

Better Homes and Gardens®

WOOD®

CONTEST
WINNERS
Page 56
BUILD-A-TOY™

THE #1 MAGAZINE FOR HOME WOODWORKERS

OCTOBER 1991 • ISSUE NO. 46
Display until October 15

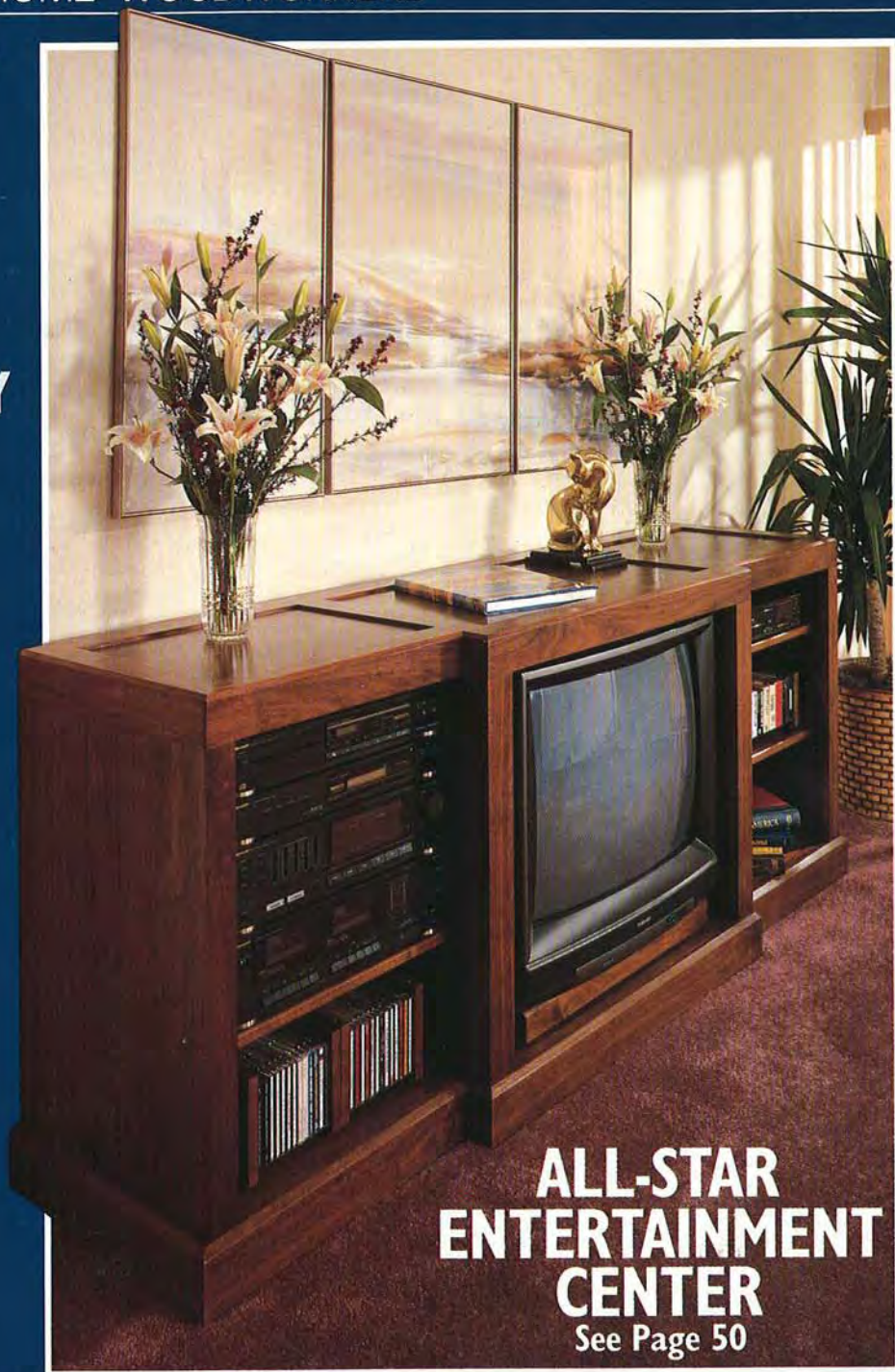
**10 SHOP-SMART
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WITH PLYWOOD**

**CARVE AN OTTER
WITH DESIREE HAJNY**

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29 DADO CUTTERS**

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PROJECTS!**

**Ash toboggan
Noah's ark
Toy floatplane
Lotion dispenser
Noodle cutter
Key chains
Turned mallet
Family-feud
cutout**



**ALL-STAR
ENTERTAINMENT
CENTER**
See Page 50



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We figured it was time you moved up to stationary tools that are a cut above the rest. Time for Delta quality. The pros' choice. Your choice, 349 bucks.*

For starters, we're giving you two table saws and a band saw.

But to rip a perfect edge, you need to start with a perfect edge. So we added a jointer. For \$349.

Now all those perfect boards are going to call for perfect holes. Yep, the perfect drill press.

You see, one choice tool leads to another. And another.

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Our 16" Band Saw is a 3-wheel design for greater capacity; cuts up to 8" thick x 16" wide. Tilting table for bevel cutting.

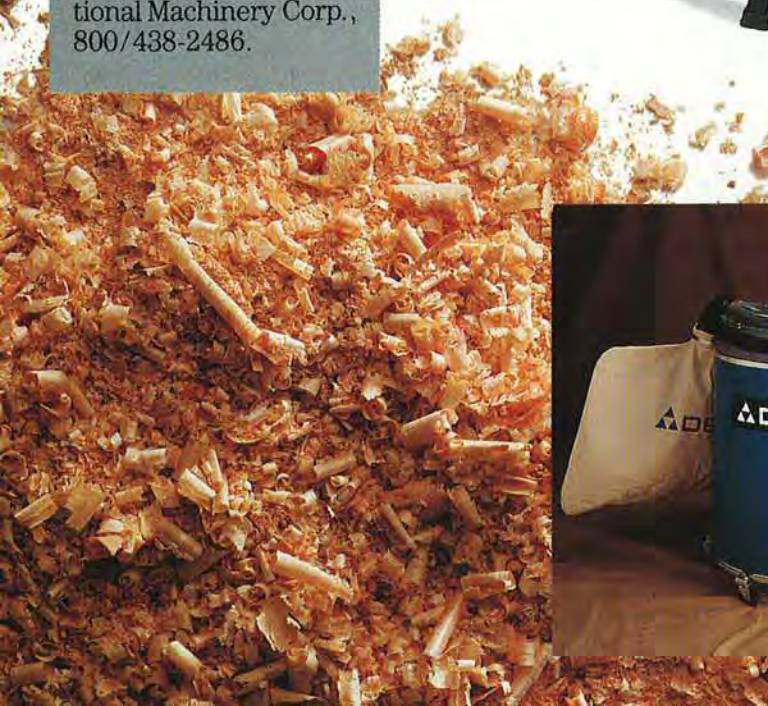


Our Super 10 Saw has a quiet 1 HP induction motor. It features a 22 1/4" x 38 3/8" table, single lever rip fence, miter gage and see-thru blade guard.

The Delta 6" Jointer with three-knife cutterhead and large cast iron table gives you a precision edge. Comes with steel stand.



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THE EDITOR'S ANGLE



DON'T TOSS THAT OLD TV CABINET

A couple of years ago, my wife Trudy looked at our aging television console and asked, "is there any way you could slip a new TV into the opening where the old set is?" My response: "Impossible." I was planning my annual Canadian fishing trip, and the last thing I wanted was another project.

But that was then, and this is now. As you can see in the photo above, I'm "almost through" proving to my wife once again that I can do the impossible.

Why the sudden change of heart? It all started one morning when I poked my head into the WOOD® magazine shop. There stood Jim Boelling, building the entertainment center that we feature on page 50. From the moment I saw it, I couldn't help but think we were re-engineering a concept that enjoyed enormous popularity in the '60s and early '70s—console entertainment centers.

I'm sure you remember them—impressive wood cabinets that housed vacuum-tube television

sets. You still can find these wonderful cabinets today, quite possibly in your own living room or family room, though more often than not the TV has long since gone on the fritz. And because the cabinet looks too good to toss, you set your 19" color television, and maybe a VCR, on top of it.

Anyway, that's why I'm giving our console a new lease on life. As it turns out, gutting the old unit proved easy. It took less than 30 minutes to remove the picture tube, trim pieces, and the other nameless parts you see here. And it doesn't look like it's going to take much longer than that to tailor the opening to the new TV set.

So if you're one of the thousands who kept an entertainment console around the house, you may want to try this idea yourself. In an upcoming issue, I'll share more of the particulars on retrofitting these aging beauties. 🍀

Larry Clayton

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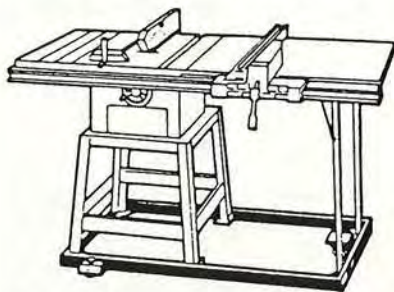
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This issue's cover wood grain: bird's-eye maple

Cover photo: Hopkins Associates

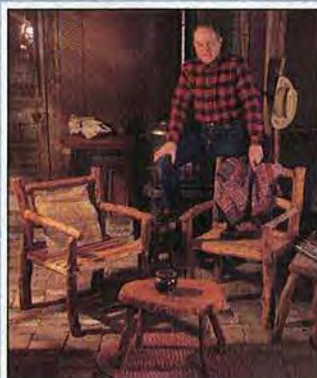
OCTOBER 1991

ISSUE NO. 46

WOOD PROFILE

Teak: The tropics' top seafaring stock 33

Serving both indoor and outdoor uses, this tough, attractive wood takes five years to arrive at market from its Southeast Asian rain forest origins.



CRAFTSMAN
CLOSE-UP

Hedge rustic 35

When Kansas craftsman Bud Hanzlick travels through farm country and spies a row of Osage orange trees, he sees a porch full of rustic Adirondack-style furniture.



CARVING

Here's Otto 40

Once again, renown carver Desiree Hajny has provided us with an exclusive wild-life carving. If you liked Roscoe the Raccoon, you'll love Otto.

SHOP-TESTED TECHNIQUES

10 winning ways to work with plywood 44

When cutting, routing, and edging, seasoned woodworkers know that plywood needs special care. Get great results with these handy tricks.



All-star media center 50

Stereo components, a 27" TV (or smaller), a videocassette recorder, tapes, and discs all fit comfortably in this handsome, multifunctional walnut cabinet.

Oh my, what a contest 56

With our 1991 Build-A-Toy contest over, it's time to see the winners from among 439 made-with-love toy entries.



Sea skipper 58

Scrollsawers, you'll enjoy cutting out, painting, and assembling this wonderfully simple and colorful floatplane. It's from our Build-A-Toy contest.

TOOL BUYMANSHIP

Dado-cutting tools 60

Don't spend a dime on a cutter for rabbets, grooves, and dados until you see what our tests revealed. The tool options and quality differences will surprise you.



Bentwood toboggan 66

Expect great family fun in the winter sun from this downhill ash sled. Cushion the ride with a customized four-person pad from our source.



Slow-set epoxy 71

Learn how to work with this mighty weather-resistant glue.

Noodle cutter 72

Roll in the dough with this turned kitchen utensil.

THE CRAFT SHOP

Pump dispenser 74

Make the perfect container for hand lotions and soaps.

Noah's lovable ark 76

Take a few evenings or a weekend to make this charming biblical boat.

Letter-perfect key chain 79

Our patterns let you make key chains for every name in the alphabet.

Resaw Jig 80

Now, cut thin stock safely and efficiently with this handy helper.

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Great Ideas For Your Shop	15	Yesterday's Tools	90
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#602		3/16" Spiral Cutter		3/16"	5/8"	1/4"	\$12.00
#603	Solid Carbide	1/4" Spiral Cutter		1/4"	3/4"	1/4"	\$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2"	\$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2"	\$24.00
#905		1/2" Spiral Cutter	Proper Adaptor Will Be Supplied	1/2"	1 1/2"	1/2"	\$29.00
#350			1/8" Round Over	1/8" R	3/4"	3/8"	1/4"
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	\$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	\$12.00
#353		5/16" Round Over	5/16" R	1 1/8"	1/2"	1/4"	\$14.00
#209		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	\$15.00
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	\$21.00
#199		Multiform Moulding	Unlimited Patterns	2 1/4"	2"	1/2"	\$40.00
#340		1/8" Cove	1/8" R	5/8"	3/8"	1/4"	\$12.00
#205		1/4" Cove	1/4" R	1"	1/2"	1/4"	\$12.00
#206		3/8" Cove	3/8" R	1 1/4"	5/8"	1/4"	\$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	\$14.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	\$26.00
#460		1/4" Bull Nose	1/4" Dia. of Circle		3/8"	1/4"	\$14.00
#461		3/8" Bull Nose	3/8" Dia. of Circle		3/4"	1/4"	\$15.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		7/8"	1/4"	\$16.00
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#506		1/2" Pattern	Flush Trim	1/2"	1"	1/4"	\$15.00
#507		3/8" Pattern	Flush Trim	5/8"	1"	1/4"	\$16.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	\$17.00
#366		1/8" Slot Cutter	3/8" Deep	1 1/4"	1/8"	1/4"	\$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	\$14.00
#204		3/8" Rabbeing	3/8" Deep	1 1/4"	1/2"	1/4"	\$13.00

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#211		3/8" Core Box	round nose	3/8"	3/8"	1/4"	\$10.00
#212		1/2" Core Box	round nose	1/2"	1 1/2"	1/4"	\$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	\$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	\$17.00
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#215		5/16" Straight	plunge cutting	5/16"	1"	1/4"	\$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	\$ 6.50
#217		7/16" Straight	plunge cutting	7/16"	1"	1/4"	\$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	\$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	\$14.00
#218		5/8" Straight	plunge cutting	5/8"	1"	1/4"	\$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	\$ 9.50
#220		1" Straight	plunge cutting	1"	1 1/2"	1/2"	\$11.00
#500		3/8" Flush	Trimming	3/8"	1/2"	1/4"	\$ 7.00
#502		1/2" Flush	Trimming	1/2"	1/2"	1/4"	\$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	\$ 8.50
#221		1/2" Flush	Trimming	1/2"	1 3/16"	1/2"	\$ 8.00
#545		Tongue & Groove	Straight	1 5/8"	1"	1/4"	\$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	\$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	\$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	\$29.00
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#451		3/16" Beading	3/16" R	7/8"	1/2"	1/4"	\$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	\$13.00
#453		5/16" Beading	5/16" R	1 1/8"	1/2"	1/4"	\$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	\$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
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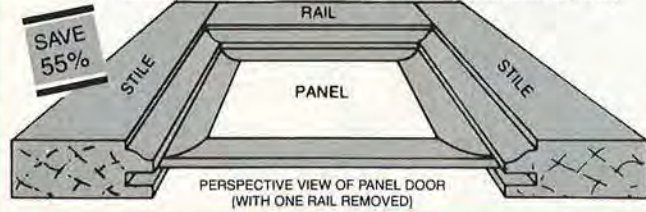
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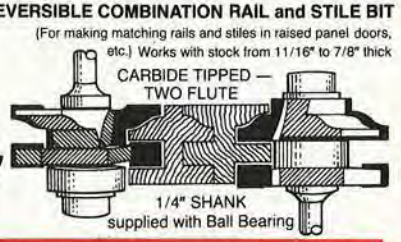
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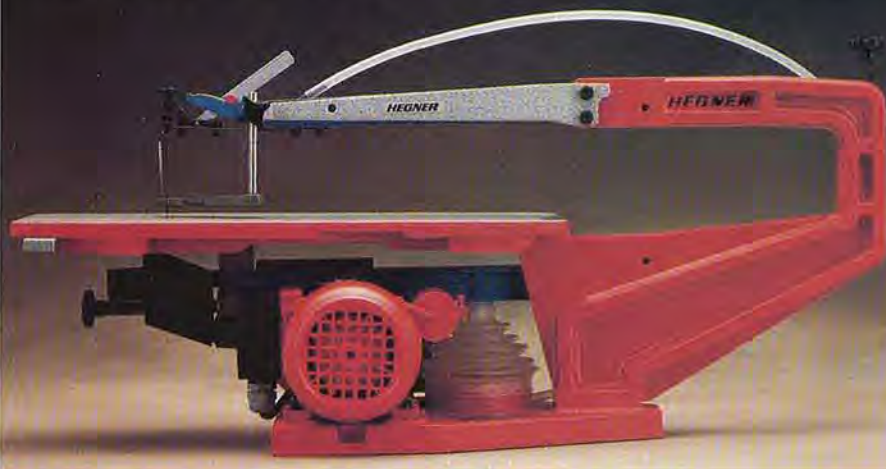
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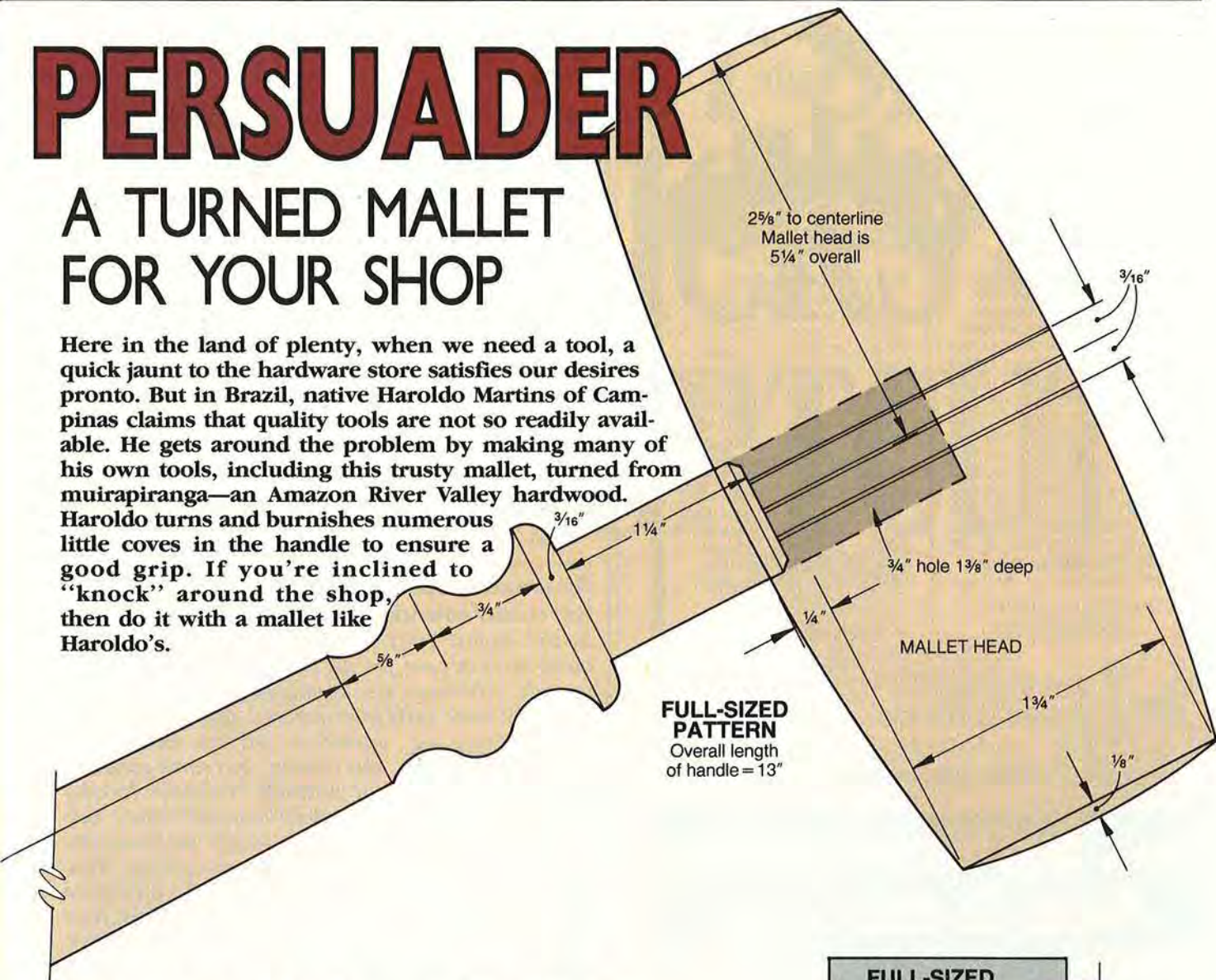
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PERSUADER

A TURNED MALLET FOR YOUR SHOP

Here in the land of plenty, when we need a tool, a quick jaunt to the hardware store satisfies our desires pronto. But in Brazil, native Haroldo Martins of Campinas claims that quality tools are not so readily available. He gets around the problem by making many of his own tools, including this trusty mallet, turned from *muirapiranga*—an Amazon River Valley hardwood. Haroldo turns and burnishes numerous little coves in the handle to ensure a good grip. If you're inclined to "knock" around the shop, then do it with a mallet like Haroldo's.



Start with mallet head

1 To shape the mallet head, mount a 2 1/2"-square piece of stock between centers, and turn it round using a 1/2" gouge. (See the full-sized Mallet Head drawing for reference.)

2 Using calipers and the dimensions shown *above*, taper the ends of the mallet head, and form a very slight convex surface on each end. This helps prevent the head from denting the furniture components during assembly.

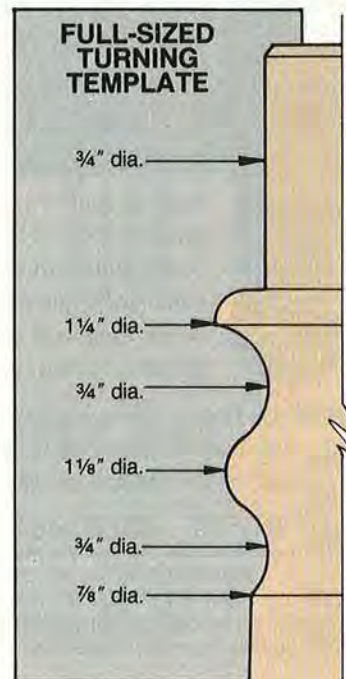
3 Remove the head from the lathe, and drill a 3/4" hole 1 3/8" deep and centered between the ends to accommodate the handle tenon later. (We secured the head with a handscrew clamp during the drilling operation.)

Coming to grips with the handle

1 Mount a piece of 1 1/2"-square stock 14" long between centers, and turn the handle blank round. Taper the handle, form the tenon, and then shape coves where shown on the drawing at *right*.

2 Form the handle grip by marking the groove locations, and making shallow cuts with the tip of a parting tool or skew. Next, with the lathe running at about 3,000 rpm, hand-hold a portion of a 12"-long piece of wire against—but not wrapped around—each V-cut until the wire gets hot enough to singe the wood.

3 Finish the mallet as desired. (Haroldo relies on an American favorite, polyurethane.)



Project Design: Haroldo Martins, Campinas, Brazil

Photograph: Hopkins Associates Illustrations: Kim Downing; Mike Henry

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TALKING BACK

Print this article

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® WOOD® magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Williamsburg tool exhibit delayed

Thanks for including information about Colonial Williamsburg's upcoming tool exhibit in your January 1991 issue. A correction does need to be made concerning the exhibition's date, however. We currently expect it to open sometime in 1993, rather than "early next year" as stated in the article. I'd hate to have your readers, many of whom have called about exhibit dates, be disappointed by arriving too early.

—Jay Gaynor, curator of mechanical arts,
The Colonial Williamsburg Foundation, Williamsburg, Va.

Alternative source found for clock/calendar modules

In the August 1991 issue, we showed you how to build an oak base for an electronic clock/calendar module. Although we double-checked before publication, Classic Gifts International, the company that agreed to sell the modules to our readers, has since gone out of business. We have located another source that has agreed to supply the electronic modules to you at the original price. You can order one for \$19.95 ppd. from New Products, 15 West Street, Spring Valley, NY 10977. Identify it as the clock/calendar for the WOOD magazine project. Sorry, no telephone orders.

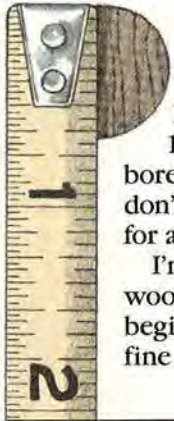


Standard nickel clipboard clips available

HELP! I recently started to make my wife an exotic wood clipboard. Seemed easy enough until I got to the clip. I'd like to use a nice one, perhaps gold-plated, but I can't even find a source for common clips. I could buy a clipboard and swipe the clip, but already she's making noises about how her friends will want one, and it looks like I'd better plan on 10 or so. Any ideas?

—Bob Montgomery, Fort Orange, Fla.

Bob, Meisel Hardware Specialties, in the 1990-91 catalog, offers brass clips in 43/8" and 23/4" sizes, nickel clips in 6" and 3" sizes, and a 3" nickel fold-ing-arm clip. Each costs less than \$1. Meisel's has a \$15 minimum order and a \$4.95 delivery charge. For a catalog or to order, call 800/441-9870.



Dowell on shrinking dowels

I'd like to throw out another suggestion for coping with "The Incredible Shrinking Dowel" (June 1991). I buy the dowel first, and then bore my stock accordingly. That way I don't have to drive around town looking for a dowel to fit the hole.

I'm a furniture maker by profession and woodworking is my hobby. Everyone, beginner to pro, can benefit from your fine magazine.

—Ed Dowell, Tacoma, Wash.

Radial-arm saw books located

Could you tell me where I may get *Fine Tuning Your Radial-Arm Saw*, by Jon Eakes? I have looked in bookstores. They don't have it and tell me it can't be ordered.

—Albert Barnes, Cramerton, N.C.

Albert, we have gotten a couple of dozen letters and telephone calls from readers unable to find Fine Tuning Your Radial-Arm Saw. Another reader recommended the book in this column in the August 1991 issue.

While the book is out of print, the publisher, Sterling Publishing Co., Inc., helped us track down 3,000 copies in Ottawa. The book, catalog no. 49L0701, is \$30 ppd. in the U.S. and \$25.50 ppd. in Canada. Check and credit card orders will be filled at Lee Valley Tools, P.O. Box 6295, Station J, Ottawa, ON K2A1T4. Or order by calling 613/596-0350. In Western Canada, call 800/267-8757. In Eastern Canada, call 800/267-8767. Sorry, COD orders will not be filled.

Forester speaks out

As a professional forester, and amateur woodworker, I must reply to Mr. Robert Gilly's concern about the depletion of forests (August 1991). I have practiced 40 years as a private industry forester in Iowa, the Pacific Northwest, the Southeast, and Kenya.

Harvested forests are not lost; they are utilized for the benefit of society. Forests are lost when the land is converted to other uses, such as agriculture, shopping malls, homesites, and highways. The real loss of natural resources, including forests, is caused by the human animal, whose reproductive habits outstrip his environment.

The U.S. has three-quarters of its original forest acreage and latest Forest Service surveys indicate that this country grows more wood than is currently being harvested. These forests provide hunting, fishing, recreation, and homes for wildlife. They also promote soil and water conservation.

—Gordon White, Huntsville, Ala.

Continued on page 10



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TALKING BACK

Continued from page 9

Who's reforesting clearcuts?

Thanks for the Rain Forest Update featured in the June 1991 issue. It sounds like the Woodworkers Alliance for Rainforest Protection is on a good track. But shouldn't conservationists be just as concerned with the fate of lands already logged as they are with protecting the remaining forests? Millions of already-denuded acres need to be reforested, hopefully with a variety of native species and *not* in the wildlife-desert monocultures favored by those interested only in maximizing gross timber output. We have plenty to do here at home in our own "rain forests" too. There are more than a million acres needing planting in Washington state alone. Let's make smoke about this until the government responds.

—Jim Wallin, Forest Grove, Ore.

Indian carvings get mixed review

I was pleasantly surprised to learn in the April 1991 issue of *WOOD*® magazine of Peter Wolf Toth and his tribute to our native Americans through his "Whispering Giants" sculptures. [Toth has sculpted 60 Indians across the country.] A man of such vision and singular conviction is worthy of all the acclaim he may receive.

I was disappointed, however, by the following article, which included instructions on how I, a white, middle-class male, can carve my very own "Indian" in an image "so recognizable and sought after" as a cigar store token! You have exhibited very poor taste and judgment. This "Cigar-Store Indian" may be an image worth 1,000 words, but for me they begin with "shameful, degrading, tasteless, pitiable. . ."

—John Saunders, Sarasota, Fla.



Belt-cleaning shop tip could lead to silicone contamination

In response to a reader tip in the August 1991 issue of *WOOD*, I strongly disagree with using cured silicone caulk to clean abrasive belts, drums, and disks. Being a maker of custom furniture, one of the biggest problems I run into is silicone contamination caused by lubricants and hand creams. Nothing's more frustrating than working weeks on a piece only to find white spots (fish-eye) when the finish is applied. I'm not sure what the commercial belt cleaners are made of, but I would suggest trying cured latex caulk with no silicone added.

—R. Billing, Chicago, Ill.

Continued on page 12

Tips from Freud



Tip 1. LU85M - How to get silky smooth cross grain cuts without sanding.

From the cutting angles, to the Teflon coating, everything in this blade was designed to obtain the ultimate finish. Not only is sanding not required, but in most cases it will even ruin the cut. Ideal for accurate cutting of precious woods, precision miters, or picture framing where sanding could result in rounded edges and gaps in the joint. Will fit in miter saws, chop saws, radial arm saws and table saws.



Tip 2. LU84M - How to save yourself hours in shop time.

In many woodworking shops one saw may be needed to rip a piece of 4/4 oak one minute or a sheet of thin plywood the next. The Freud LU84 combination design gives you the flexibility of working with different materials without worrying about changing blades. This is because the teeth are grouped in sets of 5 and are separated by a deep gullet. This combines the high number of teeth required for crosscutting with the chip ejection ability of a rip saw. To maximize the safety of this blade, the deep gullet has an Anti-kickback design. Excellent on radial arm saws because the climbing effect is eliminated.



Tip 3. LU87M/LU88M - How to increase the performance of your table saw or radial arm saw.

By using Freud's thin kerf blades, LU88M for crosscutting and LU87M for ripping, your saw will be removing less wood than the standard carbide blade, requiring less horsepower to produce equally good results. Thin kerf blades reduce the radial arm saws aggressive self-feeding characteristics. In the past, thin kerf blades have been inferior, but Freud engineered a blade that has a kerf that is 28% thinner than a standard blade and is laser cut and pretensioned to eliminate these problems. The blade has a Teflon coating to prevent heat build-up due to friction. All this provides a blade that is easier to feed and requires less power with equal precision.



Tip 4. LU91M - How to get the most from your compound miter saw.

The LU91M produces a superior finish cut on sliding and non-sliding compound miter saws. The 5° negative hook prevents the blade from being too aggressive and will push the work piece down and towards the fence. This negative hook angle meets the original equipment manufacturers recommendations for all of the sliding compound miter saw. This blade uses Freud's Thin Kerf Technology to reduce the power required and the material removed. This also helps to reduce the climbing effect associated with saws of this type and radial arm saws. Combine this with Freud's advanced carbide, laser cut body, and CAD technology and you have a blade that will out perform all others. Use on the Hitachi C8FB, DeWalt 1707 Crosscutter, and Makita LS1011.



Tip 5. LU92M - How to cut Corian® counter tops with confidence.

About the only way you can ruin a Corian® or laminated counter top with Freud's LU92M is to measure wrong. It was engineered specifically to cut the broad array of counter top materials available today. The LU92M will zip through Corian®, melamine, and laminates with little effort and leaves a smooth, chipless cut. These blades are equipped with Freud's exclusive HOOK carbide teeth tested by a leading university against other leading carbide blades. The results from the HOOK carbide left all others in the dust. Each tooth has a special Modified Triple Chip Grind that was designed by computer simulation to breeze through solid surface materials or single and double face laminates with a virtual chip free edge.

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	ST213	1/2	1	1/4	5.50
	ST216	5/8	1	1/4	6.25
	ST219	3/4	3/4	1/4	8.95
	ST406	1/4	3/4	1/2	8.50
	ST408	5/16	1	1/2	8.50
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	ST413	1/2	1	1/2	5.50
Flush Trim	FT210P	3/8	1/2	1/4	4.00
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	FT213	1/2	1	1/4	6.95
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	FT410	5/8	1-3/16	1/2	6.50
	FT413	1/2	1-3/16	1/2	6.95
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	CB413	1/2	5/16	1/2	11.00
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	SL206-2	1-1/4	3/16	1/4	11.00
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	SL210-2	1-1/4	3/8	1/4	12.00

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	CR203	1/8	3/8	1/4	10.00
	CR205	3/16	7/16	1/4	10.00
	CR206	1/4	2/1	1/4	11.00
	CR208	5/16	9/16	1/4	12.95
	CR210	3/8	5/8	1/4	14.00
	CR213	1/2	3/4	1/4	16.00
	CR406	1/4	1/2	1/2	11.95
	CR410	3/8	5/8	1/2	14.00
	CR413	1/2	3/4	1/2	16.00
Roman Ogee	RO204	5/32	1/2	1/4	15.00
	RO206	1/4	3/4	1/4	16.00
	RO404	5/32	1/2	1/2	15.00
	RO406	1/4	3/4	1/2	16.00
	CV203	1/8	3/8	1/4	11.00
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Cove	CV206	1/4	1/2	1/4	11.00
	CV208	5/16	1/2	1/4	12.00
	CV210	3/8	1/2	1/4	12.00
	CV213	1/2	5/8	1/4	13.00
	CV406	1/4	1/2	1/2	12.00
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C911 \$32

REVERSIBLE STILE & RAIL
C965 \$45

LOCK MITRE
C998 \$42

FINGER JOINT
C961 \$69

GLUE JOINT
C911 \$32

TALKING BACK

Continued from page 10

A remote dust-collector switch for woodworkers on the go

Your remote dust-collector switch is somewhat cumbersome compared to the electronic device I am using. It consists of wireless burglar alarm components commonly available through electronics catalogs, stores, and departments. Each of the two units is about the size of a pack of cigarettes. The dust collector plugs into one unit, which in turn is plugged into a standard A/C electrical outlet. Now all you need is the handheld remote on/off switch. You won't need any wiring.

I fasten my remote to my left arm with a thick rubber band, but you can wear it on your belt or keep it in your pocket. The device is sold by Radio Shack as product No. 61-2667, and carries a price of \$21.95. It is also sold by Heath Co., Benton Harbor, Michigan, and in some local home centers.

The only disadvantage is that this model's electrical capacity is limited to 110 volts and 15 amps. Larger, heavy-duty units cost more and work on the same principle. I have already saved the price of the system in shoe leather alone.

—Karl Schultz, Berwyn, Ill.

Reader cleans up dust with a 3-vac attack

I thoroughly enjoyed the central dust-collector article. Kudos to Bill Krier and his colleagues for the interesting information, pictures and illustrations. You stimulated my thinking.

After sketching several plans and checking prices, I explored another alternative. I already had one large shop vacuum. By adding two more (which were on sale), I can now collect dust from my table-saw, radial-arm saw, belt/disc sander, and bandsaw very effectively.

—Ed Heuer, Port Edwards, Wis.

Scoring test tubes by the score

If you need test tubes for bud vases or other uses, a Des Moines outfit can supply them in boxes of 20 for \$9.95 ppd. The following test tubes are available.

Catalog number	Metric size	Approx. size in inches
SR10B	10 x 75mm	3/8 x 3"
SR12B	12 x 75mm	7/16 x 3"
SR13B	13 x 100mm	1/2 x 4"
SR16B	16 x 100mm	5/8 x 4"
SR165B	16 x 125mm	5/8 x 5"
SR166B	16 x 150mm	5/8 x 5 7/8"

Send check or money order to SHARAY, P.O. Box 3093, Des Moines, IA 50316.

Readers respond with scrollsaw-pattern sources

In the April 1991 issue, we asked for help locating new scrollsaw pattern sources for reader Boyd Pearson. Your suggestions ranged from tracing old catalog pictures to the using of stained-glass window pattern books.

One of you offered to draw him patterns. Several others recommended paper-cutting books from Back Street Designs and Dover Publications. Here are some excerpts from letters:

Scherenschnitte (paper cutting) pattern books, available in crafts stores, are an excellent source. Many of these books are published by Back Street Designs, Inc. P.O. Box 1213, Athens, AL 35611.

Other good sources include 272 *Artistic Silhouettes* by Floyd Morris, published by the Goodheart-Willcox Co., Inc., South Holland, Illinois, and *Easy-to-Cut Silhouette Designs* by Betty Christy, published by Dover Publications, Inc., 31 E. 2nd St., Mineola, NY 11501.

George S. Bulau, Spring Hill, Fla.

Shine a light on an object and trace its shadow.

—Mark Comley, Lexington, Ky.

Boyd will find more patterns than he can shake a stick at in fabric-store sewing pattern books.

—Phil Pearsall, Philadelphia, Pa.



Other readers suggested the following:

- *Papercuttings* by Alison, 404 Partridge Circle, Sarasota, FL 34236 (\$1.50 for a catalog).
- *Paper Crafts 1989*, Better Homes and Gardens®.
- *Christmas Ideas 1990*, available from Better Homes and Gardens.
- *The Encyclopedia of 312 Woodworking and Scrollsaw Designs*, \$12.99 ppd., FC&A, Dept. ZMK-2, 103 Clover Green, Peachtree, GA 30269.
- Leather carving designs from Tandy Leather.
- Klockit patterns, call 800-556-2548 for catalog.
- *Complete Book of Stencilcraft*, by Joanne C. Day. Patterns for stained glass, leather work, and etching; magazines and newspapers; line drawings, stencils, and silhouettes; weather vane patterns in ironworks books; and, coloring, tole painting, and calligraphy books.

Continued on page 14

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Table Top Model:

#DPT ... \$179.95 (UPS \$25)

Floor Model:

#DPF ... \$219.95 (UPS \$30)

Two Way Sanders

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- Dust collector on belt
 - Tables tilt to 45°
 - Sealed ball bearings
 - Easy belt tracking

6x9 Sander:

- Includes stand
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- 3/4 HP, 1720 RPM
- Free Belts & Discs worth \$21.00

#S69 ... \$219.95 (UPS \$30)

4x8 Sander: ON SALE

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- 1/8" Max depth of cut

#PLA ... \$359.95 (UPS \$15)

Extra Knives ... \$25/pair

Dust Chute ... \$15/ea (UPS \$3)

Stand \$39/ea. (UPS \$6)

Variable Speed Scroll Saw ON SALE \$169.95

Cuts intricate patterns in many different materials. Electronically controlled motor gives full power at all speeds 400-1800cpm.

FREE ACCESSORIES:

- Dust blower • 1 dz blades
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- Blades: uses pin & plain end

#SVS \$169.95 (UPS \$10)

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#DC1 \$199.95 (UPS \$20)

900 CFM Dust Collector:

This 1-1/2HP model allows for use in 2 or more machines & gives improved service for long runs of hose.

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Free: 50' of hose, 1ea 4" to 3" • 2 ea 4" to 2" adaptors.. \$40Value

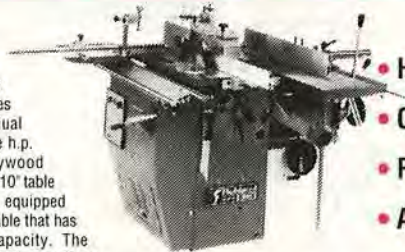
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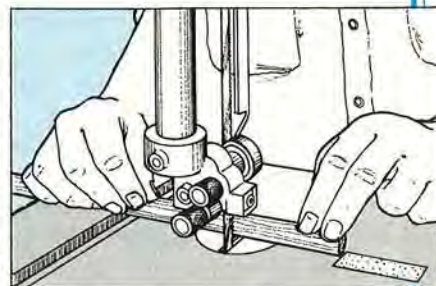
NATIONAL (800)367-4101

TALKING BACK

Continued from page 13

Cutting kickback on bandsaw illustrations

In the shop tips section, page 12, August 1991 you show an illustration of hands cutting dowels to short length freehand on the bandsaw. It is unfortunate that this illustration slipped past your safety expert.



The professionals will know better. I worry about the novices who read the shop tip and follow the illustration exactly as shown. The safety rule is "Never cut round stock on any power saw without using a V-block and clamping devices."

—Wally Fillingham, Kalamazoo, Mich.

May you sell these projects?

Readers often write to ask if they can build and sell the projects presented in WOOD magazine. You may build and sell any item designed by a member of our staff (see the masthead on page 5 for a list and compare those names to the design credit accompanying each project). But, if we bought the project from an outside designer, it is neither ethical nor legal to manufacture or sell their copyrighted item. You may make those projects as gifts for friends and family, but not for sale.

Dust-collector static

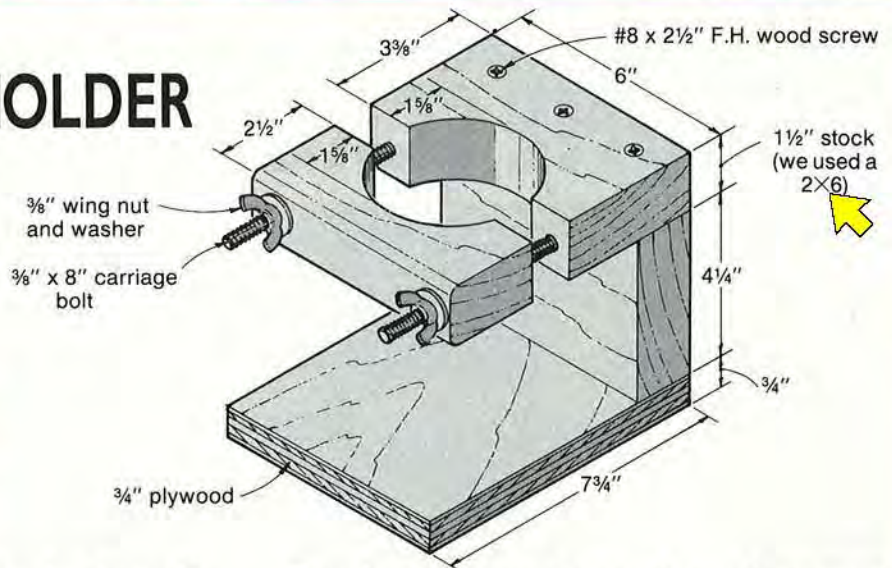
Your article on building a central dust-collection system in the June 1991 issue was especially interesting to me because I recently constructed and installed a similar system in my shop. One difference is that in running my internal ground wires, at the end of each pipe section, I drilled a 1/16" hole, threaded the wires through, and connected them on the outside. Changing the system is easier this way, and trouble spots, where the ground wire can trap chips, are eliminated. The few ungrounded inches shouldn't allow a static charge to build.

—Roger Hearn, Detmar, Del.

Get your braided ground wire here

Several readers have written to ask where to get the braided ground wire we used in our June 1991 central dust-collection system article. If you're having trouble locating the wire, contact Radio Trade Supply, 1017 High St., Des Moines, IA 50309. Refer to our article when asking for the tinned copper wire, 1/64" thick, available in 100' lengths for \$12.50 ppd. To order by telephone, call 515/288-7237. 🐣

EASY-AS-PIE PALM-SANDER HOLDER



Trying to hold a palm sander in one hand and a small project in the other can make you feel a bit like a juggler. Our holder clamps firmly to your workbench, allowing you to see your sanding progress while leaving both hands free to control the workpiece. For a proper fit, measure the shape of your sander's motor housing to determine the opening size.

To make changing sandpaper a breeze, leave enough clearance between the palm-sander pad and the top of the holder to allow you to change sandpaper without having to remove the sander.

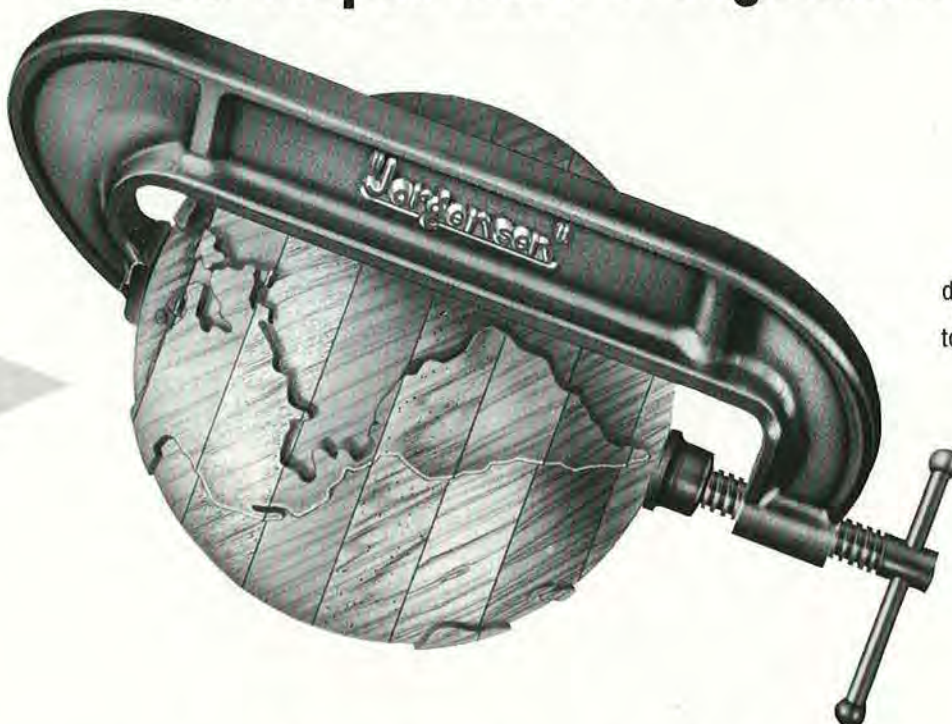
To fit the Porter Cable 330 shown, we cut a 4" hole in a 6 x 6 5/8" block and trimmed the block to the size shown. Hole sizes will vary for other brands of sanders. 📌

Project Design: Russell Smith

Illustration: Kim Downing; Jim Stevenson

Photograph: John Hetherington

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BLACK & DECKER'S CORDLESS CYCLONE SCRUDRILL



AN IMPRESSIVE PERFORMER WITH AN ENGAGING NEW CLUTCH

When we reported on 21 cordless drills in the April 1991 issue of *WOOD*® magazine, Black & Decker's new feature-laden Cyclones were prototypes, not quite ready for testing. B&D claimed the tools would sport an innovative clutch, so we waited eagerly to get our hands on a working model.

Recently, we ran a 9.6-volt model through a user test (B&D also offers a 12-volt Super Cyclone). Here's what happened.

One smooth operator

Before even turning on the Cyclone, the tool impressed us with its good balance and comfortable grip. A nice start. Then, we used it to assemble a 10'-long cabinet requiring more than 150 screws ranging from 1" to 3½" long. Most of the screws required pilot holes, and some needed countersinking. We completed the project on one battery charge.

Like other cordless drills priced at \$150 and above, the Cyclone

has plenty of nice features. All of its switches worked flawlessly, and the smooth operation of its gear-reduction lever especially impressed us. With a flip of the conveniently located lever you can change between speed ranges (0-350 rpms and 0-1,200 rpms on the 9.6-volt model 1964).

A similar lever for switching between drilling and screwdriving also worked without a hitch. In the screwdriving position, the motor engages the chuck only when you apply forward pressure to the drill. This feature, unique among the drills we've tested, allows you to drive more screws in less time and with greater control.

The tool's Versa-Clutch has 23 screwdriving torque levels to choose from. Clutches prevent you from burying screws too deeply, snapping off their heads, or stripping the threads formed on the walls of a wood hole.

And, the Versa-Clutch goes above and beyond the duties of a typical clutch. Just as a jockey

calls on his horse to give him more effort in the home stretch by cracking his whip, you can get more driving force from the drill by simply applying greater forward pressure against the screw. For example, driving a screw into a knot or other hard spot can cause the clutch to disengage before the screw reaches its full depth. With the Cyclone, you only need to bear down harder to prevent the clutch from slipping. With other drills, you have to stop and manually change the clutch to a higher setting before fully driving the screw.

The bottom line

Black & Decker's new Cyclones are among the most expensive cordless drill/drivers on the market (\$159 to \$179 for the 9.6-volt model and \$169 to \$199 for the 12-volt machine). But, these tools are worth every penny if you do a lot of screwdriving.

Our only complaints—and they're both minor ones—involve the Cyclones' keyed chuck and one-hour charger. We prefer keyless chucks for their ease of use and superior gripping strength. A keyless chuck may be in the Cyclones' future, says company spokesman Allen Brelsford, but he wouldn't elaborate.

We also think that cordless drills in this price range should have batteries that recharge in a half hour or less. The Cyclones use the same one-hour Univolt charger packed with B&D's other cordless drills.

Note: Company officials tell us B&D will have a 15-minute charger available as an accessory item by the time you read this. The unit will charge batteries up to 13.2 volts from all major power-tool manufacturers. We'll let you know how this product performs as soon as we get our hands on one. ♣

Written by Bill Krier
Tested by Bob McFarlin
Photograph: Hopkins Associates



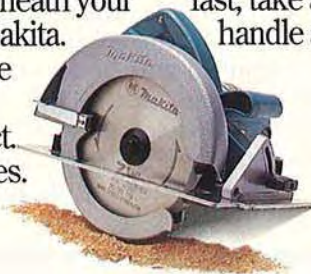
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SPAT OR CHAT?

FAMILY FEUD

SCROLLSAWED SILHOUETTE



Before radio and television, home entertainment often amounted to an animated conversation between Mom and Pop in the parlor. What could these two be talking about? Pa's night out? The cost of living? The Cubs' chances? Entertain yourself by cutting this humorous pattern from the past on your scrollsaw. Maybe by the time you're finished, you'll have decided what these two are discussing with such relish.



Materials: Cut this authentic old-time pattern from $\frac{1}{8}$ " Baltic birch plywood. A 5×9 " piece will suffice for the stand-up silhouette. You'll also need a $\frac{3}{4} \times 1\frac{1}{4} \times 9$ " piece of walnut or some other hardwood to make the base.

Photocopy the full-sized pattern, *opposite page*. Adhere it to your stock with spray adhesive.

Since you'll be cutting thin stock, try stack-cutting up to five pieces at a time. You may have more control and be less likely to cut off some of the fine details with the thicker material.

Just stack your blanks and tape the edges together with masking

tape. (Some scrollsawers nail their stacks together with small brads outside the pattern area.) Put the pattern on the top piece in the usual fashion.

Drill $\frac{1}{16}$ " blade start holes where shown on the pattern. Now, begin sawing with the smallest inside cuts, such as Mom's bonnet string, the area between Pop's feet, or the spaces between the chair rockers.

We found that a #5 blade ($.035 \times .015$ " with 15 teeth per inch) handled the detailed cutting easily. Complete all inside cuts before sawing the outline.

To make a base for your silhouette, cut a piece of hardwood (we



chose walnut) $\frac{3}{4} \times 1\frac{1}{4} \times 9$ ". Saw a $\frac{1}{8}$ " blade kerf $\frac{1}{4}$ " deep along the middle of the topside with a tablesaw. Round the top edges with a $\frac{1}{4}$ " round-over bit in a table-mounted router.

Mount the cutout in the slot, and give the project a clear finish. Clear lacquer in a spray can will do the trick. Spray at an angle from top, bottom, and both ends on both sides to cover the edges inside the cutout.

Now, put the talkative pair in a conspicuous place. Then, whenever you need some entertainment, you only need to look at them and ask, "What do you suppose they're talking about?" ♣



Red dots indicate starting holes for scrollsaw blade.

Design: Mostly Victorian Design
Photograph: Hopkins Associates
Illustration: Jim Stevenson

EARN CASH, PRIZES FOR YOUR TOP SHOP TIP

Do you have a great shop tip (or two) you'd like to share with other WOOD® magazine readers? For each published submission, you will get at least \$25 from WOOD magazine (as much as \$200 if we devote a page or more of space elsewhere in the magazine to your idea). You also may earn a woodworking tool for submitting the Top Shop Tip for the issue.

We try not to use shop tips that have appeared in other magazines, so please send yours to only one. We do not return shop tips. Mail your tips, address, and daytime phone number to:

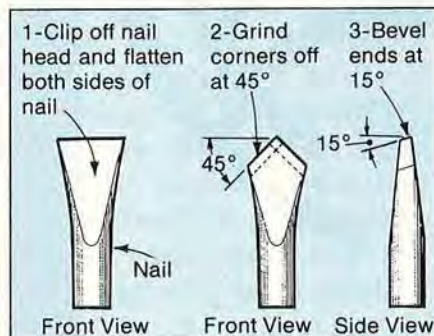
Top Shop Tip
WOOD magazine
P.O. Box 11454
Des Moines, IA 50336-1454

Turn to hammer and nails when you need a drill bit

You need to drill pilot holes for some screws, but you don't have a twist drill the right size.

TIP: Turn a nail or brad into a drill bit. Cut the head off and flatten the end with a hammer. When the width matches the hole diameter you need, file or grind the end to a point, as shown below. These shop-made bits work in softwoods or hardwoods, and resist breakage.

—Joe Hess, Calgary, Alta.

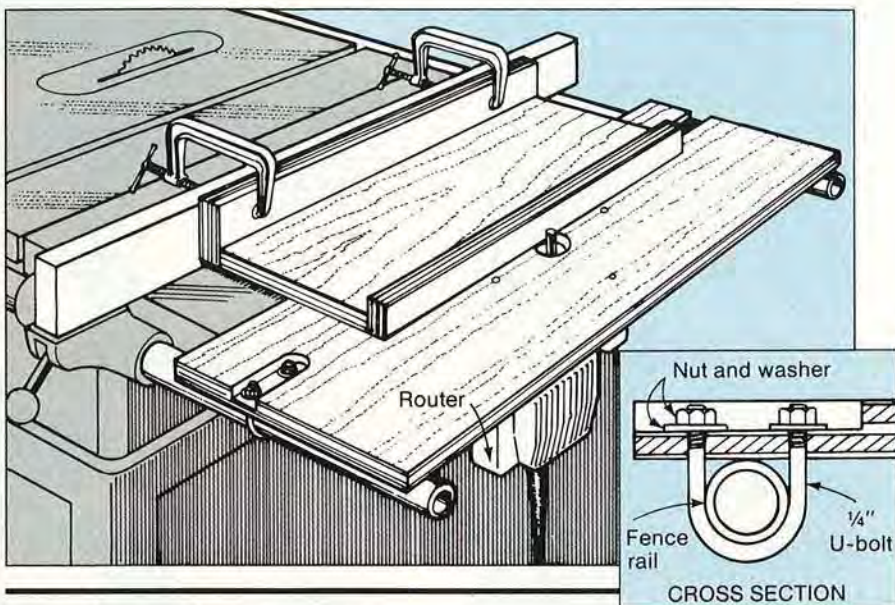


Router table mounts easily on tablesaw

A table-mounted router simplifies many operations, but finding space for another piece of equipment isn't always simple.

TIP: Mount your router on your tablesaw. Simply attach the router to a piece of 3/4" plywood long enough to span your saw's fence guides. Secure the table to the guides with 1/4" U-bolts, as shown below. The router fence clamps to the saw fence for easy adjustment. Both pieces store in a small space.

—Robert Speas, Winston-Salem, N.C.



Dowel provides center for boring bigger holes

You've drilled a 3/8" bolt hole through a project part, and now you want to counterbore it with a larger Forstner-type bit. There just doesn't seem to be an effective way to center the bigger bit on the existing hole.

TIP: Find a piece of 3/8" dowel a few inches long and mark its center. Then, insert it into the 3/8" hole, placing the center-marked end up and flush with the workpiece surface. Now, employing the center-marked dowel as a guide, you won't have any trouble getting that bigger bit started. For a hole of a different size, just use the appropriately sized dowel.

—from the WOOD® magazine shop



Continued on page 22



Round and round it goes. Where it stops nobody knows.

The Dremel Moto-Tool is a compact, high-speed rotary tool that really gets around. With variable speeds, ranging from 5,000 to 30,000 RPMs, and over 150 specially designed bits and accessories, it allows you to complete all kinds of tasks, on all kinds of materials.

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 20

Add an apron to lap tray for easy-chair carving

Sometimes it would be nice to plunk down in the living room and relax, but you hate to give up that carving time. You could carve while you're sitting there, but you'd draw flak for scattering chips all over the sofa and carpet.

TIP: Build a lap tray from scrap lumber and plywood, and then stitch up a canvas or denim apron. Arrange the apron as shown below, and then staple the hem to your lap tray. Now, you're ready to carve in comfort.

—John Blyth, Wadsworth, Ohio



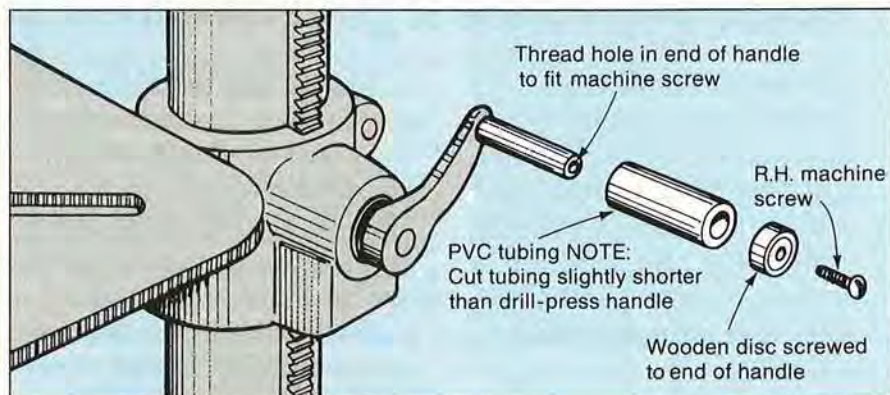
More comfortable handle isn't just a pipe dream

Adjustment cranks on some woodworking machines have fixed handles. They get the job done, but when you need to change your setups often, those handles can raise a few blisters.

crank handle (1/2" pipe fit the drill-press table crank shown below). Drill and tap the end of the metal crank handle for a 10-32 machine screw. Then, drill a 3/16" hole through the center of a wooden disc or PVC pipe cap. Slide the length of pipe onto the handle, and secure the disc or cap with a screw and washer.

—William King, Marion, Iowa

TIP: Take the friction out of adjustment by making a rotating handle from plastic pipe. Cut a length of PVC pipe to fit over the



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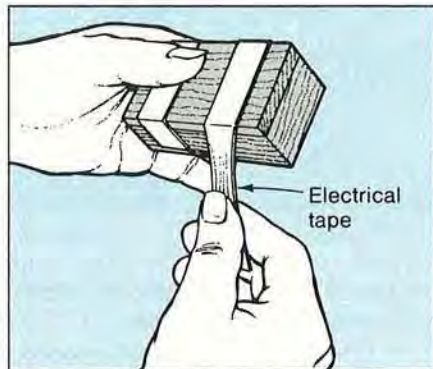
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Plastic electrical tape holds glue joints together

Tape sure would be an easy way to clamp glued joints on a small box. Too bad masking tape tears when you try to stretch it around sharp edges.



TIP: Short-circuit that torn-tape problem with black plastic electrical tape. It resists tearing, even on sharp corners, and its stretchiness lets you pull joints up snug.

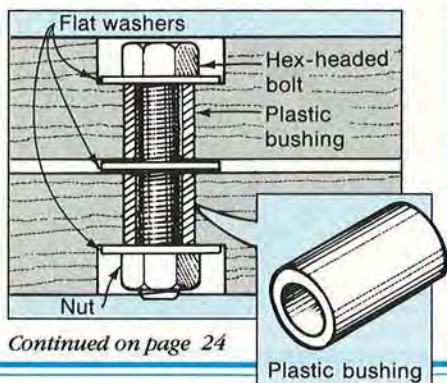
—Charles Von Herrmann, Columbia, S.C.

Plastic tubing makes pivot points sturdy

An easy way to make a pivot or hinge (as for a folding lawn chair) is to drill through the pieces and fasten them with a bolt and nut. But, metal wears the wood down, leaving a sloppy fit.

TIP: Separate the wood and the metal with plastic tubing. Select tubing that fits the bolt snugly. Then, drill through the wooden pieces to fit the tubing outside diameter. Cut a length of tubing as a bushing for each wooden part, and assemble as shown below.

—Bob Kettler, Cincinnati, Ohio



Continued on page 24

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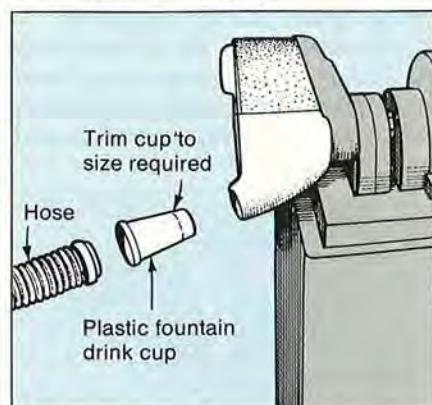
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 23

Big drink cup slurps up sawdust in the workshop

You're getting all hot under the collar trying to attach your shop-vac or dust-collector hose to a shop machine. The hose and the machine outlet don't quite mate up—you're going to have to use a lot of duct tape unless you can find some kind of adapter.

TIP: Relax; go down to the fast-food store and treat yourself to a big orange drink. When you get back home, rinse out the plastic cup and cut the bottom out of it. Now you have a cone-shaped adapter to go between the hose and the machine. The soft plastic trims easily, and it's flexible enough to conform to the ma-



chine's outlet and the hose end. Fasten it with duct tape or plastic electrical tape, if necessary.

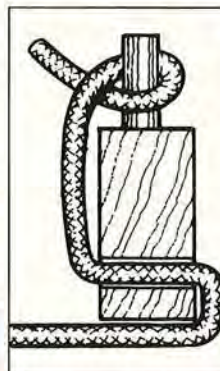
—Vence Jelouchan, Florence, S.C.

Trick ropin' saves the day when the gluing gets tough

You can fiddle a lot of time away trying to clamp hexagons, octagons, or any of the other polygons you might build. A strap-type clamp is the easiest way to hold them for gluing, but what do you do if you don't have one?

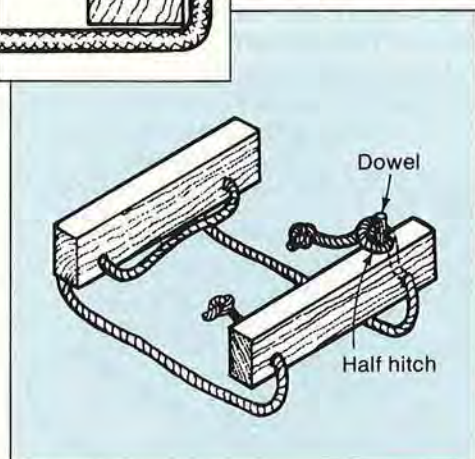
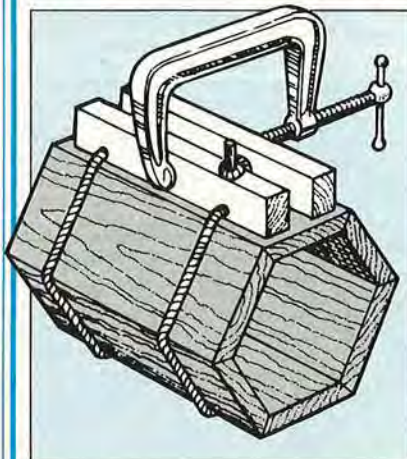
TIP: Get a rope. Then drill two holes (rope diameter) through two pieces of scrapwood near the ends. Thread the rope (sash cord works great) through the wood as shown, below, and tie a knot in each end. Drill a dowel hole on an edge at one end of one piece and glue in a dowel, leaving about two rope

diameters of it above the surface. Now, to clamp your work, place the wooden pieces three or four thicknesses apart and cinch the rope around the work, taking in the slack at the end near the dowel. When the rope is tight, pass its end around the dowel and back

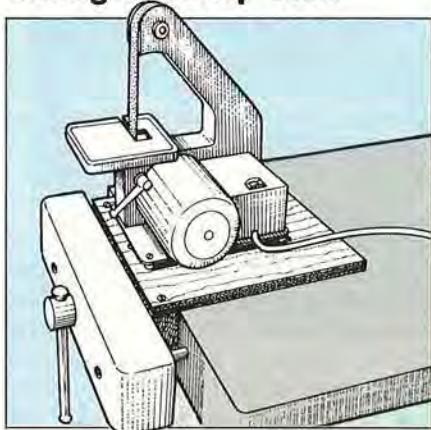


under itself to make a half hitch around the dowel. Then, draw the wooden pieces together with a C-clamp or hand-screw to tighten.

—Joe Bailey, Russellville, Ark.



The virtue of a vise: taming benchtop tools



You have so many benchtop tools now that you can't fit them all on top of your bench. You can store them somewhere else, but how do you keep a tool solidly in place when it's time to use it?

TIP: Cut a 3/4" plywood base for each tool and fasten a 2 x 4" cleat to the front edge. Store them out of the way. When you're ready to use one, place it on the bench and clamp the cleat in the vise.

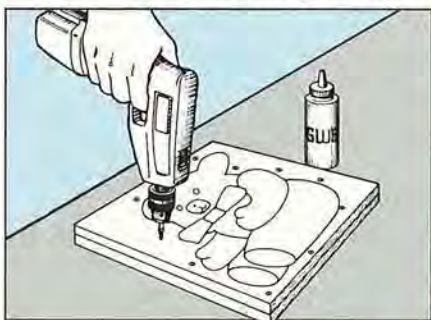
—John Hogsett, Beaver, Pa.

Drywall screws can ease your clamp shortage

You're laminating stock to be cut into project parts. But, you don't have enough clamps.

TIP: Before you start laminating, transfer your pattern to the top layer. Apply the glue and build the sandwich as usual. Then, instead of clamping it, fasten it together with drywall screws driven into waste areas.

—John J. Wells, Defiance, Iowa



Continued on page 26

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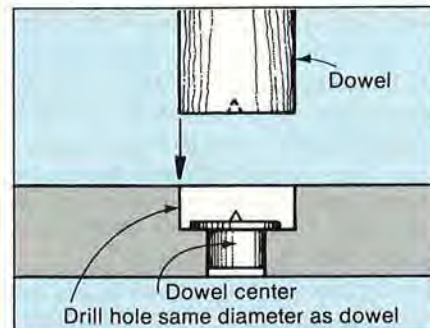
Continued from page 25

**Dowel center makes
quick center finder**

Finding and marking the center on a number of same-sized dowels—for a batch of small ornaments, for instance—sure gets tedious. It would be great to find a quicker way to do it.

TIP: Chuck a spade bit the size of the dowel into your drill press, and bore a hole about halfway through a block of hardwood. Next, change to a bit the diameter of a steel dowel center. Piloting on the centerpoint hole left by the spade bit, drill the rest of the way through the block to accept the dowel center. Then, with the center in place, put one end of your dowel into the larger hole, and tap the other end with a mallet. Bingo! An instant center mark.

—Ray Matthews, Port Clinton, Ohio



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**MORE TIPS FROM OUR
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Here are some of the other handy tips you'll find in this issue of *WOOD* magazine.

- See how we cut slots for spline joints with a tablesaw, regular blade, feather board, and tall auxiliary fence. It's on page 51.
- For flat, wobble-free shelves, make the scrapwood shelf-hole template shown on page 54.
- Don't need a toboggan? Laminating, described on page 67, also will make bent parts for rocking chairs or other projects.
- Use the stepped-scarf joint shown on page 68 when you need a strong end-to-end joint.



Chimney sweeps at one of the regular August West training workshops.

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PRODUCTS THAT PERFORM

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Interchangeable inserts for tablesaw blades and dadoes

Do you like the splinter-free cuts you get when your tablesaw throat plate hugs the blade, but you find it tedious to make and fit a new one every time you change blades or angles? The Wood Dynamics throat plate may rescue you.



Made of heavy 1/2" aluminum, the plate sports an oversized dovetailed slot, which accepts interchangeable wooden inserts. In my tests, the plate slipped easily in and out of my Powermatic 66, and remained stable and flush with the tabletop. The provided wood inserts slid firmly into the

throat plate, leaving no slop. I made additional inserts easily for other blades. By raising the spinning saw blade through the installed insert, I achieved a perfect fit.

During tests on my saw, I got the clean, chip-free cuts you expect when you have complete support on the bottom of your workpiece. My dado test cuts in plywood were splinter-free. A well-fit homemade plate will yield cuts just as good, but doesn't change as quickly and easily.

Price is the throat plate's biggest liability. But, if you demand precise cuts, and would rather spend your money than your time, this shop aid may be worth the bucks.

—Tested by Bill Krier

Delux Tablesaw Throat Plate plus two inserts, made by Wood Dynamics, \$88.75 for Sears model 103, Unisaw, and Powermatic ppd. from Garrett Wade, 161 Avenue of the Americas, New York, NY 10013-1299. Or call 800/221-2942. Additional inserts \$1.70. Sears model 113 is \$96.20 ppd.

Roll-your-own drum sanders

Here's a cleverly designed drum sander that lets you save money by using your own sandpaper. I tested two Singley drum sanders—the 3/4 x 3" and the 3 x 3"—on my drill press and found them well-made and well-balanced. At the recommended speed of 1750 rpm, they removed stock evenly and quickly.

It took some practice to pull the sandpaper taut over the sponge-rubber backing and lock the ends in the drum slot. Sanding sleeves are more durable and clean up more completely than most sheet or roll papers, but my sandpaper didn't tear during sanding or when I used my belt cleaner.

—Tested by Steve Oswalt



Singley Drum Sanders, available from Woodworker's Supply in six sizes from 3/4 x 3" to 3 x 6". Costs

range from \$15.95 to \$29.95 plus shipping and handling. Order by calling 800/645-9292.

Refinish faster and safer

Lots of strippers can remove the finish from that old garage-sale table, but generally, the quick-working ones are toxic and the safe ones are slow. Woodfinisher's Pride stripping gels, manufactured by Creative Technologies Group, are fast like the methylene chloride strippers and safe like the dibasic-ester strippers.



Between the two Woodfinisher's Pride products, you can strip varnish, shellac, and polyurethane, as well as latex and oil-based paints. In my 60° basement last winter, I used the varnish remover on a garage sale antique end table, and the paint remover on an antique bed. Each worked in 30 to 40 minutes. The original finish and stain came clean from the table with a single coat. The bed, which seemed to have been painted with latex, required one application for each of the two coats of paint.

You can use steel wool with this stripper—an advantage over other non-methylene chloride strippers. Grain raising is minimal. Other advantages: they don't dry out as quickly as the methylene chloride strippers, and have no noxious odor.

—Tested by Bill Krier

Woodfinisher's Pride, suggested retail \$8.50 per quart, \$14.99 per half-gallon. Available at homecenters and hardware stores. Call 800/457-7433 for a local distributor or to order direct.

Continued on page 31

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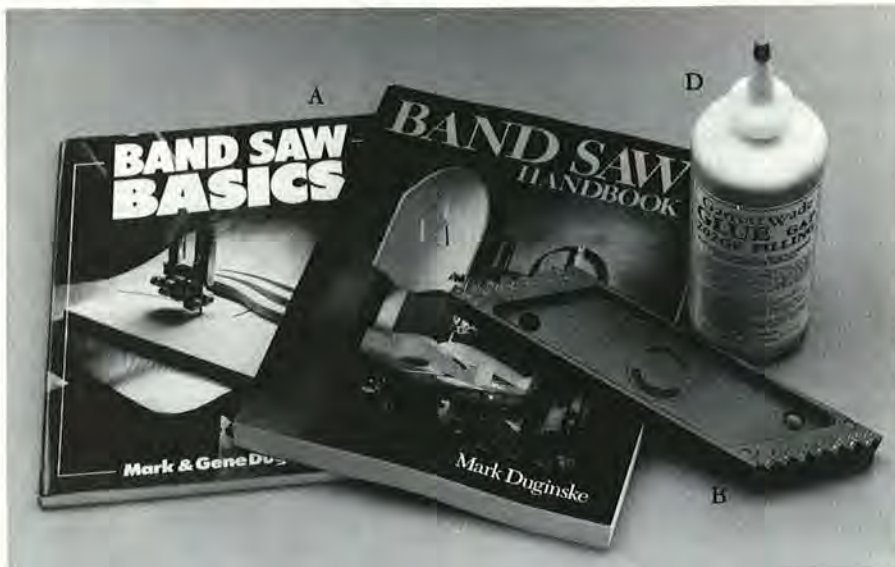
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E / The "Blind Nailer" Used To Be A Staple In Every Finish Carpenter's Tool Box

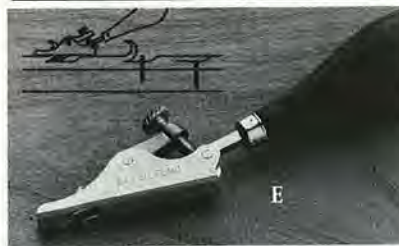
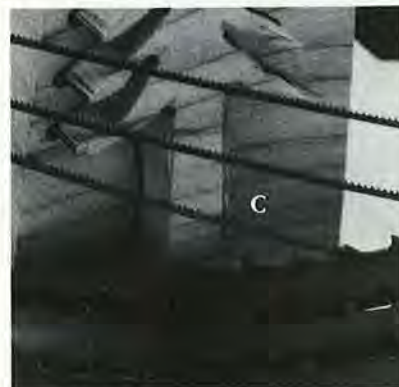
This unique tool allows you to set nails or brads invisibly. Slip the special chisel, with its finger nail shaped cutting edge, into the positioning jig and tighten the clamping screw. Place the flat sole on the wood and strike the end of the chisel with a firm tap with the palm of your hand. The Blind Nailer will lift a perfect small chip from the surface. Hammer your nail or brad in and then glue the chip back in place.

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PRODUCTS THAT PERFORM

Continued from page 29

Bit cleans dado bottoms

If your dado blade doesn't make the flat-bottomed cuts you require, you can still get striking results by following up with new bottom-cleaning router bits from Paso Robles Carbide. The bits, available for 1/4" collets in 1/2", 5/8", and 3/4" sizes, will smooth and square bottoms of existing grooves or dados.

In testing the 3/4" bit in plywood, oak, and pine, I found it consistently leveled rough or concaved bottoms (see *Dado Cutting Tools*, page 60).

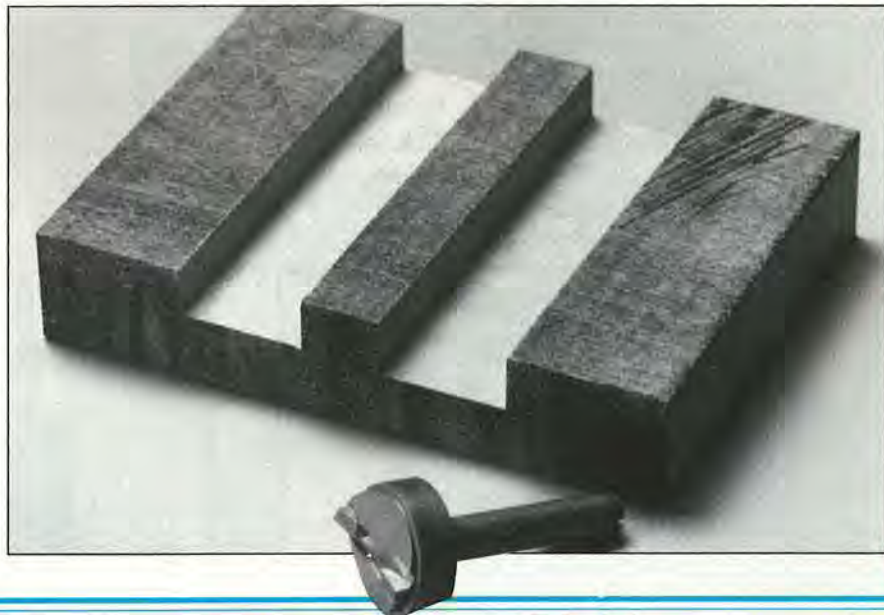
The clean-out bit will slightly deepen your dados and grooves, so make allowances. With my router, I needed fast passes to prevent burning.

Because most plywood is under-sized these days, you'll need to cut narrower dados to snugly hold a "3/4" plywood shelf. That

means you'll want to use the 1/2" or 5/8" bottom cleaner, in that dado. Use the 3/4" bit with a router table for dressing rabbets, mortise-and-tenons, and half-lap joints.

—Tested by Bob McFarlin

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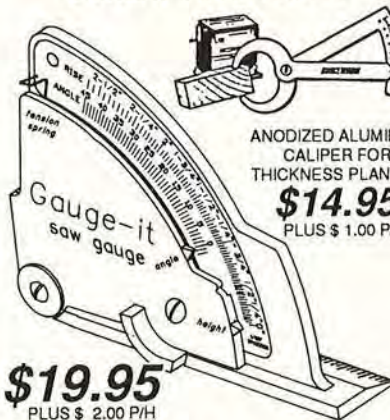
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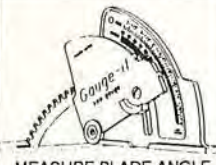
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TEAK

The tropic's top seafaring stock

Sailors and traders visiting India and China in the early 1800s were caught up with the wood they found in widespread use as seagoing stock. Teak, with working and structural properties surpassing even those of their traditional oak, soon became the prime nautical wood of Europe and America. Weather-resistant, tough teak still ranks as the favorite for boat decks and trim. But, it's the story of how this hardwood arrives in craftsmen's hands that rivals its history.

Teak harvesting begins with the girdling of selected trees deep in a Southeast Asian rain forest. This allows the timbers to die and dry on the stump over a period of years, making them tons lighter at logging time. Because of the terrain and its remoteness, elephants play a major role, moving the massive logs miles to a river. There, the teak lies for months, awaiting monsoon rains to fill the banks so it can float from the interior. In traditional forest harvesting, this seasonal reliance often results in a five-year delivery time.

Wood identification

Teak (*Tectona grandis*), a native species in the rain forests of Burma, India, Laos, and Thailand, now grows in about 40 countries throughout the tropics. In Java, for instance, teak was planted generations ago, and the trees are managed for sustained yield.

Naturally occurring teak grows to heights of 100' and diameters



Natural range

of 12' or more in about 300 years. Plantation-grown teak gets taller, but never as large in circumference, although it can be harvested in 60 years.

If size alone didn't distinguish teak from other rain forest trees, its enormous leaves would. They can measure a whopping 24x36", and their top surface is rough enough to sand with!

Teak has a thin layer of yellow sapwood, but it's never seen by woodworkers. Importers and dealers instead favor boards of only coarse-textured, golden-brown heartwood. Teak, though, depending on its growing conditions, may have a greenish tint, small stripes of yellow and darker colors, or an occasional mottle figure. At about 40 pounds per cubic foot dry, teak weighs slightly less than oak.

Silica, which the growing tree extracts from the ground and distributes throughout the wood, gives teak an oily feeling and causes finishing problems. Freshly sawed boards also carry the aroma of old shoe leather.



Uses in woodworking

Because it defies the elements, teak makes the perfect candidate for garden furniture and outdoor structures. Indoors, teak always has been prime stock for clean-lined furniture, as well as all forms of cabinetry.

Cost and availability

The Burmese set the grading and pricing standard for teak over 100 years ago. That's why teak's price goes up with the width and length of the board. For instance, First European Quality teak boards 1" thick will be at least 8" wide and bring a premium of \$8 or more per board foot. Narrower boards cost less.

Prime teak-faced plywood runs considerably more than red oak or cherry panels, but at around \$85, falls below the cost of walnut. Veneer prices fall into the \$1.50 per square foot range of most imported species.

Continued



Teak heartwood

Teak (*Tectona grandis*)

Woodworkers with lots of experience working teak say that in old-growth trees from Thailand and Burma, the silica in the wood has broken down, making it easier to machine. However, younger, plantation-grown teak has practically the same performance qualities as old-growth and you'll notice little difference in machining, although the color may vary, depending on the conditions at the location where it grew.

Machining methods

Because teak does vary in color according to its origin, try to buy all the boards you need for your project from the same shipment so the overall tone of your project will be uniform. *When working it, keep these tips in mind:*

- Due to its silica and oil content, teak slides easily over a machine's iron bed. You'll have no problem planing and jointing it, except that teak does dull blades more quickly than other hardwoods.
- In spite of its hardness, teak rips and crosscuts more easily than

oak. Always use carbide blades.

- Teak poses no routing problems, but it quickly dulls bits.
- With proper woodworking drill bits and high speed, you can put clean holes in this wood without breakout.
- Sanding teak requires frequent stops to clear its sticky dust away with a stiff brush. *Caution:* Some people have an allergic reaction to teak dust.
- Epoxy or resorcinol adhesives work best when joining teak. But first scrub all wood to be joined with acetone, then let it dry.
- Finishing teak poses the most difficulty. The wood doesn't take stain exceptionally well, and traditional clear finishes (except lacquer) can be a problem. For instance, regular polyurethane won't set up. But two-part polyurethane, the type for marine use, will. That's why teak is frequently coated with a penetrating oil, such as tung or teak.
- For outdoor use, teak doesn't require a finish, only an occasional scrubbing with soap and

water to clean the surface. The wood will eventually weather to a pleasing gray color.

Carving comments

Teak ranks high in hardness, but you can carve it with chisels and a mallet.

- The wood takes fine detail. However, the silica in the wood dulls chisels in no time.
- Take shallow cuts, despite how easily the wood seems to slice away, or else your cutting edge may wander in the coarse-grain.
- Power carvers should arm themselves with carbide cutting burrs to endure this wood.

Turning tricks

Except for its tendency to dull tools, teak turns exceptionally well in response to shearing cuts. Some teak, though, primarily from India, may be somewhat brittle and coarse-textured, causing chipping or splintering. ♣

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and special tips pertaining to this issue's featured wood species—appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-

profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.

- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means shallow gouge bevels—15° to 20°—and shallow cuts.

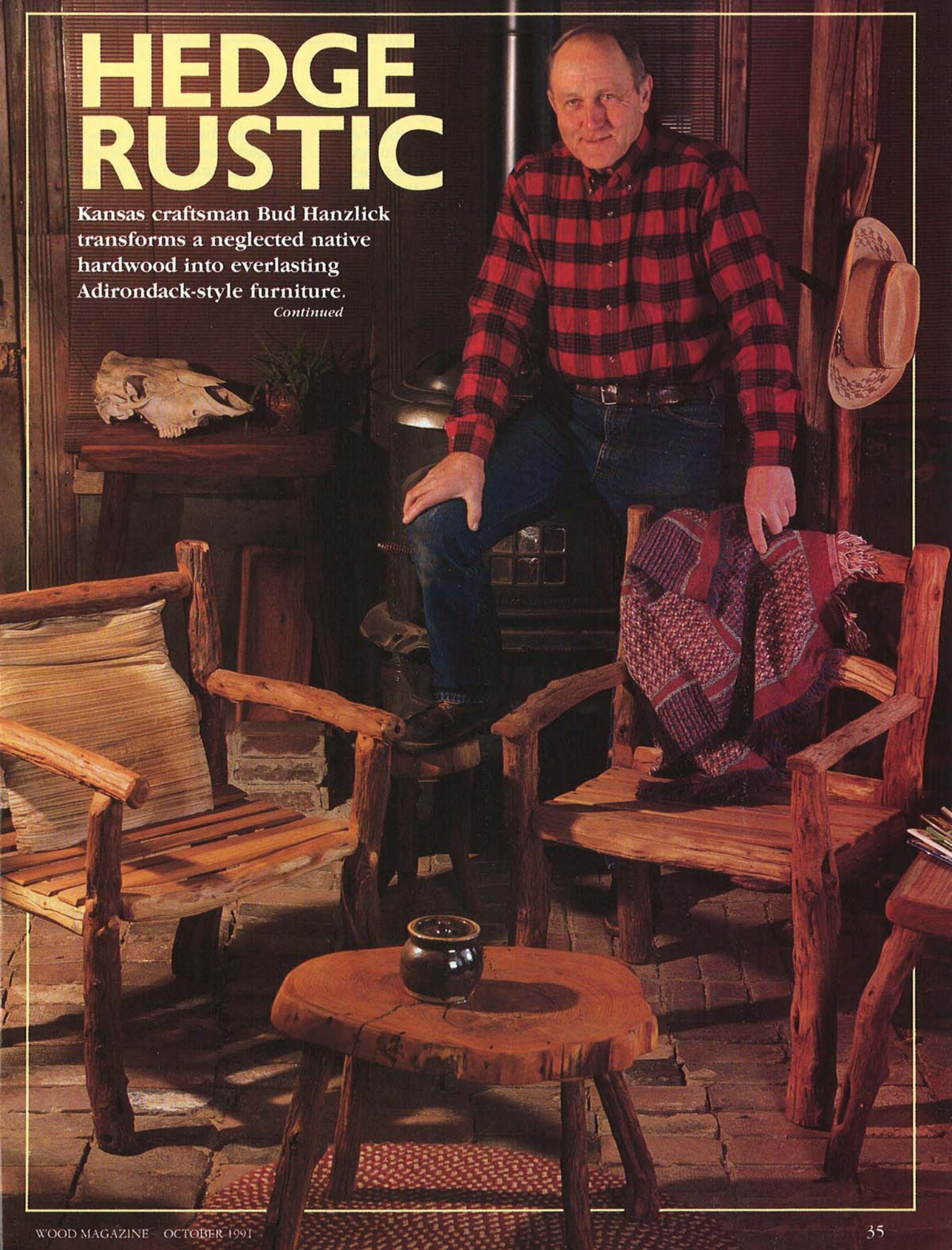
TEAK AT A GLANCE

Cost	\$ \$ \$ \$ \$
Weight	Ⓜ Ⓜ Ⓜ Ⓜ Ⓜ
Hardness	T T T T T
Stability	▲ ▲ ▲ ▲ ▲
Durability	⌚ ⌚ ⌚ ⌚ ⌚
Strength	🦵 🦵 🦵 🦵 🦵
Toxicity	☠ ☠ ☠ ☠ ☠
Workability	🔪 🪚
Look-Alike Mahogany	


HEDGE RUSTIC

Kansas craftsman Bud Hanzlick transforms a neglected native hardwood into everlasting Adirondack-style furniture.

Continued



HEDGE RUSTIC

 Print this article

Nothing escapes the bright yellow dust in Bud Hanzlick's Belleville, Kansas, shop. His drill press wears a thick coat. So does the radial-arm saw across from it. And in a corner of the room, the lathe sports a golden cloak.

"Making these integral dowels really kicks it up," Bud says, sweeping a large hand across his denim-covered chest. He nods to the small ocher cloud just created, "But, boy, I like this wood."

No matter what you call Bud's curry-colored stock—*bois-d'arc* as the early French explorers did, Osage-orange as do the wood technologists, or just plain hedge as a Kansan like Bud does—you

can't help but marvel at its sturdy handsomeness. Bright and rock-hard, *Maclura pomifera*, belongs to the same family as the mulberry and the fig.

A rustic revival

Even before he started crafting his rustic furniture, Bud had always worked wood, one way or another. Adding on here and there over time, he built the cozy frame home he and his wife Pat share. Their kitchen even features oak countertops and floors he made of planks salvaged from a nearby church.

With an old drawknife, Bud scrapes off the outer bark of his hedge fence posts to reveal the colorful wood beneath.



But it wasn't until Bud, for 20 years a Rock Island Railroad switchman, got laid off six years ago that the idea of rustic furniture clicked. "I was wondering what to do with all my new free time," Bud recalls. "Then I was out at the farm one day and spotted a barn post of hedge that the cows had polished smooth. It was darn nice. Why not make furniture out of it?"

No one that Bud knew had ever worked hedge into furniture, or anything except fence posts for that matter. But that didn't stop

him. He rounded up some old hedge posts and a few sawed slabs and made a bench.

"I made a few more benches, then a chair or two," Bud remembers, "always trying to improve." The pieces looked rustic, but he thought that an honest use of the material. Hedge *is* rustic. Now, Bud offers chairs, settees, tables, benches, coat racks, and planters.

Hedge has history

"Hedge is just as tough as the pioneers around here that planted it," notes the raw-boned 58-year-old,

ready to relay some background.

Originally confined to the Red River area of Oklahoma, Arkansas, and Texas, Osage-orange was widely planted by settlers in farming areas from western Kansas to the East Coast. Before barbed wire, the thorny, fast-growing trees made excellent fences. "In fact," Bud says, "depending on how thick it grew, even chickens couldn't get through."

According to Bud, whose ancestors helped settle the barren plains, farmers planted Osage-orange heavily along Kansas fields in the mid-1800s. "The state even paid folks to put it in," he says.

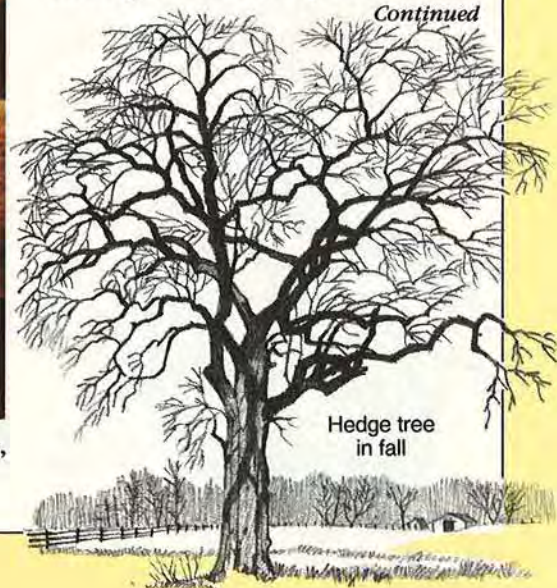
But history relates that Bud's hedge served other purposes, too. First, the Osage Indians shaped top-notch bows from it. Then, the tough-as-nails wood became wagon-wheel hubs and rims, bridge pilings, railroad ties, pulley blocks, and even paving. The dye industry used extract from it to produce yellow, tan, and khaki. And the tree's large, rough fruit—*apples* in hedge country—fed wildlife, and ground-up, fed livestock, too.

Hedge's role changed as agriculture grew, however. Fences occupied less space than trees, and mechanization meant larger fields. So, down came the rows of hedge. Thirty years ago, Bud helped harvest the hedge on area farms, turning it into fenceposts.

Continued



Because the hard hedge would quickly lay waste even the best carbide turning tools, Bud saws the round tenons at his lathe.



HEDGE RUSTIC

"You can't beat hedge for posts," Bud points out. "It won't rot, and it resists insects and weather. They'll last 60 years sunk in the ground. We used to get 75 cents for a post back then. There's still some farmers that will pay \$4 for a brand new one."

Over the years, farmers harvested most of the nearby hedge. That means Bud has to go farther and farther for his wood. "The big stuff that I have sawed into boards at the mill comes from a guy who contracts to log out hedge between fields. But mostly, I get by with old, pulled fence-posts or unused ones that I find at farm sales," he explains.

Metal meets its match

Most woodworkers shun hedge. True, the wood has a refreshing yellow color when first sawed. But before long, it turns a dark orange-brown. Then, too, it seldom comes in very large pieces because the tree rarely grows big. And any hedge will likely have knots, holes, and ingrown bark. It's also difficult to season. But it's machining hedge that tries a woodworker's patience.

For his furniture's arms, legs, and stretchers, Bud selects small-diameter posts from his outdoor stockpile. Then, he scrapes away the weathered-gray, dirty bark with a drawknife. Next, he attacks the surface with a wire brush chucked into his portable electric drill. The result: cleanly furrowed reddish-orange stock, and dis-

abled tools. "In two days of cleaning up posts, I'll wear a new steel brush down to the nubs," he says. No wonder. Hedge has the tightest of grain and rates twice as hard as hickory. That's enough to topple any cutting edge.

"The carbide blades I put on my saw only last about two months," notes Bud, "and I have to constantly sharpen my spade bits." Bud doesn't even count all the chainsaw chains he's retired before their time, or the grimace he gets from the shrugging sawyer when he brings large chunks to the nearby sawmill.

But this Kansan is actually thankful for all the fuss and bother. Because that means he's about the only one drawing on the dwindling local supply. "Most folks don't even gather it for fireplace wood," Bud comments. "It'll spark and kick a glowing coal out four feet."

Prices for his Bekan Rustic Furniture go from \$25 for a small bench to \$150 for a chair and \$250 for a settee. He markets his work at craft fairs, but gets lots of direct orders, too. "Pat and I even drove a pickup load back to a Pennsylvania buyer last year," an-

A hydraulic jack pins the stick of twisted wood in place for drilling the mortise. Note how Osage-orange's yellow dust coats the work area.



Hedge fruit and leaves

nounces Bud. Grinning, he adds, "And I could have sold all of it at rest stops along the interstate highway before we got there."

Joinery that takes abuse

Bud's chosen stock grips nails and screws in a hammerlock. The hitch is starting them, then driving them home.

The craftsman admits to some trial-and-error before he hit on the right joinery, though. He first tried bolting his hedge furniture together, but it appeared too clumsy. Next came drywall screws—not right either. Plain old

nails worked (predrilled holes, of course), with lots of effort. The technique that won out, although it took more machining, was mortise-and-tenon joinery. Bud calls it "integral doweling."

"I form a 1" diameter, round tenon on all my chair legs, arms, and stretchers," he explains. "Then, say in a chair arm, I'll drill a hole to accept it. When it's glued up, that joint will last as long as the wood."

In an unusual machining technique, Bud *saws* the round tenon while the wood spins on the lathe, as shown in photo, *page 37*.

The 1" hole Bud drills in the chair arm will receive the tenon of the leg. On some furniture, Bud leaves the tenon exposed as a detail.

At one end of the lathe bed he mounted a portable circular saw that slides back and forth on a carriage. When he chucks a hedge stick in between centers and sets the lathe spinning, he turns on the saw. By moving the saw blade gradually against the stick, and the chucked-up stick back and forth along the bed with a cranking mechanism, Bud shapes a tenon in a minute or two.

To accurately drill the 1"-diameter mortises in round pieces of hedge, Bud rigged up another unusual fixture. He built an open-sided box to rest on the drill-press table. Then, to keep the often-crooked pieces from turning under the bit, Bud installed a small hydraulic jack at one end of the box. "When I put the stick in place, I squeeze it in tight with the jack," he says."

Other than the tenon-making at the lathe and the drill-press operation, Bud's furniture stock receives little machining. "I don't plane my boards, just smooth them up with a belt sander," he comments. "The wood in rustic furniture shouldn't be slick."

Finishing? Forget it. "Hedge really doesn't need any finish. Outdoors, it's going to weather to gray and last forever," Bud says. "Indoors, it'll darken some no matter what you do, especially if it's in sunlight. But the wood doesn't need protection. A finish would just darken it."

You have to take Bud's word for it. After all, he's probably the only craftsman making hedge furniture. Besides, Bud offers a guarantee: "If it doesn't last, I'll furnish you with a new piece!" ♣

For a brochure describing Bud's hedge furniture, write:

Bekan Rustic Furniture
P. O. Box 323
Belleville, KS 66935.

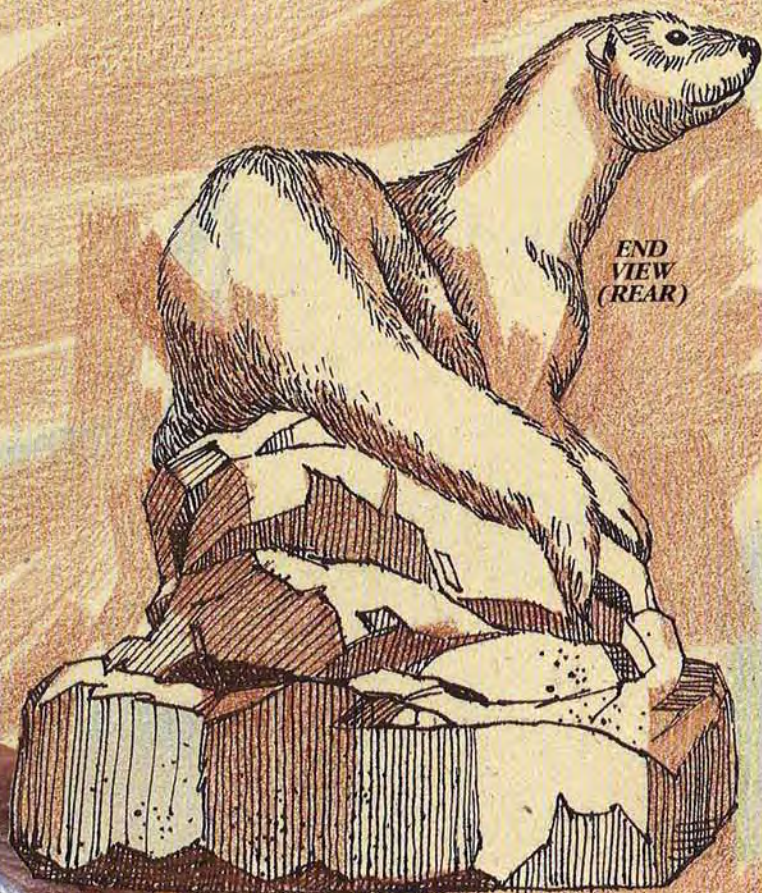
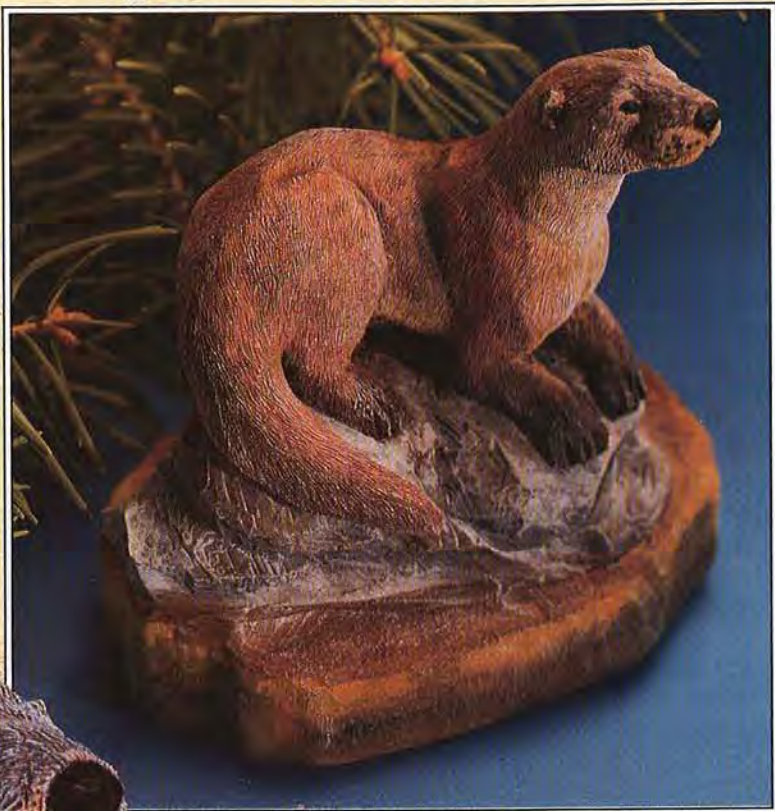
Written by Peter J. Stephano
Photographs: Perry Struse

Carve a Desiree Hajny original

HERE'S OTTO

Blue-ribbon wildlife carver Desiree Hajny created Roscoe the Raccoon for *WOOD*® magazine readers in the June 1989 issue. You responded enthusiastically, so we asked her to design another lifelike animal carving for you. Well, gather your gouges, gang; it's time to meet Otto the Otter.

 [Print this article](#)



Few creatures appear to enjoy life as much as otters. Invariably, they're shown sliding down slippery slopes, lolling about in the water, or just generally romping.

With this zesty personality in mind, champion wildlife carver Desiree Hajny perched Otto on a river rock, alert and itching to jump in. You almost can see Otto's tail switching as he surveys his stretch of river.

Get Otto into shape first

Unless you're starting with the precarved roughout, trace the full-sized front- and side-view patterns onto your carving block, and bandsaw to shape.

Before you start carving, study Otto's build, the shape of his head, and his facial contours in the photos and illustrations. Then, begin carving with your knife and small gouges.

Turn your carving frequently as you work. Don't concentrate too much attention on any one area at this stage. Instead, remove wood

from the entire carving to get the proper overall shape and proportion. And, allow yourself some room for detailing the head and face. About 1/2" of extra wood there should do the trick.

Continue your Otto-body work

Strive for a flowing surface as you carve Otto's body. Otters are sleek animals, so don't make yours too cylindrical or chunky.

If you were to cut a section across Otto's middle, you would have a triangle with bowed-out sides and base. His backbone ridge (most prominent between the shoulders and hindquarters) represents the tip of the triangle; his belly, the base.

The ridge disappears at the hips, Otto's widest point. Moving up front, study the photograph *opposite page bottom* before carving the shoulders and chest. Notice how the muscles appear like another layer, molded to the body.

Give Otto solid footing

Otters live around water and eat fish. To get about on soggy land, propel themselves through water, and snag food from the river, they have webbed, clawed feet.

Carve each foot to approximate shape; then, divide each into five toes with V-cuts (see illustration, *page 43*). Don't separate them completely—the feet won't look webbed if the cuts are too deep or too wide. Pick out the claws with your knife tip.

Put a good head on his shoulders

As the body takes shape, begin removing the excess wood from the head. Make the head about as thick as the neck from the side view, a little wider than the neck when viewed directly from the front. Otto's backbone line flows smoothly up his neck to the top

Continued next page



Tools and Supplies

Carving stock

Basswood, jelutong, or other carving wood, 3x5x5". Or, order a 70 percent precarved basswood roughout, shown *left*, for \$12 (two for \$22) ppd. in the U.S. from Rossiter Roughouts and Carving Supplies, 1447 S. Santa Fe, Wichita, KS 67211, call 800/8-BLANKS.

Knife

- bench carving knife

Gouges

- 1/2" No. 3
- 1/2" No. 5
- 1/8" No. 7
- 1/8" No. 9
- 1/4" No. 9

V-tool

- 1/4" 45°

Woodburner

- fine detail tip

HERE'S OTTO

of his head, where it changes to a slight depression (photo *below*).

From the side, Otto's head shows two major forms: a rough circle encompassing the ears, eyes, and jawline, and a blunt, half-egg shape for the muzzle. Viewed from the top, the head features appear slightly squared.

Shape the head with small gouges and a knife. The scoop-like ears sit low, near the back of the head. Carve slight hollow spots in



The top of Otto's head shows a slight depression. His ears sit low on the sides of his head. Note the nose shape.

front of the ears, on the muzzle at the inside of the eyes, on top of the head, and under the nose.

With your knife, carve the nose as a baseball diamond shape with rounded upper sides. Place the eyes about midway along lines extending from the tip of the nose to the ear on each side, about the point where the egg-shaped muzzle joins the rounded head.

To carve the eyes, cut a gentle arc shape pointing upward with a downward-pointing one beneath it. Then, outline the eye with a series of curved stop cuts and carefully round the eyeball.

Complete carving the riverbed rock for Otto's perch. Then, sand or burnish Otto's head and body to smooth the contours and remove tool marks.

To burnish, rub the surface with a blunt object to compress the wood fibers. Some carvers do this with a small piece of wood while others use metal. An old

teaspoon makes a good burnishing tool. With this done, you're ready to paint or woodburn the fine texture of Otto's fur.

First, study the illustration *opposite page*. Notice how the hair grows, and the way it follows the contours of Otto's body.

Don't forget his fur coat

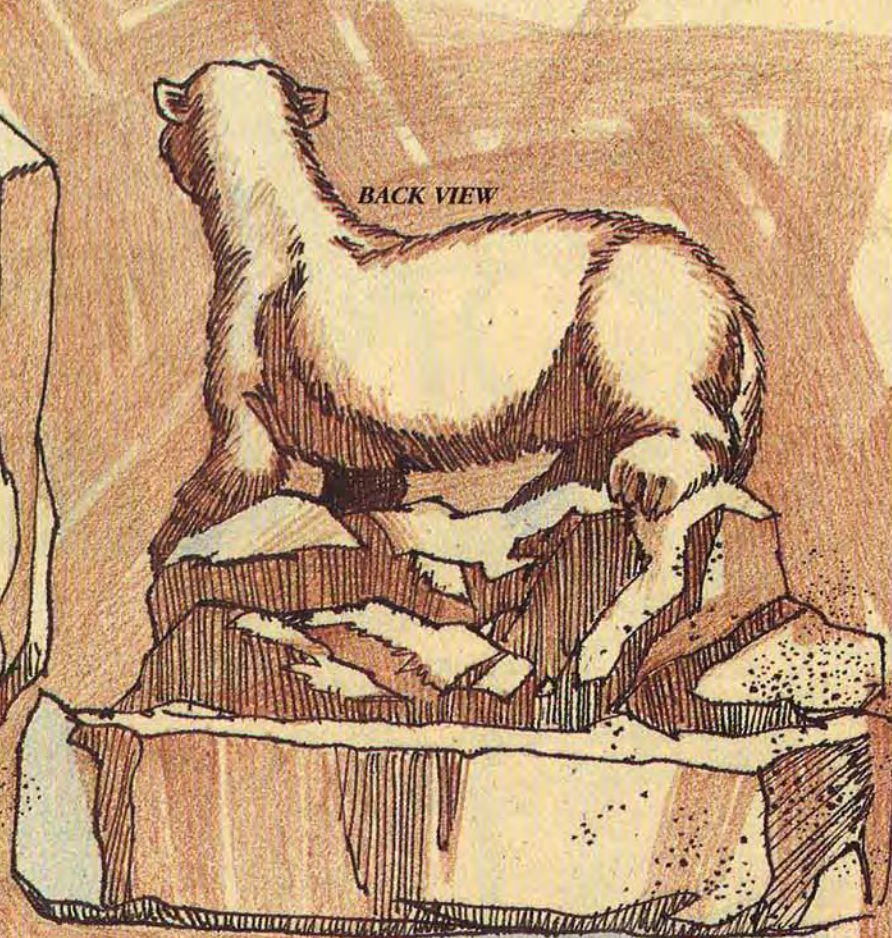
If you paint Otto's coat, seal the bare wood with tung oil or spray lacquer before you start. This prevents the paint from soaking in. Paint the fur with a fine-tipped brush, size No. 1 or smaller.

Otto looks more realistic with his fur texture woodburned, and then painted. With a fine detail point on your woodburner, burn short, curving strokes in layers.

For shiny nose and eyes, sear them with the side of a hot woodburning tip. The seared wood won't absorb tung oil (applied later), and will look shiny. You also could paint the nose and eyes



TOP VIEW



BACK VIEW

with flat black paint, and then apply gloss varnish, clear fingernail polish, or clear epoxy over them.

Give Otto some color

Study the color photos and refer to the Finishing Materials and Paint Colors listings, *right*, before you begin painting your carving.

Thin your paint. Make it watery, almost a wash, so the pigment doesn't fill in the woodburning marks or carved details.

Start with light colors and work toward darker shades, blending color changes to avoid harsh lines or a zebra effect. To build color, put on several thin coats.

Allow the paint to dry, and then dry-brush Otto with a mixture of white and brown paint. As the technique's name suggests, you start with a dry brush. You'll get better results if your paint is a little thicker, too.

Dip the brush into the paint lightly. Better yet, pat the paint

surface with the brush just enough to pick up a hint of color on the bristles. Then, brush your carving with light, quick strokes. Your best strokes will be the ones where you darn near miss Otto altogether with the brush.

You're not trying to put another layer of paint on Otto when you're dry-brushing. Rather, aim to put on the slightest amount of color as a frosty-looking highlight.

Mix some shades of gray for Otto's rock, and paint the base with browns and golds to represent a streambed. Dry-brush the rock and streambed with a light gray.

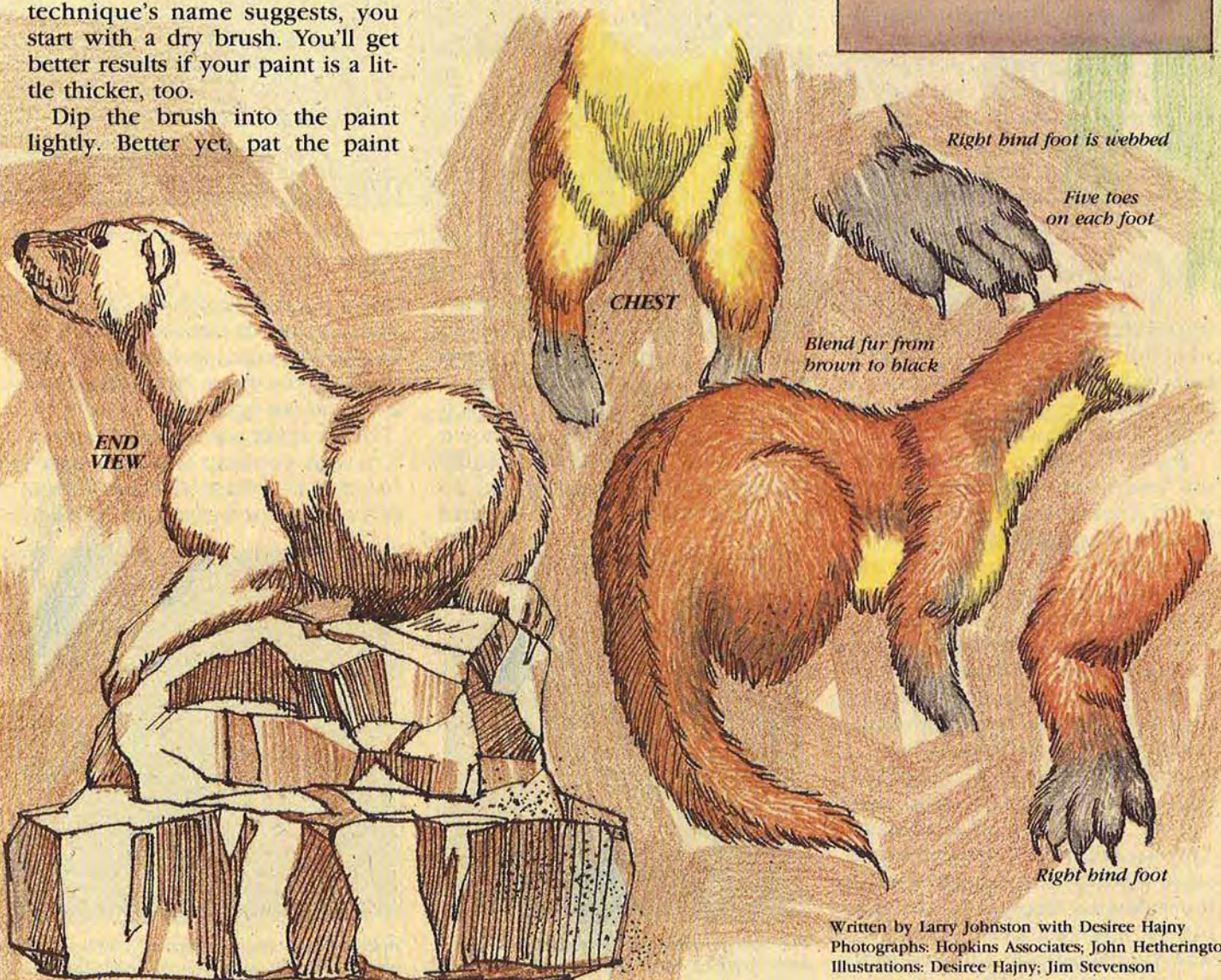
Inspect your work, and then sign and date it on the bottom. Finally, coat your carving with low-gloss tung oil. ♣

Finishing Materials

- acrylic artist's colors in parchment, dull white, bright white, black, dark brown, and gold
- sable or camel-hair brushes, sizes 00, 0, 1, and 3
- low-gloss tung oil

Paint Colors

- Spots on muzzle, nose, eyes—black
- Feet—brown-black (add black to dark brown)
- Belly, chin, chest, lower muzzle, neck—buff (add white to brown or parchment)
- Ears—brown
- Back, top of head, nose, tail—varied brown shades
- Rocks—varied grays
- Base—gold, varied browns



Written by Larry Johnston with Desiree Hajny
 Photographs: Hopkins Associates; John Hetherington
 Illustrations: Desiree Hajny; Jim Stevenson

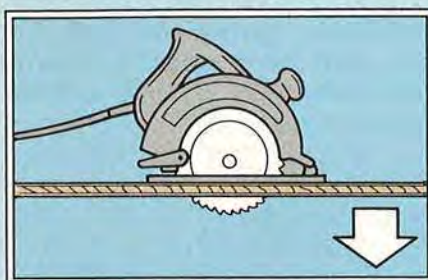
10 WINNING WAYS TO WORK WITH PLYWOOD

For all of its virtues—stability, strength, and good looks, to name a few—a sheet of hardwood plywood can present some real challenges to the woodworker. For example, cutting a 4×8' sheet down to size without a lot of rigmarole, or cutting through its thin surface veneer without splintering, can be time-consuming or downright frustrating. And, how do you go about hiding those unsightly edges?

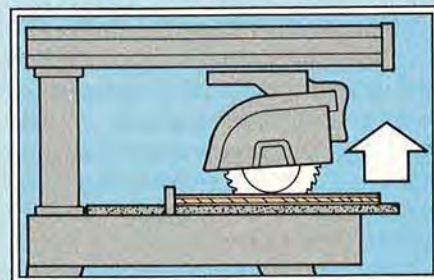
To help you deal with these and other problems peculiar to plywood, we've assembled 10 of our best tips and jigs.

Now, bring on the plywood!

1 HOW TO SHOW YOUR GOOD SIDE WHEN CUTTING
Circular saw-blade teeth create few splinters as they enter a veneered surface, but may create a lot of chipout as they exit the workpiece. So, always position your stock as shown.



Position the best face *down* when cutting with a portable circular saw.



When using a radial-arm saw, position the plywood's best face *up*.

2 ZERO-CLEARANCE INSERTS ADD UP TO IMPRESSIVE TABLESAW RESULTS

To minimize splinters on the underside of the workpiece—something that's especially important with a dado blade—make a zero-clearance insert for your table saw. Here's how:

Trace the shape of your table-saw insert onto a piece of ½" plywood (some smaller saws may require ¼" plywood or tempered hardboard). Cut just along the outside of this line, and then sand back to the line.

To cut the zero-clearance slot in the insert, you first have to install a blade that's at least 1" smaller than the largest blade that the saw handles (9" blade in a 10" saw). The outside blades of a stackable dado set work well if you're making the insert for a ½"-kerf blade. This is necessary because fully sized blades will interfere with the following steps. If you're making the insert for a dado blade, install the dado blade adjusted to its desired cutting width.

With the saw blade fully lowered, check the fit of the plywood insert. To set the top of the insert flush with the table saw top, apply dabs of hotmelt adhesive to each of the insert supports as shown *below*. Allow these dabs to harden slightly (5–10 seconds should do it), then install the insert and

push it down flush with a straightedge as shown *below*. If the insert sinks too low, just pop it off, apply more hotmelt adhesive, and try again.

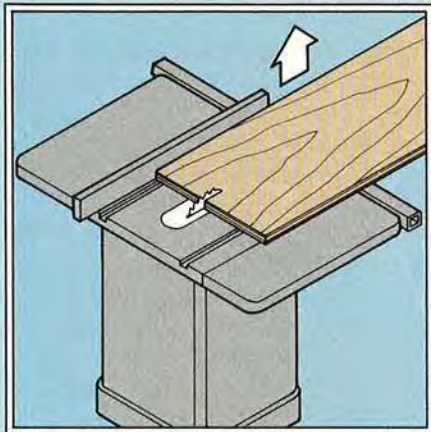
Now, cover a portion of the insert with your rip fence. *Be careful not to place the rip fence directly above the saw blade.*



For best results, allow the hotmelt adhesive to cool for 10–15 seconds before putting the insert in place.



Before the hotmelt adhesive cools completely, set the insert flush with the table top using a straightedge.



Position the best face *up* when cutting plywood with a tablesaw.

Slowly raise the blade through the insert as shown *below*. With the blade slot cut, remove the insert and replace the smaller blade with a larger one if necessary.

In the *WOOD*® magazine shop, we make several insert blanks at once so we have one handy whenever we change blades.



Hold down the insert with your rip fence and slowly raise the blade. *Be careful not to cut into the rip fence!*

3 A HASSLE-FREE WAY TO CROSSCUT LONG STOCK ON YOUR TABLESAW

Crosscutting a long piece of plywood on a tablesaw can be a dangerous—if not impossible—proposition. It doesn't have to be.

Clamp a straightedge onto the bottom of your workpiece and guide the straightedge along the edge of the tablesaw extension as

shown *below*. If the extension casting has a rough edge, or protruding bolts, you'll have to add a wooden strip to it for the straight-edge to glide against. If you add such a strip, make it the necessary thickness so the blade-to-straight-edge distance is a round number.



A straightedge clamped to the bottom side of your workpiece helps you crosscut long panels quickly, easily, and accurately.

4 TWO WAYS TO GAIN THE UPPER HAND ON GLUE SQUEEZE-OUT

Glue squeeze-out can do a real number on your finish if allowed to seal the surface of the wood. Unfortunately, these blemishes usually only reveal themselves after you apply a finish. We use two substances—oil and masking tape—to block squeeze-out from coming in contact with the wood.

As shown at the top of *page 47*, you should first apply the masking tape to surfaces adjoining the dado. Then, dry-fit the mating piece into the dado, and apply tape to the exposed surfaces of this piece. Separate the two pieces, apply glue, clamp, and allow the squeeze-out to form a

tough skin before gently peeling away the tape.

Masking tape may not stick to all woods, so we occasionally use Watco natural oil as shown at the top of *page 49*. First, dry-fit the adjoining pieces, wipe oil where the squeeze-out will occur, separate the pieces, and glue them together. With a sharp chisel, carefully shave away the glue squeeze-out after a tough skin forms.

Before using this method, test the oil's compatibility with the finish you will apply over it. The oil will blend nicely with most stains, but may discolor a clear-finished piece.

Continued

10 WINNING WAYS TO WORK WITH PLYWOOD

5 HOW TO CUT PLYWOOD WITH A PORTABLE CIRCULAR SAW OR ROUTER

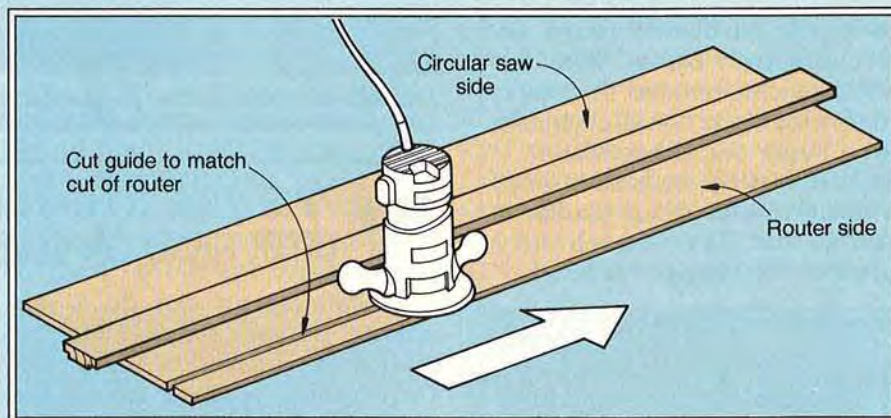
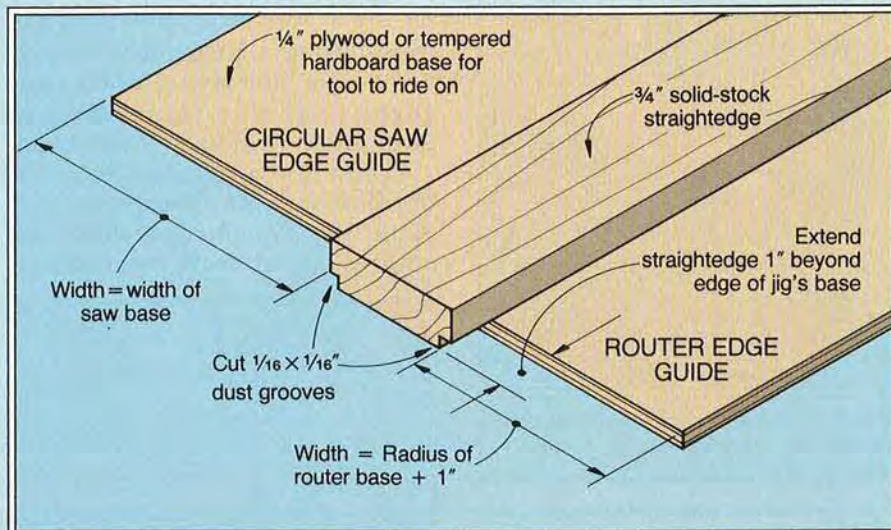
Many of us don't have tablesaws or workshops large enough for ripping full sheets of plywood. What we need: a system for getting good results with portable tools. You can use a router for smooth cross-grain cuts, or a portable circular saw for fast ripping. The edge guide shown at *right* accommodates both tools. (You can make the guide for use with just one tool, as we did with the guide shown at the top of *page 45* and in the photo at *bottom right*).

Make the $\frac{1}{4}$ " base wide enough so you can trim one side to width with your router as shown in the drawing at *right middle* and the other side with your saw. This way, the router bit or saw blade trims the $\frac{1}{4}$ " base so you can align this edge with the marks on your workpiece for quick, precise results. We made our edge guide 8' long so it handles almost any plywood job.

You must use the same saw and blade, and the same router and bit, with the guide at all times, so it helps to write the make and size of these tools on each side of the guide. Otherwise, the edges of the guides will not align with your cutoff marks as required in the following step.

To make a cut, line up either of the trimmed base edges with your cutoff marks, clamp the edge guide in place, and cut away. As shown in the photo at *right*, we prefer to support the workpiece on top of several 2x2s resting on top of sawhorses.

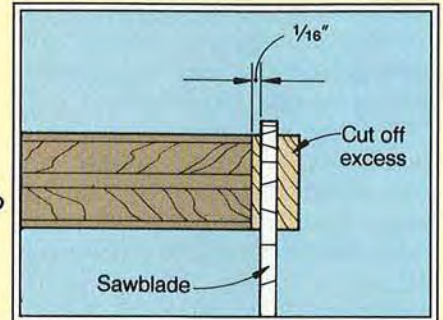
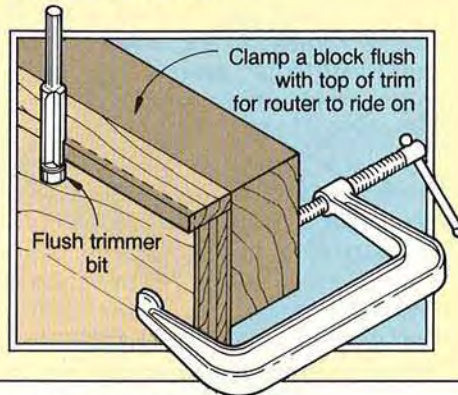
Use several 2x2s to make an inexpensive support that prevents you from cutting into your sawhorses.



6 HOW TO GET THE EDGE ON PLYWOOD

Plywood components such as shelves require edging of some sort, and we prefer solid wood over edge banding because of its durability and natural look.

First, glue a $\frac{1}{4}$ "-thick strip of wood onto the edge and trim it as shown at *right*. If you want the edge to look as inconspicuous as possible, trim it to $\frac{1}{16}$ " thickness as shown at *far right*.



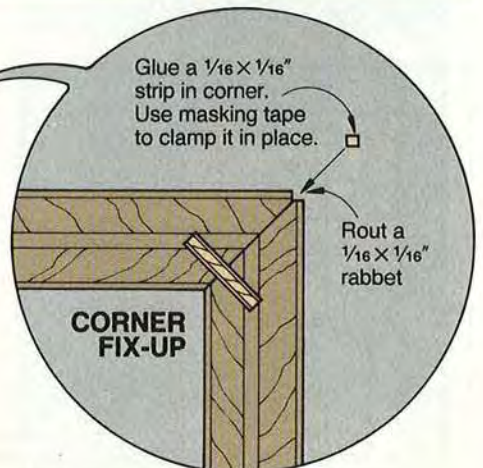
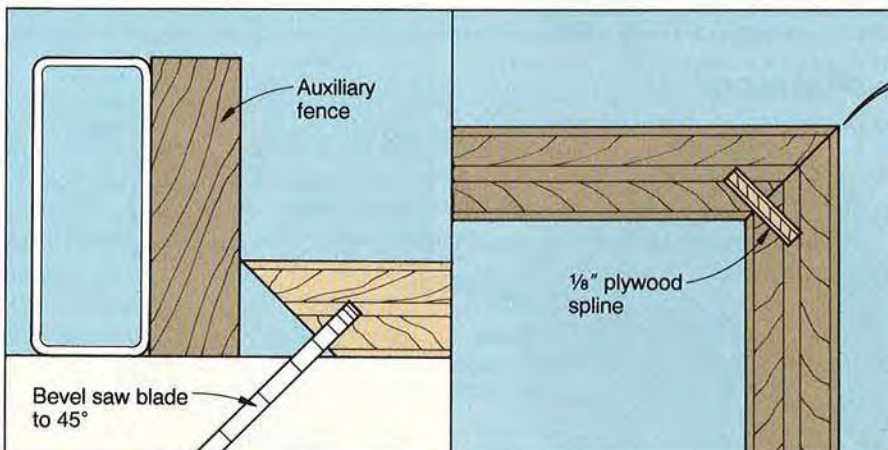
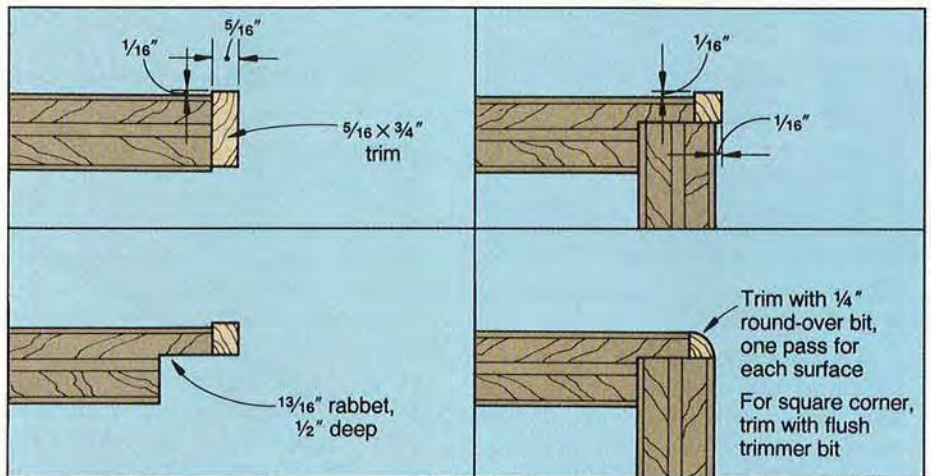
7 GETTING CORNERED WAS NEVER EASIER

Like edges, plywood corners need disguising. Here's how to handle rabbeted and mitered corners.

For rabbeted corners, glue a $\frac{5}{16}$ "-thick trim piece onto the edge of one of the workpieces, and follow the sequence at *right*.

When faced with a mitered corner, we insert a $\frac{1}{8}$ " spline for increased strength as shown *below left* and *middle*. If the corner doesn't align perfectly, add a $\frac{1}{16} \times \frac{1}{16}$ " strip as shown in the Detail drawing *below right*. Sand the strip smooth with the surface.

Continued



10 WINNING WAYS TO WORK WITH PLYWOOD

8 TO CUT DADOES WITH A ROUTER, YOU NEED THIS JIG

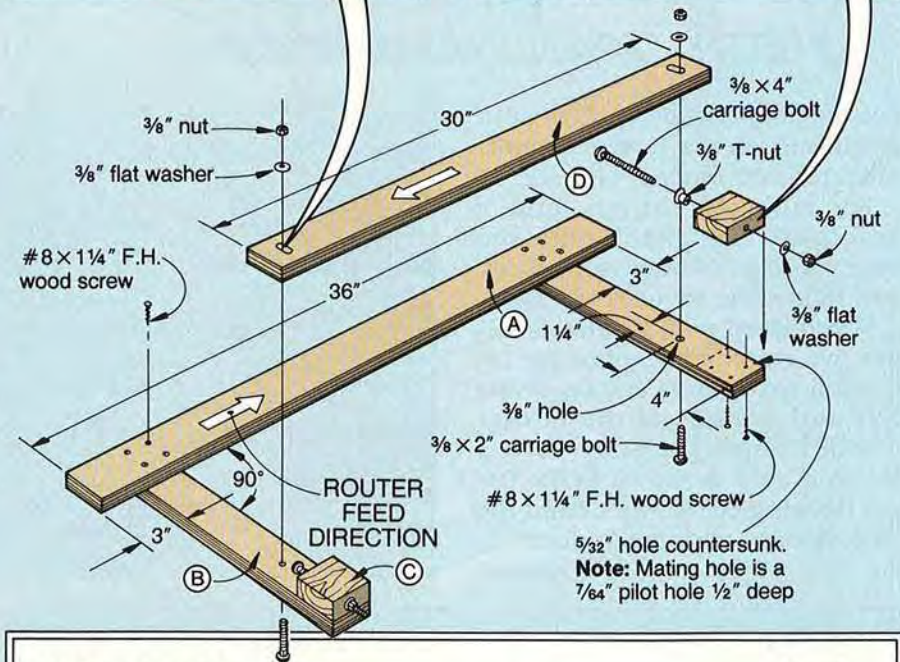
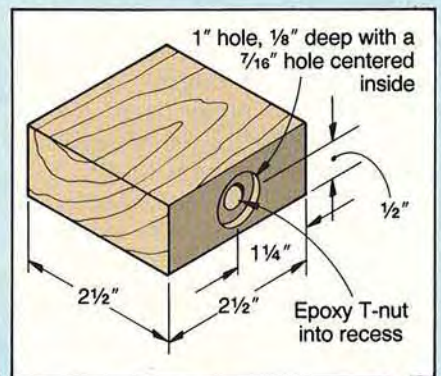
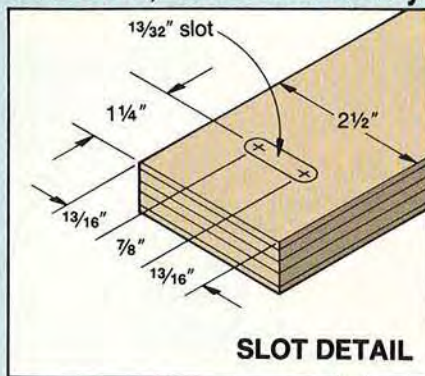
Routers equipped with straight or spiral bits cut clean dados but have one drawback: you can't adjust the bit for different cutting widths. Until now.

With the jig shown *below*, your router, and a single straight bit, you can cut dados in widths that range from your bit's width to twice your bit's width. For example, with a $\frac{1}{2}$ " bit you can cut dados from $\frac{1}{2}$ " to 1" wide.

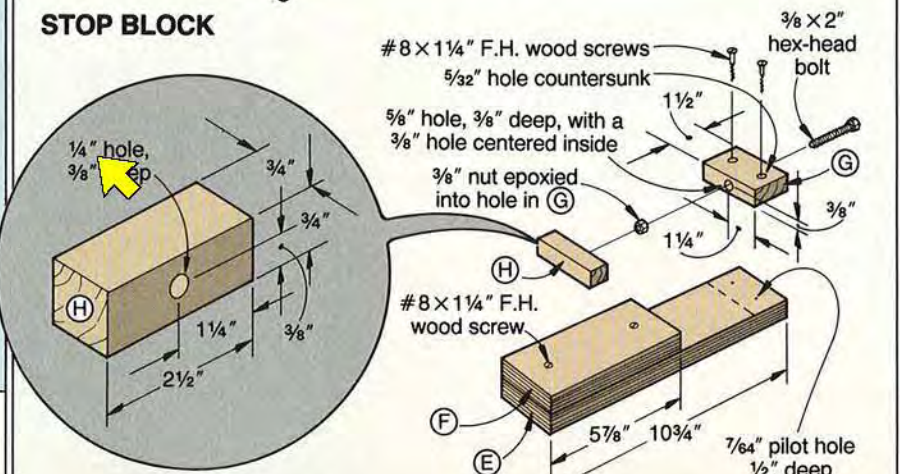


With this jig you can rout tight-fitting dados every time.

To build the jig, see the drawings and Bill of Materials at *right* and *below*. We sized this jig for routers with 6" bases. If your router has a larger or smaller base, you'll need to change the length



Bill of Materials					
Part	Finished Size			Material	Qty.
	T	W	L		
A	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	36"	Plywood	1
B	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	$14\frac{3}{8}$ "	Plywood	2
C	$1\frac{1}{16}$ "	$2\frac{1}{2}$ "	$2\frac{1}{2}$ "	Solid stock	2
D	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	30"	Plywood	1
E	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	$10\frac{3}{4}$ "	Plywood	1
F	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	$5\frac{7}{8}$ "	Plywood	1
G	$\frac{3}{4}$ "	$1\frac{1}{2}$ "	$2\frac{1}{2}$ "	Solid stock	1
H	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$2\frac{1}{2}$ "	Solid stock	1



of parts B accordingly. The jig will handle stock up to 25" wide, but you can make parts A and D longer for larger workpieces.

To use the jig, adjust part D so it's parallel to part A and separated from part A by the width of the router base (place the router base on top of parts B to make this adjustment). Turn the carriage bolts mounted in parts C counterclockwise until they contact part D.

Now, turn the carriage bolts clockwise as many revolutions as necessary (each revolution equals $\frac{1}{16}$ "") to make up the difference between the width of the straight bit and the width of dado you need. For example, if you need a $\frac{3}{4}$ " dado, and have a $\frac{1}{2}$ "-diameter straight bit in your router, back away the carriage bolts $\frac{1}{4}$ " (four revolutions). Mark the carriage-bolt head with a single dot near its rim so you can keep track of the number of revolutions. Now, lock down part D by tightening the nuts that hold it.

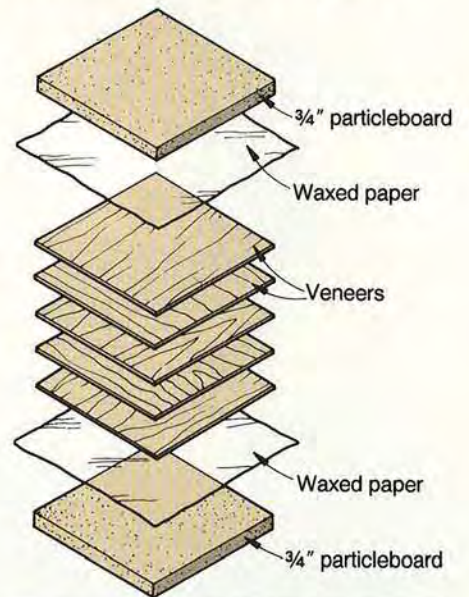
For a tight-fitting dado, test your adjustments by making some cuts in scrap stock. Clamp the jig to the scrap stock and feed the router along part A in the direction indicated by the arrows on the jig. After completing this cut, feed the router along part D in the opposite direction. As you enter and exit the cuts, the bit will also cut dados in parts B. This won't harm the jig, so long as you don't make cuts deeper than $\frac{3}{8}$ ". If you make a deep cut, replace parts B.

To cut stopped dados as we're doing in the photo *opposite page*, just secure the stop block in place by turning its hex-head bolt.

9 THIN PIECES WITH STRENGTH AND GOOD LOOKS

Some workpieces—such as fine toy parts or scrollsawed ornaments—have to be thin ($\frac{1}{4}$ " or less) *and* strong. The problem: Solid stock won't hold up, and you might not be able to find plywoods in the necessary thickness or species. Even if you can find the right plywood, it's likely to have an inner ply of a contrasting wood. Yuck!

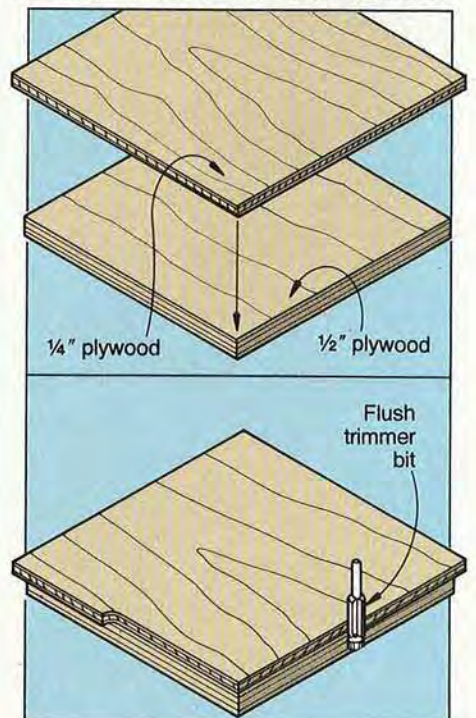
The solution: Cross-laminate several layers of veneer of the same species as shown at *right*. Apply an even layer of white woodworker's glue between the veneers and secure the sandwich with clamps. After drying overnight, your homemade stock will have strength *and* good looks.



10 HOMEMADE PLYWOOD LOOKS GREAT ON CABINETRY

The next time you need $\frac{3}{4}$ " plywood with only one good hardwood face, consider laminating $\frac{1}{4}$ "-thick hardwood plywood to a substrate of fir plywood or particleboard. Why? The cost of these materials (plus the necessary glue) usually amounts to less than the cost of a sheet of $\frac{3}{4}$ " hardwood plywood of the same square footage. And, in our trips to lumber outlets, we've often found $\frac{1}{4}$ " plywood (especially oak) that looks far better than what's available in $\frac{3}{4}$ " plywood of the same species.

As shown at *right*, you can make your own plywood by laminating a slightly oversized sheet of $\frac{1}{4}$ " plywood to a substrate (contact adhesive or woodworker's glue will do it). Then, straighten the edges with a flush trimmer bit in your router. ♣

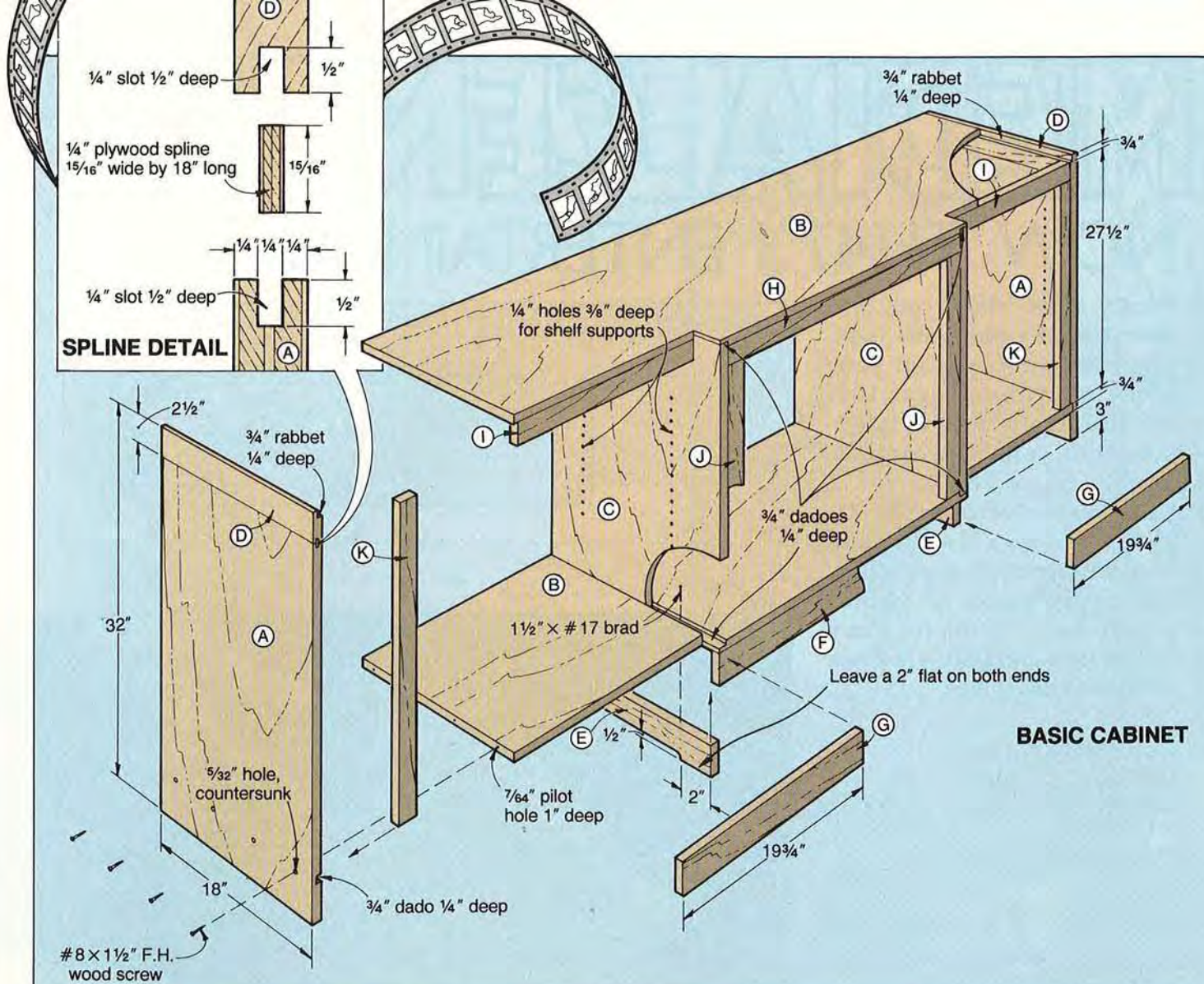


Written by Bill Krier with Jim Boelling and Jim Downing

Illustrations: Kim Downing, Mike Henry Photographs: John Hetherington, Hopkins Associates

ALL-STAR





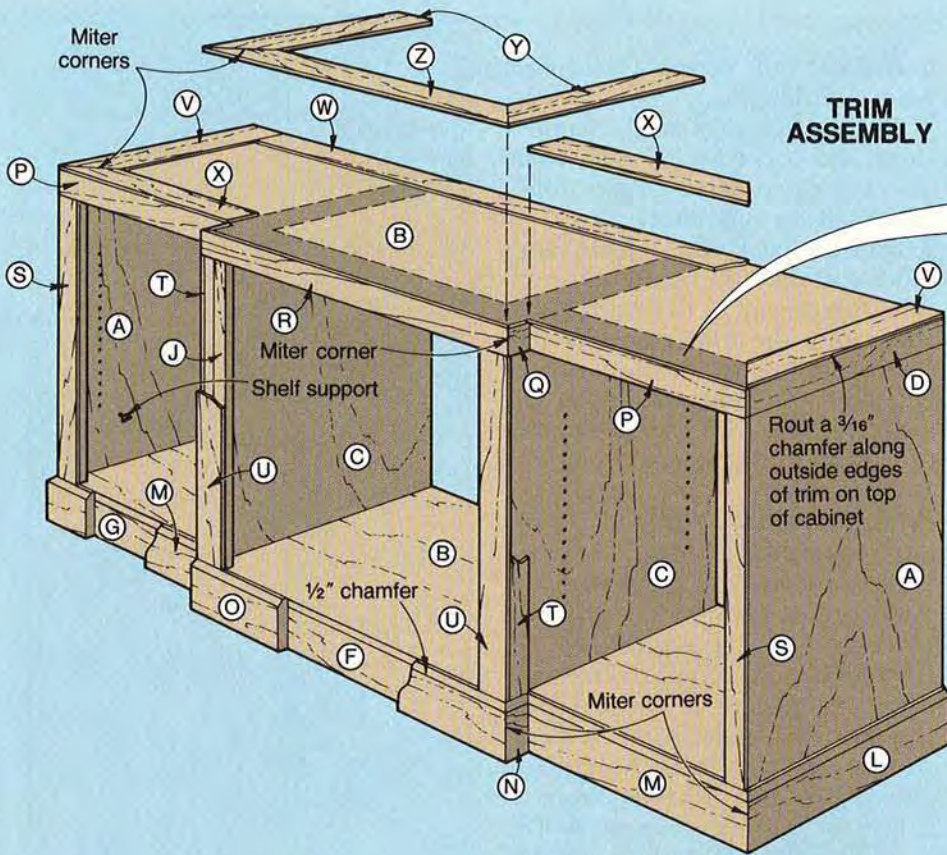
Bill of Materials

Part	Finished Size*			Material	Qty.	Part	Finished Size*			Material	Qty.	Part	Finished Size*			Material	Qty.
	T	W	L				T	W	L				T	W	L		
BASIC CABINET COMPONENTS						BASE MOLDING PIECES						TOP TRIM					
A	3/4"	18"	29 1/2"	WP	2	L*	3/4"	3 3/4"	18 3/4"	W	2	V	1/4"	2 1/2"	18 1/4"	W	2
B	3/4"	20"	73"	WP	2	M*	3/4"	3 3/4"	21 1/4"	W	2	W	1/4"	2 1/2"	69"	W	1
C	3/4"	20"	28"	WP	2	N*	3/4"	3 3/4"	2 3/4"	W	2	X	1/4"	2 1/2"	20 1/4"	W	2
D	3/4"	2 1/2"	18"	W	2	O*	3/4"	3 3/4"	34 1/2"	W	1	Y	1/4"	2 1/2"	17 3/4"	W	2
E	3/4"	3"	19 3/4"	WP	2	FRONT AND SIDE TRIM						Z	1/4"	2 1/2"	33 1/2"	W	1
F	3/4"	3"	33"	WP	1	P	1/4"	2 1/2"	20 1/2"	W	2	SHELVES AND BACKS					
G	3/4"	3"	19 3/4"	WP	2	Q	1/4"	2 1/2"	2"	W	2	AA	3/4"	15"	19 5/8"	WP	4
TRIM SUPPORT PIECES						R	1/4"	2 1/2"	33 1/2"	W	1	BB	3/4"	3/4"	19 5/8"	W	4
H	3/4"	1 3/4"	31 1/2"	W	1	S	1/4"	2"	25 3/4"	W	2	CC	1/4"	20 1/2"	28 1/4"	WP	2
I	3/4"	1 3/4"	19 3/4"	W	2	T	1/4"	1 3/4"	25 3/4"	W	2	TURNTABLE SHELF					
J	3/4"	1 1/2"	25 3/4"	W	2	U	1/4"	2 1/2"	25 3/4"	W	2	DD	3/4"	12"	24"	WP	2
K	3/4"	1 1/4"	25 3/4"	W	2							EE	3/4"	1 3/4"	24"	W	1

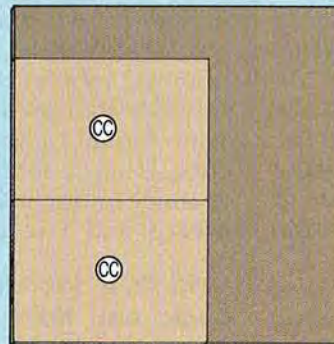
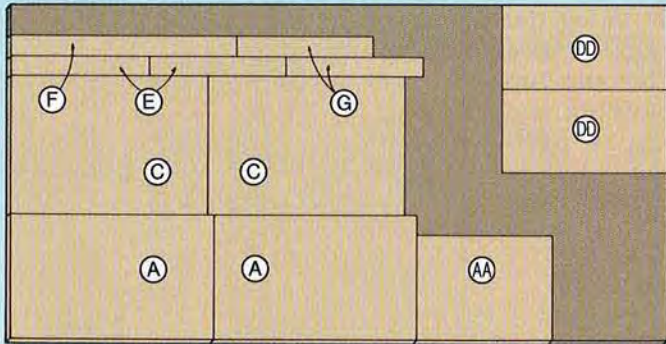
*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Supplies: 1 1/2" x 17 brads, #6 x 3/4" flathead wood screws, #8 x 1 1/2" flathead wood screws, shelf supports, finish.

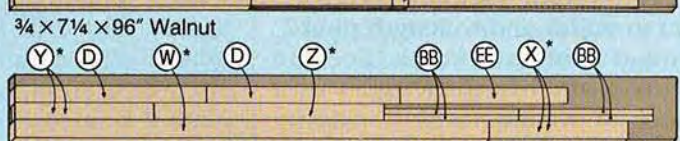
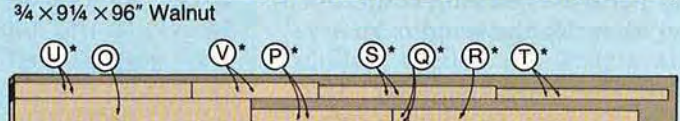
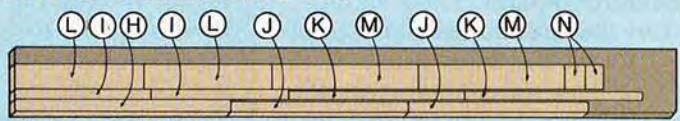
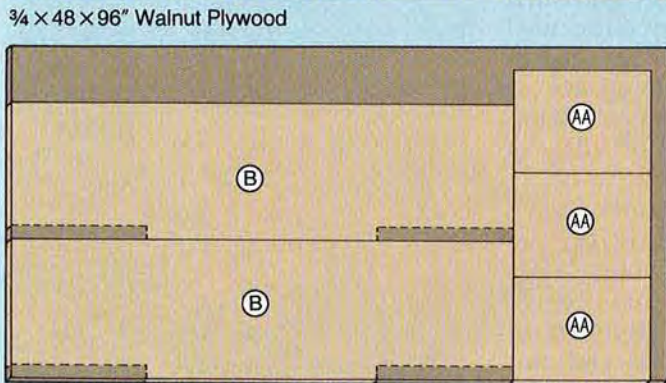
Material Key: WP—walnut plywood, W—walnut.



Cutting Diagram

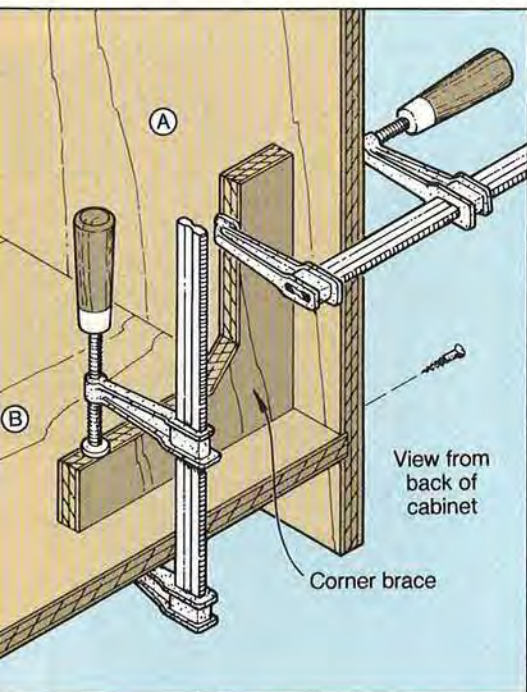


*Resaw or plane to 1/4" thick
1/4 x 48 x 48" Walnut Plywood



Now, let's assemble the basic cabinet

1 Glue and clamp the end panel assemblies (A/D) to the bottom (B). Check for square, and use corner braces where shown in the drawing below. Drill and countersink four mounting holes through each cabinet side (A) and into the ends of the cabinet bottom. Drive the screws.



2 Glue and clamp (no nails) the front support pieces (F, G) to the bottom panel. Glue and nail the supports (E) to the bottom side of the bottom (B) directly under the $\frac{3}{4}$ " dados.

3 Glue and clamp the dividers (C) and top (B) to the assembly. Check for square.

4 Cut the trim support pieces (H, I, J, K) to the sizes listed in the Bill of Materials. (Before cutting the parts, we measured the opening to verify the lengths.)

Add the base molding

1 Cut the base molding pieces (L, M) to width and to length plus 2" from $\frac{3}{4}$ " walnut stock. See the Trim Assembly drawing. Cut a piece of walnut to $3\frac{3}{4}$ " wide by 12" long; later, you'll cut two N's from this piece. Next, cut the

front base trim piece (O) to size plus 2" in length.

2 Rout or bevel-rip a $\frac{1}{2}$ " chamfer along the top edge of each base molding piece. See the Base Molding detail for reference.

3 Trim the back edge square, and miter-cut the front end of each side trim piece (L) to length. Glue and clamp the trim pieces to the base. Continue to measure, miter-cut, and glue and clamp the remaining base trim pieces (M, N, O) to the cabinet assembly.

Add the front, side, and top trim pieces

1 From $\frac{1}{4}$ "-thick walnut (we resawed thicker stock), cut and miter-cut the front trim pieces (P, Q, R) to size and length. Glue and clamp the pieces to the front of the cabinet assembly where shown on the Trim Assembly drawing on the previous page.

2 Cut the vertical trim pieces (S, T, U) to size. Add them to the cabinet, and sand smooth.

3 Cut the top trim pieces (V, W, X, Y, Z) to size. Glue and clamp them to the top of the cabinet, and sand smooth.

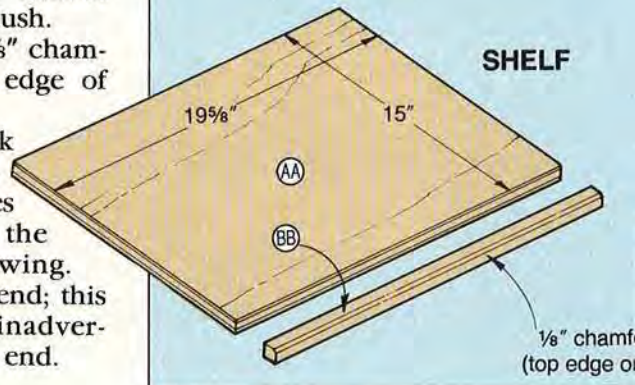
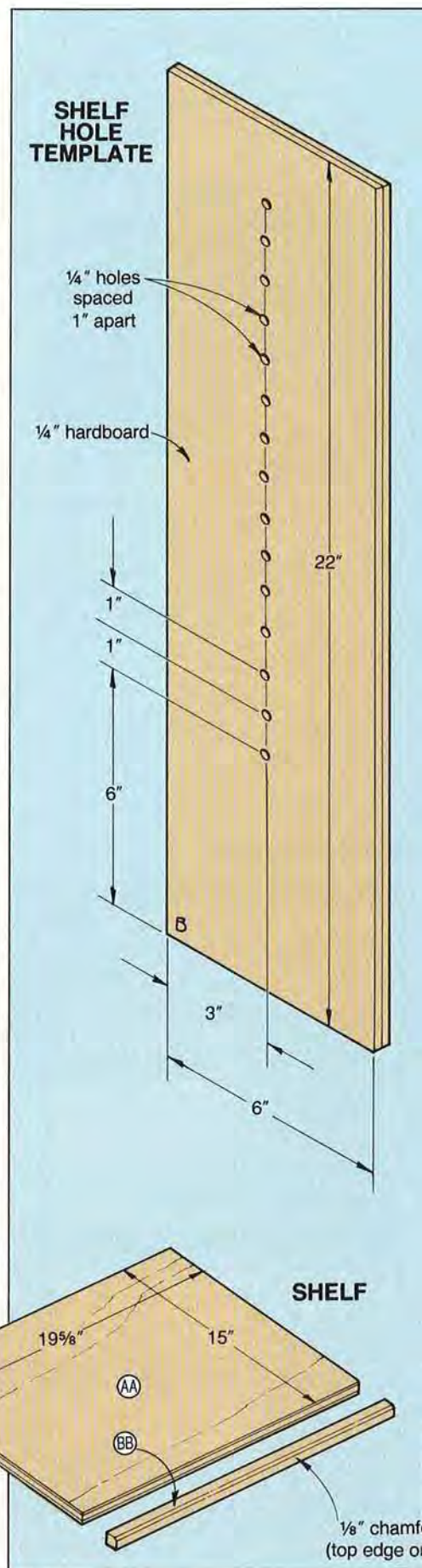
4 Rout a $\frac{3}{16}$ " chamfer along the front and side edges of the trimmed cabinet top. See the Top Trim detail accompanying the Trim Assembly drawing for reference. Using a sharp chisel, form a chamfer on the inside edge where parts X and Y meet.

And now for the shelves, back, and finish

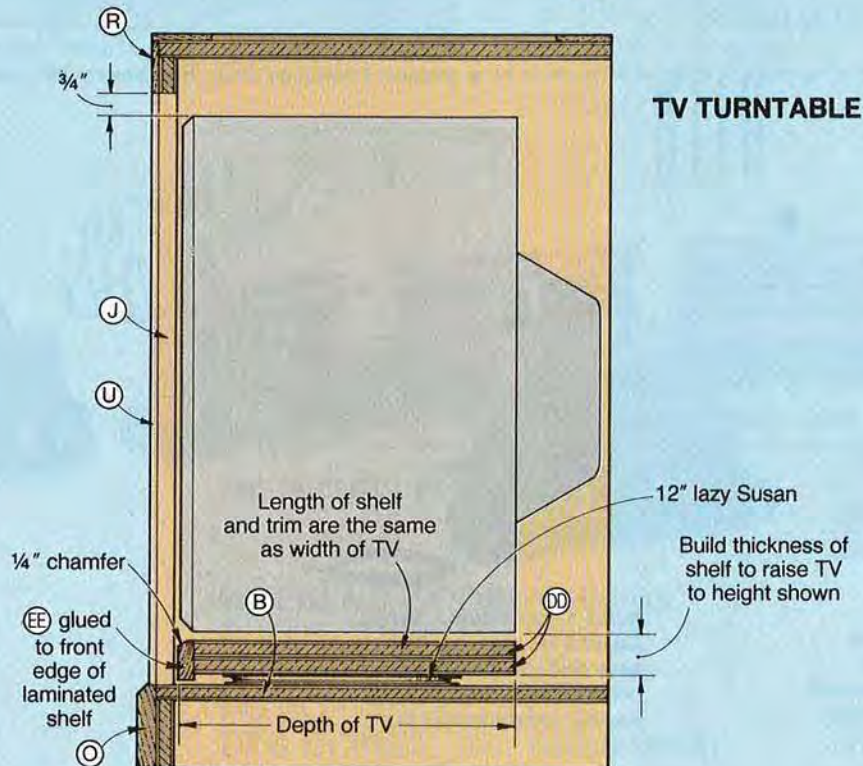
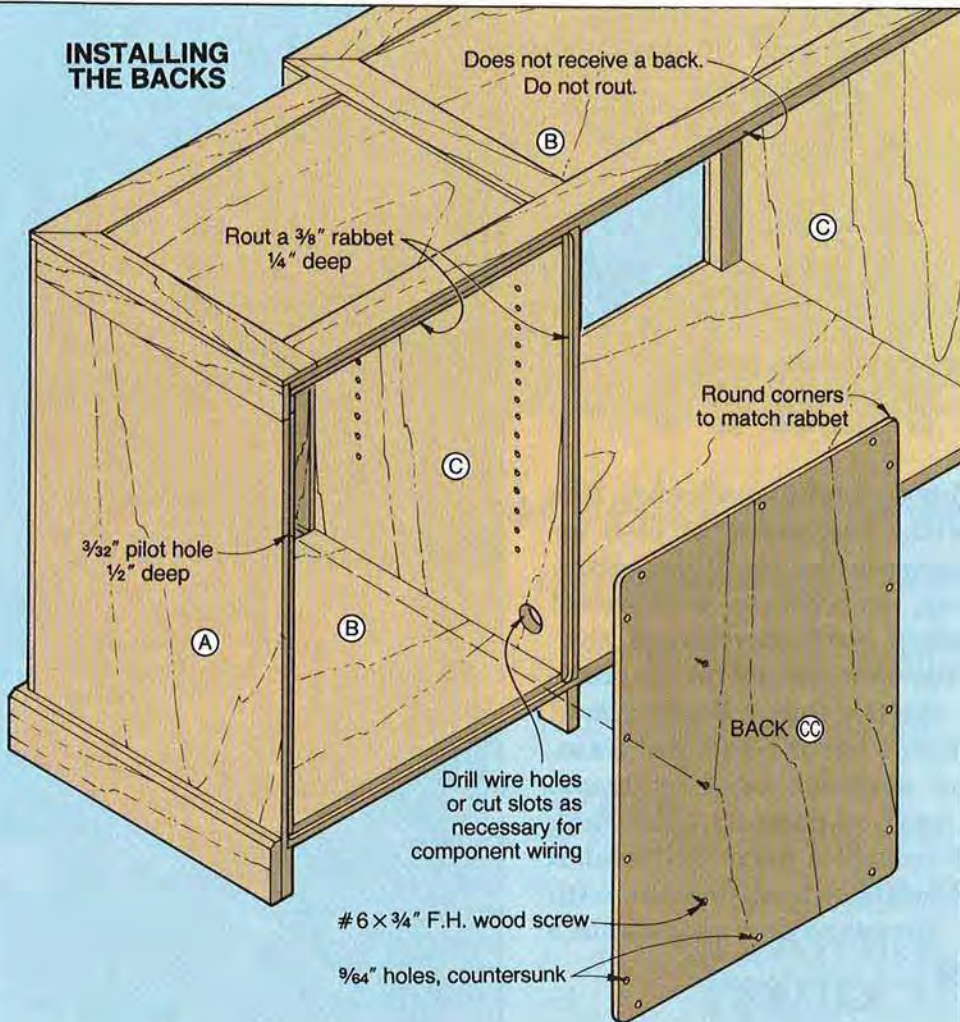
1 Cut the shelves (AA) and shelf fronts (BB) to size. Glue and clamp the fronts to the shelves with the tops and ends flush.

2 Cut, rout, or sand an $\frac{1}{8}$ " chamfer along the top front edge of each walnut shelf front.

3 Cut a strip of stock 6×22 " long. Mark a centerline, and drill $\frac{1}{4}$ " holes where dimensioned on the Shelf-Hole Template drawing. Mark a B on the bottom end; this will prevent you from inadvertently flopping it end for end.



INSTALLING THE BACKS



TV TURNTABLE

4 Using the shelf-hole template, drill the $\frac{1}{4}$ " shelf-clip holes $\frac{3}{8}$ " deep. (We used a stop on the drill bit to prevent drilling through the cabinet sides.)

5 Position the cabinet facedown on a blanket. Viewing the drawing at left, rout a $\frac{3}{8}$ " rabbet $\frac{1}{4}$ " deep around the inside edge of each of the end-cabinet openings where shown on the drawing.

6 Measure the routed openings, and cut the two back pieces (CC) to size. Round the corners of each back piece to fit the corners of the routed openings.

7 Drill access holes through the dividers for the electrical wires for your components (we used a Forstner bit). Back the plywood with scrap stock when drilling the holes to prevent chip-out.

8 Finish-sand the cabinet and shelves. Apply the finish.

Add the turntable shelf

Note: The TV turntable shelf shown was dimensioned to fit our particular television. Determine the size you'll need by referring to instructions on the TV Turntable drawing at left.

1 Cut the turntable shelves (DD) and front trim piece (EE) to size.

2 Glue the shelves face-to-face with the edges and ends flush. Trim or joint the front edge even, and glue the shelf front (EE) to it. Rout a $\frac{1}{4}$ " chamfer along the top front edge of the shelf.

3 Sand and finish the assembled shelf. Fasten a 12" lazy Susan to the shelf and then to the cabinet bottom piece (B)—see the Buying Guide for our source.

Buying Guide

• **12" lazy Susan.** Ball-bearing system, mounting instructions included, catalog no. 77520, \$8.50 ppd. (\$11 U.S. funds for Canadian orders). Armor Products, Box 445, East Northport, NY 11731. Or, call 800/292-8296 to order. 🍀

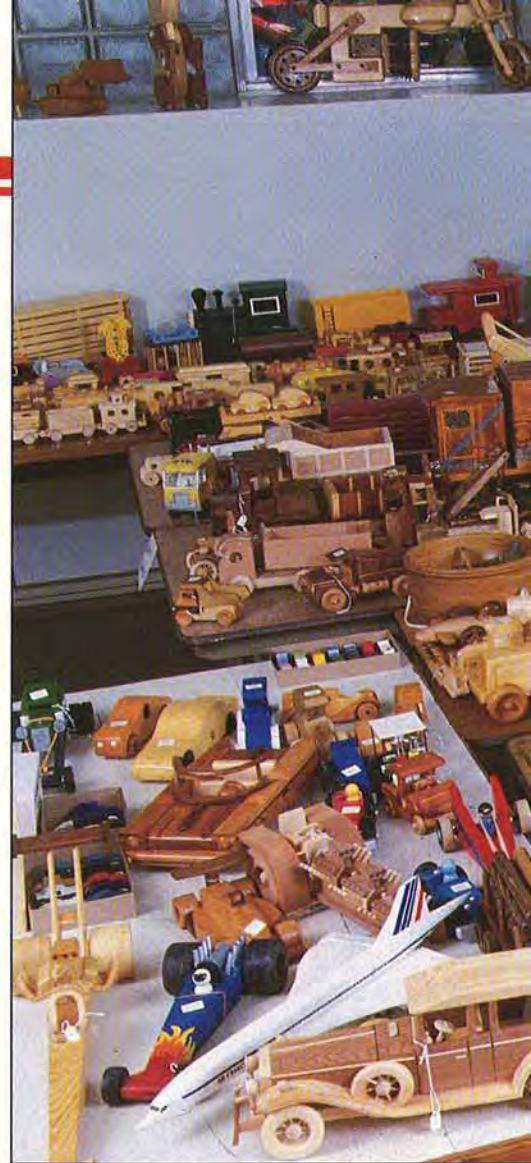
Produced by Marlen Kemmet
Project Design: Gregory A. Henderson
Photographs: Hopkins Associates;
John Hetherington
Illustrations: Kim Downing; Bill Zaun



OH MY, WHAT A CONTEST!

Each workday preceding the entry deadline seemed like Christmas morning here at *WOOD*® magazine. As toys arrived for our third Build-A-Toy competition, we unwrapped, admired, inspected, tagged, and yes, even played with them! Thanks to you warmhearted readers, underprivileged children across the nation will have the same opportunity come the holidays. As always, the U.S. Marine Corps Reserve will distribute 1991 entries through their Toys-for-Tots program.

Showcased here are the grand- and first-prize winners. For the complete winners list, turn to page 82. (All told, about one of every eight entrants earned a prize!) Although press deadlines prevent us from sharing winning plans with you in this issue, you will find the plans for an entrant's whimsical seaplane on page 58. ♣



Build-A-Toy judges examined more than 400 Armor Products, East Northport, N.Y.; Barry



First prize, home hobbyist, went to *Richard Zichos*, Pasadena, Md., for his maple and walnut train.

One of last year's top winners, *Neal Seely*, Rochester, N.Y., captured first place, professional, with a puppy pull toy.

Build-A-Toy veteran *Mike Jagielo*, of Almond, Wis., snatched the grand prize, professional, with this lovable ladybug pull toy.



wooden entries. From left, Kelly Mehler, Berea, Ky., craftsman; Jim Downing, *WOOD* magazine design editor; John Capotosto, Haley, industrial arts teacher, Licking Valley High School, Newark, Ohio; Maj. W.C. Koehler Jr., USMC.



In the student division, *Josh Escobedo*, of Pioche, Nev., won the grand prize with his car transport.



Among home hobbyists, *Larry Weaver*, of Petersburg, W. Va., claimed the grand prize with his space shuttle.



A monster truck of solid paduk by *John Hicks*, Westlake Village, Calif., took student first prize.

Yes, indeed! *WOOD* magazine will sponsor another Build-A-Toy contest for 1992. Look for the rules on page 84 in this issue.

Photographs: John Hetherington

SEA SKIPPER

A TOY FOR YOUNG FLIERS TO ENJOY

In hopes of making some young child happy, David Lanford, from Pipe Creek, Texas, entered this simple beauty in our 1991 Build-A-Toy contest. We like the floatplane because you can quickly cut the pieces to shape, and then fit them together like a puzzle. We also have designated this as the *Student Special-Entry Project* in our 1992 Contest. See the complete rules on page 84.

1 Using a photocopy and spray adhesive or carbon paper, transfer the full-sized patterns on the *opposite page* to $\frac{1}{4}$ " plywood. (We chose Baltic birch because it's strong, smooth, and lacks voids.)


2 Check the thickness of your stock against the width of the marked notches ($\frac{1}{4}$ " plywood doesn't always measure exactly $\frac{1}{4}$ " thick). Adjust the notch size if necessary for a snug fit, and cut the pieces to shape.

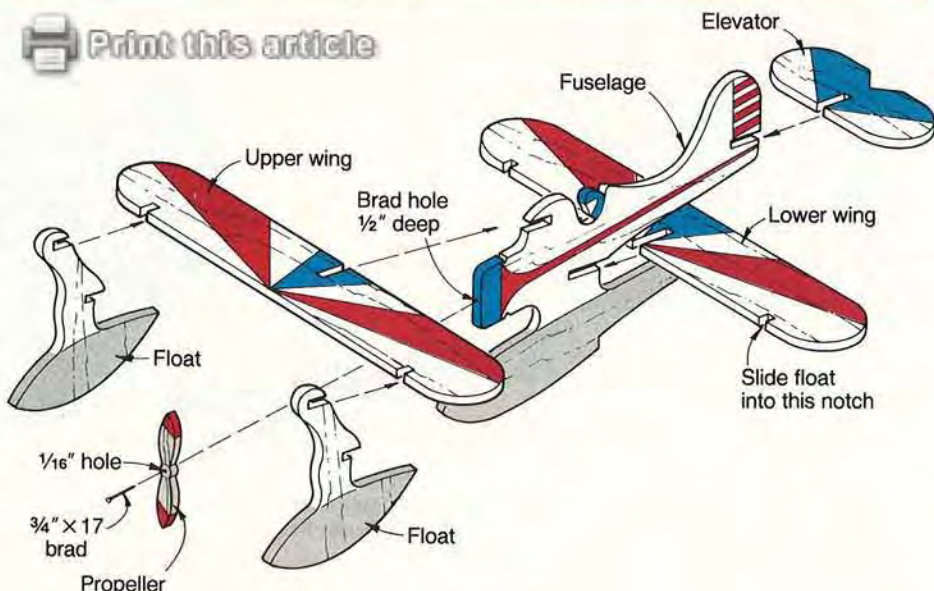
3 Drill a $\frac{1}{16}$ " hole through the center of the propeller.

4 Sand the pieces smooth (we progressed to 220-grit sandpaper), prime the pieces, mask off the mating surfaces for a good glue joint later, and then paint as desired. (We covered the mating surfaces with masking tape, sealed the plywood with two coats of aerosol lacquer, primed the pieces with white paint, and then used enamel modeling paints for the stripes. To form the straight lines, we used masking tape and painted one color at a time.)

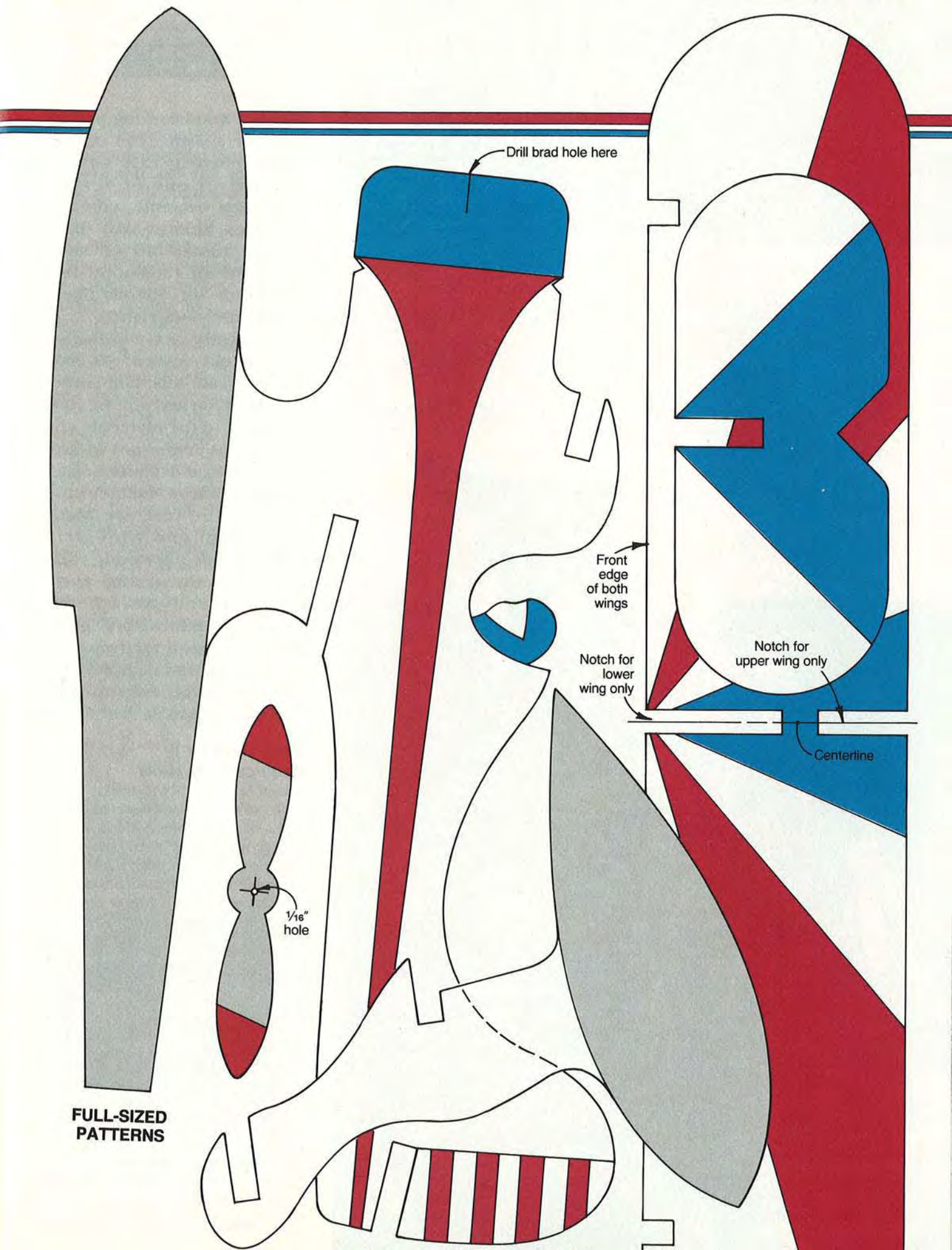
5 Remove the masking tape, glue the parts together, and hold the propeller brad in the fuselage with instant glue. Don't use an accelerator with the instant glue; it will dissolve some paints. ♣



 Print this article



Project Design: David Lanford
 Photographs: Hopkins Associates
 Illustrations: Kim Downing; Bill Zaun



Drill brad hole here

Front edge of both wings

Notch for lower wing only

Notch for upper wing only

Centerline

1/16" hole

FULL-SIZED PATTERNS

DADO-CUTTING TOOLS

Choosing the accessory that makes the most sense in your shop

When a woodworking project calls for a dado, you can go about cutting this square channel in one of several ways. For example, you can spend as little as \$10 for a straight router bit, or more than \$300 for a top-of-the-line dado-blade set. Sounds like a simple decision, right?

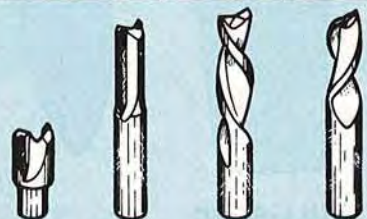
Not really. As we discovered in our tests of 30 dado blades, blade sets, and router bits, the type and size of your project, and the materials you use, are as important as cost in selecting a dado tool.

To put these dado-cutting tools to the test, we made cross-grain and with-grain cuts in oak plywood, solid oak, melamine-coated particleboard, and pine. We assigned a performance grade to every product for each type of cut, and compiled the results in the easy-to-read charts on *pages 64 and 65*.

Your options in dado-cutting tools

For this article we tested three types of dado blades/sets and four types of router bits. We found that router bits of the same *type* tended to perform about equally from manufacturer to manufacturer. So, we limited our testing to the four types of bits shown *below*.

ROUTER BITS THAT YIELD FLAT-BOTTOMED DADOES



Carbide-tipped mortising bit

Carbide-tipped straight bit

Solid-carbide, downward-spiral bit

Solid-carbide, upward-spiral bit

Blades and blade sets were a different story, though. We came across big performance differences from model to model of the same *type*. We tested assemblies ranging from 6" to 8" in diameter. (A few manufacturers provide 10" dado blades, but they're too large and heavy for 10" table saws.)

Manufacturers told us they sell more 8" models than any other size because they have greater cutting capacity than 6" products while not costing much more. For example, Freud's 8" model SD308 dado set sells for about \$115, but the 6" version of the same product sells for only about \$8 less.

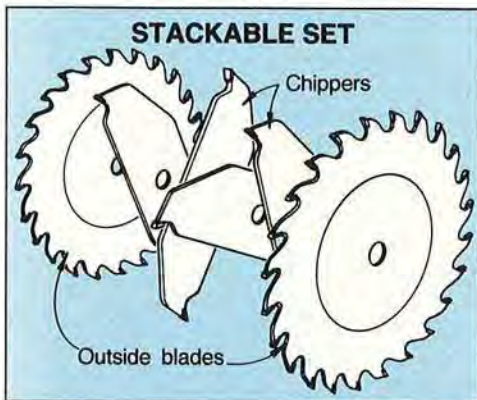
These products will cut dados ranging from 1/4" to 1 3/16" wide. Here's a look at the different types of dado blades and blade sets:

Stackable set. As shown *below*, most of these products consist of two 1/8"-kerf outside blades for cleanly shearing the walls of the dado, and four or five chippers for removing the stock between the

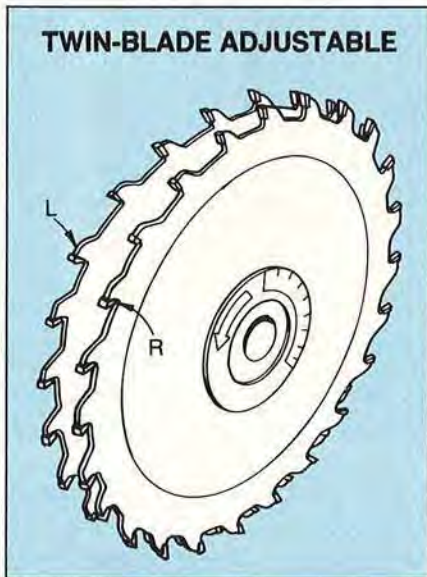
outside blades. These chippers come in various widths (1/4", 1/8", and 1/16") for cuts in 1/16" increments. For in-between sizes, you add shims (thin paper or metal discs) between the chippers.

As shown in the photo *bottom left*, most carbide-tipped chippers have two teeth, but two premium sets—the Forrest Dado King and the SystiMatic Super Fine—have chippers with four and six teeth respectively. The extra teeth result in smoother dado bottoms and less "hammering" of the blade against the stock.

Twin-blade adjustable. To adjust the cutting width of this product, you simply turn a wedge mechanism at its hub. As shown in the drawing *below*, the two blades form a wedge themselves. The teeth at the point of the "wedge" clean out the middle of the dado, while the outermost teeth marked "L" and "R" in the drawing cut the left and right walls.

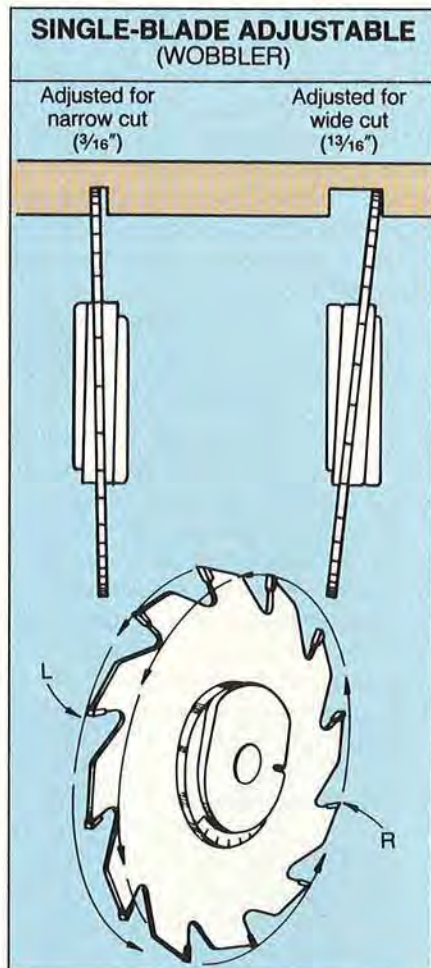


Most chippers have two carbide teeth, but Forrest and SystiMatic make four- and six-toothed chippers, respectively.



Single-blade adjustable. These tools, often referred to as "wobblers" have two round wedges on each side of the blade that you rotate to adjust the width of cut. As you can see in the drawing *above right*, the wedges angle the blade for various cutting widths.

Contrary to its nickname, this blade doesn't actually wobble



from side to side. As shown *above*, one tooth (marked "L") stays along the left wall of the dado, and the tooth on the opposite side of the blade (marked "R") stays along the right wall. The other teeth also stay in orbits perpendicular to the saw arbor while cleaning out the dado.

Which do you need: dado blade, blade set, or router bit?

As a group, router bits have several advantages (besides just lower price) over dado blades and sets:

- Router bits cut smooth, chip-free, square, flat-bottomed dados in nearly any material (something that only dado sets costing \$100 and up can do).

- You can't top the portability of a hand-held router when dealing with large, cumbersome workpieces (such as sheet goods).

Continued

DADO TOOLS

● When cutting stopped dados, router bits make the job as easy and safe as possible. A stopped dado made with a router bit requires less cleanup than one cut with a blade or blade set.

● You can have a router bit sharpened for less than \$5, but sharpening a stackable dado set will likely cost \$25–\$55.

Despite these merits, dado blades/sets still hold a special place in the hearts of most woodworkers for these reasons:

● Blade-based systems cut faster than router bits, and enable you to cut the dado in a single pass. A router often requires you to make multiple passes to achieve the necessary depth or width of cut. The more passes you make, the greater your chances of error.

● Most dado blades and sets will last a lifetime. Few router bits will do the same.

How we graded the tools

As you can see by the charts on page 64, we ran the dado accessories through a variety of materials, using a tablesaw, radial-arm saw, and router. For each cut, we assigned superior, excellent, good, fair, or poor ratings.

As shown in the photo below left, lesser-quality dado blades and sets have a tendency to chip laminates such as oak-veneered plywood (especially when cutting across the face grain). Some router bits handle laminates with ease, but a few leave fuzzy edges in

softwood as shown *bottom right*. (In most instances, you can quickly sand away this fuzz.)

For cabinetry and furniture projects, look for tools that produce good-or-better cuts in the material you work with. For construction-type projects such as utility shelving, decks, or fencing, products with “fair” and “poor” ratings may meet your needs.

Note: If you already own a dado set that leaves a rough bottom, see page 31 for a product that offers you a solution.

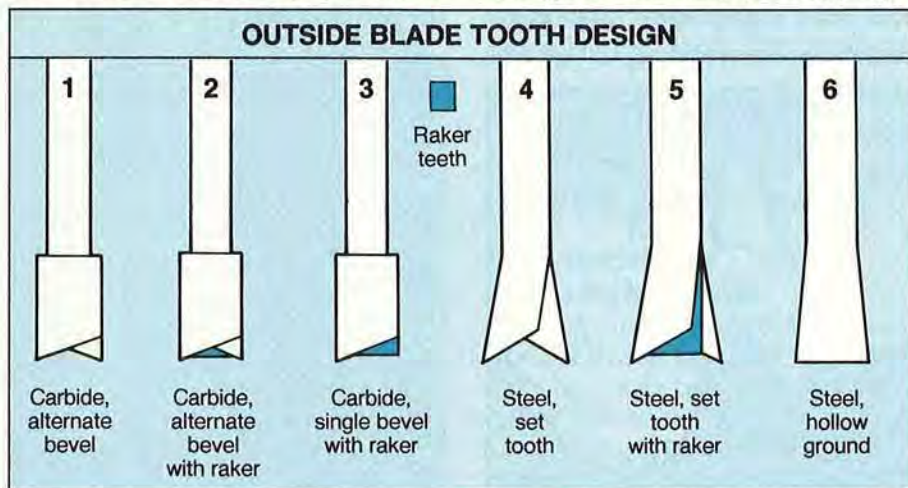
In the column “Outside-blade tooth design,” we list which of the six tooth designs shown below you’ll find on the outside cutters of the stackable sets. The cutters with raker teeth produced a flatter bottom near the walls of the dado. We like the blades with No. 3-designed teeth because they leave only small scoring lines in the bottom corners of the dado.

These sets come with left and right outside blades, which must be kept in the correct orientation.

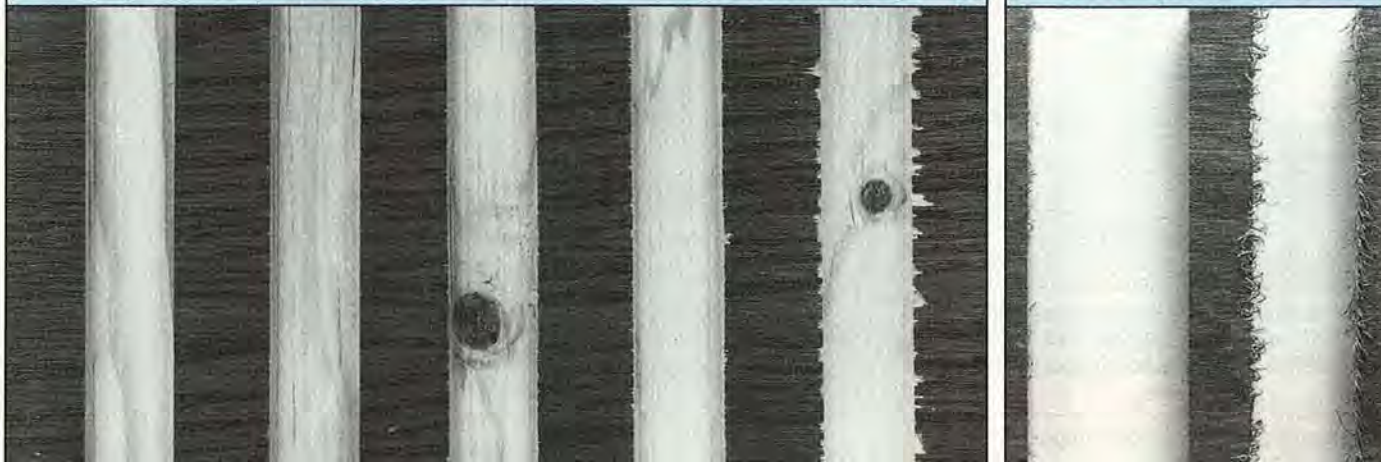
Steel, hollow-ground blades (sometimes called “thin-rim” blades) have one distinct disadvantage: When adjusted for a ¼” cut (no chippers), the set leaves a tiny sliver of wood in the middle of the dado as shown below.



Both of the steel, hollow-ground sets we tested—the Sears 32177 and Vermont American 26747—left a tiny ridge when cutting a ¼”-wide dado (no chippers).



Forrest Dado King (Superior)	Freud SD308 (Excellent)	V-A 26742 (Good)	U.S. Saw 800-C-RPD (Fair)	V-A 26747 (Poor)	Freud ¾” long-cutter model 16110	Freud 1½” long-cutter model 12-122
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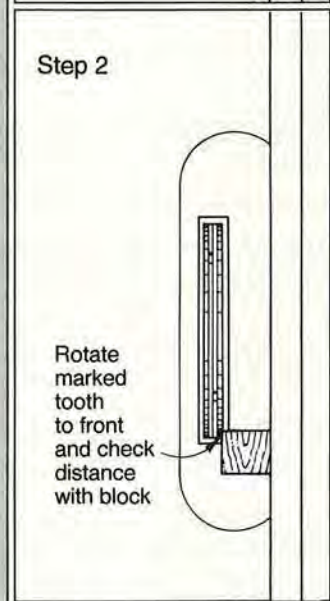
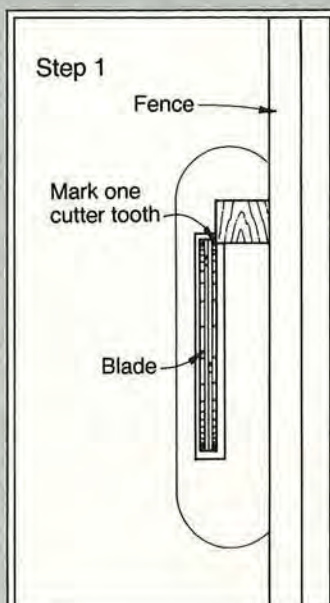
How to get the most from your dado blades and sets

At the start of our testing, we were astonished at the chipping and splintering produced by even the finest dado assemblies when mounted in a table-saw. Obviously, our saw was contributing to the problem, and that's where we looked for solutions. By the time we were finished, our results had improved 100 percent.

First, we added zero-clearance table inserts to the table-saw. (See page 44 for instructions on making these helpers). This addition alone improved our results by at least 40 percent. The reason: the insert acts as a chip breaker that helps the blade cleanly shear the wood fibers.

Then, with dial calipers we adjusted the rip fence parallel to within .001" to the dado blade and blade sets. Voila! Our cuts improved another 40 percent. Of course, nobody wants to take the time to make such fine adjustments for every dado cut, so we wondered just how accurately a fence must be set. Through a series of tests, we determined that a fence can be misaligned up to 1/64" from front to rear and still produce superior results (with a superior blade).

The simple method shown at *right* will help you attain this level of accuracy. First, cut a block of wood to a width equal to the desired fence-to-dado distance. With the dado blade or set raised fully, place the block where shown in Step 1 and set the fence at this distance. Then, rotate the same tooth toward you as shown in Step 2



and use the block to check the fence for parallel. (With adjustable blades, be sure to use the outermost tooth.)

We improved our dados the final 20 percent by installing turned-metal pulleys and a link belt on our contractor's-style table-saw. These products, shown in the photo *below*, reduced the machine's vibration in two ways: 1) the turned-metal pulleys are better balanced than the cast pulleys that come standard with most saws, and 2) link belts run much smoother than conventional drive belts. You can interconnect the belt links to form a belt of any size in 3/4" increments. To purchase these products for most contractor's-style saws, see the Buying Guide on *page 65*.



We reduced the vibration in our table-saw by replacing its cast pulleys (*left*) with turned pulleys (*right*), and adding a link belt.

Should you spend the big bucks for a good stackable-blade set?

If you intend to do cabinetry, furniture, and other projects that demand good-quality dados, then it pays to invest in a carbide-tipped, stackable dado set. Even the best adjustable dado blades do not produce good-or-better cuts in all materials. Although \$100 or more may seem like a big investment for a saw *accessory*, keep in mind that such a set will give you a life-

time of service. And, with some hardwood plywoods costing \$100 or more per sheet, a high-quality blade will quickly pay for itself if it saves just one or two panels.

Following are purchase recommendations in four price ranges. We based these guidelines on the assumption that you cut dados in a wide variety of materials. But, if you tend to make one type of cut in a specific material—say cross-grain cuts in oak plywood with a radial-arm saw—then look in the

chart for the least expensive blade that gives good or better results under those circumstances.

● **Over \$150:** All of the products in this price range cut like a dream and should satisfy even the fussiest woodworkers. But, only the Forrest Dado King earned "superior" ratings in every category. The set from Woodworker's Supply (made by FS Tool) might be a better value—if you can live with "excellent" crosscuts in solid stock and plywood.

Continued

DADO TOOLS

DADO-CUTTING TOOLS:

TIP: When having a \$100-and-above dado set sharpened, ask the sharpener if he grinds to 400-grit or finer. Grinding such a set to only 180-grit or so will not restore the blade's original ability to cut smooth dados.

• **\$100-\$150:** The Freud SD308 yielded superior and excellent cuts throughout; mail-order outlets offer this product for about \$115. The Amana 658030 and the Delta 35-560 earned similar marks and will meet the needs of most any woodworking situation.

• **\$50-\$100:** The Sears No. 32708 Excalibur twin-blade dado model (\$76.47) produced good-or-better cuts in every material except pine and melamine-coated particleboard. In this price range and below, none of the blades produced perfectly flat bottoms, but the Excalibur comes close.

• **Under \$50:** Here, we found only one blade that meets the needs of most home woodworkers: the Irwin 16120. This product had beefier construction than the other "wobble" blades, and produced the squarest dado of any blade in this price range. The same product used to be sold under the Accu-Edge name.

Which type of router bit works best?

If a router bit is what you need, try a downward-spiraled, solid-carbide bit such as the Freud No. 76-106 we tested. Because its flutes cleanly shear the wood downward, it creates little chipping or fuzzing along the dado edge. However, remember that this bit does not work well for mortises (a task the upward-spiraled version excels at).

If you want to spend a little less, buy carbide-tipped straight bits that will handle most jobs. In our tests, the versions with shorter cutters—about 3/4"—produced the smoothest cuts. ♣

STACKABLE

MANUFACTURER/ SUPPLIER	MODEL	BLADE DIA. (INCHES)	CARBIDE-TIPPED	TEETH PER CHIPPER	TEETH PER OUTSIDE BLADE (NOT INCL. RAKERS)	RAKER TEETH PER OUTSIDE BLADE	SHIMS INCLUDED	PERFORMANCE EVALUATION				
								TABLESAW ¹				
								CROSS GRAIN OAK PLYWOOD	WITH GRAIN OAK PLYWOOD	CROSS GRAIN SOLID OAK	WITH GRAIN SOLID OAK	CROSS GRAIN PINE
AMANA	658030	8	YES	2	24	4	NO	E	S	E	S	E
DML	ID800	8	YES	2	24	2	NO	E	S	E	S	E
DELTA	35-560	8	YES	2	24	4	NO	E	S	E	E	E
DELTA	34-333	6	NO	2	36	6	YES	P	G	F	G	F
FORREST	DADO KING	8	YES	4	24	12	YES	S	S	S	S	S
FREUD	SD308	8	YES	2	24	4	NO	E	S	E	S	E
OLDHAM/US SAW	C800-CCD	8	YES	2	18	0	NO	F	G	F	E	G
OLDHAM/US SAW	800-C-RPD	8	NO	2	20	0	NO	F	F	F	F	G
SEARS	3264	8	YES	2	22	4	YES	F	E	F	E	G
SEARS	32177	8	NO	2	128	0	YES	F	E	G	E	G
SYSTEMATIC	SUPERFINE	8	YES	6	42	2	NO	S	S	S	S	E
SYSTEMATIC	FINE	8	YES	2	22	6	NO	E	S	E	S	E
VERMONT AMERICAN	26742	8	NO	2	48	8	YES	G	E	F	E	G
VERMONT AMERICAN	26747	7	NO	2	112	0	YES	P	G	F	E	E
WOODWORKER'S SUPPLY	800-764	8	YES	2	32	8	NO	E	S	E	S	E

ADJUSTABLE

CREDO	13436 ENDURO	7	YES	-	8	0	-	P	F	F	G	F
CREDO	10223	7	YES	-	12	0	-	P	F	P	G	F
DELTA	34-959	6½	YES	-	12	0	-	P	P	P	G	F
IRWIN	16120	6½	YES	-	8	0	-	G	E	G	E	F
SEARS	32708 EXCALIBUR	8	YES	-	24	0	-	G	E	G	E	F
SEARS	3262	7	YES	-	32	0	-	F	E	G	E	F
VERMONT AMERICAN	26752	6½	YES	-	12	0	-	P	P	P	F	P

1/2" SPIRAL AND STRAIGHT ROUTER BITS

MANUFACTURER/ SUPPLIER	MODEL	TYPE ²	SHANK SIZE (INCHES)	CUTTING LENGTH	PERFORMANCE EVALUATION						
					CROSS GRAIN OAK PLYWOOD ¹	WITH GRAIN OAK PLYWOOD ¹	CROSS GRAIN SOLID OAK ¹	WITH GRAIN SOLID OAK ¹	CROSS GRAIN PINE ¹	WITH GRAIN PINE ¹	MELAMINE-COATED PARTICLE BOARD ¹
AMANA	45230	S	¼	¾	S	S	E	S	G	G	S
FREUD	75-108	CU	½	1¼	P	E	G	E	P	G	S
FREUD	12-122	S	½	1½	E	S	G	S	F	G	S
FREUD	16-110	S	½	¾	E	S	E	S	E	E	S
FREUD	76-106	CD	½	1¼	S	S	S	S	E	S	S
MLCS	905	CU	½	1½	P	G	P	F	P	F	S
MLCS	774	S	½	1 3/16	E	S	G	S	F	G	S
WOODHAVEN	30128	M	½	¾	G	S	G	E	P	F	S

HOW THEY STACK UP

DADO SETS

EVALUATION

RADIAL-ARM SAW ¹							BOTTOM OF CUT ²	OUTSIDE-BLADE TOOTH DESIGN	WEIGHT (WITH ALL CHIPPERS)	COUNTRY OF ORIGIN	LIST PRICE	SELLING PRICE ⁵
WITH GRAIN PINE	MELAMINE-COATED PARTICLEBOARD	CROSS GRAIN OAK PLYWOOD	CROSS GRAIN SOLID OAK	CROSS GRAIN PINE	MELAMINE-COATED PARTICLEBOARD	3						
S	E	G	E	E	S	E	3	73	IS	165.00	\$110.00	
S	E	E	E	E	S	E	3	73	US	233.10	200.00	
E	E	G	E	E	E	E	3	73	IS	270.33	150.00	
F	G	G	G	E	F	F	6	31	US	66.65	60.00	
S	S	S	S	S	S	S	3	82	US	299.00	254.00	
S	E	E	E	E	S	E	3	86	IT	218.90	115.00	
G	F	F	E	E	G	E	1	59	US	198.62	149.00	
E	P	F	F	E	F	F	5	73	US	42.92	35.00	
E	G	P	F	G	G	G	2	66	US	-	89.99	
G	E	E	S	E	S	F	6	78	US	-	54.99	
S	S	S	S	E	S	S	3	139	US	347.50	310.00	
E	G	E	E	E	S	G	3	82	US	198.00	155.00	
G	F	E	G	G	G	F	3	74	US	60.49	52.00	
E	G	G	E	F	G	G	4	59	US	60.49	55.00	
S	S	E	S	E	S	S	3	81	C	289.00	179.00	

DADO BLADES

BOTTOM OF CUT ²	COUNTRY OF ORIGIN	LIST PRICE	SELLING PRICE ⁵								
G	P	P	F	P	G	-	26	US	34.70	29.00	
G	P	P	P	F	P	E	-	24	US	47.24	35.00
G	P	F	F	F	P	P	-	16	J	45.05	41.00
G	G	F	G	G	E	E	-	18	US	61.00	45.00
E	F	G	G	G	E	G	-	33	US	-	76.47
G	G	F	G	F	G	E	-	28	US	-	49.99
F	P	P	F	F	G	G	-	16	US	44.00	36.00

Buying Guide

• Turned-metal pulleys and link belt. Two pulleys and 4' of link belt, \$34.95 ppd. (\$19.95 ppd. for the belt and \$15 ppd. for the pulleys if purchased separately). Specify tablesaw model. In-line Industries, 661 S. Main St., Webster, MA 01570. Call 800/533-6709 or 508/949-2968.

Manufacturers' listing:

Amana
800/445-0077 or 516/752-1300

Credo
503/982-0100

DML
800/233-7297 or 502/587-5562

Delta
800/438-2486 or 412/963-2400

Forrest
800/733-7111 or 201/473-5236

Freud
800/334-4107 or 919/434-3171

Irwin
513/382-3811

MLCS
800/533-9298 or 215/886-5986

Oldham/US Saw
800/828-9000 or 716/778-8588

Sears
Call your nearest store

SystiMatic
800/426-0000 or 206/823-8200

Vermont American
704/735-7464

Woodhaven
800/344-6657 or 319/391-2386

Woodworker's Supply
800/645-9292 or 505/821-0578

Footnotes for charts

- S** Superior - No imperfections.
E Excellent - Some sandable fuzz on shoulders of dado; no chips on stock surface.
G Good - Some sandable fuzz on shoulders of dado; minor chipping on stock surface.
F Fair - Chips on surface of stock; not acceptable for quality work.
P Poor - Large chips on surface of stock that require filling.
- S** Superior - Flat, smooth bottom that's square to the walls.
E Excellent - Flat bottom with slight roughness.
G Good - Minor ridges.
F Fair - Uneven bottom with large ridges.
P Poor - Concave-shaped bottom.
- See drawing on page 62.
- (C) Canada
(J) Japan
(IS) Israel
(IT) Italy
(US) United States
- Selling prices based on advertisements, catalogs, and dealer inquiries at time of article's writing.

This footnote pertains to the router-bit chart only

- (CD) Solid-carbide, downward-spiral bit.
(CU) Solid-carbide, upward-spiral bit.
(M) Carbide-tipped mortising bit.
(S) Carbide-tipped straight bit.

Written by Bill Krier
Product testing: Bob McFarlin
Illustrations: Kim Downing, Bill Zaun
Photographs: John Hetherington

BOTTOM OF CUT ²	COUNTRY OF ORIGIN	LIST PRICE	SELLING PRICE ⁵
S	IS	\$15.85	\$14.00
S	US	49.40	40.00
S	IT	17.80	14.00
S	IT	16.70	14.00
E	US	45.40	35.00
S	US	-	29.00
S	T	-	10.00
S	US	-	17.00

KING-OF-THE-HILL

BENTWOOD



Last winter, I took my daughters Sasha and Chelsy, pictured *above*, to a sporting-goods store to pick out a toboggan. But after seeing the poor quality of available sleds, I got together with our project designer, Jim Downing, to design and build our own. The result—a sleek bentwood toboggan that really flies. Build yours now, and be ready to enjoy it by the first snow.

Marlen Kemmet

Marlen Kemmet, How-to Editor

TOBOGGAN



Note: You'll need some $\frac{1}{16}$ "-thick ash strips for the curved portion of each runner. We resawed our own stock. See our resaw jig on page 80 for the method we used to cut our own thin stock.

We recommend slow-set epoxy for laminating the runners. If you're unfamiliar with how to work with this type of adhesive, see the article on page 71 for details. And, for added seat comfort, consider buying the cushioned pad shown. See the Buying Guide at the end of the article for our source of these two items.

Build the form to laminate the runners

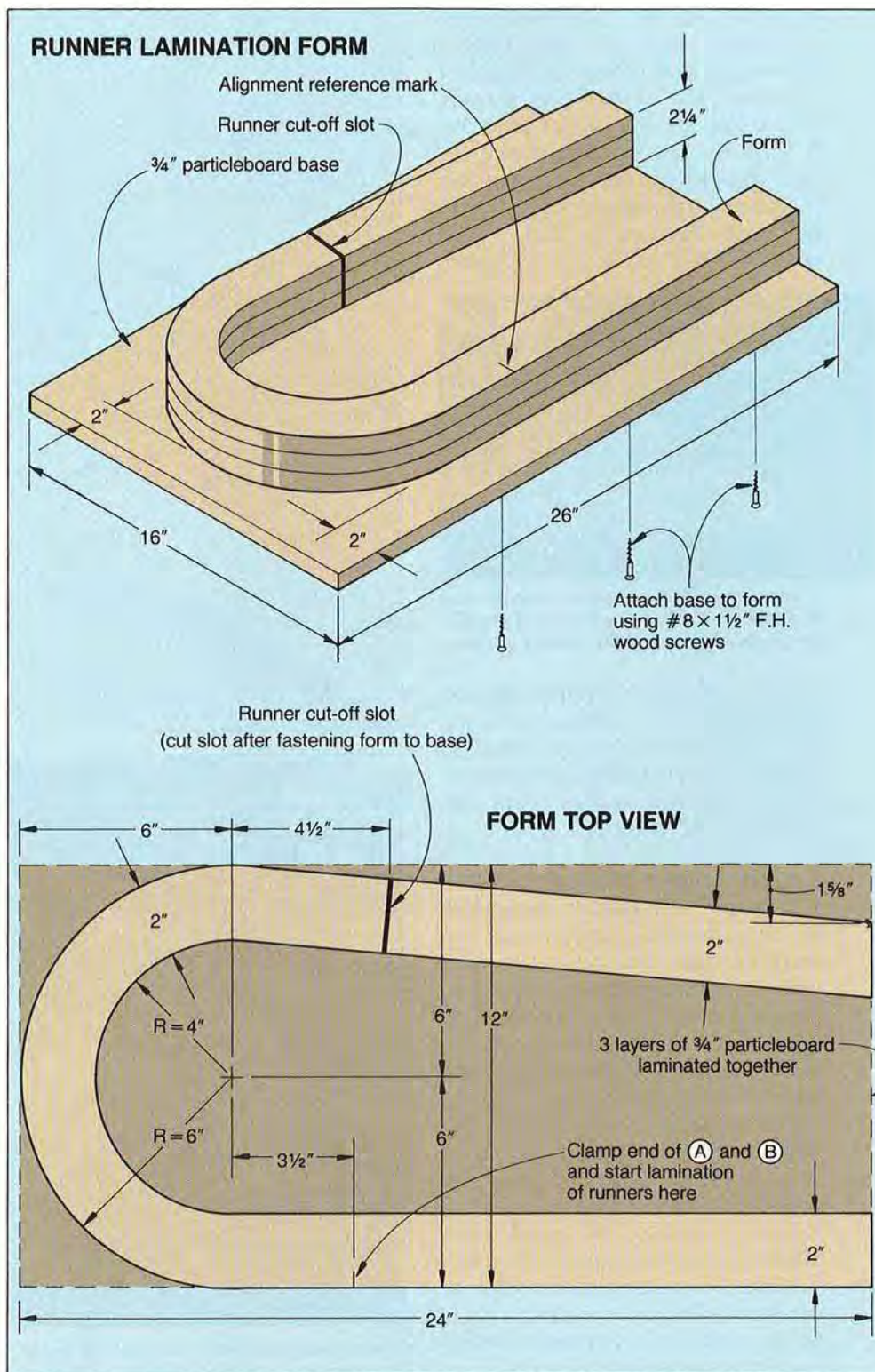
1 From $\frac{3}{4}$ " particleboard or plywood, construct a form and base like the ones dimensioned on the Runner Lamination Form drawing at right. Use the Form Top View drawing, bottom right, for dimensions when cutting the curved form pieces to shape. (To form the curved pieces, we cut three pieces of $\frac{3}{4}$ " particleboard to 12×24 ", and glued them together face-to-face. Later, we marked the layout lines, cut the form to shape, and sanded the cut edges.)
2 Drill mounting holes through the base and into the bottom surface of the form. Glue and screw the form to the base.

Cut the pieces for the runners

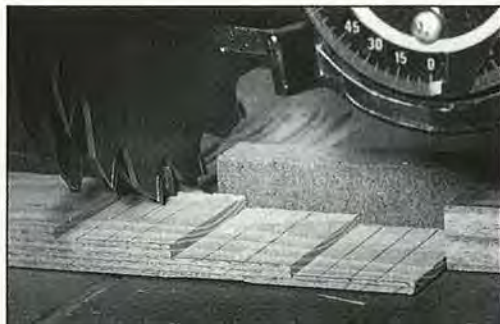
1 From $\frac{1}{2}$ "-thick straight-grained ash, cut seven runners to $2\frac{1}{4}$ " wide by $75\frac{3}{8}$ " long. Now, plane four of the runners (B) to $\frac{3}{8}$ " thick. Leave the remaining runners (A) at $\frac{1}{2}$ " thick.

2 Mount a dado blade to your radial-arm saw or tablesaw. Next, cut a set of three stepped $1\frac{1}{2}$ " dados to the depths shown across one end of each thick runner (A),

Continued



using the Runner Joints drawing at right and the photo below for reference. Cut just two dados across one end of the four thinner runners (B) to the size shown. Use a stop for consistent lengths. **3** To form the runner strips (C), use straight-grained ash, and rip 52 strips (this includes four extra strips in case of breakage) $\frac{1}{16}$ " thick by $2\frac{1}{4}$ " wide by 38" long.



Using a stop for consistent lengths, cut the rabbets for the stepped-scarf joint in the ends of the straight runner pieces.

(We cut $\frac{3}{4}$ "-thick straight-grained ash to $2\frac{1}{4} \times 38$ ". Then, we used the resaw jig shown on page 80 and a thin-kerf blade to resaw our own $\frac{1}{16}$ "-thick strips from the $\frac{3}{4} \times 2\frac{1}{4} \times 38$ " pieces of stock.)

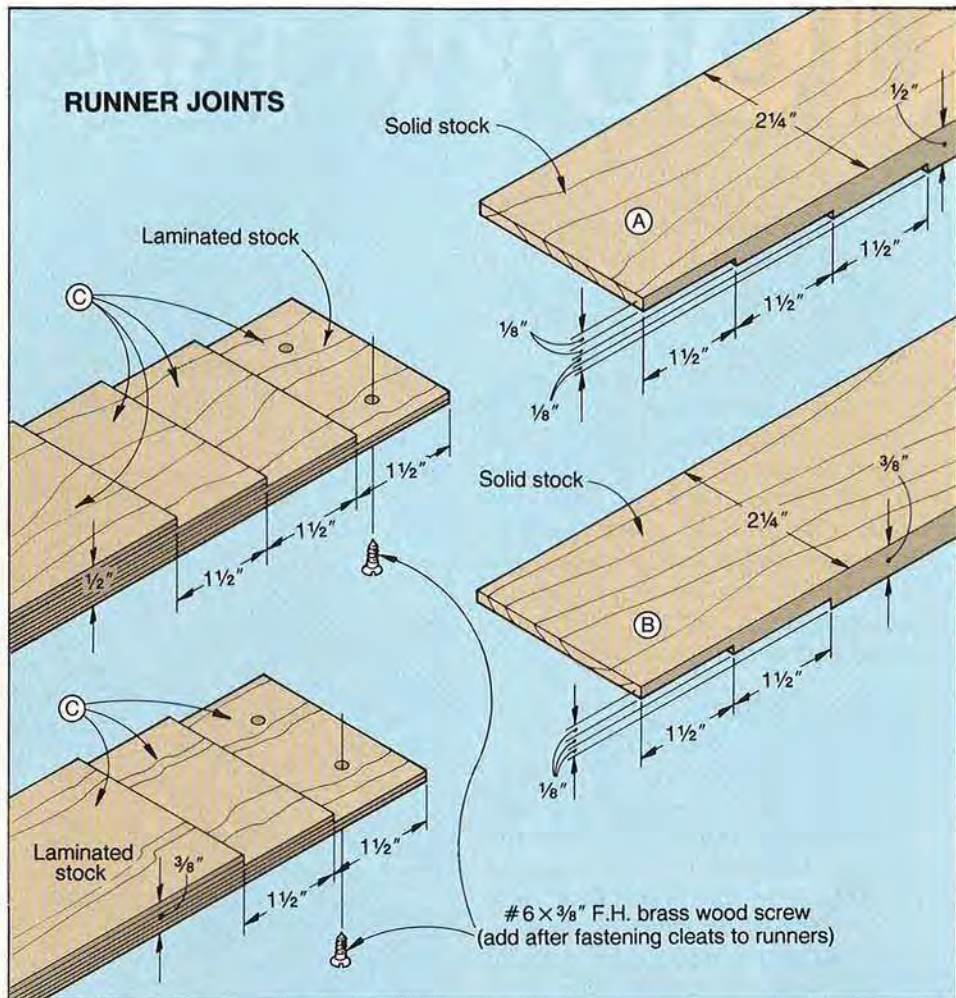
Laminate the curved fronts

1 Prepare the form for laminating by coating with paraffin wax the surfaces that will be in contact with the runner strips. The wax prevents any epoxy that accidentally leaks through tears in the waxed paper from bonding to the particleboard form.

2 Cover the form with waxed paper to further prevent the strips from sticking (see the photo at right for reference). Then, cut a dozen $1 \times 2 \times 2\frac{1}{4}$ " and one $1 \times 2\frac{1}{4} \times 6$ " clamp blocks to size.

3 Clamp a runner piece (A) to the form so that the dadoed end is flush with the alignment reference mark and facing out.

Continued



#6 x $\frac{3}{8}$ " F.H. brass wood screw (add after fastening cleats to runners)



Epoxy and clamp the thin ash strips to the straight rabbeted runner and then

around the laminated form to create the bent front of the toboggan.

10 brass finish (countersunk) washer

10 x 1 1/4" F.H. brass machine screw

5/16" polypropylene rope 15' long

5/16" hole

EXPLODED VIEW

3/16" round-overs

1 1/4"

5/16" hole drilled through G and A

5/16" hole

2 1/4"

3/16" holes centered

10 brass flat washer and brass acorn nut

1 1/4"

Space runners 1/8" apart

5/16" pull rope 10' long

Note: D and E sit 1/4" in from edge of runners on both sides

SIDE VIEW DETAIL

6 x 3/8" F.H. brass wood screw (2 per runner)

8 x 1" F.H. brass wood screw

CLEAT DETAIL

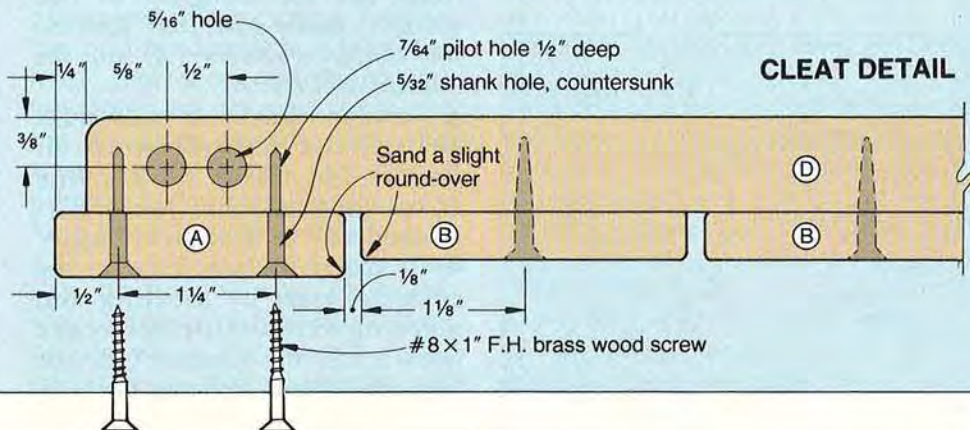
Bill of Materials

Part	Finished Size*			Matl.	Qty.
	T	W	L		
A thick runners	1/2"	2 1/4"	75 3/8"	A	3
B thinner runners	3/8"	2 1/4"	75 3/8"	A	4
C* strips	1/16"	2 1/4"	40"	A	48
D cleat	3/4"	2"	16"	A	1
E cleat	3/4"	1 1/2"	16"	A	5
F cleat	3/4"	3/4"	16"	A	2
G cap rail	3/4"	2 1/4"	16 1/2"	A	1
H cap rail	1/2"	1/2"	16 1/2"	A	1

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: A-ash.

Supplies: # 6 x 3/8" flathead brass wood screws, # 8 x 1" flathead brass wood screws, # 10 x 1 1/4" flathead brass wood screws, # 10 brass finishing (countersunk) washers, # 10 brass flat washers, # 10 brass acorn nuts, 23' of 5/16" braided polypropylene rope, finish.



4 Spread epoxy on the mating surfaces of eight of the thin strips (C). Position and clamp the thin strips to the dadoed end of runner (A) to form what professional woodworkers call a “stepped-scarf joint,” as shown in the photo on page 68. Keep the edges flush, and use the clamp blocks to prevent marring the runners with the clamps. Let the lamination sit overnight for the epoxy to set up.

5 Before removing the clamps, cut the top curved end of the runner to length with a backsaw, using the cut-off slot in the runner lamination form. Now, remove the clamps and repeat this process to make the two remaining thick runners and the four thin runners.

6 Scrape the squeeze-out from the edges of each runner. Sand the runner surfaces and edges smooth, making a slight round-over on the edges of each runner where shown on the Cleat detail.

Machine the cleats

1 Cut the cleats (D, E, F) and cap rail parts (G, H) to the sizes listed in the Bill of Materials.

2 With the ends and outside edge flush, glue and clamp the cap rail part G to part H. Later, scrape off the excess epoxy.

3 Mount a $\frac{3}{16}$ " round-over bit to your table-mounted router, and rout round-overs along the edges of each cleat where shown on the

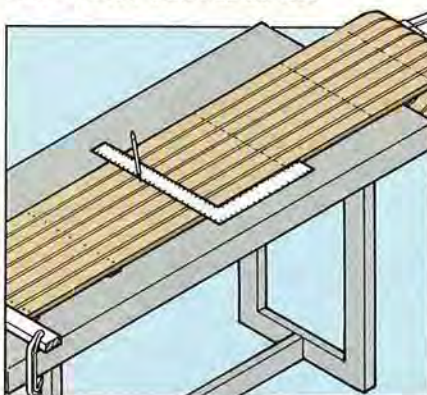
Exploded View drawing and accompanying Side View detail.

4 Mark the locations and drill $\frac{5}{16}$ " holes through the cleats for the ropes. As shown in the Cleat detail, you'll need a pair of rope holes on each end of the front cleat (D). Sand the cleats.

Add the finish, assemble, and head for the hills

1 Finish-sand the runners and cleats. Stain the three thicker runners. Seal each piece with an exterior finish (we applied four coats of exterior polyurethane). Finishing the toboggan now seals areas you'd be unable to get at after the toboggan's assembled.

2 Clamp a straight piece of stock across your workbench top at one end where shown in the



drawing above. Position the runners side by side on the workbench top, flush the curved ends, and clamp the curved front portion of the runners together with two pieces of straight stock where shown in the drawing above.

Note: For the toboggan to ride straight, make sure that you use the thicker runners (A) on the outside and center.

3 Position the back ends flush against the straight stock. If they're not flush, mark a line across the ends, and use a fine-toothed saw to trim them flush.

4 To attach the rear cleat to the runners, start by locating and marking screw-hole reference lines across the runners (see the Exploded View drawing for loca-

tion). Next, drill and countersink holes through the bottom of the runners and into the cleat to the sizes shown on the drawing. Be careful not to drill through the cleats (we used a depth stop on our drill bit.)

5 Place a drop of epoxy in each screw hole, and fasten the rear cleat to the runners with brass wood screws where shown on the Exploded View drawing and accompanying details. The epoxy keeps the screws from working loose over time.

6 Repeat the drilling, epoxying, and screwing process until all the cleats have been firmly attached.

7 To further strengthen the stepped-scarf joint, drill and countersink a pair of screw holes through each joint where shown

on the Runner Joints drawing and the Side View detail accompanying the Exploded View drawing. Place a drop of epoxy in each hole, and drive the screws.

8 Cut one piece of $\frac{5}{16}$ " braided polypropylene rope to 15' long and a second piece to 10' long. Attach and knot the ropes to the toboggan where shown on the Exploded View drawing.

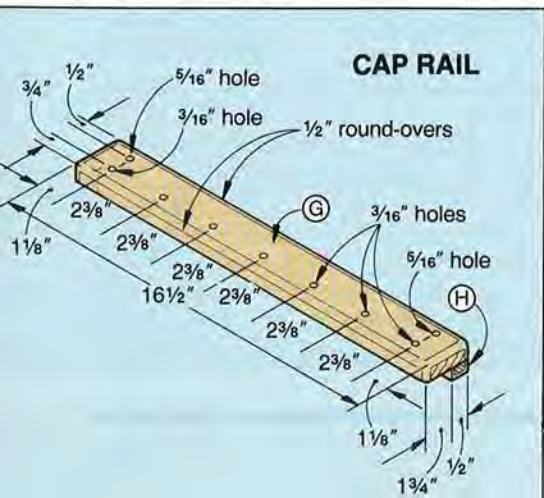
Note: We found the toboggan easier to pull by moving the position of the pull rope from the top of the toboggan (see the photo) to cleat (D). See the Exploded View drawing and accompanying Cleat detail for the revised position.

Buying Guide

• **Tropical hardwood epoxy.** Slow-set epoxy, one 16-oz. can of resin, one 16-oz. can of hardener, and instructions. \$27 ppd. Smith & Co., 5100 Channel Ave., Richmond, CA 94804. Or, call 800/234-0330 to order.

• **Seat pad.** 1" foam covered with $13\frac{1}{2} \times 64$ " vinyl, 10 grommets, \$22.95 ppd. Sleepland 4412 NE 14 St., Des Moines, IA 50313. 📍

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: John Hetherington
Illustrations: Kim Downing, Mike Henry





A FAST TAKE ON SLOW-SET EPOXY

More forgiving than its quick-set cousins, this tough-guy glue stands up to the elements. So when you're building a project requiring moisture-proof, high-strength bonding and weather resistance, it's the only glue.

 [Print this article](#)

Slow-set versus quick-set

To use any type of epoxy, you first have to mix together its two parts: the resin and the hardener. With quick-set, or "five-minute," epoxy, you'll then only have a few minutes to mate up the pieces to be bonded. On the other hand, slow-set epoxy gives you an hour or more of open working time, and it takes up to 24 hours to cure completely.

Both slow-set and quick-set epoxies shrink very little as they cure. This makes both of them excellent gap fillers. Slow-set even lends itself to mixing with other material, such as colloidal silica, or fine sawdust to become a colored putty. And, both types can bond dissimilar materials.

For fast, on-the-spot repairs that don't require water resistance, count on quick-set epoxy to get the job done. Boat builders, though, favor slow-set epoxy because of its water resistance. We chose it for use on our toboggan project on the previous five pages because the wood, along with all glue joints, will be exposed to plenty of moisture from melting snow and ice.

Slow-set epoxy also rates slightly stronger than the quick-set type. However, the proper mix of resin and hardener is the key to successful gluing. Most slow-set epoxies require a one-to-one mixing ratio. Some, however, call for up to five parts resin to one part hardener. So, carefully follow the manufacturer's directions.

Minimal heat shrinkage

Epoxy also shrinks very little during curing because the exothermic (heat-producing) polymerization (combining of molecules) continues until all possible chemical bonding has occurred. That's why epoxy's heat-producing curing process can be a hindrance or a help. As a help, cool shop conditions (below about 60 degrees) slows curing for more working time. But warming the epoxy, say with a portable hair dryer, speeds it up for a faster bonding time.

When you mix and apply epoxy, be sure to wear disposable vinyl gloves. And beware—some people when they touch epoxy encounter an allergic reaction that irritates the skin.

Dispense the required amounts of resin and hardener in a disposable paper or plastic cup (for large amounts, you can use a metal can). Because epoxy creates heat, you shouldn't mix it in an insulated foam cup—it'll melt.

Remember to mix only what you need or can apply in a reasonable amount of time. Then, with a stick or plastic paddle, stir the parts thoroughly.

For best results, apply the epoxy evenly to both mating surfaces with a brush, spatula, or roller. Join small, intricate items with a syringe.

You'll need less clamping pressure on material joined with epoxy than you would with other adhesives. Light and even pressure does the job. In fact, over-clamping squeezes out the epoxy, leading to a weak, glue-starved joint. Use wax paper or paste wax to protect surfaces that you don't intend to glue. And, using a solvent, such as acetone or vinegar, clean off all epoxy that squeezes out before it sets. Cured, epoxy proves nearly impossible to remove from a surface. ♣

Illustration: Jim Stevenson

ROLL IN THE DOUGH WITH OUR STRAIGHT 'N' NARROW

NOODLE CUTTER

Fine woodturning and gourmet cookery come together in this unusual design. When you're done at the lathe, turn out some noodles with the recipe on page 88 provided by our friends at the *Better Homes & Gardens*® Test Kitchen.

We used these tools and supplies

3×3×18" turning square of hard maple, yellow birch, or other close-grained hardwood; lathe; centers; 1/8" parting tool; 1/4" gouge; 3/8" gouge; 1/2" gouge (optional); outside calipers; tape measure; straightedge.

LATHE SPEEDS

Roughing: 800-1200 rpm
Sanding: 1300-2000 rpm
Finish cutting: 1200-1800 rpm

Note: Turning the noodle cutter's coves and cutting edges requires careful, consistent tool control. Practice those cuts on scrap material before beginning the project.

First things first

Mount the turning square between centers, and round it down to 2 3/4" diameter with the 3/8" or 1/2" gouge. Gauge the diameter at the ends and several points along the length with calipers.

Lay out the turning on your rounded blank with a sharp pencil. Starting at the headstock end, leave 5/8" for waste. From there, mark consecutively a 2" section for the ball end of the handle, 1" for the handle cone, 11" for the main coved body, another 1" handle cone, and another 2" ball end. The remaining portion at the tailstock end will be waste. (See Full-Sized Half Pattern, *opposite page*, for reference.)

With the 1/8" parting tool, cut 3/8" deep on the outside and inside of each ball end, leaving a full 2"



width for the ball. Next, taper the areas from each end of the 11" center section toward the ball. Now, turn the center section to 2 5/8" diameter. Check the surface for unevenness with a steel straightedge, and gauge the diameter at the ends with calipers to insure that the cylinder is true.

Sand the center section with 150-grit sandpaper, and then recheck with the straightedge. Complete the sanding with 220-grit and then 400-grit sandpaper.

Now for the cutting edges

Transfer the template from the Full-Sized Half Pattern, *right*, to posterboard, and cut it out with an X-acto knife. Now, on your turning, lay out marks 3/8" on center along the 11" section, starting from the middle and working toward each end. With the lathe at a slow speed, about 800 rpm, draw a pencil line around the cylinder at each mark. These will be the noodle-cutting edges. (See the half-pattern for reference.)

Now, refer to the Cutting the Covs drawing, *below*, and cut 1/8" deep midway between each pair of lines with the 3/8" gouge. Next, widen each cove with two careful cuts, one from the pencil line on each side to the center of the cove. Start each cut *at* the pencil line, but be sure to leave the line.

Then, with a 1/4" gouge and working from one end of the noodle cutter to the other, round out the covs to about 3/16" deep.

Maintain the symmetry and consistent shape of the covs by checking with the template.

With the lathe running, sand inside the covs with 150-grit sandpaper rolled into a tube. Follow with 220-grit. With the lathe stopped, lightly sand the cutting edges—just enough to erase the pencil lines—with 400-grit sandpaper. Be sure the cutters don't come to a knife edge.

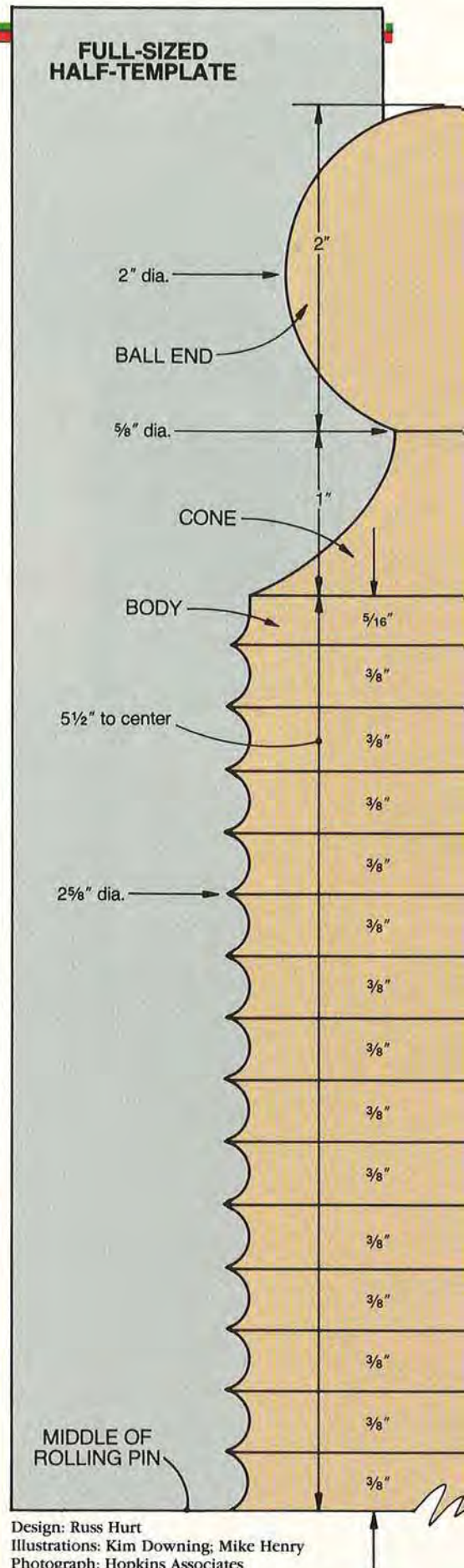
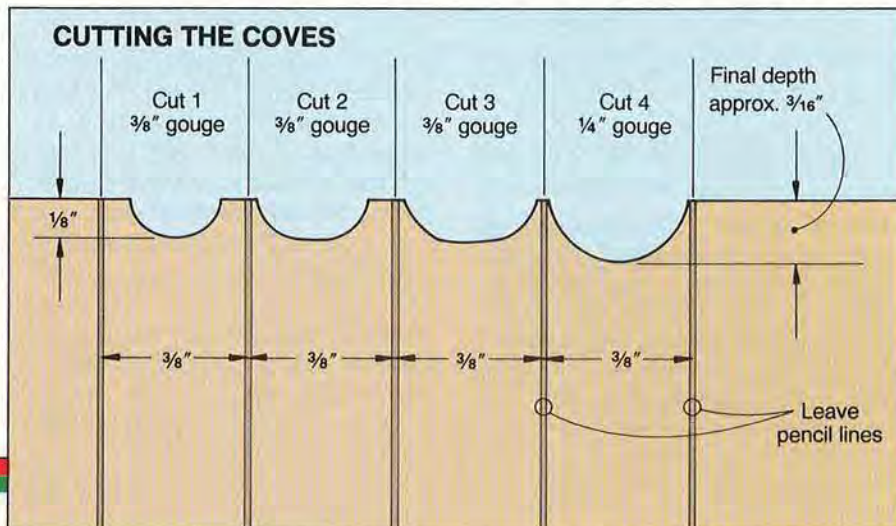
Here's how to turn the ball handles

Part in to 2" diameter in the middle of each ball section, checking with calipers. Remove the waste on either side almost to the parting-cut depth. Cut in to about 1" deep on each side of each ball section. Now, form the ball ends with the 3/8" gouge. Make room for the tool by cutting into the handle cone area and the waste areas on the ends of the turning.

Part in to 5/8" diameter at the point where the ball joins the cone, checking with calipers as you cut in. Sand the ball ends and cones with 150-grit sandpaper followed by 220-grit.

Cut the waste ends to 1/8" diameter. Shut off the lathe, and remove the turning with a coping saw. Sand the area to match the ball contour in graduating grits up to 400-grit sandpaper.

Finish the noodle cutter with a food-safe finish such as Livos Kaldet Resin and Oil Finish, or Behlen's Salad Bowl Finish. 🌿



Design: Russ Hurt
Illustrations: Kim Downing; Mike Henry
Photograph: Hopkins Associates

Walnut-clad

 Print this article

PUMP DISPENSER



A
hands-down
winner for
lotion
and soap



A handy pump dispenser for soap or hand lotion that's easy to build and looks great, too? Where else but The Craft Shop? Your reward for a little effort on this one: the perfect finishing touch for your kitchen or bathroom.

Note: You'll need 1/4"-thick stock for this project (we used walnut). Plane thicker stock to size, or re-saw the stock using our simple re-sawing jig on page 80.

From 1/4"-thick stock, cut two 2 7/8" squares for the top and bottom, then bevel-rip eight pieces 1 1/8 x 5 1/16" at 22 1/2° for the sides.

Lay the sides, bevel down, next to each other on your workbench. Align the ends and tape the pieces together with masking tape or reinforced strapping tape. (See the Body Strips drawing.) Turn the assembly over, and roll it into an octagon, checking all joints for a tight fit.

Unroll the sides, then apply woodworker's glue to the open joints. Roll up the sides again, making sure all joints are tight. Secure with tape until the glue sets.

Use a Forstner bit or hole-saw to bore a 1 1/8" hole in the center of one square. Back it with scrapwood to prevent tear-out. Then, using the body as a guide, cut the corners off both squares, leaving a margin on all sides.

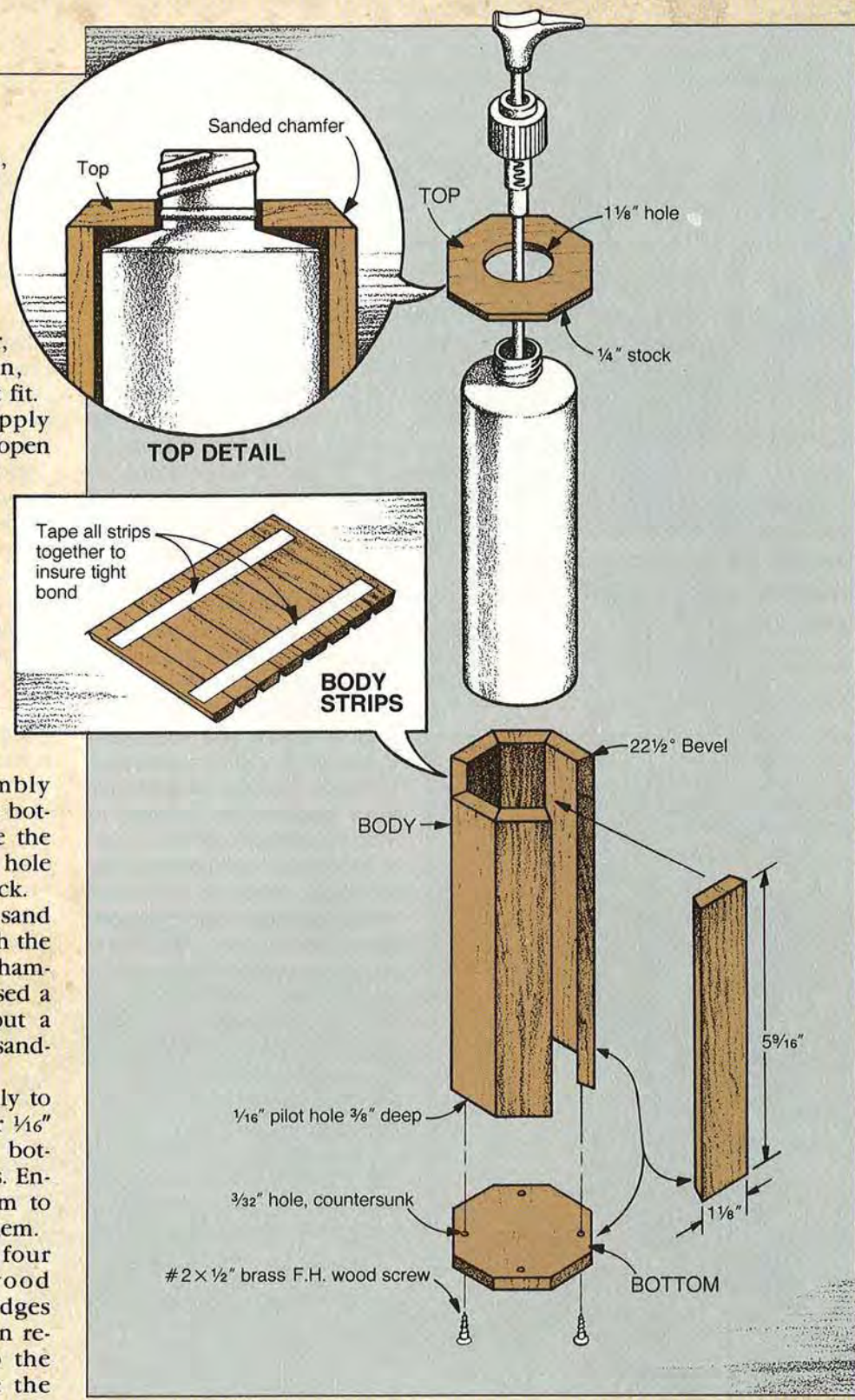
Remove the pump assembly from the bottle, and slide the bottle into the body. Now, glue the top into place, locating the hole in the top over the bottle neck.

With a disc or belt sander, sand the edges of the top flush with the body sides. Then, sand 45° chamfers on the top edges. (We used a miter gauge for accuracy, but a guide block clamped to the sander table also would work.)

With the bottom held firmly to the body, mark and drill four 1/16" holes 3/8" deep through the bottom and into the body's sides. Enlarge the holes in the bottom to 3/32", and then countersink them.

Attach the bottom with four #2 x 1/2" flathead brass wood screws. Sand the bottom edges flush with the sides, and then remove the bottom. To keep the bottle from turning inside the body, glue it to the bottom with hotmelt adhesive.

Apply a clear, durable finish (we used a wipe-on polyurethane product), and then install the bottom. Now, you're ready to fill the dispenser and pump your hand lotion in style.



Buying Guide

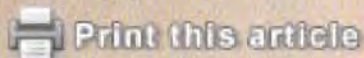
• **Bottle and dispenser.** Plastic bottle with screw-on pump-type dispenser, \$4.98 for one set, or \$6.50 for two sets, ppd in the United States. Include an index

card or mailing label with your name and address typed or printed on it. Order from Ennis Mountain Woods, RFD 2, Box 222B, Afton, VA 22920. ♣



NOAH'S LOVABLE

When family and friends see this great Noah's Ark and animals, they'll think you worked for 40 days and 40 nights. But thanks to our easy, pattern-packed plans, you can tell them it took less time to make than a rainy afternoon. Or, you could just keep 'em guessing!



You'll need these materials:

Build the ark with a 1×6"×4" pine board, a 12" length of 2×4, and a ¼" dowel at least one inch long. You'll need ¼" stock for the gangplank and the animals. Plane or resaw thicker stock to size. We used several wood species for the animals as indicated on the patterns.

First, let's build the ark

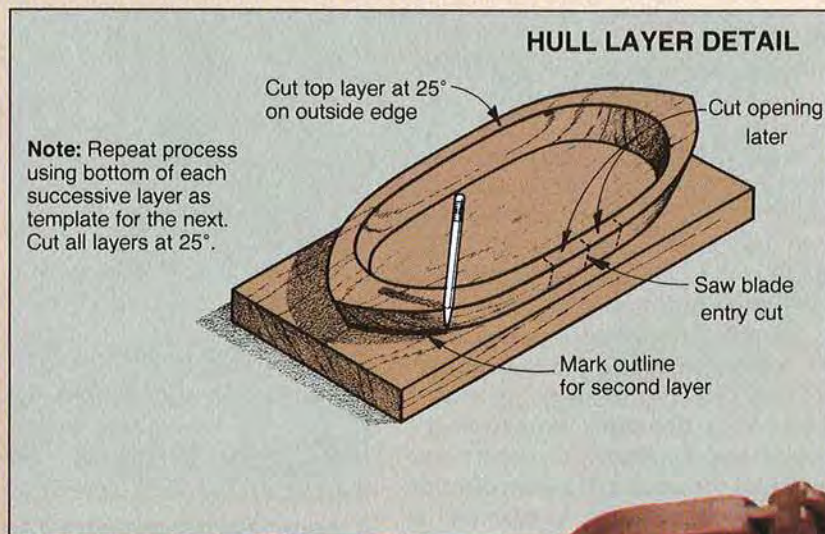
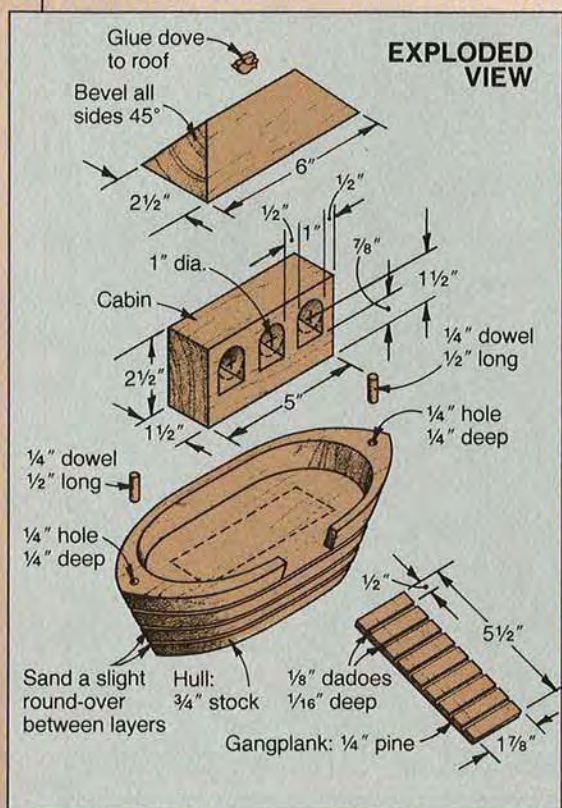
Cut four pieces of 1×6 pine 12" long. Now, make four photocopies of the full-sized hull quarter pattern on page 78. Scissor out the four sections, and then join them with cellophane tape to make a full-sized hull outline. Adhere the pattern to one of the hull pieces.

Next, tilt your bandsaw or scrollsaw table to 25°, and cut along the outside pattern line. Then, place the part

you just cut with the narrow side down on top of another 1×6 piece. Trace the bottom outline as shown below, and cut. Make four layers total, tracing each from the previous layer.

Now, return to the top (largest) layer and saw along the inside pattern line, entering the interior cut at the midpoint of the left side. Do not cut inside the other hull layers.

Finally, set the bandsaw table to 0°, and cut the gangplank opening 1⅞" wide, as shown on the Exploded View drawing. Sand round-overs on the top and bottom edges of the hull layers (to create the grooved sides), apply glue, and clamp together. Once dry, drill a ¼" hole ¼" deep in each end where shown on the Exploded View drawing. Cut two pieces of ¼" dowel ½" long, apply glue, and insert.



ARK and a complement of friendly critters

Rip a 12" 2x4 to 2½". From this, cut a 5" length for the cabin, and a 6" length for the roof. Next, bore three 1"-diameter holes through the cabin piece where shown on the Exploded View drawing. Cut the window bottoms with the scrollsaw. Adjust the bandsaw or scrollsaw table to 45°, and bevel the sides and ends of the 6" length to make the roof.

Saw ¼" stock to 1⅞x5½" for the gangplank. With a tablesaw, cut ⅛"-deep blade kerfs ⅛" wide, spaced ½" apart on one side.

Sand off saw marks, and sand slight round-overs on the cabin and roof corners. Stain the deck, cabin, and gangplank. Paint as shown in the photo, *above right*.

For an aged look, scuff the paint with sandpaper, sanding through to bare wood on some corners. Then, wipe with walnut stain. Now, glue together the hull, cabin, and roof.

And now, for the animals

Make two photocopies of each animal pattern, *next page*. For each, except the dove, cut three pieces of ¼"-thick stock to the dimensions shown on the pattern.

Laminate matched sets temporarily with double-faced tape. Use small pieces of tape so you can easily separate the pieces later.

Our animals have a clear finish, but you could cut them from pine and paint them.

Adhere a pattern to its respective stack. Then, cut along the outermost line. Separate the three pieces. (If they don't come apart easily, dribble lacquer thinner into the joints to break the bond.)

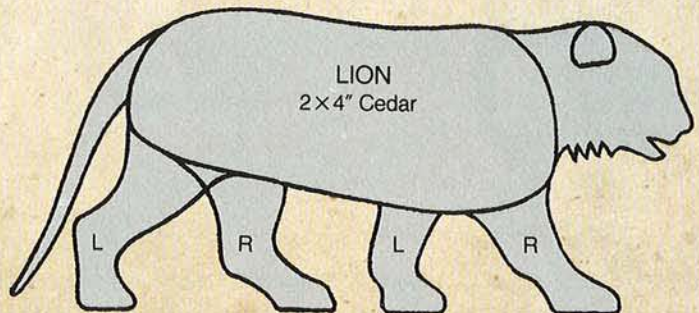
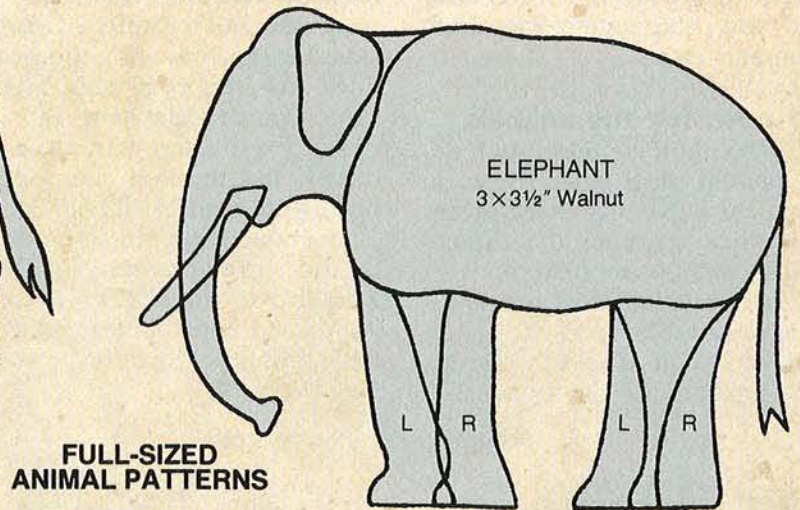
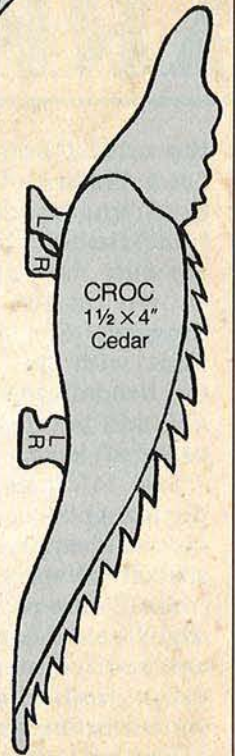
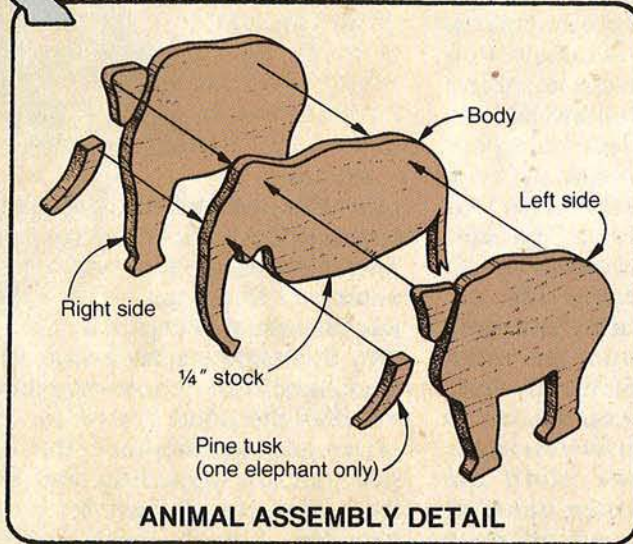
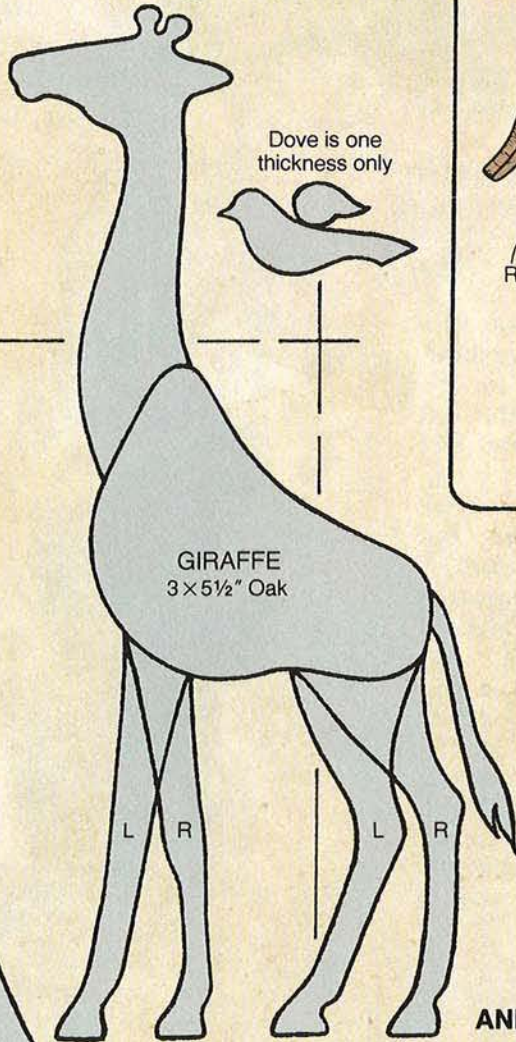
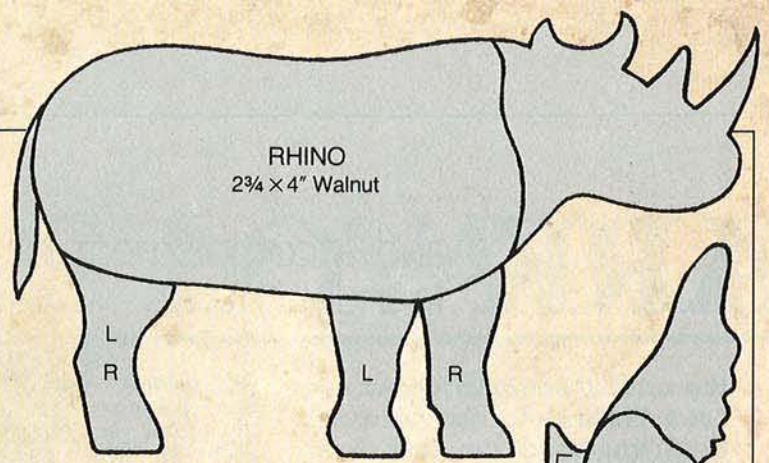
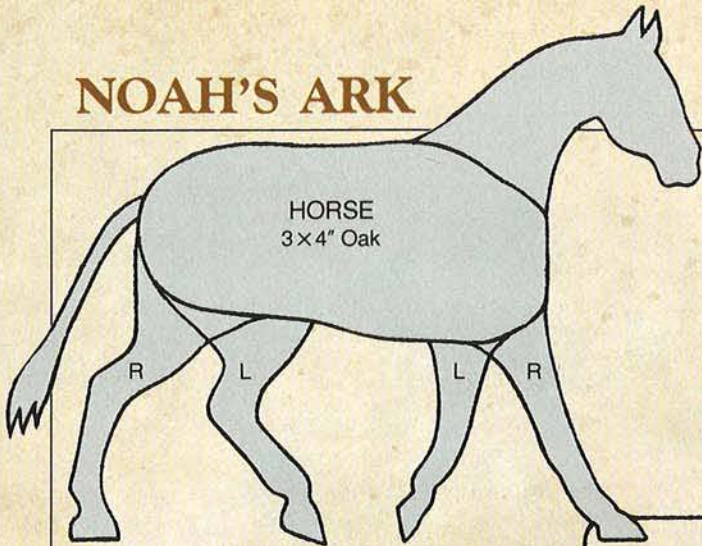
Designate one piece the left side, one the right side, and one the center. Saw all legs off the *center* piece. Saw the head and tail from the *left* and *right* sides (but leave the tail on the crocodile's sides). Now, following the pattern lines, saw the extra legs off each side. Cut the elephant ears and tusks (we used pine for the tusks), and the lion ears. Cut the dove from a single thickness.

Assemble the animals, referring to the Animal Assembly detail. Round over the edges with sandpaper, and apply a clear finish. Finally, glue the dove to the roof of Noah's ark. ♣

Full-sized patterns on next page



NOAH'S ARK



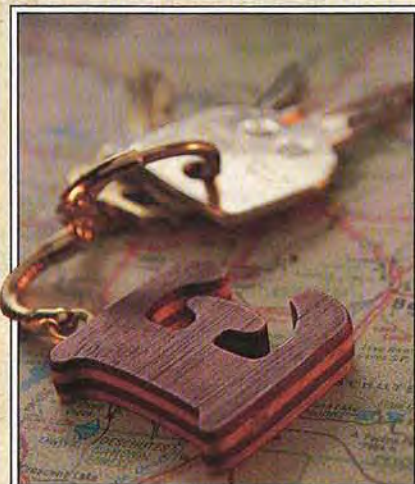
HULL
FULL-SIZED
QUARTER
PATTERN



ABCDEFGHI

LETTER PERFECT KEY CHAINS

A great gift idea for friends from A to Z



Note: You'll need thin stock to laminate for this project. Plane thicker stock to size, or resaw it using our jig on page 80.

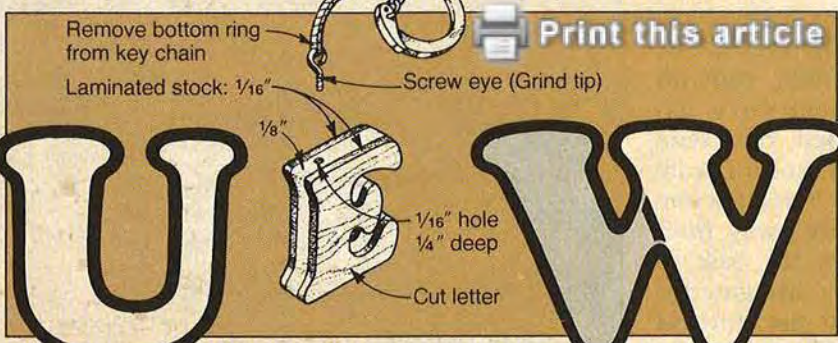
Cut your stock (see the drawing below for thicknesses) and glue up $\frac{1}{4} \times 1\frac{1}{2} \times 6$ " laminations. Photocopy or trace the letter you need from the full-sized alphabet running around this page.

Adhere the letter to your lamination with spray adhesive. Scrollsaw any interior openings first, drilling start holes as needed. Then, cut around the outline. Sand and apply a clear finish.

Remove the bottom ring from a keychain assembly (available from craft suppliers). Open a size 216½ brass screw eye from the hardware store, and then install it on the chain end. Drill a $\frac{1}{16}$ " hole $\frac{1}{4}$ " deep centered in the top edge of the letter. Coat the threads with epoxy, and insert the screw eye. ⬤

That little plastic key chain from the insurance agent just isn't you, is it? Why not spend a few minutes with your scrollsaw, cutting your initial from laminated hardwoods? Then, make some more for gifts because everyone will want one.

Illustrations: Jamie Downing; Jim Stevenson
Photograph: Hopkins Associates



N O P R S T

U X

Y

W Z

J K L M

SUREFIRE RESAW JIG

SAFELY AND CONSISTENTLY CUTTING IT THIN

Thin stock for projects like our toboggan (see page 66), can be hard to find, but you can resaw your own easily and safely with the jig featured here. Build it to fit your saw table, and you'll use it again and again.

Construct the base and fence to form the jig

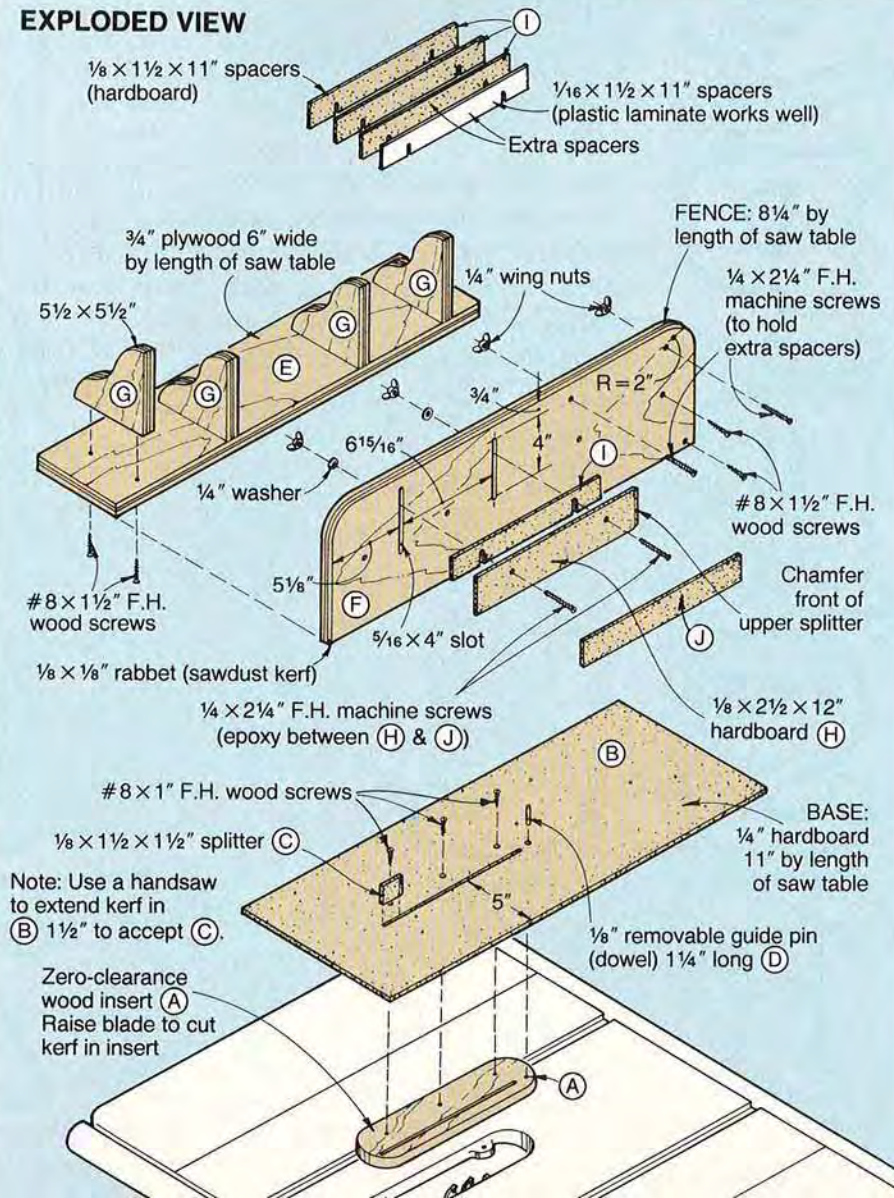
The jig shown has two basic components: the **base** and the **fence**. For the **base**, start by making a zero-clearance insert (A) of solid wood to replace your saw's metal insert. (The top of the insert must rest flush with the top of the table surface.) Cut the base (B) to size. Lower the insert into place, and position one edge of the base approximately 5" from the blade where shown on the drawing. Clamp the base to the tablesaw.

Start the tablesaw and raise the rotating blade to its highest setting (this creates the kerf in the insert and base); then, shut off the saw. (We settled on a 24-tooth, carbide-tipped rip blade as the best for resawing.) Locate countersunk pilot holes for the screws shown safely away from the kerf, and screw the base to the insert. Using a straightedge and pencil, extend the lines of the kerf in both directions.

With a handsaw, cut between the lines just marked to lengthen the kerf enough to accept the splitter (this device keeps the kerf of freshly cut stock from pinching on the blade). Also



EXPLODED VIEW



drill a 1/8" hole inside the marked lines on the base to accept the 1"-long removable dowel-guide pin. Cut the splitter (C) and guide pin (D) to size; epoxy the splitter in place.

To fabricate the fence, cut the horizontal support (E), upright (F), and the four support braces (G) to size. Locate and cut the 3/16" slots. Form the rabbet at the bottom edge of the upright, and radius its top two corners. Glue and screw these parts together, checking that the base and the upright meet at a 90° angle.

Cut the upper splitter parts (H, I, J) to size. Notch the spacers (I). Drill and countersink a pair of holes through part H to align with the slots in the upright (F). Epoxy a pair of 1/4 x 2 1/4" machine screws between parts H and J. Then, drill and countersink the mounting holes, and epoxy a pair of 1/4 x 2 1/4" machine screws to the upper back end of the upright where shown on the Exploded View drawing. You'll use this last pair of screws to form an easy-access storage rack for the spacers.

Readying the jig for resawing

Lightly clamp the jig to the table saw, and raise the blade about 1 1/2" above the saw table. Using the appropriate number of spacers (in the case of the toboggan on pages 66, use one 1/16"-thick spacer), set the fence the desired distance from the blade as shown in the opening photo left. Use the spacer so that the fence is parallel with the front and back edges of the blade.

As shown in the intro photo, use a square to verify that the fence is perpendicular to the saw table. If you detect problems (be precise in your measurements), loosen the C-clamps slightly and shim as necessary.

Insert the appropriate number of spacers between the upper splitter and fence (for the toboggan strips use just one 1/16" spacer). Then, set up a feather board

and kicker arrangement like the one shown in Photo A.

With the feather board snugged up against the stock and the blade raised to make a 1" cut, run the material through the saw as shown in Photo B. (For ease in cutting



the toboggan runner strips, we raised the blade to 1 3/16" and cut the strips in two passes.)

Flip the stock end for end, lower the upper splitter so that it captures the upper portion of the material. Run the stock through again (same face against the fence) as shown in the photo. The splitter prevents the blade from gouging the already-sawn portion of the stock as the remainder of the material passes the saw blade. *Note: For wider boards, it's best to adopt a multiple-pass technique. Take a 1" bite from the material on the first two passes, and then raise the blade 1/2" each pass after that. After making one cut along each edge, put the guide pin in place. Sometimes, a kerf will close up immediately after passing over the blade; the pin will hold the kerf apart to prevent the kerf from binding on the blade.* ♣

Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry

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ANNOUNCING...

WINNERS APLENTY IN THE 1991 BUILD-A-TOY CONTEST

From the best use of a router to the home hobbyist's top finish, here's the complete list.

CHUG-A-CHUG-A-CHOO-CHOO



Best train by a professional was claimed by Carl Boop, Levittown, Pa., for his old-time steam train.

STUDENT DIVISION

Grand Prize (\$2,000 Kity K-5 machine): Josh Escobedo, Pioche, Nev.

First Prize (\$1,500 Black & Decker merchandise): John Hicks, Westlake Village, Calif.

Second Prize (\$579 Jet 14" band-saw): Brad Noble, Hamilton, Ohio.

Third Prize (\$500 merchandise, American Tool Cos.): Todd Journey, Newark, Ohio.

Fourth Prize (\$250 merchandise, Industrial Abrasives): (tie) Michael Bishop and Tony Henry, Newark, Ohio.

HOME-HOBBYIST DIVISION

Grand Prize (\$2,500 Delta merchandise): Larry J. Weaver, Petersburg, W. Va.

First Prize (\$1,600 Shopsmith Mark V): Richard J. Zichos, Pasadena, Md.

Second Prize (\$500 Grizzly merchandise): Larry Tkaczyk, Charlotte, Mich.

Third Prize (\$500 Lobo merchandise): Bob Hill, Oelwein, Iowa

Fourth Prize (\$250 Leichtung merchandise): Oswald Dobat, Ferndale, Mich.

PROFESSIONAL DIVISION

Grand Prize (\$2,000 Freud merchandise): Mike Jagielo, Almond, Wis.

First Prize (\$1,000 AEG merchandise): Neil Seely, Rochester, N.Y.

Second Prize (\$500 Skil merchandise): Steven A. Bruni, Fort Madison, Iowa

Third Prize (\$400 Wilke BW1-P planer): Daniel F. Sims, Pendergrass, Ga.

Fourth Prize (\$348 Milwaukee electric 4" belt sander): Donald J. Polito, Hawthorne, Calif.

SPECIAL CITATIONS

BEST USE OF ROUTER

Student (AmMax scrollsaw): Casey Vosen, Lewiston, Mont., train.

Home hobbyist (\$1,000 Porter Cable merchandise): B.J. Dowler, Phoenix, Ariz., fire truck.

Professional (\$1,000 Ryobi merchandise): Phillip Peck, Montague, Calif., push-button telephone.

BEST USE OF WOOD

Student (Turning squares, Adam's Wood Products; \$100 Constantine's merchandise): Josh Escobedo, Pioche, Nev., car transport.

Home hobbyist (14" RBI scrollsaw): Steve Roberts, Dunmore, Pa., road grader.

Professional (\$500 Makita merchandise):

PUTT-PUTT-PUTT

Steve Roberts, of Dunmore, Pa., won best use of wood by a home hobbyist with his road grader.





dise): Joseph Pasquito, Lawrenceville, N.J., jet airplane.

BEST CARVED TOY

Student: No winner

Home hobbyist (\$500 Dremel merchandise): Sylvia Adair Maker, Windsor, Vt., clown music box.

Professional (\$500 Dremel merchandise): Robert C. Benson, Tyler, Texas, boot rocker.

BEST FINISH

Student (\$1,000 Deft merchandise): Joint student project of Octavio Chavez, Mike Choi, Paul Farrugia, Matt Manley, Craig Sandoval, Richard Segovia, Jeff Wetzstein, Robert Wong, Downey, Calif., jointed teddy bear.

Home hobbyist (\$1,000 Minwax/Watco merchandise): Brian Rebella, Mellen, Wis., bulldozer.

Professional (\$500 Dremel merchandise): Steven A. Bruni, Fort Madison, Iowa, helicopter.

BEST TRUCK

Student (\$100 membership How-to Book Club and antique car plans, Toys and Joys): Brad Noble, Hamilton, Ohio, fire truck.

Home hobbyist (\$500 Meisel merchandise, Dollar Trading carving set): Frank W. Pickett, Johnson City, Tenn., semi-truck.

Professional (Craftsman Wood Service turning squares and Brandmark branding iron): Henry J. Gorczyński, Batavia, N.Y., cement truck.

CLANG-CLANG-CLANG

B.J. Dowler, of Phoenix, landed best use of a router as a home hobbyist with this fire truck.



BEST CAR

Student (\$100 Constantine's merchandise): Joint project of Steve Smyers and Dan Loper, Newark, Ohio, race car.

Home hobbyist (hardwoods from Berea Hardwoods): Mark Canales, Gansevoort, N.Y., Indy race car.

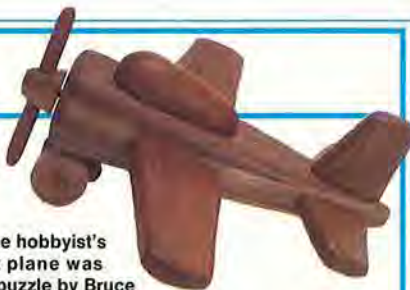
Professional (Plans from Furniture Design): Lewis R. Dow, Apollo Beach, Fla., car with spare.

BEST PULL TOY

Student (DML 10" carbide-tipped blade): Stephen Forman, E. Amherst, N.Y., road hugger.

Home hobbyist (Formby's gift set): Kris Kransberg, Tavernier, Fla., swimming fish.

Professional (Timbers Woodworking



Home hobbyist's best plane was this puzzle by Bruce Stevenson, Circle Pines, Minn.

VAR-O-O-O-O-M

gift certificate): Mike Jagielo, Almond, Wis., lady bug.

BEST TRAIN

Student (Rodale woodworking books): John Hopp-Ventres, Fairfield, N.J., steam engine.

Home hobbyist (\$250 in power tools, Seven Corners): Richard J. Zichos, Pasadena, Md., passenger train.

Professional (\$100 membership in How-To Book Club): Carl Boop, Levittown, Pa., engine and Pullmans.

BEST BANK

Student (Formby's gift set): Tina Petzold, Ontario, Ore., see-through bank.

Home hobbyist (Rip Straight from Fisher Hill): Robert W. Sanders, St. Marys, Ga., Mack truck.

Professional (DML 10" carbide-tipped blade): Michael Watters, Saginaw, Mich., boat.

BEST AIRPLANE

Student (Nova Tool branding iron): Bill George, Hamilton, Ohio, maple biplane.

Home hobbyist (Blueprints from Accents in Pine): Bruce Stevenson, Circle Pines, Minn., puzzle plane.

Professional (\$100 Constantine's merchandise): Dan Shuler, Jetmore, Kan., maple monoplane.

GREATEST NUMBER OF TOY ENTRIES

Student (Paragauge from Accuset Tool and \$100 sandpaper from Econ Abrasives): John Hopp-Ventres, Fairfield, N.J. (6)

Home hobbyist (\$100 Woodworkers Supply Corp. gift certificate): Robert D. Sylvain, Granby, Conn. (27)

Professional (8" fine whetstone, Diamond Machining Technology): Randall E. Vanover, No. Kesville, Va. (6)

BEST BOAT

Student (Router insert, Tarheel Fling): John Hopp-Ventres, Fairfield, N.J., sailboat.

Home hobbyist (Rip Straight from Fisher Hill): Harold Geiselman, Canton, Ohio, Noah's ark.

Professional (Penn State variable-speed scrollsaw): William Bruck, Hamilton, Ohio, pontoon and four-wheeler.

BEST PUZZLE

Student (Thumb piano, St. Croix Kits): Rick Zwart, Crestwood, Ill., mountain.

Home hobbyist (Master Set, MLCS): Cynthia B. House, Arlington Heights, Ill., town.

Professional (20 sq. ft. of walnut, Hardwoods of Illinois): Harold A. Rupert, Jr., Pueblo, Colo., train.

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ASK WOOD

Whether your woodworker's license reads "Beginner," "Intermediate," or "Advanced," you're bound to have a few questions about your favorite hobby. By consulting our staff and outside experts, you can get the answers you need. Send your questions to:

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Going around in circles on your bandsaw

 [Print this article](#)

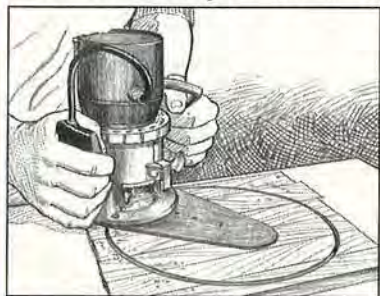
What's the secret for cutting a perfectly round circle in wood—something about 6"—on your bandsaw?

Do you always have to follow a line, and then sand? I'm making a carousel which requires cutting a 4"- and a 6"-round piece out of 1" stock. Thanks for any help.

—Henry R. Krygsbeld,
Lansing, Ill.

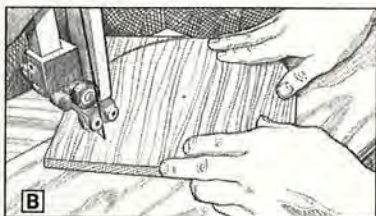
Henry, do we have a jig for you! It consists simply of a piece of plywood scrap with a small nail sticking up through its center about $\frac{1}{4}$ ". In the bottom of the intended round cutout, drill a center hole the same diameter as the nail. Place the workpiece on the nail, and secure the plywood jig to the bandsaw table, making sure the distance between the center of the circle and blade equals your circle's radius. Now, using a $\frac{1}{8}$ " blade, cut out the circle by rotating the workpiece. (See Drawing B) Note that we laid out our circle along the edge of the workpiece to create a starting place. After cutting, sand the edge smooth to remove splinters and saw marks.

If you want to cut perfect circles and don't care what machine you do it with, consider using a



router and a tram-mel base like the one shown left. A straight bit works best for this operation. You can go with either a nail or dowel pin as the pivot point for the base piece.

Continued on page 86



WOOD® Magazine's Fourth Annual



Lt. Mike Snyder of U.S. Marine Corps with young child holding handcrafted wooden toy donated by WOOD Magazine.

BUILD-A-TOY™ Competition

1992 RULES

1. Make projects no larger than 2' X 2' X 2'. The primary material should be wood, but may incorporate other materials.
2. Please follow Consumer Product Safety Commission guidelines: nontoxic wood finishes only; no parts smaller than 1 1/4" square on toys for children under three years of age; no sharp corners or points; pull strings longer than 12" should not have beads or other attachments that could tangle and form a loop.
3. Entries must be received by February 1, 1992. All entries must be postpaid; collect entries will be refused. Attach an entry label, photocopy of an entry label or a 3" x 5" card with your name and address to each toy.
4. Woodworkers who build toys from existing plans will be eligible for Special Citation prizes only. Woodworkers who build their own original designs will be eligible for design and citation prizes. Only students will be eligible for the Student Special Entry Project. Only home hobbyists and professionals will be eligible for the Home Hobbyist/Professional Project category. No purchase necessary. To receive a copy of a toy plan from *All-Time Best Toy Projects*, please send a self-addressed stamped envelope to: WOOD® Magazine, c/o Eileen Sullivan, 750 Third Avenue, New York, NY 10017.
5. Entry constitutes permission to use winner's name and photograph for promotional purposes. Employees and family members of Meredith Corporation, their affiliates and subsidiaries are ineligible. Void in Quebec.
6. Winners will be selected and notified by mail on or about April 15, 1992, and will receive the prize directly from the manufacturer/distributor. For a list of winners, send a separate, self-addressed stamped envelope to BUILD-A-TOY, 1912 Grand Avenue, Des Moines, IA 50309-3379.
7. Meredith Corporation will donate all entries to the U.S. Marine Corps Reserve Toys-for-tots program.
8. For woodworkers who enter their toy as an original design: Toy must be your own original design. A different approach to an existing toy would qualify. Please do not enter toys with only subtle changes from published patterns.
9. A panel of representatives from the U.S. Marine Corps Reserve, Meredith Corporation and woodworking experts will judge the toys on a child's appeal, craftsmanship, originality, and durability. The panel's decision will be final.
10. Professional woodworkers include woodworking teachers and anyone earning income by selling wooden items.



WOOD® Magazine announces: 1992 BUILD-A-TOY™

Fourth Annual Contest to benefit children through Toys-for-Tots.



ENTRY DEADLINE: FEBRUARY 1, 1992

Great prizes for every skill level!

Prizes for Original Designs and Built from Plans!

We're proud to invite woodworkers of every age and skill level to participate in our Fourth Annual BUILD-A-TOY Contest.

Design prizes will be awarded for toys built from original plans. Several of these toys will be chosen for future editorial features in WOOD! Special Citation prizes are open to all woodworkers who send us a toy.

BUILD-A-TOY is the best way we know of for woodworkers to get the recognition they deserve for great craftsmanship. And the toys you submit will be contributed to the Toys-for-Tots program of the U.S. Marine Corps Reserve and distributed to underprivileged children this Christmas!

Enter our BUILD-A-TOY contest; help promote the wonderful craft of woodworking, win some terrific prizes, and make a child very happy this holiday season. Please join us!



Above top: Editor and Publisher of WOOD Magazine with children from St. Barbara's Head Start Program at a special BUILD-A-TOY reception in New York City, December 1990.

Above bottom: Award-winning BUILD-A-TOY entries on display at the Museum of American Folk Art, December 1990.

COMPETITION PRIZES AND CATEGORIES

	STUDENT (K-12):	HOME HOBBYIST:	PROFESSIONAL:
DESIGN PRIZES: These 12 categories are open to original designs only.			
Grand Prize	Black & Decker: \$1,000 in merchandise	Delta: \$2,500 in merchandise	AEG: \$1,000 in merchandise
First Prize	Grizzly: \$500 in merchandise	Shopsmith: Mark V (\$1,600 value)	Porter Cable: \$1,000 in merchandise
Second Prize	Skil: \$500 in merchandise	Ryobi: \$1,000 in merchandise	RBI: 16" variable speed Scroll saw (\$750 value)
Third Prize	American Tool Co.: \$500 in merchandise	Lobo: \$500 in merchandise	Wilke: BW-P Planer (\$400 value)
SPECIAL CITATIONS: These 36 categories are open to both original and existing designs.			
Best use of Wood	Adams Wood Products: Assortment of Turning Squares	Woodworkers Supply Corp.: \$100 gift certificate.	Makita: \$500 in merchandise
Best Carved Toy	Dremel: \$500 in merchandise	Dremel: \$500 in merchandise	Dremel: \$500 in merchandise
Best Finish	Deft: \$1,000 in merchandise	Minwax: \$500 in merchandise	Minwax: \$500 in merchandise
Best Truck	Klockit: \$100 in merchandise	Meisel: \$500 in merchandise	Brandmark: Branding Iron
Best Car	Constantine: \$100 in merchandise	Toys & Joys: Antique Car Plans	Furniture Designs, Inc.: Furniture Plans
Best Pull Toy	DML: 10" Carbide-Tipped Blade	How-To Book Club: \$100 gift certificate	Woodmaster: \$100 gift certificate
Best Train	Rodale: Woodworking Books	Seven Corners: \$250 in Power Tools	Milwaukee Electric: 4" Belt Sander with Bag (\$348 value)
Best Bank	Klockit: \$100 in merchandise	Formby's: 3 Gift Sets	DML: 10" Carbide-Tipped Blade
Best Airplane	Geneva Specialties: \$100 in merchandise	Accents in Pine: Set/Blueprints	Industrial Abrasives: \$250 in merchandise
Most Number of Toy Entries	Accuset Tool: ParaGauge	Woodworkers Book Club: \$100 membership	Econ Abrasives: \$100/Sandpaper
Best Cradle	Geneva Specialties: \$100 in merchandise	Sears Craftsman: 20" Scroll saw (\$400 value)	Penn State: Variable Speed Scroll saw
Best Puzzle	St. Croix Kits: Thumb Plano	MLCS: Master Set	Formby's: 2 Gift Sets
STUDENT SPECIAL ENTRY PROJECT:		This category is open to student woodworkers who build a toy plane from plans found on page 58.	
Best Toy Plane	Woodworkers Book Club: \$100 membership		
HOME HOBBYIST/PROFESSIONAL PROJECT:		This category is open to home hobbyists or professional woodworkers who build a toy from plans in WOOD magazine's new book, <i>All-Time Best Toy Projects</i> . See ad on Inside back cover.	
Best Toy Project	Leichtung: \$250 in merchandise		

WOOD® Magazine's 1992 BUILD-A-TOY Competition

There is no limit to the number of entries. Please provide the following information for each toy submitted.

My entry is: Original design* Built from plans Special Entry Project

My skill level is: Student Home Hobbyist Professional

*For Original Design entries: I certify that I have designed and built this toy myself. Should my entry win, I agree to cooperate with WOOD Magazine to supply builder's notes and a bill of materials for publication.

Signature _____ Date _____

Name _____

Address _____

City _____ State _____ ZIP _____

Phone (____) _____

Send toys to: 1992 BUILD-A-TOY, WOOD Magazine, 1912 Grand Avenue, Des Moines, IA 50309-3379

**1992 BUILD-A-TOY ENTRY DEADLINE:
FEBRUARY 1, 1992.**

Continued from page 84



Wanted: a slow glue for longer working time

Do you know of any good slow-drying wood glues? These new aliphatic resin glues dry too fast for large projects. In fact, they dry so fast that it's impossible to square the item when you assemble it.

If you don't believe me, just take two pieces of scrap pine, apply a thin coat on one, press the pieces together, and in less than three minutes you won't be able to pry the pieces apart.

Applying heavy coats works somewhat better, but you always end up with a mess, and hide glue is too thick for use with biscuit joints.

—Paul Ondras, South Windsor, Conn.

Paul, white (polyvinyl) glue, available at hardware stores and homecenters, gives you the set time you're looking for—30 minutes. It dries by losing water to the wood and air, providing a strong joint under normal conditions. Makers recommend that you avoid stressing white-glue joints for at least 24 hours. To maintain joints for years to come, keep them away from moisture and heat.

Safe finishes for wood toys

I'm looking for advice on locating nontoxic finishes (paints and stains) for wooden toys that I make for my children. Specifically, I'm seeking information on stains in primary colors that let the natural wood show through, and paints that produce bold bright colors.

Am I right that water-soluble aniline dyes bring out wood's natural beauty? Could you please supply brand names of the dyes and paints you prefer for children's toys? Thank you for your help.

—Cy Stockhoff, Albuquerque, N.M.

Cy, once finishes dry on a project—such as a toy—children can come in contact with it without any threat to health. Today, commonly available paints no longer include lead or other heavy metals among their ingredients. Of course, while in the liquid or curing states, these same finishes should remain out of reach of children because the paint's evaporating vehicle may prove harmful.

To locate the most common paint finishes used on toys—acrylics and enamels—you need go no farther than your local hardware stores and home centers. The labels on many of these products use the word "nontoxic" to describe the contents.

Regarding aniline dyes—these should serve your needs for showing grain and color. For a clear dull look, go with either Rockler's or Beblen's Salad Bowl Finish. If you would like to mail-order nontoxic finishes, try calling Cherry Tree Toys, Inc. at 614/484-4363 and ask for their catalog.

Why wipe up stain?

Most staining instructions say wipe or brush on [the stain], wait a prescribed number of minutes, and then wipe off. Why does the stain have to be wiped off? And secondly, what's the difference between paint and primer?

—Rudy Nerat, Chula Vista, Calif.

Rudy, beginning with your first question, you need to remove any stain residue to create an color-even finish. Leaving extra stain could result in blotching. Keep in mind, also, that you can always reap-apply more stain for a deeper, darker look.

Turning to your second question, a primer is the first paint coat applied to a surface. It functions as a filler to cover up slight imperfections while guaranteeing a solid color finish and double protection against grain show-through. Sanded and wiped clean, it provides a terrific surface on which to apply a smooth finish coat.

You can buy paint sealers that serve strictly as primers, or use varnish or lacquers. With many woodworking projects, you can apply the same paint for the finish coat and the primer. Often, you'll want to thin the prime coat for best adhesion to the original surface.

Seeking software for furniture design

I would like to design my own furniture on computer. However, all the software drawing packages I'm familiar with do not draw or design furniture. Do you know of any specific woodworker's software suitable to this type of design work? I have an IBM PS-2 386 computer.

—Ken Haynes, Green River, Wyo.

Ken, we recently purchased a PC and compatible software for our design editor,

Jim Downing, to do exactly what you seem to want. In his search for software, Jim found generalized CAD (computer-assisted design) drawing programs for use in designing anything from airplane cockpits to entire houses. He found nothing geared specifically to woodworking. In spite of this, he purchased

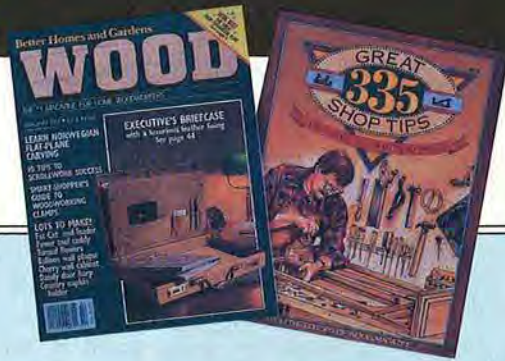
DesignCAD 2-D and DesignCAD 3-D by American Small Business Computers, Inc. and says he's happy with the softwares' performance and drawing features. For more information, call 918/825-4844.



Continued on page 88

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#13 Cedar chest, kid's table and chairs, mug rack, kitchen cabinet standards, jewelry case, drum-sanding, planers.
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#34 Bowed psaltery, dollhouse, tablesaw base, framed hummingbird, carved bluegill, sandblasting, planers.
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#43 Dust collection, mobile, wildlife scene, outdoor table, eggs, cutting board, barnyard cutouts, cosmetic mirror.
#44 Intarsia cat, calendar/clock, Southwest tables, carved plaque, toy toolbox, turned pens, weather vane.

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335 GREAT SHOP TIPS

Continued from page 86

Those bleeding oil-based finishes

I finish all of my red oak projects using medium walnut Watco Danish Oil, being careful to follow all label instructions. My basement shop is both warm and dry. However, the oak continues to "bleed" drops of oil for several days after wiping it dry in accordance with the instructions. In fact, even when it appears dry after wiping with a cloth or towel, still more drips appear on the surface when I turn the wood over or stand it on end. I buy dried oak from a reputable dealer in the area. Needless to say, this wiping adds a great deal of time and effort on my part to complete a project. Do you have any ideas?

—Rob Carter, Lynnwood, Wash.

Rob, we called Deborah Sherry, the technical service manager at Minwax (the folks who own Watco), and read her your letter. Deborah calls your problem "bleedback," and says that it occurs typically "with red oak, but on only one out of 20 boards." Various theories on this condition link it to the solids levels in the stain, to microorganisms, or to dirt embedded in the wood. Here's how to deal with it.

"Wipe the (finished) piece until the oozing stops," advises Deborah. "If pimples appear, use mineral spirits or Minwax's Antique Refinisher and steel wool to dissolve them. Then, go over the affected area with a cloth." For more on the problem, call Minwax's help line at 800/647-9365.

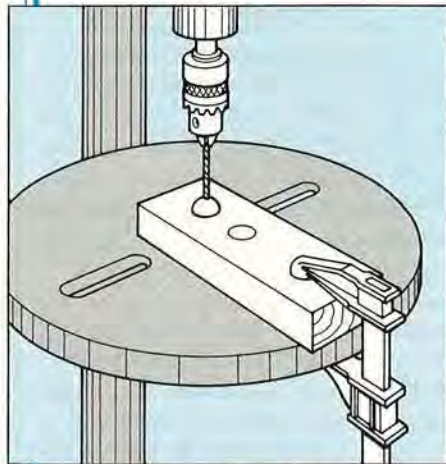
Drilling centered holes in wood balls

I have been making door harps using wood clapper balls and dowels, but I have a problem making the straight holes in the balls with my drill press. Is there some kind of jig I can make to help me out?

—L. J. Anderson, Wisconsin Rapids, Wis.

Yes, L. J., we have such a jig. (See left.) To make it, first clamp a block of wood to your drill-press table. Then, take a spade bit that's 1/8" to 1/16" less than the diameter of the wood ball you intend to drill, and bore a hole into the wood block. Next, change bits

to the size of hole needed in the ball, insert the ball snugly in the hole just drilled, and bore into the ball to the desired diameter and depth.



Sad over sap

For a hobby, I cut and make woodcraft projects. My problem lies in the discoloring that occurs from oozing sap after I finish my projects with acrylic paint and varnish. I use only pine. What can I do to seal the wood and prevent discoloring?

—Randy Berndt, Franklin, Mass.

Randy, you might try these two strategies to eliminate your problem. First, closely check the pine you buy to ensure that it's free of sap pockets or dark streaks where a concentration of sap may lurk. Then, before painting projects made from this wood, seal them with polyurethane varnish or lacquer to create a barrier between the paint and any leeching sap.

NOODLES FOR YOUR CUTTER

If you've just completed the turned noodle cutter shown on page 72, you can try it out right away with this pasta recipe from the Test Kitchen at Better Homes & Gardens®.

Woodworker's choice pasta

2 1/3 cups all-purpose flour

1/2 teaspoon salt

2 beaten eggs

1/3 cup water

1 teaspoon cooking oil or olive oil

In a large mixing bowl, stir together 2 cups of the flour with the salt. Make a well in the center of the mixture. In another bowl, combine the eggs, water, and oil. Add to the flour mixture; mix them together thoroughly.

Sprinkle the kneading surface with the remaining flour, and turn the dough out onto it. Knead until smooth and elastic (8-10 minutes). Cover and let rest for 10 minutes.

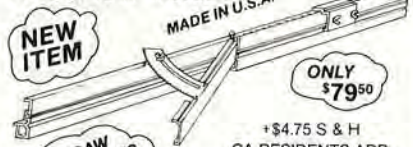
Divide the dough into fourths. On a lightly floured surface, roll each fourth into a 12 × 12" square (about 1/6" thick). Let stand 20 minutes. Cut the pasta on a hard surface. Let it stand for 10 minutes, then separate the noodles.

Cook pasta 1 1/2 to 2 minutes. Drain well. Makes 1 lb. fresh pasta.

To store the pasta, separate the noodles and dry them overnight or until completely dry. Refrigerate in an air-tight container for up to 3 days. Or, dry the pasta at least 1 hour, seal in a freezer bag, and freeze for up to 8 months. ♣

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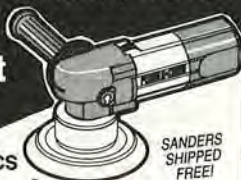
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YESTERDAY'S TOOLS

TURN-OF-THE-CENTURY ROUTER PLANES

They clean grooves and dados and cut shallow mortises.

Print this article

Three classic but common Stanley Rule and Level Co. router planes.



G ranny's tooth, grandfather's tooth, witch's tooth, or old-woman's tooth—for centuries the router plane has carried the most colorful of nicknames. The names make sense, too, considering the way the cutting iron protrudes beneath the wood-block body. It conjures up the image of a lone incisor—a common sight before dental hygiene.

According to our dictionary, one definition of "rout" is to "dig up with the snout." And that kind of describes what the manufactured iron router planes pictured *above* do. The most common of those—the Stanley No. 71½, for instance—smooths and flattens the bottoms of grooves and dados cut by plow planes, saws, or chisels. The wide base makes it ideal for flattening bottoms of grooves too wide for a plow plane. You can adjust the cutter to reach into corners that most planes can't reach and to rout mortises. And, you can cut stopped mortises, such as those on stair stringers.

Despite its rather peculiar looks, the No. 71½ occupied a place in the toolboxes of most late-19th- and early-20th-century carpenters. Today, craftsmen still use it for smoothing dado cuts made with a tablesaw. If you want a No. 71½

in good condition, expect to pay about \$30—half the cost of a new one from Stanley.

Turn-of-the-century carpenters favored the tiny No. 271, also pictured *above*, for routing small hinges, door-strike plate mortises, and for cleaning small grooves and dados. First made in 1926, today it's worth \$10 to \$20.

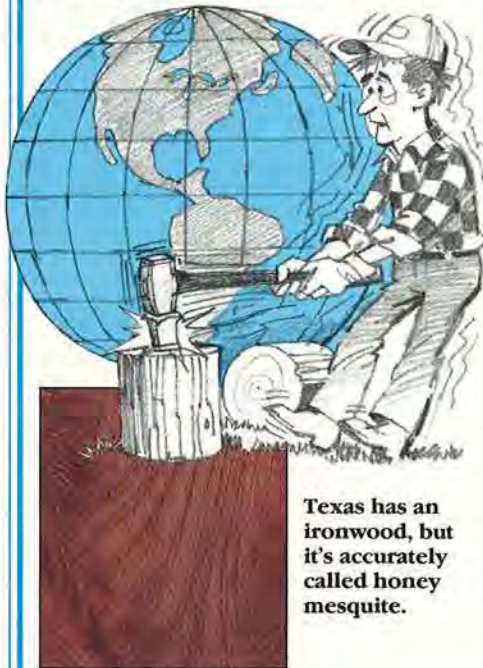
At \$150 to \$350, the more specialized No. 171 door-trim and router plane, pictured *above*, appeals primarily to collectors. Distinguished by its spring-loaded cutter mechanism, this fascinating tool routs door-hinge mortises with ease. Its cutter works down to a preset depth and then smooths the bottom. Manufactured from 1911 until 1935, it came with an adjustable fence and three interchangeable cutters. The blade turns in 90° increments, so you can pull it toward you with the handles perpendicular to the groove. Or, you can put the driving force at the heel of the tool, as you would other planes.

The motorized tool we now call a router also performs bottoming and mortise-cutting tasks, plus many others. Routers and router planes have similar base and handle configurations, and each has a cutter protruding from the base.

Written with Philip Whitby

Photograph: Tim Murphy

IRONWOOD AROUND THE WORLD, IT'S TOUGH AS NAILS



Texas has an ironwood, but it's accurately called honey mesquite.

In Ontario, New England, and the northern Great Lake states, there's a firewood so tough that it stalls hydraulic log splitters. Yet, it's worth the herculean effort necessary to build up a pile because it burns well through a cold winter's night. Ironwood, as it's called, has such complete combustion it leaves little ash.

Ironwood grows in Texas, too—and in Australia, Brazil, Ceylon, England, India, and other parts of the world as well. Wherever the wood appears, it attains legendary stature, taking claim to the titles of hardest and heaviest.

Despite the wood's reknown, however, ironwood isn't a specific species. Rather, it's the colloquial term for a state or region's toughest wood. All told, there are

80 distinct species around the world known as ironwood.

In Texas, for instance, it's honey mesquite. The ironwood found in the northern U.S., Canada, and Europe is actually hophornbeam. Florida has horsetail casuarina as its ironwood. In Australia, it's Queensland red ironwood; in Ceylon, gangsaw. Brazil touts pau ferro and quebracho. So, wherever you live, you'll never be wrong equating the toughest wood you know with iron, you just won't be technically correct.

By the way, whatever the exact scientific term for the different species, trees designated as ironwood frequently become home-made tool handles, mallets, fence posts, levers, and definitely warming fuel. 🌲

Illustration: Jim Stevenson

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WOOD Magazine, October 1991
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Model List Sale
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6071DWK above Drill w/removable bit. 199 115
5090DW 3-3/8" Saw Kit 9.6 volt..... 256 137
6010DWK 3/8" cordless Drill Kit 7.2V..... 195 97

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23-580 5" Bench Grinder 1 1/2 HP..... 62 54
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6095DW above Drill w/keyless chuck..... 268 135
6093DL 6093DW Drill Kit w/Flash Lit..... 299 169
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5007NBA 7-1/4" Saw w/electric brake..... 238 124
5008NBA 8-1/4" Saw w/electric brake..... 295 158
604510 1/4 sheet Pad Sander..... 93 54

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6527 NEW Sawzall 8A var. speed
with case..... 299 164
0399-1 12V cordless Drill Kit complete..... 299 159

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5007NBA 7-1/4" Saw w/electric brake..... 238 124
5008NBA 8-1/4" Saw w/electric brake..... 295 158

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Item Description Teeth List Sale
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401 Porta Nailer complete..... 265 189
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30404 4' Fiberglass 300 lb rating..... 155 60
30405 5' Fiberglass 300 lb rating..... 174 70
30406 6' Fiberglass 300 lb rating..... 190 60

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B-50 50' Commer Saw Fence..... 329 295
T-SQUARE 52 52' Homeshop Fence..... 249 235
T-SQUARE 40 40' Homeshop Fence..... 242 209

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SM-TR4 4 FT Level w/sensor 150 125
SM-TR6 6 FT Level w/sensor 180 155
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JORGENSEN I-BAR CLAMPS
Model Size List Sale
7224 24"..... 31.46 16.35
7236 36"..... 33.77 17.95
7248 48"..... 37.12 19.75

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Item# Jaw Length List Sale Box of 6
#0 8" 4-1/2" 19.00 11.95 62.95
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JORGENSEN STYLE 37 2-1/2" Throat 1/4" x 3/4"
Item# Jaw Length List Sale Box of 6
3706 6" 9.86 6.49 36.55
3712 12" 10.92 6.99 39.75

PONY CLAMP FIXTURES
Model List Sale of Lots
50 3/4" Black Pipe Clamps 13.61 7.99 84.99
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BOSCH
1591VS Top Handle Jig Saw..... 265 132
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Bosch Metal Case for above Jig Saws..... 34 30
Bosch 30 blade assortment for Jig Saws..... 25.99 10

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Model List Sale
3308 2-1/4 HP w/spd Plunge Router 427 249
3304 1 HP var. speed Plunge Router..... 292 178
3375 3-1/8" Univ. planer 7.2 amp..... 313 158

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JTS-10 10" Table Saw w/std 1-1/2 HP 585 459
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R500 2-1/4" HP Plunge Router..... 331 155
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1582VSC NEW CLIC Barrell Jig Saw..... 265 132
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RECYCLED REDWOOD

Smith and Hawken, a retailer of garden tools and equipment headquartered in Mill Valley, California, has developed a sensitivity to their customers' environmental concern. Their catalog portrays a garden potting bench constructed of "unfinished redwood reclaimed from old barns and warehouses."

In 1990, the same company researched a sustainable source of teak for its line of garden furniture. Java, devoted to teak plantations, got the nod.

FARMS TURN GOLDEN

Seventy thousand American Tree Farm System members celebrate 50 years of growth this year. The system began in Washington state in 1941 with a Weyerhaeuser Company property the size of Philadelphia.

Tree farms come in all sizes, with both industrial and private ownership, but collectively they

represent 95 million acres growing 95 billion trees, says the parent American Forest Council.

To plant that many trees, you need to set one tree per second, 24 hours a day, 365 days a year, for more than 3,012 years!

50 Years

BABY BOOMERS GROWING UP

According to the National Forest Products Association, about 23 percent of all softwood harvested in the U.S. comes from plantations established since the 1940s.

SAWS THAT SHOULD KNOW WHEN TO SAY WHEN

Lumber-mill workers in the Pacific Northwest sometimes refer to a circular wobble blade, used for sawing dados and grooves, as a drunken saw because of its unsteady travel.

FRONT AND CENTER: WOOD READERS WHO MAKE A DIFFERENCE

Name: Neal and Lorraine Asten

Ages: 67 and 65

Home: Henderson, Nevada

Occupation: Retired

WOOD® connection: Subscriber since 1989

When Neal took early retirement from his job at a chemical plant in 1977, he hardly knew a lick about woodworking. He did have a workshop, though, and tools enough that he had accumulated to make an occasional garden ornament, birdhouse, or whirligig.

A few days after Christmas that year, Neal, exasperated by his decline into television watching, told Lorraine, "We've got to find a better way to spend our time." Making toys for needy kids came to mind almost immediately.

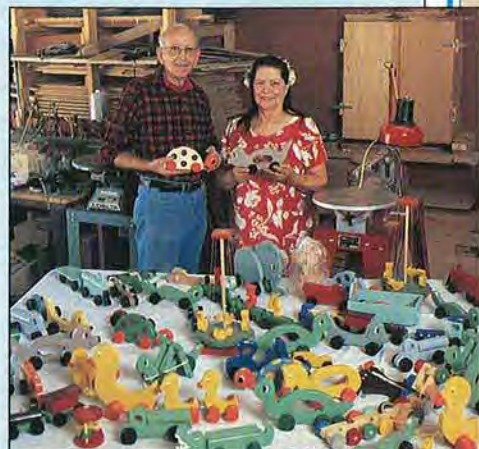
By the following Christmas, the pair had made nearly 1,800 toys to give away. "We started

with a couple of designs from magazines, then added our own," Neal recalls. "And we enjoyed it so much we were spending 50 to 60 hours a week in the shop."

Neal and Lorraine have been making toys for 13 years now, without letup. Their toys reach deserving children through friends and Las Vegas-area agencies, and wind up in Canadian hospitals, in Mexican orphanages, and in the hands of kids as far away as Palestine.

"I helped a newly retired fellow in Florida get going making toys, too," says Neal. "I like to see people get into this."

The Astens say their biggest problem is time, since they spend three days a week selling some of their shop-made items at a local craft shop, and the other four days woodworking. "There're just not enough hours in the day and days in the



Neal and Lorraine Asten stand behind some of their annual toy production that goes to needy children.

month for us," complains Neal. "We have 6,000 to 8,000 parts to cut out this year."

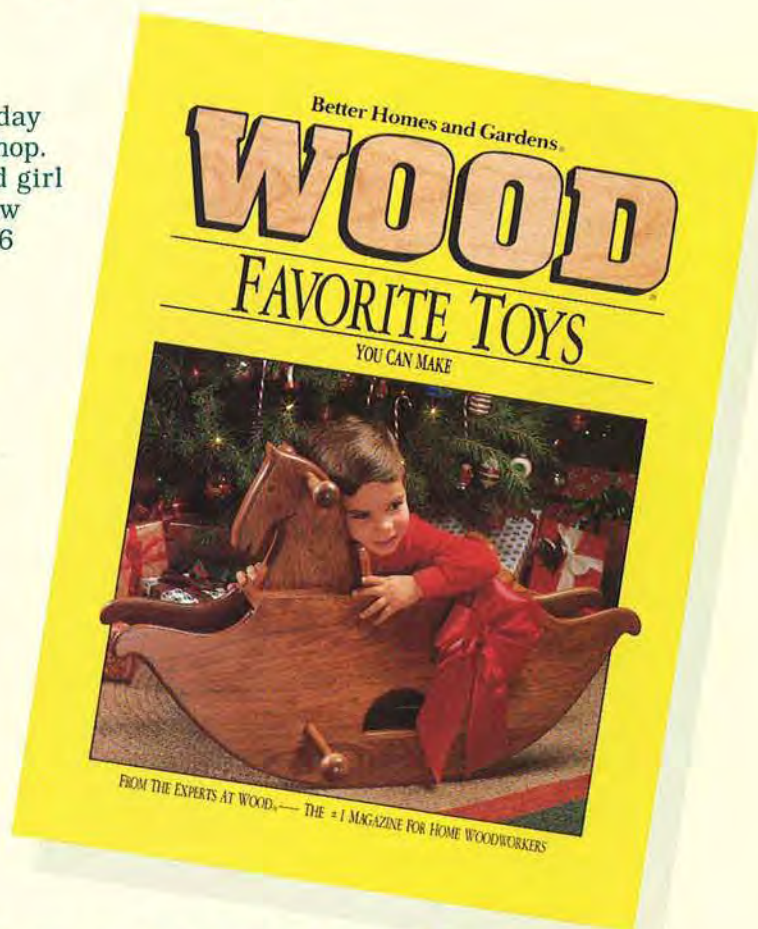
Do you know a subscriber who makes a difference? Send details to: Front and Center, WOOD magazine, P.O. Box 11454, Des Moines, IA 50336-1454. ♣

Make an Heirloom Toy for Holiday Joy

Fill a child's world with delight this holiday season by giving a handmade toy from your workshop. Better yet, build a sackful to please every boy and girl on your list. You can do it with the help of our new book "Favorite Toys You Can Make". Included are 26 timeless designs, ranging from easy-to-make playthings to more challenging projects.

This all new, hard-cover, 96-page publication (which includes full-color photos of every project), presents toys for a variety of ages and in a range of sizes. Best of all, these toys are heirlooms in the making. While any child could ride happily into the sunset on the ever-popular Rocking Horse, for instance, its rugged construction makes it sturdy enough to withstand a band of buckeroos.

"Favorite Toys You Can Make" walks you through every project with a materials list, easy-to-understand instructions, detailed drawings and handy tips from the WOOD Magazine shop. Order your copy now to ensure plenty of shop time before the holiday rush.



Yes! I want to make the most popular wooden toys from WOOD® Magazine. Please send me "Favorite Toys You Can Make" for just \$14.95 U.S. (\$16.95 Canadian). Price includes postage and handling.

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