and the tool rest bar is the shorter of the two you have made. Make the blanks $1\frac{3}{4}$ " square and 19" long. Mark the center of the end that will be the top of the leg and mount the blank in the same manner that you did the spindle blank. Figure 3 shows the finished dimensions of the legs. Note particularly that the taper is not straight but slightly curved. This shape is more graceful and pleasing to the eye than a straight taper. (It also shows that it was hand turned; machine turned tapers are always straight.)

The first step is to turn the entire blank to $1\frac{3}{4}$ " diameter. The only point where this dimension is important is at the shoulder. Even there, if it's a little undersize it won't really matter. Turn the tenon (which will go into the chair seat) to $1\frac{1}{4}$ " plus about $\frac{1}{32}$ " and leave it at that for now. Measure the length of the leg

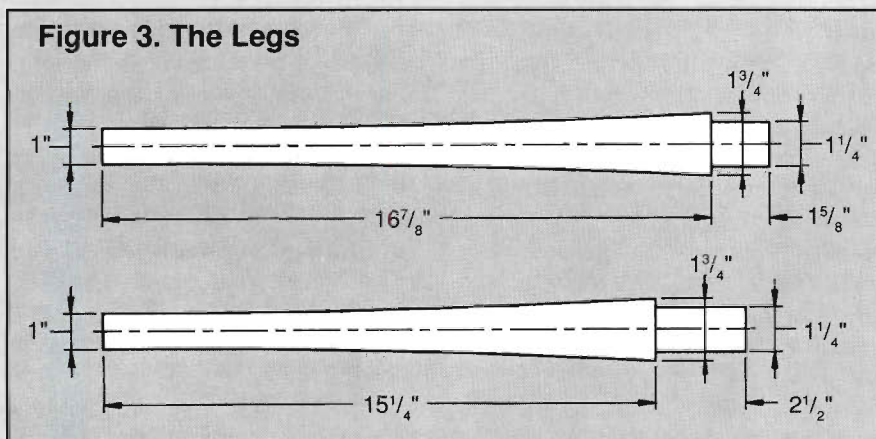
from the shoulder and, with the parting tool, cut down to about $\frac{1}{16}$ " larger than the finished diameter of the leg bottom. Now, rough the taper with the gouge, and finish to size with the chisel. Remember to work from the large to the small diameter. Sand as with the spindle. This is as far as you'll go until you are ready to fit the leg to the chair. Put a mark on the square part of

the blank to match the mark on the jig, and remove the turning. After you have drilled the holes in the chair seat, you can put the legs back in the lathe and turn the tenons further to get a tight fit. Also, since the shape of the taper is gauged by eye, as you turn the other legs you may want to rework one to make a better match with the others.

Here's a tip when turning any curved taper, whether it's a leg or a spindle or something else. When you get to the last bit of finishing with the chisel, put your hand lightly around the back of the piece while the lathe is running; then slide it slowly up and down—if there is a small irregularity you'll feel it. Then you can work it out with the chisel. Do this also when you're sanding and you'll feel the chatter marks and can then sand them out. Another way to gauge the smoothness of your curve is to leave the lathe running and stand back a few feet and look at it. You'll spot the uneven areas right away.

You'll find the fixtures and tool rests you've made for this project a very useful addition to your shop. I've made at least six different lengths of the tool rest for my own shop. As for the faceplate fixtures, they are indispensable when doing multiple turnings, and they provide a surer drive than the standard headstock center. If you add a $1\frac{1}{2}$ " square and 2" square to the three you've made here, you'll cover most of the blanks that you'll use between centers. **PW**

Figure 3. The Legs



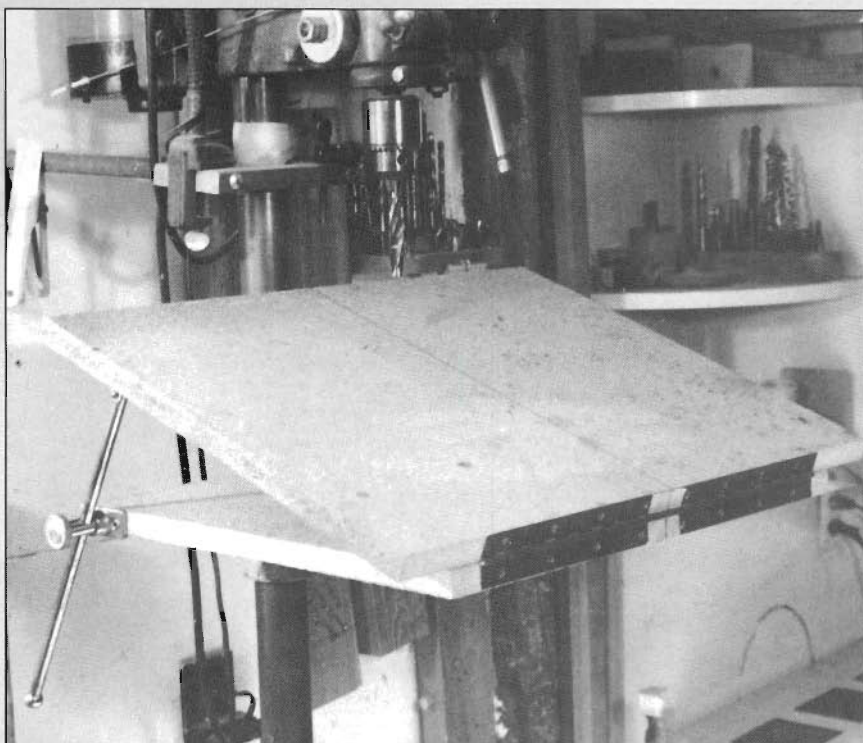
Illustrations by Tom Larson

spindle holes. With a pencil, mark the points where the dashed lines from the leg center points intersect the front and back edges. Note that the lines from the front legs run to the back edges and those from the back legs run to the front. These lines are used to orient the blank when drilling the compound angles. Remove the template and carry those lines across the bottom surface of the seat.

All the holes in the seat are drilled with the angle drilling fixture in place. Be sure it's fastened firmly, the centerline of the fixture is exactly under the centerpoint of the drill chuck, and the back end of the centerline is in line with the center of the drill press column. Set the table for 10° using the angle blocks described in "Here's An Angle." Using a 1/2" brad point drill, position the seat so that with the drill bit at the center of a back spindle hole, an imaginary line between that point and the center point of the front surface matches the centerline of the fixture. Set the depth gauge on the drill press and drill all the back spindle holes 3/4" deep, lining each up as described above. Then reset the fixture to 15° and put a 5/8" bit in the chuck to bore the two brace spindle holes. For these holes, position the seat so that the bottom edge is parallel with the front edge of the fixture. Drill these holes 1" deep.

The leg holes are a bit more difficult, primarily because they're bigger—1-1/4". It is best to use either a multispur or a Forstner bit. We'll do the front legs first. Set the angle of the fixture for 10°. You will need a couple of C-clamps with pads to protect the seat. Bring the drill bit down so that the point is impressed on the centerpoint and lock the drill press spindle temporarily. This will hold the seat in place. Using the drill point as a pivot, bring the line on the seat bottom into position matching the centerline of the fixture and clamp the seat to the fixture. Release the drill press spindle and proceed to drill the

Center the bit on the hole location, lock it in place, then turn the blank to align the mark with the jig centerline.



Project for the Shop

Here's An Angle

by Ken Sadler

Drilling wood at a precise angle can be difficult no matter how you do it. Many drill press tables don't tilt, and when they do, it's usually in the wrong direction for drilling large parts (the column gets in the way). The fixture described here solves the problem simply and easily.

To make it, you'll want two pieces of either 3/4" A-B grade plywood or particle board. Although it's heavier, I prefer the particle board because it will stay flat. The top piece is 16" X 22" and the bottom piece is 16" X 18". As to hardware, you will want an 18" length of 1-1/2" continuous hinge and two heavy-duty locking lid supports (part #800-539 from Woodworker's Supply of New Mexico, 5604 Alameda Place NE, Dept. PW, Albuquerque, NM 87113, phone 505-821-0500). If you want to try to buy these locally, be sure you get the heavy-duty kind. Thin, flat bars have a tendency to flex and these need to be as rigid as possible. They should also be at least 10" long.

The 16" particle board dimension is the depth of the fixture. Draw a centerline

front to back on both pieces of particle board, and carry this line over the front edge. Starting at the back edge of the bottom, measure along this line a distance equal to the distance from the drill press column to the center of the table, and drill a 1/2" hole at this point. Center the top over the bottom, clamp them securely together, and screw the piano hinge to the front edge. Using a square, carry the centerline down across the hinge. Do this with a narrow marker pen so that you can see it clearly.

Next, install the two locking lid supports. The fitting for the rod goes on the underside of the top, centered 3" from the back edge. The lock fitting goes on the side edge of the bottom, as close to the back edge as you can get it.

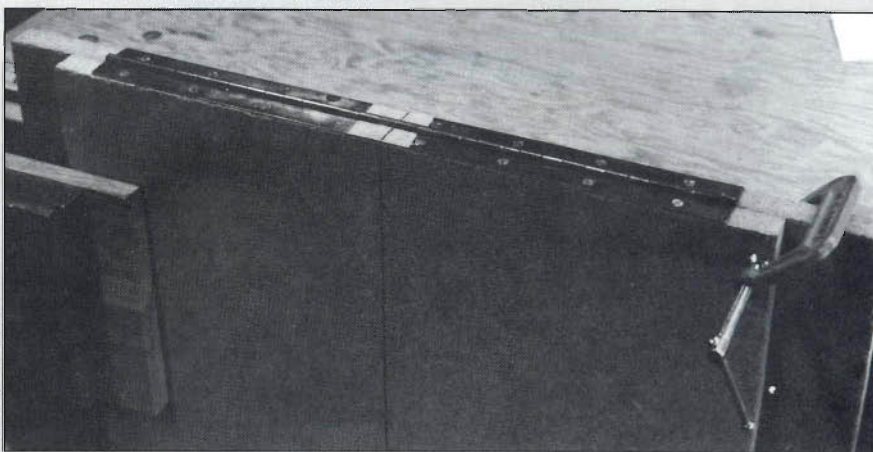
Attach the fixture to the drill press table with a 3/8" bolt through the hole drilled in the bottom. Use large flat washers under the head and the nut. The reason for the 1/2" hole and the 3/8" bolt is to allow room for a small adjustment in positioning the fixture.

To set up the fixture, first set your sliding T-bevel to the angle you want

with a protractor. Cut a nice straight piece of 1/2" dowel about 8" long and mount it in the drill press chuck. Don't grip it too tightly (you'll throw it out of line). Drop the drill press table until you have clearance to raise the top of the fixture to the approximate angle you want and tighten one of the lid supports just enough to hold it in place. Now, place the T-bevel on the fixture, and slide it up to the dowel; ease the top either up or down until the blade of the T-bevel and the dowel touch along their entire length. Then tighten both locks as tight as you can.

For angles that you'll use frequently, or when you're drilling a large hole that takes considerable pressure on the drill, a better way is to make angle blocks. When drilling the chair seat for the accompanying project, you will need settings of 5, 10, 15 and 20 degrees. The 5° setting is too small for blocks, but for the others, blocks will be very helpful. Cut a piece 1-1/2" X 2-3/4" X 10" for the 10° blocks, 1-1/2" X 3" X 10" for the 15°, and 1-1/2" X 5-1/2" X 14" for the 20°. Lay out a diagonal line on each piece and cut along it (see the illustration below). The

photos by the author



Clamp the two parts of the drilling fixture with their centers aligned and apply the continuous hinge. Be sure to carry the centerline across the hinge.

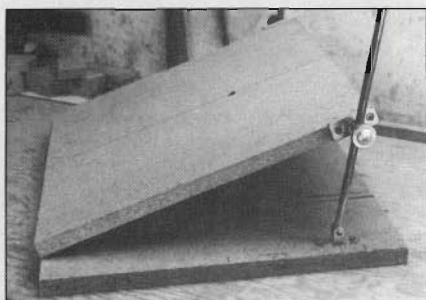
two pieces should match when put side by side on the bench. If they don't, take light cuts on the jointer off the bottom edge of the larger one until they match.

When in use, these blocks should be placed at the outer edges of the fixture in such a way that both bottom and top fit flat on the block surfaces.

Once the angle is set, make sure that the centerline is exactly under the center of any drill bit that's in the chuck, and that the back end of the centerline lines up

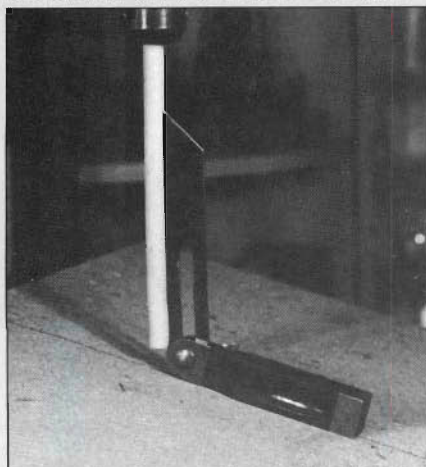
with the center of the drill press column. Tighten the attachment bolt as securely as you can so there is no chance for the fixture to shift while you're using it. (You can make doubly sure by adding a C-clamp between the fixture base and the drill press table.)

This fixture makes building the spindle-back chair much easier. However, you'll be surprised how many times you'll use it for projects you haven't even thought of yet. **DW**



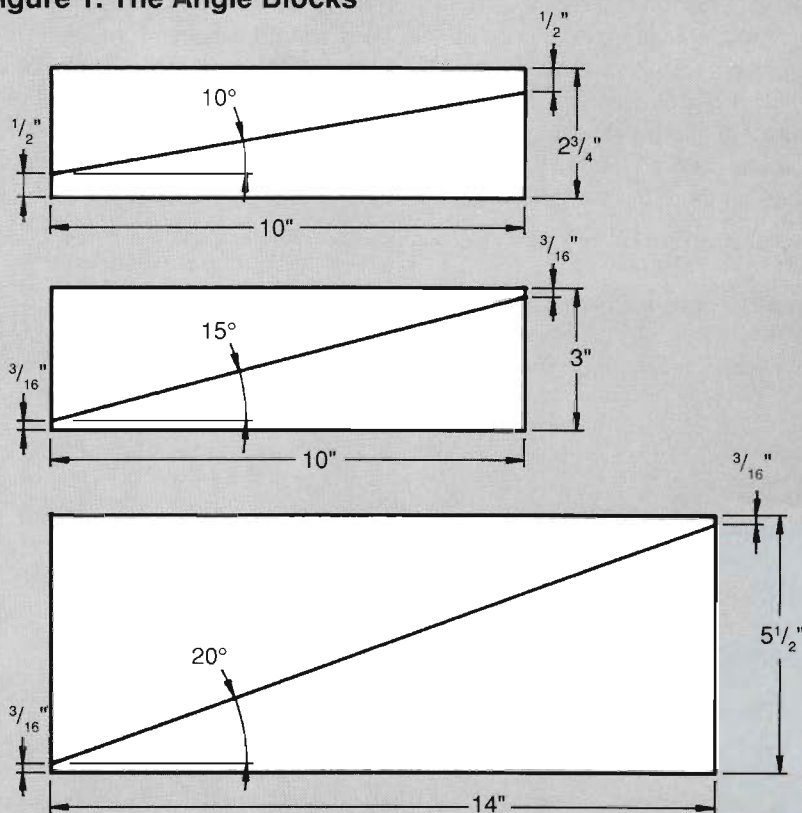
Attach the lid support to the underside of the top and the sides of the bottom.

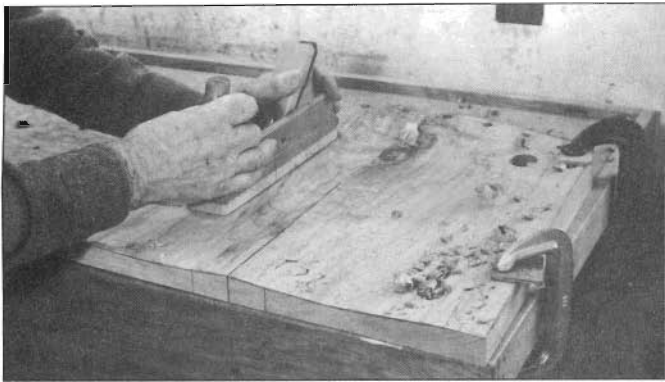
Use a sliding T-bevel to set the angle of the table relative to a dowel held in the chuck.



illustrations by Tom Larson

Figure 1. The Angle Blocks





Carve out the surface of the seat with a roughing plane, an inshave, and a spokeshave. Use the plane and the inshave with the grain and the spokeshave across the grain.

hole all the way through the seat. I use the slowest speed and feed slowly and carefully. This is particularly important when breaking through the far side. You may get some vibration as you begin the hole. How much will depend on how sturdily you've built your fixture and how firmly you have it attached to the drill press table. The vibration will stop as soon as the entire drill bit is in the hole. Once you've drilled both front holes, reset the fixture to 20°, and drill the back leg holes the same way.

The last operation on the seat before assembly is to rough carve the contour into the top face. Tape the front edge template to the front edge of the seat. The top edge of the ends of the template should be flush with the top of the seat, and the center of the template should match the center of the seat. Trace the top edge of the template with a heavy line. This line is the contour depth line you should work to. The line you drew on the top face shows the outer edges of the contour area. It's

difficult to describe the contour of a chair seat. To be blunt about it, you shape it to fit your bottom. The shape on the front face fades out at the end of the 10" long line you drew on the top face; from there on, the concavity extends all the way across. For the roughing operation I use a variety of tools, depending on the area of the contour and how far along I am. For the initial work I use either a roughing plane or an inshave. For later work I use a spokeshave set to take a heavy cut. The roughing plane and the inshave are used with the grain, and the spokeshave across the grain. Work on this until the shape you want is clearly defined and any heavy roughness is removed. Round the bottom corner of the side edges to a 3/8" radius and finish sand the bottom, side, and back surfaces. The seat is now ready to have the legs installed.

Begin by fitting each leg to its chosen hole. Do this by putting the leg back in the lathe and, using the straight-faced scrap-

ing tool, take the diameter of the tenon down to just a little more than 1-1/4". Take the leg out of the lathe and try it. If it is too big, take off a little more and try again. Continue this until you can slide the leg in and out of the hole without undue force. When they are all fitted, you can cut the square section off the bottom of the legs.

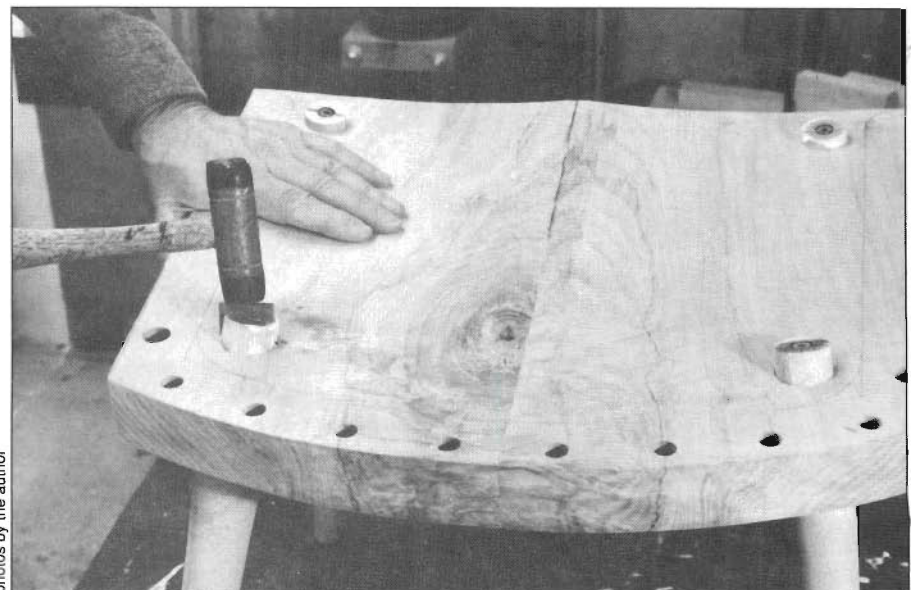
The next operation is to cut the slot in which to put the wedge that will help hold the leg in place. The slot should be about 1/8" wide and 1-1/4" deep, through the center of the tenon. You can cut this with a hand saw, but that's a rather tedious job. I prefer to do it on the table saw. It's freehand cutting and a bit tricky, but if you hold the leg firmly with both hands well above the blade, you won't have any trouble. A blade with about 1/8" kerf set 1-1/4" high will make the proper slot in one pass.

To make the wedges, rip a piece 1-1/4" wide and slightly thicker than the width of the slot and long enough to cut four 1-3/8"

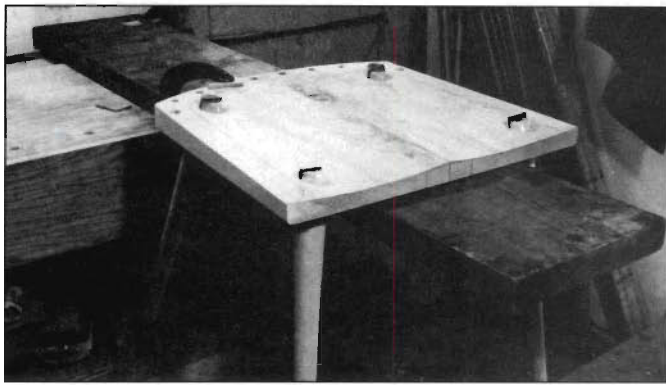
Carefully cut the notch for the wedge freehand on the table saw.



Apply glue to the first third of the hole, and push the legs all the way in. Then use a knife to spread glue in the slots, and drive in the wedges.



photos by the author



Clamp a plank to the top of the workbench to support the seat while you work on it. Saw the ends of the tenons, and finish the surface with a rotary sander followed by a pad sander.



long pieces. Taper each piece along the grain with a chisel to make it wedge-shaped (I put some 3/4" scrap against a bench dog, lay my wedge material up against it, and chisel towards the scrap). If you're using a light wood such as maple for your chair, a dark wood for the wedges makes a nice touch, but a light wedge with a dark chair looks terrible.

The legs extend beyond the top surface of the seat, so place the seat, bottom up, on a couple of sticks to give clearance. Put glue around the inside of the rim of the hole, and push the leg home as far as it will go. Position the slot parallel with the front edge of the seat; if it runs with the grain, you may split the seat when you drive the wedges in place. Turn the assembly over and set it on its legs. Using a knife or spatula, put glue generously in the slots and drive in the wedges until you're pretty sure they're bottomed.

When the assembly has dried for 24 hours, trim the protruding tops of the legs and sand the seat contour to its final shape and finish. For this work I have developed a special setup so that I can clamp the seat firmly in place while I'm working on it. A piece of 2 X 12 about 4-1/2 feet long, clamped to the bench and protruding from it, provides the working surface. The photos above show how the setup is arranged.

The first step is to trim the leg tops flush with the surrounding area. I do this with a flexible keyhole-type saw, and if that doesn't get it flush, I clean it up with the spokeshave or a chisel. The final shaping of the contour is done with a rotary sanding disk mounted in an electric hand drill. I use a 5" diameter disk. Start with 50-grit paper and go to 80-grit. Final sanding is done with an orbiting palm sander. Put an extra sponge rubber pad under the sandpaper so it won't flatten the contour of the seat. Start with 80-grit and finish with 150.

Be sure to get out all the rotary marks.

The time has come for final fitting and assembly. Take the two brace spindles and saw off the square at the bottom; then fit them into their holes in the seat. They should go in with a light tap, and you should be able to rotate them with your hand when they're in place. Be sure they're bottomed in the hole. Mark each spindle and the hole it goes into. Remove them from the seat and fit them to the top rail. Put a mark on each spindle at the bottom edge of the rail.

Remove the bottom square from all the back spindles, marking them with their numbers as you go. Working from the middle outward to the right and left, they are numbered from 1 to 4 with the shortest (the two in the center) being #1 (see the chart on page 71). Fit each one to its hole in the seat and in the top rail as you did with the brace spindles. Now, put all the spindles in place in the seat and put the top rail on the brace spindles only and in front of the

Fit the back rail onto the brace spindles to mark its position on the back spindles.



back spindles, making sure that the rail comes down to the marks you previously made on the brace spindles and that it is level. Position each spindle behind its proper hole in the rail and mark it at the bottom edge of the rail. Remove the rail and the back spindles. Measure each back spindle from the top end to the mark you just made. If it measures more than 3/4", cut it to that length. (If all the spindles are shy by more than 1/8", it means your brace spindles are a bit too long. Shorten them and mark the back spindles again.) Put all the spindles back in the seat with the marks on the upper ends facing forward. Take the top rail in hand, and starting at one side, carefully start each spindle in its hole. When they are all started, using a small block of wood as a buffer, drive the top rail down to the marks. To get it all the way down, you may have to hit it rather hard. If it won't come down, something is wrong; one hole may not be deep enough. Take the rail off, find the trouble, and do it again. When you are satisfied that everything is right, take it all apart, apply the glue and put it together again. In applying the glue be very careful—put glue only in the top 1/3 of the hole and be rather sparing with the amount you use. If you use too much, you will trap it in the bottom of the hole, the spindles will not go home, and you won't realize it until it's too late.

Well, that's it. You're done except the finishing which I'll leave up to you. I think you will be pleased with what you've made and I hope you decide to make several. If you like them enough to want to build a dining room set around them, I have a great table I'll write about for you. There's also a variation on this same basic chair that has a lower back and curved arm rests (first seen in "Design Your Own Furniture" in *PW* #53, page 35) which I'll tell you how to make in a future issue. **PW**

If your group is having an event you would like other woodworkers to hear about, please send us all pertinent information at least three months before the opening date. We will publish it for you in Calendar free of charge.

California

Date: October 5-14

Event: Ramona Country Carvers Show

Location: Farmers Fair, Perris

For information, contact: CA Carvers Guild, Box 1195, Cambria, CA 93428. Tel. (805) 927-4718

Date: October 12-14

Event: Pomona Woodworking World Show

Location: LA County Fairplex #6, 1101 W. McKinley Ave., Pomona

For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Date: October 19-20

Event: Woodworking Fair

Location: Sacramento

For information, contact: Sacramento Machinery Co., 3412-A Auburn Blvd., Sacramento, CA 95821. Tel. (916) 483-8513

Date: October 20-21

Event: Huntington Beach Carving Show

Location: City Shopping Center, Orange

For information, contact: CA Carvers Guild, Box 1195, Cambria, CA 93428. Tel. (805) 927-4718

Date: through October 28

Event: Fine Art of Woodworking Furniture Show

Location: Highlight Gallery, Mendocino

For information, contact: Clyde Jones, Box 1515, Mendocino, CA 95460. Tel. (707) 937-3132

Date: November 3

Event: Tool Clinic

Location: San Francisco

For information, contact: National Maritime Museum Assoc., Bld. 275, Crissy Field, San Francisco, CA 94109. Tel. (415) 929-0202

Date: November 3-4

Event: Capital Woodcarvers Fall Show

Location: Country Club Plaza Mall, Sacramento

For information, contact: Nelson Krouse, 2212 Avalon Dr., Sacramento, CA 95864. Tel. (916) 484-1264

Date: November 3-4

Event: Santa Maria Valley Carving Show

Location: Santa Maria

For information, contact: CA Carvers Guild, Box 1195, Cambria, CA 93428. Tel. (805) 927-4718

Date: November 9-11

Event: Woodworking Show

Location: San Mateo County Fairgrounds, 2495 S. Delaware St., San Mateo, CA 94403

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Date: November 10-18

Event: Building A 15' Lapstrake Canoe

Location: Hyde Street Pier, San Francisco

For information, contact: National Maritime Museum Assoc., Bld. 275, Crissy Field, San Francisco, CA 94109. Tel. (415) 929-0202

Date: November 30-December 2

Event: Woodworking Show

Location: Long Beach Convention Center, 300 E. Ocean Blvd., Long Beach, CA 90802

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Connecticut

Date: September through November

Event: Classes: Spindle Turning 10/13-14; Power Tools & Equipment 10/27-28; 18th Century Woodworking Methods 11/3-4

Location: Brookfield

For information, contact: Brookfield Craft Center, 286 Whisconier Rd., Brookfield, CT 06804

Date: October 27-28

Event: Marquetry Exhibition & Competition

Location: Treadway Hartford Hotel, Cromwell

For information, contact: Marquetry Society of America, Larry Appleton, 89 State St., Guilford, CT 06437. Tel. (203) 453-1835

Date: November 30-December 2, 7-9

Event: Christmas Crafts Expo I & II

Location: Hartford Civic Center

For information, contact: Arts & Crafts Festivals, Box 412, Canton, CT 06019. Tel. (203) 693-6335

Illinois

Date: October 5-7

Event: Chicago Area Woodworking World Show

Location: Metro Center, 300 Elm St., Rockford

For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Date: November 3-4

Event: Midwestern Wood Carvers Show

Location: BelleClaire Exposition Hall, 200 S. Belt E., Belleville

For information, contact: Don Lougeay, 1830 E. D St., Belleville, IL 62221. Tel. (618) 233-5970

Kentucky

Date: October 19-21

Event: Woodworking Show

Location: Commonwealth Convention Center, 221 4th Ave., Louisville, KY 40202

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Maryland

Date: October 6-8

Event: Ward Exhibition of Wildfowl Art

Location: Wicomico Civic Center, Salisbury

For information, contact: Jane Rollins, tel. (800) 742-4988

Date: October 12-14

Event: Baltimore/Washington Woodworking Show

Location: Festival Hall, Camden & Sharp Sts., Baltimore

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Massachusetts

Date: October 6-8

Event: Seminar: Carve A Finback Whale

Location: Norton

For information, contact: Buyer Woodcarving Studio, 28 Power St., Norton, MA 02766. Tel. (508) 285-9583

Date: October 19-21

Event: New England Woodworking World Show

Location: The Big E, 1305 Memorial Ave., Springfield

For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Michigan

Date: October 4-13

Event: Woodturning Exhibition

Location: Artpack Service, Inc., 31505 Grand River, Door #10, Farmington

For information, contact: Tel. (313) 645-6212 or (313) 478-8946

Date: December 7-9

Event: Woodworking Show

Location: Cobo Hall, Washington Blvd., Detroit, MI, 48226

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

New Jersey

Date: October 6-7

Event: Flemington Crafts Festival

Location: Flemington Fairgrounds,

Flemington

For information, contact: United Craft Enterprises, Box 326, Masonville, NY 13804. Tel. (607) 265-3230

Date: October 13-14

Event: Fall Nomahegan Park Art & Crafts Show

Location: Cranford

For information, contact: Rose Squared Prod., 12 Galaxy Ct., Belle Mead, NJ 08502. Tel. (201) 874-5247

Date: November 3-4

Event: Garden State Crafts Festival

Location: Garden State Park Racetrack, Cherry Hill

For information, contact: United Craft Enterprises, Box 326, Masonville, NY 13804. Tel. (607) 265-3230

Date: November 17-18

Event: Fall Wood Carving Show

Location: National Guard Armory, Mt. Holly

For information, contact: South Jersey Wood Carvers, Tel. (609) 829-8731

Date: December 1-2

Event: Fine Arts & Crafts

Location: Aspen Convention Center, Parsippany

For information, contact: Rose Squared Prod., 12 Galaxy Ct., Belle Mead, NJ 08502. Tel. (201) 874-5247

Date: December 7-9

Event: NJ Holiday Crafts Festival

Location: Raritan Center Exhibition Hall, Edison

For information, contact: United Craft Enterprises, Box 326, Masonville, NY 13804. Tel. (607) 265-3230

New York

Date: October 5-7

Event: Upstate New York Woodworking Show

Location: Riverside Convention Center, 123 E. Main St., Rochester

For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Date: November 3-4

Event: Central NY State Woodworking World Show

Location: NY State Fairgrounds, Syracuse

For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Date: November 9-11

Event: Albany Woodworking World Show

Location: New Scotland Avenue Armory, 130 Scotland Ave., Albany

For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Date: November 17-January 20

Event: Furniture by Wendall Castle
Location: University of Rochester Memorial Art Gallery
For information, contact: Detroit Institute of Arts, 5200 Woodward Ave., Detroit, MI 48202. Tel. (313) 833-7963

Date: November 30-December 2
Event: Christmas Art & Craft Spectacular
Location: NY State Fairgrounds, Syracuse
For information, contact: United Craft Enterprises, Box 326, Masonville, NY 13804. Tel. (607) 265-3230

Date: November 30-December 2
Event: WBAI Holiday Crafts Fair
Location: Ferris Booth Hall, Columbia University, 115th St. & Broadway
For information, contact: Matt Alperin, Box 889, Times Sq. Station, New York, NY 10108. Tel. (212) 695-4465

Oklahoma

Date: November 9-11
Event: Wonderful World of Wood Carvers Show & Sale
Location: Southroads Mall, 41st & S. Yale, Tulsa
For information, contact: David Davies, 8274 E. 33rd St., Tulsa, OK 74145. Tel.

(918) 664-8971
Oregon

Date: October 14
Event: Seminar: Hollow Turning
Location: Portland
For information, contact: Oregon School of Arts & Crafts, 8245 SW Barnes Rd., Portland, OR 97225. Tel. (503) 297-5544

Date: October 26-28
Event: Woodworking Show
Location: Memorial Coliseum Complex, 1401 N. Wheeler St., Portland, OR 97227
For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Date: November 10-11
Event: Workshop: Design, Production & Marketing of Fine Furniture
Location: Portland
For information, contact: Oregon School of Arts & Crafts, 8245 SW Barnes Rd., Portland, OR 97225. Tel. (503) 297-5544

Pennsylvania

Date: November 10-11
Event: Valley Forge Crafts Festival
Location: Convention Center, King of Prussia

For information, contact: United Craft Enterprises, Box 326, Masonville, NY 13804. Tel. (607) 265-3230

Date: November 16-18
Event: Central Pennsylvania Woodworking World Show
Location: Harrisburg Farm Complex, 2301 W. Cameron St.
For information, contact: WANA, Box 706, Plymouth, NH 03264. Tel. (800) 521-7623

Tennessee

Date: October 25-27
Event: American Association of Woodturners Symposium
Location: Arrowmont School, Gatlinburg
For information, contact: AAW, 667 Harriet Ave., Shoreview, MN 55126. Tel. (612) 484-9094

Washington

Date: through October 28
Event: Furniture & Sculpted Towers by Michael Elkin
Location: Gilman Village, Issaquah
For information, contact: Cheryl Peterson, Northwest Gallery of Fine Woodworking. Tel. (206) 625-0542

Date: October 19-21
Event: Artistry in Wood 1990 Carving Show & Sale
Location: Walk in the Wild Zoo, Spokane
For information, contact: Dan Eubank, E. 603 Rich, Spokane, WA 99207. Tel. (509) 487-3319

Date: November 16-18
Event: Woodworking Show
Location: Seattle Center, 305 Harrison St., Seattle, WA 98109
For information, contact: 1516 S. Pontius Ave., Los Angeles, CA 90025. Tel. (213) 477-8521

Wisconsin

Date: October 26-28
Event: Milwaukee Woodworking World Show
Location: MECCA, 500 W. Kilbourn Ave., Milwaukee
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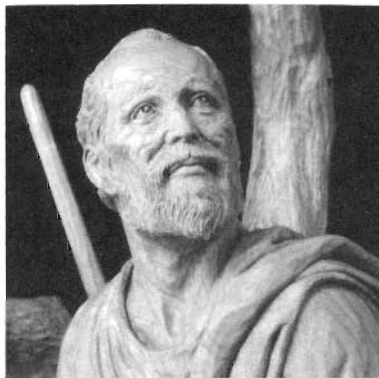
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B725CRR	7-1/4"	36	UNIV.	.046	.065	14.95
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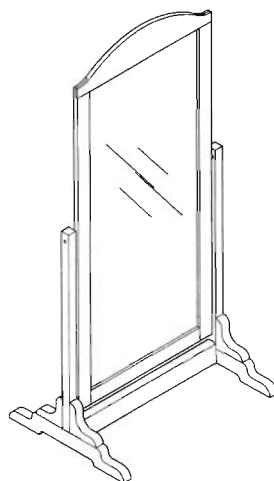
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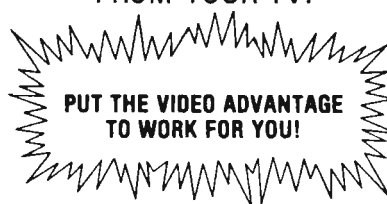
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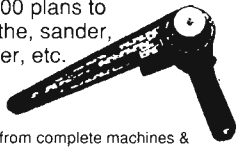
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TOOL TALK

by Sanford Wilk



Porter-Cable's Model #695 Router Table

Lately, I've noticed a multitude of router tables coming onto the market. It used to be that most woodworkers made their own router table, and that was that. Sure, there were a few tables available from manufacturers, but typically most small shops had homemade tables. With the influx of all of the new table variations, a craftsman can get pretty confused (I know I did), and so we decided to test a router table that's tried and true.

The Porter-Cable table has been around for several years now, and the bugs have been worked out of it. It is available both with a Porter-Cable Model #690, 1-1/2 hp router, or without a router, and it will accommodate most Porter-Cable routers as well as quite a few of the old Rockwell units (remember them?). Both tables offer an optional stand that I recommend (model #696—list \$49.95, sell \$35.00), a fence that can be drilled for attaching anti-kickback devices, pin mounts for freehand routing (they only give you one pin, though), and a 3/4" miter gauge slot (Porter-Cable, however, does not make or supply a miter gauge to fit their table. If you want it, you'll need to go to their sister company Delta, and order the model #34-578).

Our criticisms about the router table were far outweighed by its positive features. Nonetheless, I feel it only fair to warn you that Porter-Cable's 16" X 20" top is somewhat smaller than those made by the competition. This can lead to problems if you're not used to feeding large stock, and supporting it

Sanford Wilk is a builder and an organic architect in San Francisco, CA. He heads a team of technicians—over 50 craftsmen in fields ranging from finish carpentry to cabinetry and furnituremaking—who evaluate tools under actual work conditions.



at the same time. The obvious solution to this is to make your own infeed and outfeed tables (hey—what do you think you've got a shop for anyway?).

On the plus side, this router table ranked extremely well in the areas of stability, versatility, and ease of adjustment. The split fence on the unit adjusts down to such tight tolerances that even micro-woodwork isn't a hassle. We beat on the fence by purposely causing kickbacks, and we couldn't get it to budge from its position. (We test under controlled conditions. Please don't purposely abuse your machinery to test its limits.)

All in all, I would recommend the Porter-Cable router table for the small shop. The model #695 table (with router) lists for \$310.00, but I found it selling for \$215.00, and that's not a bad deal, considering that you get one of the best routers available on the market as part of the deal. The table alone (model #696) lists for \$170.00, and you can pick it up for \$124.00. (Porter-Cable, P.O. Box 2468, Jackson, Tennessee 38302, phone 800-321-9443)

Easy Chucker. The Hand-Tite™ keyless chuck is the newest addition to the Jacobs line. It installs in minutes on all brands of 3/8" corded & cordless drills, and it features a sure-grip sleeve for lightning-fast bit changes. The chuck's holding power is 25% greater than keyed chucks according to the manufacturer. (The Jacobs Chuck Manufacturing Company, One Jacobs Rd., Clemson, South Carolina 29633, phone 803-654-5926)



Super Power. Milwaukee's all-new 12-volt cordless drill/driver has two torque settings with high/low no-load speed



Hitachi's Model R 100 Dust Collector

Airborne wood dust particles have been shown to cause everything from bronchitis to lung cancer. I'm not trying to scare you, but the fact remains that most woodworkers don't take wood dust seriously. You've seen the large, multi-bag dust collectors before, and often the size of these monsters immediately scares you away. I don't blame you, but shop safety is number one with me, so I went to work trying to locate a small, maneuverable dust collector with big power. The Hitachi R 100 is what I ended up with, and for a small shop, it seems to be the answer.

First off, the Hitachi unit runs on 110 volts, so you don't need any special electrical hook-ups. Second, this small, low-profile machine glides around on rollers so you can switch it from machine to machine. Third, the R 100 is shaped to fit under a workbench, and in tight corners. Finally, the unit has more than enough suction to handle the needs of any machine in the shop.

You won't be able to run hundreds of feet of ductwork, and ten dozen blast gates (used to control which machines receive suction) to the Hitachi unit. It just isn't designed for that purpose. It is designed to be a great mate with a single machine, one on one.

The unit weighs 66 pounds, and it has a standard 4"

inlet. You can use 4" dryer hose with the machine, but we found it to be too thin. We also noticed that a standard dryer hose had a strange quirk to it when coupled with the machine. Because of static electricity, we got a nice jolt every time we touched the hose while the machine was in action. When we replaced the dryer hose with one offered by Hitachi, the shocking ceased. I don't know about you, but I don't like getting zapped first thing on a Saturday morning.

The R 100's bag capacity is kind of interesting, too. The unit comes with an 8-gallon and a 40-gallon bag. Both are heavy cloth, and look as if they would last a very long time. The 8-gallon bag fits into the machine, and conforms to the unit's profile, while the 40-gallon bag extends beyond the machine and makes the R 100 a little less admirable on the space conserva-

tion front. Still, I like the fact that Hitachi threw the larger bag into the deal. It's good to use when you know you will be collecting a lot of chips and you don't want to empty the bag every few minutes. Hitachi also offers an optional 105-gallon bag for those who only want to empty their bag, oh, once every leap year.

As a final touch, the Hitachi R 100 pulls about 6 amps so it's compatible with most shop machines on the same circuit. The unit lists for \$958.00, but it's available for \$525.00; depending on where you live, you might have to call around since most distributors don't stock it. (Hitachi Power Tools U.S.A., Ltd., 4487-E Park Dr., Norcross, Georgia 30093, phone 404-925-1774)

Makita's Model XSV-20 Shop Vacuum

While we're on the subject of dust collection, I thought I might address a suction system designed for both dry and wet pick-up. It's true that there's nothing totally exciting about this tool, but it is somewhat of a shop staple when it comes to clean-up.

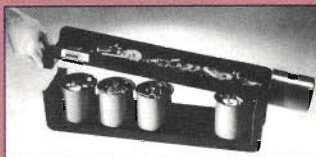
The XSV-20 is a 20-gallon stainless steel wet/dry vac with 1.7 h.p., and a cubic feet per minute rating of 100. In English, this means that the vac has sufficient suction for all shop clean-up requirements. It uses a cartridge filter (easy to

NEWS AND NOTES

ranges from 1-1,000 rpm and 1-350 rpm. Boasting a six position clutch that helps to prevent screw-stripping, and a 1/2-hour recharge time, this new drill complements the full line of 7.2 and 9.6 volt drills offered by the company. (Milwaukee Electric Tool Corporation, 13135 W. Lisbon Rd., Brookfield, Wisconsin 53005, phone 414-781-3600)

Sort It Out. The Plano Sorta-Neat sorts and stores small fasteners, screws, washers, nails, or anything else that you might have laying around the shop. Just pour a container's contents into the sorting tray, find what you're looking for, and lift the tray to slide the remainder into the canister. It's simple, and it puts an end to clutter. (Plano Molding Company, 431 E. South St., Plano, Illinois 60545, phone 708-552-3111)

Putting It In Perspective. Accu-Line's new P3 drawing board creates three-point perspective drawings simply, and fast. The board's T-square rotates in curved channels that allow you to draw lines that meet at vanishing points far away from the table's limits. Any size project can be drawn—from miniatures to buildings.



(Accu-Line/DPI, 5103 Kingston Pike, Knoxville, Tennessee 37919)

Clean Cutter. Delta now offers a 2-speed, 16" scroll saw that handles intricate internal, and external curve cutting jobs. The saw



has a full 2" depth of cut, and it runs at 850 and 1790 CS/M making it versatile enough to handle a variety of materials. Its round table tilts a full 45°, and the saw features a dust-blower, as well as the company's famous Quickset™ blade change system. (Delta International Machinery Corporation, 246 Alpha Dr., Pittsburgh, Pennsylvania 15238) **PW**



clean, and long lasting), and the motor head is held fast to the canister by means of retainer clips. I really like these clips since one of the big drawbacks with some of the other vacs on the market is that the motor sometimes separates from the container while lifting or carrying. This can be bad for the canister (we've severely dented one or two this way), and it can have even worse repercussions for your feet (imagine a 30-pound weight being dropped on your foot from 12" up)!

The Makita vac also comes with metal extension wands, 12 feet of hose, a nozzle, and a squeegee. When you're shopping for a shop vac keep in mind that most machines charge extra for the wand, and hose, and those that don't usually give you plastic instead of chrome-plated steel. Last but not least, the Makita XSV-20 has two oversized wheels, a guide wheel, and a large handle that make up its cart system. This type of cart is helpful if you expect to be hauling the machine up and down stairs.

The wet pick-up ability helps if you ever have the occasional overflow, or sink stoppage, and the stainless steel models are resistant to corrosion. The model XSV-20 lists for \$583.00, but it sells for \$350.00, and other models in both stainless and regular steel (even less expensive) are available. (Makita U.S.A., Inc. 14930 Northam St., La Mirada, California 90638, phone 714-522-8088)

Lervad 610 Workbench

Are you looking to buy a nice workbench, but you don't want a huge beast because you lack the space? Have I got a bench for you!

Most of you are familiar with Leichtung Workshops, but you probably don't know that the first product ever sold by this distributor of weird and wonderful tools was the Lervad Bench. The bench is pretty unusual itself. It's small enough so that it doesn't invade the entire shop, and it's versatile enough to compete with features belonging only to larger workbenches.

The 610 bench is almost 5 feet long and about 11" wide, but don't be discouraged by the lean width of the Lervad. Most small shop applications fit nicely atop the work surface, and the table's double row of bench dogs is suitable for almost all clamping applications. The bench has a shoulder and tail vise just like the big boys do; in fact, both vises are made with the precision and care that would rival some of the most expensive workbenches on the market today. The tail vise has an inset of hornbeam wood, a very tough, close-grained species that isn't easily distorted over time. The majority of the Lervad is made of Danish beech that's the clearest I've ever seen, and the people over at Leichtung tell me that it's seasoned, kiln-dried, and allowed to relax before it is ever milled. The finished product is soaked in linseed oil, and it receives numerous coats of lacquer to lock in the oil, and stabilize the bench.

One of the neatest features that the bench has is the folding frame that it sits on. The frame has 4 oversized knobs that tighten up to bring the base into position. The base can be mounted permanently to the floor (Leichtung

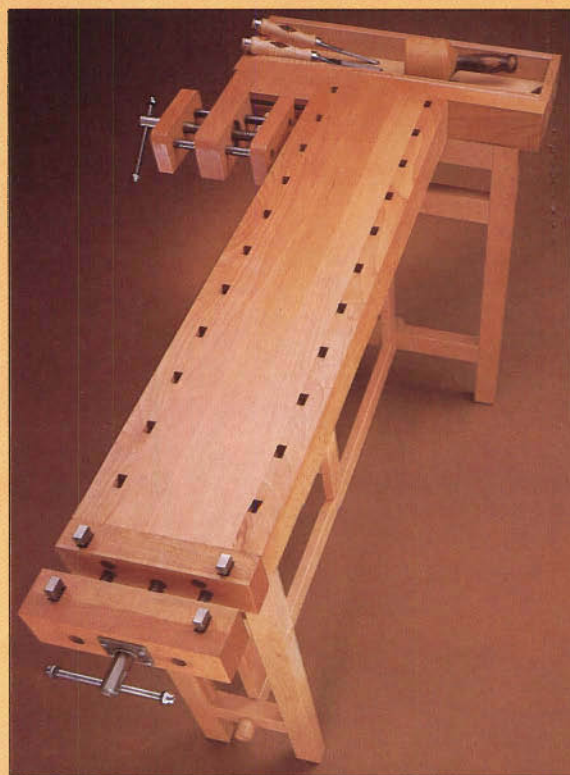
provides the hardware), but I think that grounding the bench would defeat its design-based mobility. The unit weighs just over 90 pounds, and most of that load is located in the tabletop.

The bottom of the bench top is pre-drilled to accept the frame, and thanks to its size, weight distribution, and folding base, the Lervad can be set-up or broken down without help from another person. If you're looking for more stability, and you don't suffer from space restrictions that would force you to move the bench around the shop, then perhaps permanently mounting the bench frame to the floor wouldn't be a bad idea. But you shouldn't expect the Lervad unit to have the same solid feeling as a bench weighing in at half a ton. Here again, though, the unit has more than sufficient beefiness to support most, if not all, small shop projects.

Going back to the vise and clamping system, the shoulder (side-mounted) vise is strong enough to hold stock that's extremely long without movement. It has the capacity to handle widths up to around the 8" mark, and we milled wood that was 7 feet long without the vise complaining. The

bench comes equipped with 4 steel dogs that can slide easily in or out of 26 slots, but stand firm (and extremely perpendicular) when even slight pressure is used. As a final note of detail, the bench has a tool well that's also uncommon: it can be repositioned on the end nearest the shoulder vise, or on the side. This proved to be helpful when we were working wide stock and would have suffered interference by having the well on the side, so we moved it to the end. When we were done with the wide stuff, we moved the well back to the side so that we didn't have to lean to reach our hand tools.

Leichtung is the sole U.S. distributor of this marvelously crafted workbench, so their price is their price (\$449.00). This selling price is F.O.B. Cleveland, Ohio, so expect to pay between \$65.00 and \$100.00 to the trucking company when your bench arrives. For maintenance I recommend the application of teak oil to the wood about once every month, or so. Don't overdo it, though; use just enough so the top doesn't become greasy (Leichtung Workshops, Department PW, 4944 Commerce Parkway, Cleveland, Ohio 44128, phone 800-321-6840) **PW**





**Moon's
Saw & Tool Inc.**

7" Adjustable Carbide Tipped Dado Head

Adjust any width from 3/16" to 13/16" without removing dado from saw. For smooth, clean dadoing & rabbeting in all types of wood. Dado will fit all 8", 9", 10" & 12" saws with 5/8" arbors. 16 carbide teeth. Made in New Zealand. \$22.95

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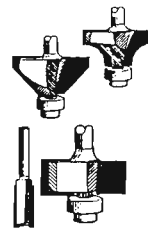
**Forrest Mfg.
Co. Inc.**

Woodworker II Saw Blade

This is the one blade that you can count on to leave a smooth-as-sanded surface. Lasts up to 10 to 20 sharpenings. 10" x 40T. Call 1-800-733-7111.

\$94.00

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MLCS, Ltd.

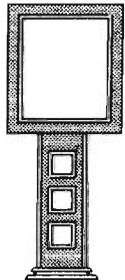
"Must Have" Carbide Tipped Router Bits

8-piece 1/4" shank router bit set includes:

3/8" Round Over Bit
1/4" Straight Bit
1/2" Straight Bit
1/2" Flush Trim Bit
3/8" Rabbeting Bit
45° Chamfer Bit
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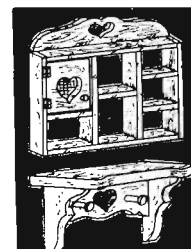
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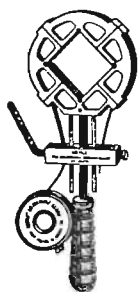
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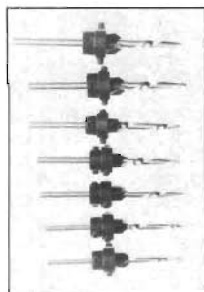
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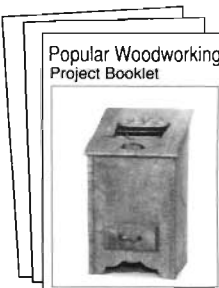
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- | | |
|------------------------|-----------------------|
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| b. Carved Wall Cabinet | e. Coopers Fruit Bowl |
| c. Scroll-Sawn Animals | f. Spindle-Back Chair |

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- | | |
|------------------------|-----------------------|
| a. Rocking Horse Chair | d. Wood Mosaics |
| b. Carved Wall Cabinet | e. Coopers Fruit Bowl |
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- | | |
|------------------------|-----------------------|
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- | | |
|---------------------|------------------------|
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- | | |
|--------------|--------------------|
| a. Carving | d. Finishing |
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VI. Do you ever sell your woodcrafts?

- a. Yes b. No

VII. What is your age?

- a. Under 30 b. 31-40 c. 41-50 d. 51-60 e. Over 60

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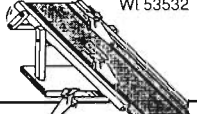
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Boxwood

*Smooth—grain'd, and proper for the turner's trade,
Which curious hands may carve, and steel with ease invade.*



By S. Reed Poverny

... So penned the Roman epic poet Virgil some 2000 years ago. Evergreen box was very much a part of life back then—children played with spinning tops of boxwood, musicians performed on boxwood pipes and flutes, women ran fine-toothed boxwood combs through their hair. Boxwood trees, trimmed into fanciful animal forms and other shapes in a kind of plant sculpture called **tapiary**, filled the gardens of the time.

True box—genus *Buxus*—is native to upper Africa, southern Europe, through Turkey, northern Iran, Afghanistan, and into China, Korea and Japan. This hardy tree or shrub has thin, scaly bark much like crocodile skin. Its slow growth, long life, and resistance to disease have made it a symbol of immortality.

One of the most well known uses of boxwood is **xylography**, or wood engraving, a purpose for which it has no equal. The size of engravings was limited by the diameter of the trees until Charles Wells invented the compound wood block in 1860, when boxwood began to be utilized for inexpensive commercial illustration. It was soon in great demand, and until the trade waned in the 1930's, boxwood was harvested in vast quantities.

Though commonly planted in gardens today, boxwood is in such short supply that few people bother with it anymore. One who does is Friedrich von Huene, a pioneer in the reproduction of historical woodwind instruments. He uses a variety of woods for his flutes and recorders, but observes that "the favorite these days is boxwood because it was the traditional wood in the 16th, 17th and 18th centuries."

Friedrich summarizes the problems involved in obtaining genuine boxwood today: "It grows very crooked, lots of blemishes, so you have to throw a lot of wood away to find a good

piece." The largest chunk he's come across was about 8" in diameter, but they're usually 3" or 4". Around Washington, D. C. some pretty large trees are still growing. "If you've got a 5" trunk, you've got a nice big one." The Von Huene Workshop gets much of its boxwood from a lumber dealer who owns a forest in the Pyrenees.

With the scarcity, low quality, and high price of genuine boxwood, other woods have come to be used as substitutes. The most popular today is "Maracaibo boxwood," or zapatero, and "Thai boxwood," or mai pud. They grow in very large trees, are free of knots, and are much less expensive.

According to Friedrich the instrument maker must put more work into boxwood than into any other kind. The green wood will

"You can turn a piece of boxwood with your hand, hold a tool against it, and shave off a beautiful little ribbon."

crack if dried too quickly, but if it's not dried quickly enough—particularly in warm weather—it's apt to get moldy and grow a blue stain, like that found in maple. He cuts and dries boxwood while the

weather is still cold, a practice he calls "hot logging." "As soon as the log is out of the forest, we cut it up, cut out the pieces we want and bring them into the workshop. Then we turn them round, drill them out, and steam particularly nice pieces." Steamed heat prevents the wood from cracking and kills the organisms which cause the mold. After rough-turning, the pieces are left to season for two or three years—sometimes even five or ten—before finish work begins. Friedrich will even use a microwave oven to force out the remaining moisture. "And after that I might still put it into a bucket of water to put some water back into it, just so it can do all the warping it wants to do." Even then things are not certain during the final stages. "I just trust my luck. If the piece warps too much, I have to throw it away." The imitation boxwoods—the Thai and Maracaibo—like to warp, and both split more readily than true box.

Here's where boxwood shines. Friedrich describes it as the wood that's closest to plastic. "You can turn a piece of boxwood with your hand, hold a tool against it, and



photos by the author



Boxwood's legendary compactness and evenness of grain are the result of its slow, even growth, typified here by a 35-year-old European boxwood, just 3" in diameter at its base.

S. Reed Poverny is a woodworker, wood researcher and photographer.

The boxwood recorder on the right, with silver embellishments, has been dyed to resemble an 18th century original in The Hague. The same recorder, shown in progress on the left, illustrates the natural color of boxwood.

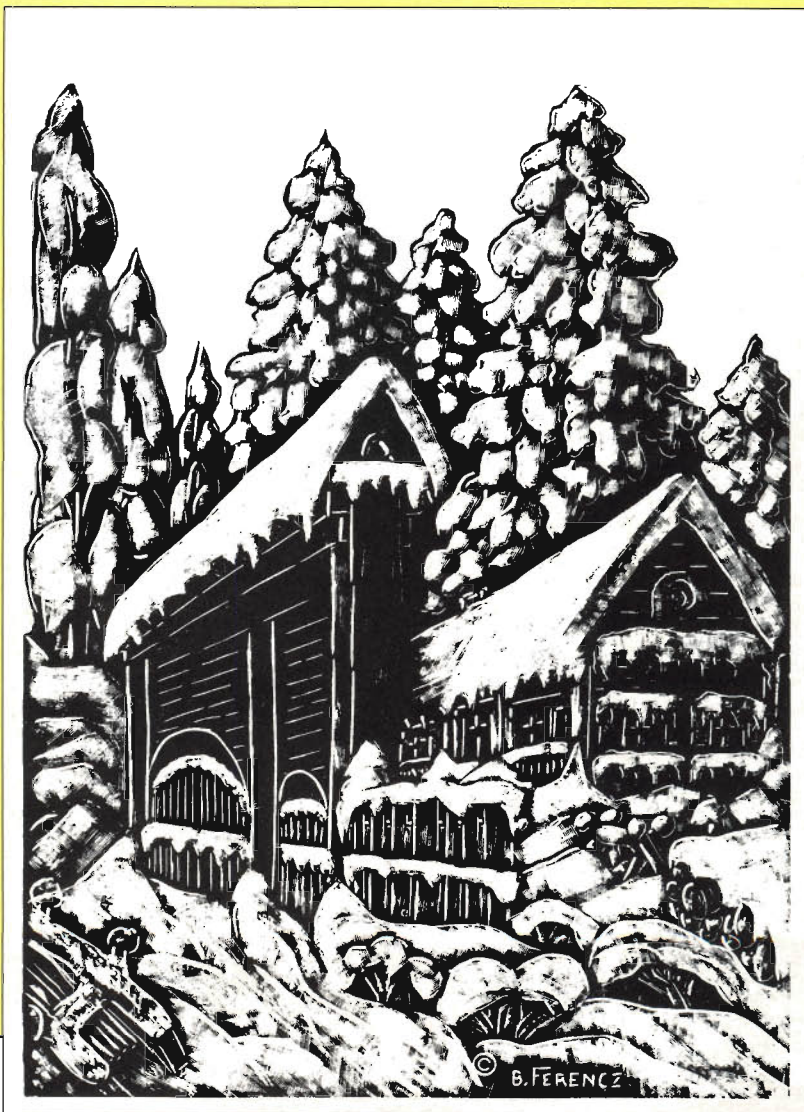


shave off a beautiful little ribbon. Its density makes it superior for engraving. While Thai boxwood end grain crushes under the same treatment, the fibers of true box are extremely compact and strong, making it possible to achieve detail said to rival metal engravings. Unlike engravings in maple end grain and other softer woods, boxwood engraving maintains its fine detail through multiple printings. One reference claims up to 900,000 impressions can be had from a boxwood engraving block.

Like other extremely dense woods such as ebony, boxwood doesn't require much finishing. Fine abrasives bring out a beautiful polish on the wood. But against its creamy light color, even skin oil can cause a stain—witness the browned boxwood tuning pegs on old violins, which some makers today try to simulate with mountain mahogany.

Boxwood is readily dyed, and for centuries has been dyed black to imitate ebony. Fifteenth century manuscripts give recipes for ebonizing boxwood, and much of the "ebony" inlay in furniture of that period is actually dyed boxwood. "After 200 years, boxwood has a little more brownish color than the very blond yellow it has when it's freshly cut," according to Friedrich. He spends a lot of time coloring, making it look old, treating it with either nitric acid or Clairol® hair dye to match the old instruments. "It's very different from painting. Dying is really changing the color of the fibers." After that, he applies linseed oil to the instruments, sometimes mixed with a little varnish. Boxwood instruments now cost more than those made in any other woods,

including ebony and African blackwood. "These woods are expensive, but boxwood is more so to me because I put so much time and labor into it." **PW**



"Transylvania Winter" by Bela Ferencz is from a series of woodcuts illustrating a book of poetry. It was engraved into boxwood end grain, still the finest material for this purpose. Note the compound block before it is engraved.

Helper

By Elaine E. Laney

Perhaps it's time I set the record straight. I'm not *really* a woodworker, not of the sort that turns out finely crafted items made with the kind of skill and knowledge I can only dream of.

There's nothing in my background that could have contributed to knowing anything about the craft. At age three, I could have been called an "earthworker"—seems I drove an entire box of nails into the earth with a tack hammer. It was several years more before I discovered driving nails into wood.

My father was the cerebral sort—hand tools to him were the fountain pen and letter opener. Mother was my manual skills role model, and what she did to wood, you don't want to hear. She was a self-made handywoman—she had no one else to blame for her mistakes. Oddly enough, operating mostly on luck and tenacity, she had a pretty high success rate. Her few failures she either painted or slipcovered.

With this background, I brought to my marriage a few hand tools—a saw, a chisel (which I used as a scraper, screwdriver and part-time pry bar), a couple hammers and real screwdrivers, and a drill which looked to me a bit like an old egg beater. I didn't know anything about power tools, but I was ready to learn some new tricks.

Elaine Laney is an architectural draftsman and a free-lance writer who works wood with her husband in Hendersonville, North Carolina.



It didn't take Bob long to discover that he'd wed a woodworking ignoramus. But since I could read without moving my lips and parallel park, as well as do all the traditional "female things," he figured I could learn. Our first project was rough carpentry—he handled the carpentry, the rough part was mine. We constructed a 12' X 20' storage building, turning out trussed rafters and free-standing shelf units like we'd been doing it all our lives (which it felt like). It was a success—the neighbors didn't ask us to tear it down. I was proud.

Gradually we worked up to making things which we could use and bring in the house! My pride grew with my skills and knowledge. Not only was Bob grooming me to be his trusty helper, but also a wife who could give her husband useful gifts. Birthdays, anniversaries and Christmas saw us adding to our tool inventory. They know me by name at the hardware store. They should—I've paid their wages for years now.

While building an 8' dinky, my task was to ballast the plywood bottom to the sides so it could be screwed into place on a sensuous curve. Being neither eight feet tall nor of sufficient weight to make the plywood meet its mark at all points, I found this my most challenging helper's assignment. I did learn not to call the front of a boat the "front," or the back the "back," but if you want me to hold something, you'll have to call it by a name I can recognize. Those nautical terms sound romantic until you're in a workshop full of them and have to sort out which one you're supposed to be working on.

The weeks before Christmas usually see a bustle of gift-making in the shop. I help enough to be able to say I did, and to let folks know that I love them more than a sweater from K-Mart might indicate.

I have learned how to saw, drill, sand, stain—all the crucial steps—while mastering the art of knowing what the "boss" is going to need next. The work is satisfying, but the payoff came on vacation—a visit to Colonial Williamsburg, Virginia. The restoration of this lovely town is a pleasure to anyone exploring our heritage, but to a woodworker . . . well, let me say that three days of rain there was like throwing Br'er Rabbit into the briar patch. We didn't mind missing the activities, but spent more time in the carriagemaker's shop, the blacksmith's, the cabinetmaker's, the fiddlemaker's . . . What a delight to see that all the tools we used and loved were there, being used and loved in the same manner as they were hundreds of years ago. I felt a continuity, and glad that my interest went beyond mild curiosity. Being a helper had paid off. I enjoyed three rainy days of delving into woodworking of the past more than a sunny beach.

Some women might find it degrading to be relegated to the role of helper. Every draftsman doesn't become a famous architect. Every nurse won't become a renowned surgeon. And every helper doesn't become a master woodworker. But it takes us *all* to do the job, and when a new project leaves our shop, I can admit to a bit of pride at being able to say, "I helped." **PW**

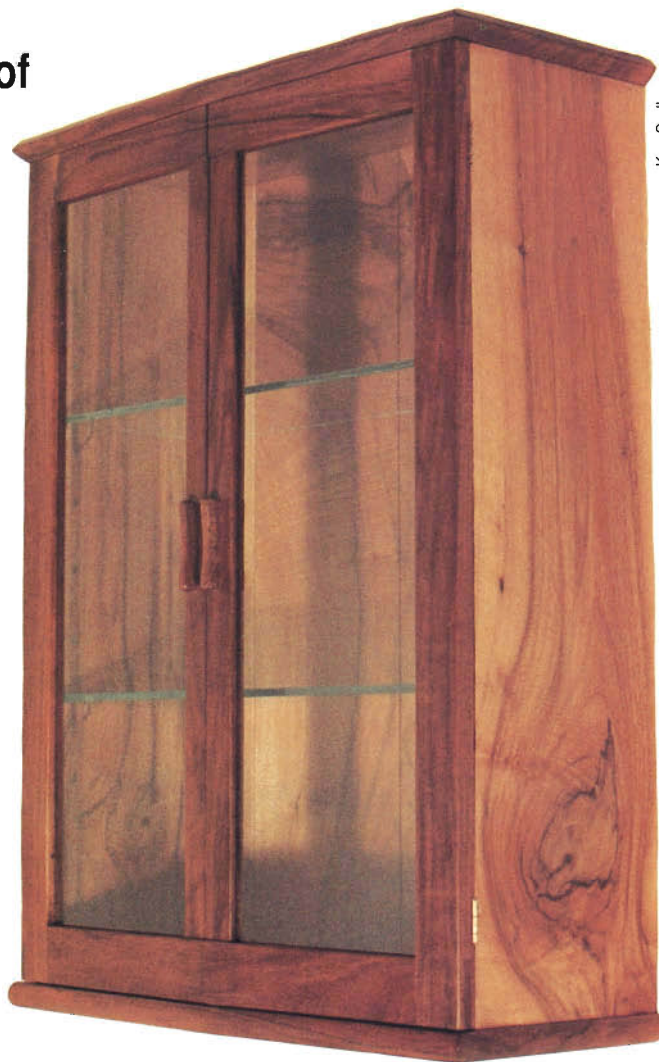
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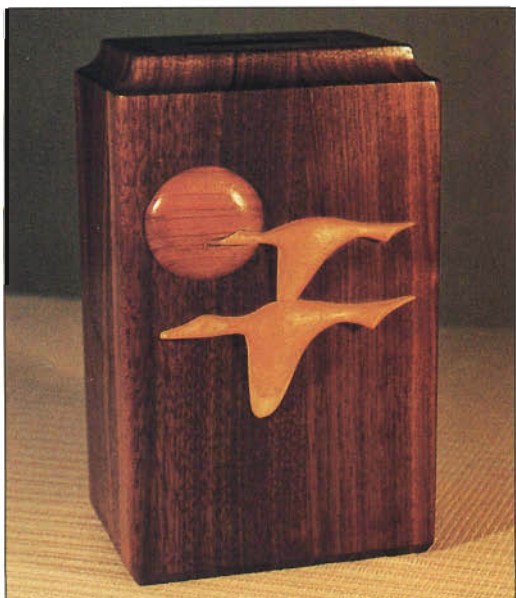
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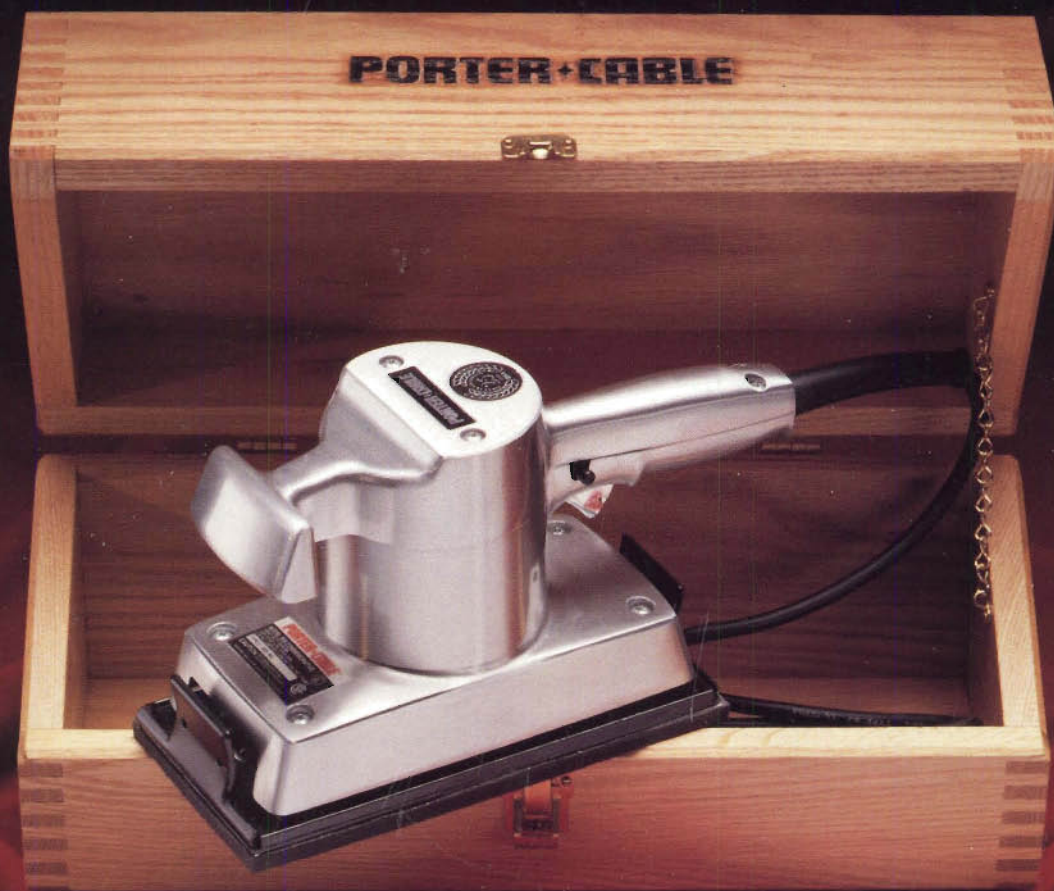
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