12
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INSIDE!

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FEATURES & PROJECTS

Commercial-Grade China Hutch

Professional cabinetmaker Danny Proulx shares his secrets to building face frame cabinets in a flash. So get out your screw gun and biscuit joiner and get ready to slam out a cabinet as fast as a contractor.

A Bench in the Style of Nicolai Fechin

Russian painter Nicolai Fechin was also an excellent woodworker, builder and sculptor. This poplar hall bench can be carved by beginners with only a few tools. And the interesting finish is easier than you think.

Butler Tray Table

Back when manners mattered, this table was the ultimate statement of good taste. It still is. Mahogany lumber, special hinges and a classic finish all combine to create this museum-quality table.

Norm Falls for Salvaged Timber

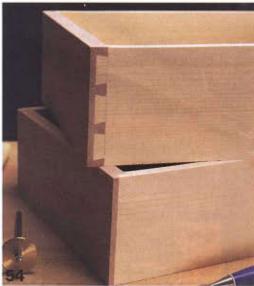
Master carpenter Norm Abram explains why he uses salvaged lumber in his projects for "The New Yankee Workshop" and lends a hand to Popular Woodworking's "Trees to Furniture" program.

49

Fear Drawers No More **54**

Few things scare beginning woodworkers more than building drawers. Learn two classic ways to construct perfect-fitting and longlasting drawers for your projects and get them just right the first time.







Drill Press Table

58

Your drill press was designed for metalworking. Radically improve the way you work using the fence, stops and hold-downs on this versatile drill press table accessory.

If These Walls Could Talk

62

Woodworker and artist Stephen Edwards shares one of his humorous projects that's a toothsome mix of intarsia and sculpture.

Make a Custom Knife 66

You probably have all the tools you need to start making custom knives in your woodshop this weekend. Knife enthusiast Mark Thompson shows you how to get started on this ancient craft and to make a great knife on your first try.

The Family Crest 70

Scrollsaw whiz Rick Longabaugh built this amazing intarsia family crest that would look great over a mantle or a bar. You can too, with our full-size plans and easy-to-follow instructions.

Endurance Test

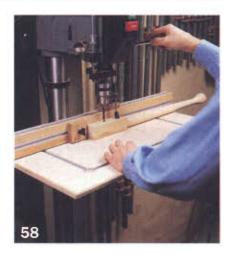
74

Find out how Jet's contractor saw fared in *Popular Woodworking's* project shop after more than two years of hard use.

COLUMNS

Out On a Limb "What's Your Woodworking Quotient?"	6
Letters Mail from readers	8
Tool Test	14
Tool Talk "The Moulding Cutterhead"	16
Projects From the Past Corner Bookcase	52
Tales From the Wood	72
Caption the Cartoon	76
Tricks of the Trade	82
Wood Types Restoring the Chestnut	84
Classifieds	86
Out of the Woodwork	88

"My 3hp Dinette Set"





62





Popular Woodworking Crew

PopWood@FWPubs.com

Steve Shanesy Editor & Publisher

Specialties: Projects, techniques, article and project selection (513) 531-2690 ext. 238 SteveS@FWPubs.com Wood Quotient: 17



David Thiel Senior Editor

Specialties: Projects, new products and tools, tricks of the trade (513) 531-2690 ext. 255 DavidT@FWPubs.com Wood Quotient: 19



Christopher Schwarz Managing Editor

Specialties: Article submissions, letters, reader contests, projects, author llaison. (513) 531-2690 ext. 407 Chriss@FWPubs.com Wood Quotient: 30



Jim Stuard

Specialties: Projects, carving, tuming, project illustrations (513) 531-2690 ext. 348 JimS@FWPubs.com Wood Quotlent: 27



On the Cover



Cover photo: Al Parrish, Parrish Photography

Master carpenter Norm Abram, host of "The New Yankee Workshop" and "This Old House," checks out some red oak salvaged from a residential neighborhood in Cincinnati. Abram, as you might know, is a big advocate of using recycled wood. Find out why in this issue, and how you can get involved in turning waste trees into lumber for your projects at pennies a board foot.

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Technical Advisers:

Bill Austin Makita USA. Inc. Scott Box Delta International Chris Carlson S-B Power Tool Steve Erbach Grizzly Industrial Inc. Dale Zimmerman Franklin International

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CIRCULATION

David Lee, Director Mark Fleetwood. Single Copy Sales Mgr. Terry Webster-Isgro, Direct Sales Mgr.

PRODUCTION

Barbara Schmitz,

Director of Manufacturing Martha Wallace, Magazine Production Dir. Vicki Whitford, Coordinator Ruth Preston, Art Production Manager

ADVERTISING

National Sales Representative Bill Warren, Five Mile River Assoc. LLC RR1 Box 1400, Stockton Springs, ME 04981 Tel. (207) 469-1981; Fax (207) 469-3050

> **Advertising Sales** Joe Wood - Tel. (513) 336-9760 Fax (513) 336-9761

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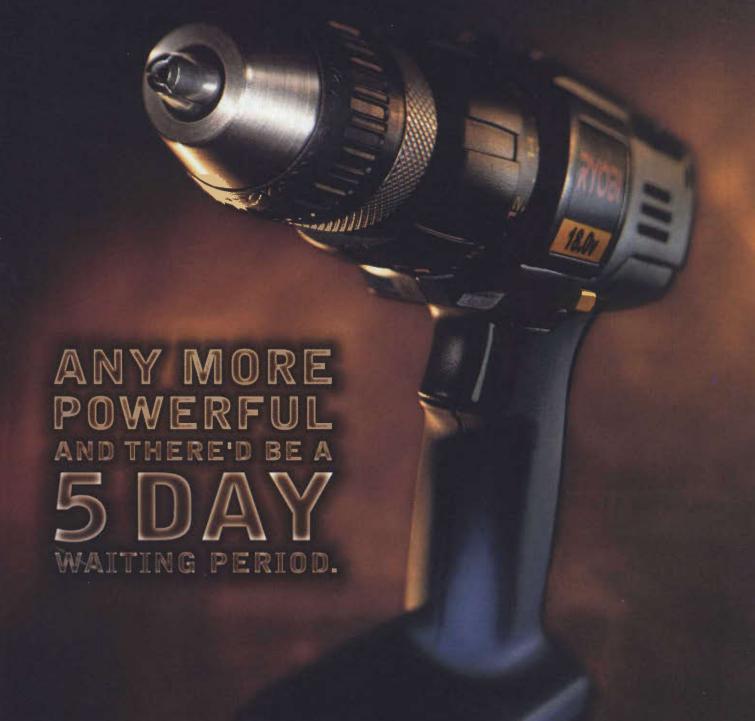
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OUT ON A LIMB

What's Your WOODWORKING **UOTIENT?**

ou've seen those machines in truck Y stops and arcades where for a mere two bits you can insert your index finger and find out your love quotient, your emotional state, perhaps your IQ. Well, I've never seen one that tells you what kind of woodworker you are, so I came up with this simple test to give you your "woodworking quotient." Achieve the most scientifically accurate result by selecting only one answer. There are no right or wrong answers. When you're finished I'll tell you how to score and what the results mean. Good luck!

- 1. Your choice of woodworking glue: 1) polyurethane, 2) yellow, 3) white, 4) hide, the cooking kind, 5) none, with traditional Japanese joinery, glue is not necessary.
- 2. In preparing to make a mortise, you'd set up: 1) your bench-top mortiser, 2) your drill press with mortising attachment, 3) your router and mortising jig, 4) your mortising gauge and your firmer or mortising chisels.
- 3. When buying material for a project, you'd ask for: 1) lumber and plywood, 2) veneered MDF and iron-on veneer tape, 3) veneer core plywood and solid edge banding, 4) surfaced lumber (S4S) only, 5) rough lumber, 6) an ax.
- 4. You think a biscuit joiner is: 1) a revolutionary joinery tool, 2) handy tool with appropriate uses, 3) no strong opinion, 4) used for cheap woodworking, 5) an invention of the devil.
- 5. Your favorite woodworking TV **show is:** 1) "New Yankee Workshop," 2) "The American Woodshop," 3) none, you'd rather work wood than watch TV, 4) "The Woodwright's Shop," 5) what's television?
- 6. Your choice for winner as the best source of stationary equipment would **be:** 1) Delta International Machinery, 2) Grizzly Industrial Tools, 3) newspaper classifieds, 4) you'd protest the category and refuse to award a prize.
- 7. Same as 6 above, but for hand

tools: 1) Bosch, 2) Porter-Cable, 3) Stanley, 4) Lie-Nielsen, 5) The tool stall at your local antique mall.

- 8. When preparing a project for finishing you use: 1) a random orbit sander, 2) an orbital sander, 3) a belt sander, 4) a sanding block, 5) a scraper. 9. Your finish of choice is: 1) lacquer, 2) polyurethane/varnish, 3) shellac, 4) oil, 5) wax.
- 10. Your finish method of choice is: 1) HVLP spray, 2) conventional spray, 3) brush, 4) rag, 5) dip.
- 11. Your favorite woodworking catalog is: 1) Tool Crib of the North, 2) Woodcraft, 3) Lee Valley, 4) Garrett Wade, 5) Japan Woodworker, 6) Bridge City Tools.

Now Score. Add the numbers of the responses you chose (if you selected the first response for each question, your total would be 11). What does your score

- 11-24 High-tech Normite: Your shop is a drain on your city's power grid. You'll be at home in the next millennium when they introduce laser saws.
- 25-34 Owns a chisel: You'll try something new after some encouragement but sure won't go looking for it. You're willing to admit that cordless tools are here to stay. Like those of the following group, you're no tool junkie, you just like working with wood.
- 35-44 Knows that Bridge City isn't a real city: OK, you say, carbide tooling is an advancement, but why bother when you can get the same results with your Stanley 45? Biscuit joiners are a gimmick.
- Over 45 Knuckles drag; forehead slopes: You have a recurring nightmare that the power company sneaks in and wires your cave, err, shop. You're a happy Neanderthal and proud of it. PW

5 kwe Shaves Editor & publisher

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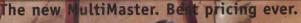
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LETTERS

We welcome your comments about PW or anything related to woodworking. We'd also like to see color pictures of what you're building. Send your input to: Letters, Popular Woodworking, 1507 Dana Ave., Cincinnati, OH 45207. Our e-mail address is:

PopWood@FWPubs.com. Letters may be edited for publication.

- Steve Shanesy, editor, PW

He Won't Surrender His Contour Marking Gauge, Or His Tool Cases

I just got the latest issue (#106) and am only as far as your column, "Gotta Have it, Never Used It." I work as a trim carpenter by trade and a woodworker by choice, and I have to disagree with some of your picks (sorry, but it's true). The tilting base on my Bosch jigsaw comes in very handy at times. A contour gauge (shape-finding gadget) is almost irreplaceable when it comes to repairing or replacing antique or out-of-date stair spindles. I happen to love all those elaborate tool cases as I must take almost all (seems like) my tools to the job site daily, and I like them too much to just throw them in the truck without protection. I own several tape measures, and the ones used most are 30' long, although I rarely go beyond 28'. Other than that I think I must agree with your other picks. Keep on writin' 'em, I'll keep readin' 'em.

> Dan Whitley Benld, Illinois

OK, Sometimes We Have to Sneak Into Your House

Your notes on "Gotta Have it, Never Used It" were right on. I thought you had been looking in my work drawers! However, I have one exception to your list. The ripping function on the radial saw. I've had a 9" DeWalt since 1956 and would be lost without it when ripping boards with uneven edges.

There is a permanent line marked in 1" from the outside long rip edge, where the blade can be locked in the rip position. Then I clamp a long straight edge on the uneven edge about an 1½8" to $1^{1}/4$ " in on the uneven board edge so that material can be ripped along the entire board length and thus get a straight edge to then run through the jointer. I do have to be careful to have the full height of the clamp in the downward position so it doesn't get hit by the saw blade.

> Don Henschel Shelton, Connecticut

If You Think a Swiss Army Knife is Useless, Read On

I share your convictions as to the questionable utility of Swiss Army knives and offer this suggestion.

Remove the red handle scales and scrounge up some opaque plastic of about the same thickness in a pleasant shade of medium to dark blue. Shape the scales to fit the handle, add the little white insignia.

When someone sees you with it, they'll ask, "What in the world is that?"

Whereupon you can smirk smugly and reply, "Why, it's a Swiss NAVY Knife."

> Dean A. Grennell Mission Viejo, California

Editor's note: OK, knife lovers, this issue is for you. Check out the story on building custom knives in this issue.

Safety Note

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



Nice Art & Crafts Bookcase, **Except for One Small Detail**

Just got the latest Popular Woodworking and was glad to see the Art & Crafts Magazine Stand article. I'm sitting next to a Stickley re-issue of the Roycroft version. I did cringe when I saw you used Baltic Birch for the drawer sides... argh! Somebody give the author some quartersawn white oak.

Keep up the Craftsman projects. I'm pretty selective these days, and a Craftsman project is one way for me to decide to buy a magazine and keep it.

I just finished a "Mission" style version of a Frank Lloyd Wright slant back side chair that turned out quite nice for my first chair project.

I am building a Craftsman bungalow and would like to see some Craftsmanstyled "built-in" projects. For example, an entryway seat, a window seat, a server... just about anything but a bookcase.

> Marc Ries Grants Pass, Oregon

> > Continued on page 11

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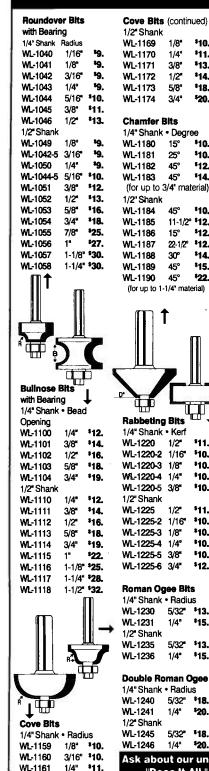
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¹ 14.	, program	•-	D .
aterial)	Core Box	Bits	1
	1/4" Shank	• Diam	eter
^{\$} 10.	WL-1370	1/8"	*10
2° *12.	WL-1371	1/4"	s
[‡] 12.	WL-1371-1	3/8"	4
° 112.	WL-1372	1/2"	*10
³14.	WL-1373	3/4"	*12
^{\$} 15.			
¥22.	Roundnos	e/Core	Box
aterial)	1/2* Shank	• Diam	eter
	WL-1375	1/4"	*1
	WL-1375-1	3/8"	*11
	WL-1376		*12
		3/4"	\$14
П	WL-1378	1"	*10
	(T) †		
		æ	_
	 		

1/8"

1/4"

3/8"

1/2*

5/8"

3/4"

-1180	15°	•10.			Щ
-1181	25°	^{\$} 10.			
-1182	45°	¹ 12.			J
-1183	45°	¹14.	,000		D T
or up to 3	3/ 4 " mai	terial)	Core Box		Ŧ
"Shank			1/4" Shank		
-1184	45°	§10.	WL-1370	1/8"	³10.
-1185	11-1/29		WL-1371	1/4"	\$8.
-1186	15°	³12.	WL-1371-1	3/8"	*9 .
-1187	22-1/2°	³12.	WL-1372	1/2"	³10.
-1188	30°	¹ 14.	WL-1373	3/4"	³12.
-1189	45°	³15.			
-1190	45°	*22.	Roundnos		
or up to 1-	1/4" mat	erial)	1/2* Shank		
			WL-1375	1/4"	*8.
\mathbf{m}	1	•	WL-1375-1	3/8"	³11.
			WL-1376	1/2"	^{\$} 12.
		m	WL-1377	3/4"	^{\$} 14.
11 1			WL-1378	1"	³16.
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"Shank		***		l	
-1220	1/2"	¹ 11.			
-1220-2	1/16"	§10.	\longrightarrow	_	ı
-1220-3		³10.	_		+
-1220-4		\$10.	Bowl & Tra		
-1220-5	3/8"	* 10.	1/4" Shank		
"Shank	4 104	***	WL-1380	7/16"	³13.
-1225	1/2"	⁵ 11.	WL-1381	3/4"	³15.
-1225-2		*10.	1/2" Shank		
-1225-3		*10.	WL-1385	3/4"	⁸ 15.
-1225-4	1/4"	\$10.	WL-1386	1-1/4"	³18.
-1225-5	3/8"	^{\$} 10.			

Dado & Pi	aner B	it
1/4" Shank	• Diame	eter
WL-1390	3/4"	[‡] 12.
1/2* Shank		
WL-1391	3/4"	§12.
WL-1392	1"	[‡] 14.
WL-1393	1-1/4*	³15.
WL-1394	1-1/2"	¹ 16.
WL-1394-1	2"	^{\$} 28.
	1	
_	\mathbf{n}	٦ .

1/4" ¹15.

1/4"

5/32" ^{\$}20.

1/4"

1/4"

"Does It All "

ROUTER TABLE

5/32" *18.

5/32" *13.

¥15.

¹18.

¥20.



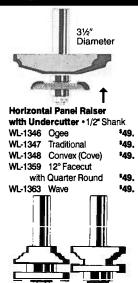
Pattern C		
1/4" Shank	 Diame 	eter
WL-1400	1/2"	³12.
WL-1401	5/8"	¹12.
WL-1402	3/4"	³12.
1/2" Shank		
WL-1405	3/4"	¹ 15.
WL-1406	1-1/8"	^{\$} 16.
∏ ↑		

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Straight E	• → •)→
1/4" Shank		tor
WL-1001		*10.
WL-1001		*5
WL-1002-5		*5.
(for undersized		
WL-1003		*5.
WL-1004		*5.
WL-1005		*5.
	15/32"	*5.
(for undersized		
WL-1007	1/2"	°6.
	9/16"	*6.
WL-1009	5/8"	\$7.
WL-1010	23/32"	*B.
(for undersize		
WL-1011	3/4"	19 .
WL-1012	1"	^{\$} 10.
1/2" Shank		
WL-1020	15/64"	[‡] 5.
(for undersize	ed 1/4" plyw	
WL-1021	1/4"	³5.
WL-1019	5/16"	³5.
WL-1022	3/8"	* 5.
WL-1023	7/16*	³5.
WL-1024	15/32	³5.
(for undersize		
WL-1025	1/2"	*6.
WL-1027	5/8"	*8.
WL-1028	23/32"	*8.
(for undersize		
WL-1029	3/4"	*9 .





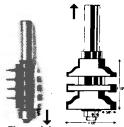
For the Shaper Lock Mitre WL-1581 40.



1	is II	
2-piece F	Rail & Stile Cutt	er Sets
1/2" Shan	k	Set
WL-1360	Ogee Profile	³59.
WL-1361	Roundover	\$59.
WL-1362	Cove & Bead	³59.
1-piece Rall & Stile Cutter Sets		

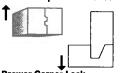
Just raise the cutter to make the matching cut. No changing or reversing. 1/2" Shank WL-1365 Ogee Profile \$49. WL-1366 Roundover ¹49.





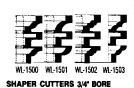
Finger Joiner Router Bit WL-1429 *39. For the Shaper WL-1580 389.

Reversible Glue Joint WL-1430 1-3/4" Diam *35. For the Shaper WL-1706 *35.



Drawer Corner Lock Makes drawer side separation virtually impossible 1/2" Shank WL-1435 For 1/2" material *30.

SHAPER CUTTERS 3/4" BORE			
Corner R	ound		
WL-1509	1/8"	⁵ 22.	
WL-1510	1/4"	¹ 24.	
WL-1511	3/8"	*26.	
WL-1512	1/2"	*26.	
WL-1513	3/4*	*30.	
WL-1514	1"	*32.	
WL-1515	1-1/4"	³38.	
48 1	_		
	(
Dand			
Bead WL-1520	1/4"	104	
WL-1520 WL-1521	3/8"	*24. *26.	
WL-1521 WL-1522	3/6" 1/2"	*26. *26.	
WL-1522 WL-1523	3/4"	*28.	
WL-1523 WL-1524	3/4 1"	*30.	
Flute	'	30.	
WL-1530	1/4"	¹24.	
WL-1531	3/8"	‡26.	
WL-1532	1/2"	‡26.	
WL-1533	3/4"	‡28.	
WL-1534	1"	*30.	
• • • • • • • • • • • • • • • • • • •			
	13		
Rabbeting	g/Straigh	rt	
WL-1540	1/4"	*24.	
WL-1541	3/8*	*26.	
WL-1542	1/2*	*26.	



3/4

1-1/2

¥28.

³30.

\$32.

SAR.

WL-1543

WL-1544

WI-1545

WL-1546

^{\$}49.

1-piece Rail & Stile Just raise the cutter to make the matching cut. No changing or reversing. WL-1500 Roman Ogee WL-1501 Roundover ⁵89. WL-1502 Cove & Bead \$89 WL-1503 Dbi Roundover *89. WL-1600

WL-1601 WL-1602 WI-1603 WL-1604 WL-1605

Panel Raisers (Shaper Cutter)		
3/4" Bore		
WL-1600	Ogee	³59.
WL-1601	15° Facecut	³59.
WL-1602	18° Traditional	³ 5 9.
WL-1603	Convex (Cove)	⁵59.
	12° Facecut	
with	Quarter Round	^{\$} 59.
WL-1605	Wave	³59.

All Major Credit Cards Accepted • Shipping is only \$3.75 per order • Most items in stock • Same-day shipping!!

LETTERS

Continued from page 8



Thoughts on Meriwether Lewis and the Military Writing Desk

I just wanted to commend you on the fine project in the current issue of Popular Woodworking ("Military Writing Desk," #106). I have also become caught up with "Lewis and Clark" fever, and as an avid woodworker have been trying to find adequate plans for a lap desk since I read "Undaunted Courage." There is no doubt Lewis carried a portable desk with him on the expedition as he mentions in his journals that at one point the horse that was carrying it stumbled and fell down a hill and the desk was smashed. As to the appearance of the desk, it's hard to say. I have a theory that as he and Thomas Jefferson were close he might have carried one that was similar to the one Jefferson had made by a cabinetmaker in Philadelphia. Jefferson wrote the rough draft of the Declaration of Independence on this desk. The original is in the Smithsonian. If you wish to see a picture of it there is a web site entitled "Drafting the Declaration of Independence" at www.concentric.net/~walika/drafting.htm.

Again, thank you for sharing the beautiful project. I plan on starting one as soon as I can get my hands on some nice cherry. Perhaps we will meet someday on the Lolo trail! (As soon as I can talk my wife into it, also!)

Terry McSorley Endwell, New York

The Original Deltagram Readers are Still Around and Working Wood

The reason I am writing this letter is because of the Deltagram projects you have been publishing in your magazine as "Projects From the Past."

I am 82 years old and have a Shopsmith shop in my garage. I became interested in woodworking in junior high and high school. I have really started to get into woodworking since I retired in 1980 and started buying my shop equipment.

When I was in junior high, I began getting wookworking magazines and plan books. I have five Deltagram books dated November 1936 to March 1937. I also have four Delta Projects books. They all have a price on them of 10 cents. I just wanted to write and let you know that some of us old-timers are still around.

Aubrey Thomas Tecumseh, Kansas

Continued on page 12



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LETTERS

Continued from page 11

COMING NEXT ISSUE! July 1999

(on newsstands May 25)

Get your yard and deck in shape for spring with *Popular Woodworking*'s annual Outdoor Issue. Here are some of the great things we have planned:

Titanic Steamer Chair

We build a reproduction of one of the two surviving deck chairs from the Titanic. Forget all the hype about the movie, these are comfortable and beautiful loungers.

Greene & Greene Patio Table

In our 1997 Outdoor Issue we published a Greene & Greene Garden Bench that got rave reviews from readers. So we build a matching coffee table that will look great on the patio or even inside.

Do You Have the Right Approach to Saw Safety?

After watching some readers cut wood on a table saw during a workshop here at *Popular Woodworking*, we realized that there are a lot of people who need a refresher course in how to safely feed wood through a saw.

Endurance Test: Ryobi's Drill Press

For the last two years we've been using Ryobi's woodworking drill press in our shop. Find out how it fared in our Endurance Test.

VISIT OUR WEBSITE

www.popwood.com

Some of the great features of our website for subscribers:

- Search an index of every story that's been in the magazine
- Check your account, report problems, change your address
- Read some of our tool reviews from recent issues
- Quickly purchase back issues and full-size plans
- Enter our "Tales From the Wood" contest. Win tools. **PW**

Make perfect Raised Panel Doors

with your 1/4" or 1/2" Router, or your 1/2" or 3/4" Shaper.

It's simple, inexpensive, and easy with professional production quality MLCS carbide tipped door sets! Our reversible combination bit makes a matching rail and stile frame. The panel raising bit with ball bearing guide makes a perfect raised panel every time!

Includes Instructions and Professional Tips!

Raised Panel Door Sets *Ball bearing included

SET#	BIT STYLE	LRG. DIA.	SET PRICE
#1301	1/4" Shank Router	* 2"	\$69.95
#1302	1/2" Shank Router	* 3-1/2"	\$79.95
#1303	1/2" & 3/4" Shaper	4-5/8"	\$99.95

Raised Panel Door Instructional Video

\$9.95 #1438 Special Sale Price



*Reversible Combination Rail & Stile Bit Works with stock from 11/16" to 7/8"



1/4" Shank Carbide Tipped Router Bits

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3

OGEE RAISED PANEL

.\$29.95 #1423 2" Large Diameter

IZ TONGUE AND GROOVE

#1333	Straight	\$29.00
#1335	Wedge	\$29.00

BULL NOSE

#1330 1/2" Dia. of Circle\$16.00 #1331 3/4" Dia. of Circle\$21.00

I LOCK MITRE BIT

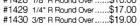
#1433 2" Dia., Stock thickness: 1/2"-3/4"..\$37.50

5 RABBETING KIT

4 depth of cuts: 3/8", 7/16", 5/16", 1/4". Set: 1/4" shank rabbeting bit, 4 bearings (3/8", 1/2", 5/8", 3/4") & hex key. #1425 1-1/4" Large Diameter..\$25.00

6 BRASS PILOTED

Rout into tight spaces and sharp corners. These bits have Brass Pilots, measuring only 5/32" in dia., instead of usual 1/2" bearing. #1428 1/8" R Round Over\$16.00



7 SOLID CARBIDE UPCUT AND DOWNCUT SET

2 flute flat bottom cutters. Upcut spiral ideal for mortise and tenon joints. Downcut will plunge cut and plane edges. #1437 1/4" dia., 3/4" cutting length Special Set Price



The **Can-Do Clamp**

ITEM #1420

- Join picture and cabinet frames
- Clamps to 2¾" wide
- Easy mounting . Use as bench vise

Sturdy aluminum clamp is great for framing, drilling, doweling, and more.

- High clamping pressure
- Movable jaws
 Two swivel points

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PANEL



WOOD

16 Piece Forstner Bit Set

ADJUSTABLE

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with 23 ft. reel of steel banding!

Adjustable, uniform clamping pressure

on all corners . Great for wide cabinet frames (for center or edges) · Forces a frame into perfect square

High Quality Steel - ground for heavy use This set comes with the following sizes: 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1-1/8", 1-1/4", 1-3/8", 1-1/2", 1-5/8", 1-3/4", 1-7/8", 2", 2-1/8".

ITEM #1418 REG. \$141.20 Sale \$4395



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Makes perfect fitting recesses and inlays!

Easy to use inlay kit follows a 1/4" thick pattern template of almost any shape to produce the recess. Fits Porter Cable, Black & Decker or any router with an adaptor for Porter Cable bushings. Kit includes 1/8" solid carbide downcut spiral bit, brass bushing, brass template guide, brass retainer nut & instructions.

ITEM #1426 REG. \$35.95 Sale 2195



Over Bits with 1/2" OD bearing: (1/8", 1/4", 3/8", 1/2"), plus 3/8"OD bearing & allen wrench

ITEM #1434

\$72 Individually...



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Biscuit Joining Set

ITEM #1385 REG. \$35.00

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TOOL TEST

We get to test a lot of tools at *Popular Woodworking*, and while we don't often test tools until they fall apart, we do give them an honest, real-world workout. Each issue we share the results of our tool tests with you and offer insights to help with your shopping decisions. The ratings shown reflect the opinion of the *Popular Woodworking* editorial staff.

Here's a quick reference on our rating system. PERFORMANCE: A rating of "five" indicates we think this tool is a leader in its category — for now. (You won't likely see ratings of "one" or "two" in these reviews because we wouldn't publicize an inferior tool.) VALUE: "Five" is a great tool for the money; "one" isn't the mark of a value. However, a low "value" rating shouldn't prevent you from buying that tool. Some tools might be worth a little more because they're one-of-a-kind or just a really great tool.

If you have a question about a specific tool — whether it has been reviewed or not — contact me at (513) 531-2690, ext. 255, or by e-mail at DavidT@FWPubs.com.

And by the way, many of our past tool reviews appear on our website at www.popwood.com. Check it out.

- David Thiel, senior editor

Powermatic's 10" Benchtop Table Saw

Well-respected for their line of industrial machinery, Powermatic (www.powermatic.com) has recently introduced tools for the smaller shop and home woodworker. Powermatic is now offering a table saw for the jobsite contractor and entry-level woodworker. The *left-tilt* model 411 benchtop saw sports a 13-amp universal motor and the largest table top in this category (26¹/2" x 31" wide, or 45" with wings extended). Selling for about \$200, the saw has all the standard features



Lee Valley's Affordable HSS Boring Bits Reduce Heat and Increase Performance

When you need to drill a very clean or large hole, there's nothing quite like a Forstner or saw tooth bit. Problem was that most affordable sets dulled quickly and soon lost their temper. Lee Valley Tool's (www.leevalley.com) new high speed steel bits stay sharp longer, give a clean cut and are a good price. Available in sizes from 1/4" to 3" diameters, the bits up to 1" are a traditional Forstner design, while those larger than 1" are saw tooth. But "traditional" isn't exactly correct, either. The rim on the Forstners is proud of the chippers by only .005" to reduce rim heat, and the saw tooth style is a true saw tooth with a skewed shear-cut design, not just rim notches. The chippers on both styles have a sloped bevel that helps with waste removal and allows for a shorter center brad.

We checked the high speed bits against a set of high-carbon steel bits and found the high speed to cut easier and faster, cleaner and with less burning. The saw tooth design cut very quickly with negligible tearout on the back side of the hole and a very clean and smooth wall in the hole.

Available individually or in kits, the Forstner and saw tooth bits are quite affordable for the performance and longevity offered. Forstner set of seven from $^{1}/_{4}$ " to 1" sells for \$32.50, while a set 16 saw tooths from $1^{1}/_{8}$ " to 3" runs \$179. For more information, circle #160 on the Resource Directory Coupon.



other benchtops have and includes a 36-tooth carbide-tipped combination blade.

The 27"-long rip fence is longer than most benchtop fences, but don't expect a Biesemeyer. The steel fence, though square to the blade and flat, is difficult to adjust to find a balance between smooth movement and tight lock-down. You'll still see outfeed flex on the fence and a \frac{1}{32}" to \frac{1}{16}" runout. That said, this isn't out of line for other benchtop saws at this price. While the 411's other features stack up to or are better than features on other saws in this price range, we'd recommend Powermatic improve the fence and increase the price if necessary. A better fence would earn them four stars in performance and value. For more information, circle #161 on the Resource Directory Coupon.

Small Vacuum Table for the Home Shop

Vacuum tables are standard in many commercial shops, allowing the woodworker an easy way to hold down his work without clamps. Carter Products (www.carterproducts.com) now offers a version for the small shop and DIY crowd. The Mini-Mach is a 13" x 24" platform with 12 vacuum cells of various sizes powered by your existing



shop vac (1.5 hp or better). When the lever is switched on, the lower vacuum cell holds the Mini-Mach to the work table. The upper cells operate independently and will hold a piece as small as 4" x 4" or as large as 48" x 48". We found this product to be useful, but it's pricey (\$140 to \$190). The lateral hold is more than sufficient for most applications, and you can easily remove the work by simply lifting from a corner. With taller work pieces (such as drawers) the vacuum bond can be broken a little too easily, but for flat (no warp or twist) materials it's a very handy tool. For more information, circle #162 on the Resource Directory Coupon.

00000

Grizzly 1hp Dust Collector— Super Value!



Who says things don't get cheaper — and better! Grizzly Industrial (www.grizzlyindustrial.com) has just upgraded its 1hp dust collector by increasing its sucking power from 450 to 500 cfm (cubic feet per minute) and reducing the price \$60 — selling the G8027 for only \$130! In comparing the Grizzly model to other competitors, two things are apparent: most are rated at 650 cfm, and most are priced between \$179 and \$230. The average planer needs 400 cfm to adequately remove sawdust, so my quick math says that 500 cfm is just fine for one machine at a time, and at \$130 that's a great deal.

Grizzly didn't skimp on features to keep the price right, either. The 13-amp motor powers a balanced steel radial fin impeller to fill the $14^{1/2}$ " x 23" bag. For these reasons and more, the G8027 is a lot of ma-

chine for the money.

For more information, circle #163 on the Resource Directory Coupon.

Craftsman's Automatic Power Switch

Shop vac: on. Work light: on. Band saw: on. Forget flipping three switches. Now it's a onestep process. Craftsman's Automatic Power switch (www.sears.com/craftsman) lets you power-up a tool and two accessories by simply turning on the machine. At \$19.99, this is a great accessory for small shops and will save lots of running from power switch to power switch. The 20-amp switch with built-in circuit breaker is available only for 110-volt tools, so check your equipment for compatibility. PW For more information, circle #164 on the Resource Directory Coupon.



TOOL SCOO

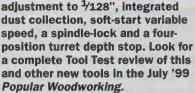
Jet Agrees to Buy Performax Jet Equipment and Tools has acquired Performax Products, a major manufacturer and distributor of horizontal surface sanding machinery for the woodworking industry. **Performax founders Gary and Donna** Green will stay with the company during the transition while plans for future business activities are developed. Jet Equipment and Tools manufactures and distributes stationary woodworking machinery for the professional and DIY markets, as well as a full line of metalworking machinery.

Need a Dovetail? Iron it On!

While many woodworkers will consider this cheating, new Iron-on Dovetail Tape® gives you the look of hand- or machine-cut dovetails in a fraction of the time. Start by cutting a \(\frac{1}{32}\)"-deep rabbet on the opposing edges of your drawer or box, then apply the tape to the rabbet, heat and file or sand flush. Available in 15 contrasting and matching wood species, the 1/2"or ³/4"-wide tape comes in 25-foot rolls for \$10.99. A starter kit is offered for \$39.99 with a bearingguided rabbeting bit and four tape options. But what about the seam between the tape and drawer side? The package points out that it looks just like the scratch line left by a marking gauge when you lay out the dovetails! Enjoy fooling your friends. Contact the Four1 Group at 888-555-3665, or read our website review at: www.popwood.com/features/tape

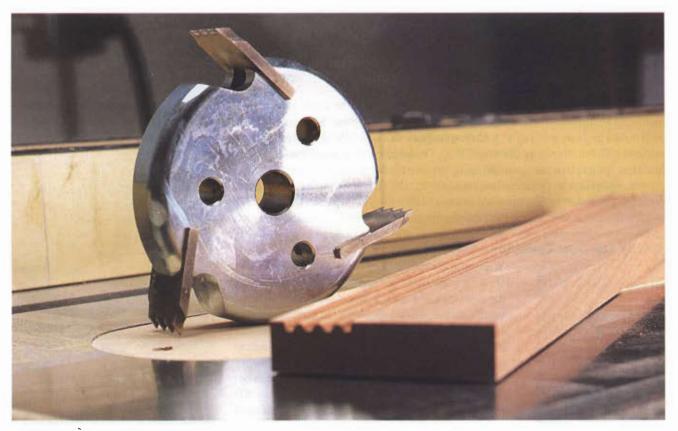
Sneak Peek at PC's New Router!

Just introduced in January, the new model 7529 plunge router from Porter-Cable should just be entering stores in March. The 2hp router sells for about \$246 and offers micro-height



The Moulding Cutterhead

Are you overlooking a practical accessory for your table saw?



OULDING HEADS, often called M "moulding cutter heads" or "shaper heads," were available before carbidetipped saw blades became common, and in fact, before portable routers became "in" tools. The term "moulding" isn't the whole story. While the accessory, with an assortment of knives, is efficient for production of standard or original moulding designs, it is also a practical tool for producing various classic joints, applying decorative details like flutes or beads to furniture components, and for other applications such as shaping the edges of slabs and forming cabinet door lips. While I have my share of portable routers, I often rely on the moulding head for those times when it's more convenient to bring the work to the tool.

R.J. DeCristoforo is a contributing editor to Popular Woodworking and the author of more than 30 woodworking books.

The Moulding Head

Moulding heads may be comparatively heavy or light and can differ in configuration, but each type has three slots equally spaced about the perimeter to accommodate a matched set of knives. Some units are supplied with a bushing and/or spacer so that they can be correctly mounted on the saw's arbor. Be attentive to the moulding-head information in the machine's owners manual and to the instructions that come with the accessory. An important factor is the length of the saw's arbor. This may dictate how thick the head can be. In any event, there must be sufficient threaded area, after the head is mounted, for the arbor nut to seat.

Some table saws, especially small ones, can't handle moulding heads, or must be used with knives of a particular size and shape. In general, moulding heads are interchangeable among various brands of table saws, but check with your manufacturer first.

Table Insert

Like a dadoing tool, a moulding head makes wider cuts than a saw blade, so it must be used with an insert that has a wide opening for the knives. This insert is a special unit: the one you may have on hand for dado work won't do.

The standard insert for moulding chores will do for general use but there will be times when it's good practice to furnish one that allows customizing the opening for minimum clearance around the knives. You can make your own by using the regular insert as a pattern or purchase ready-made blank ones from mailorder houses. In either case, be sure the new insert fits tightly in the table. Form the opening by setting the blank insert in place after lowering the head so the knives are below the table's surface. Set the rip fence so it will serve as a hold-down (using shims if necessary) and then slowly raise the head until the knives project to the depth-of-cut that's needed.

Moulding Knives

There are three classes of moulding knives. Combination types are designed so that a portion of the profile may be used to produce a particular form. For example, one part of the knife makes a bead, the other cuts a quarter-round profile. Single-purpose units are meant for full-profile cuts. Sets of knives will produce complementary shapes. The basic function of a profile may be specific, but there is no rule that you limit any knife to a particular chore. You can opt to use any portion of any profile if the result suits your design. After some experience you will find that partial cuts from two or more knives can result in a form that can't be achieved with a single knife.

There are many knife shapes available. Those shown here are typical but are not a complete library. Some catalogs offer as many as 40 profiles. The options are nice and won't be confusing if you start by selecting knives that suit your current work interests — decorative edges, cope cuts for frames, reed or flute details, forming joints. Both Delta and Sears, for example, offer sets that include the moulding head and three or four knife sets of popular profiles. That's a wise and economical beginning; add others as you need them.

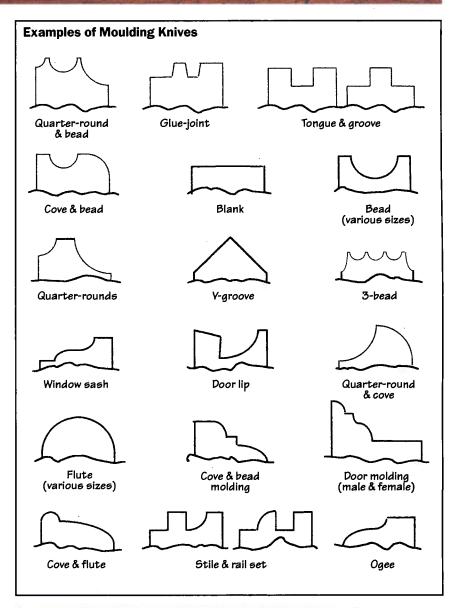
Installing Knives

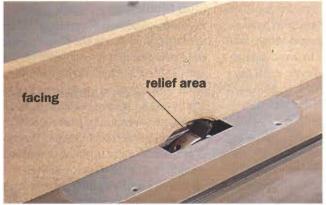
The knives slip into the slots in the head and are secured with screws, but the method of installation may be particular to the head design, so be certain to follow the manufacturer's advice for the correct way to go. In any case, be sure the slots and knives are clean.

Unplug the saw before placing the moulding head on the arbor. Hand turn the tool after tightening the lock nut to be sure the knives have clearance through the insert. Stand aside when turning on the machine and then recheck the knives before starting to work.

Rip-Fence Facing

Most moulding operations, especially those that use only part of a knife's profile, are done by using the rip fence for guidance. This makes it necessary to provide an auxiliary fence or "facing" of ³/₄" or 1" stock (**photo 1**).





An auxiliary wood fence is securely attached to the saw's rip fence. Make the facing as long as the fence and several inches higher if needed for the type of moulding you'll be running, or if the stock will be run on edge.

To make the relief area, equip the moulding head with blank knives and lower the head so the knives are below the table's surface. Lock the rip fence in position so the facing will receive a cut that is about three quarters its thick-

ness. Slowly raise the moulding head until the relief arc is about ³/₄" high.

At Work

Moulding heads are asked to work much Continued on page 18 Continued from page 17



2 A featherboard, clamped to bear down on the work in front of the cutter, will help keep the work in the correct position.



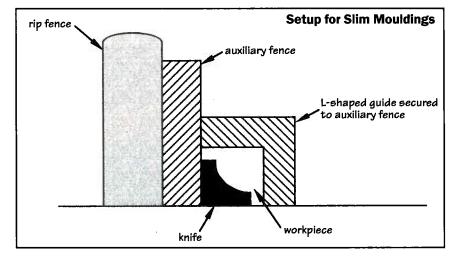
3 End cuts, especially when the work is narrow, are done safely by moving the work with the miter gauge. Be sure of correct alignment. The angle between miter gauge and facing must be 90 degrees.

harder than, say, a saw blade, or even a dadoing tool, so move the stock across the knives at a slower rate than normal to allow the knives to cut efficiently. Forcing is poor practice and usually results in poor cuts and burn marks on the work and the knives. If you feel excessive resistance it's probably time to think about getting to the full depth of your cut by making repeated passes, raising the head enough each time so the work moves smoothly over the knives.

Keep the work flat on the table and snug against the fence throughout the pass. The depth of the cut is determined by the height of the knives above the table; width-of-cut by the position of the fence. Use a featherboard to provide a good hold-down assist (photo 2). As usual in woodworking, cuts are smoothest when made with the grain. When you can't do this, feed the work slowly and make repeated passes to avoid tearout.

Always make end cuts, especially when the stock is narrow, by using the miter gauge to advance the work (**photo 3**). Tear out is inevitable on any shaping cut on end grain at the end of the cut, so do the shaping on a piece that's a bit wider than you need. The imperfection can be removed with a rip cut, making a pass on a jointer or with a hand plane. Make the end cuts first when shaping adjacent edges or all four edges of a piece of work. The final with-the-grain passes will remove the imperfections.

Shaping can also be done with the stock on edge. Be sure to keep the work



flat against the fence throughout the pass. Allowing the work to tilt at any time will mar its edges.

Slim Mouldings

A common method of producing slim mouldings is to form the shape on the edge of stock that is wide enough for safe handling and then rip off the milled piece. The procedure can be repeated to supply any number of mouldings, but it can be time consuming and requires repeated changing from moulding head to saw blade. A more productive method is suggested in the drawing above.

Start the job by ripping enough stock to the size of the moulding that's needed. Make the setup so that the L-shaped guide will provide a snug fit for the parent pieces. They should pass through the guide without chatter. Start the shaping by feeding the stock into the front end of the set up and end it by pulling it from the rear.

Circular Work

Using a moulding head to shape the perimeter of circular components is a feasible application for the moulding cutterhead. What you need is a V-shaped guide that's composed of left- and right-hand parts. The parts are clamped to the fence and are placed so the centerline of the V is in line with the center of the moulding head (photo 4).

Start the shaping by bracing the work firmly against the right leg of the V and swinging it slowly until it is firmly seated. Then slowly rotate the work in a counterclockwise direction. The work must be round and have smooth edges or results will be less than perfect. Be sure the shape you are forming leaves enough edge on the work and guides. To help keep the work flat on the table you can nail a strip of wood across the V to serve as a hold down.

Continued on page 20

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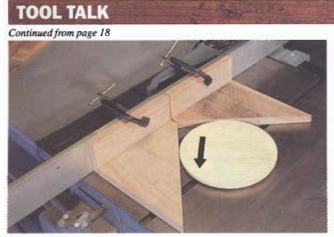
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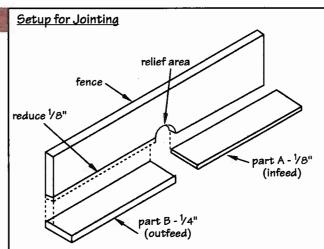
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A V-block is used to shape edges of circular components. The units, spaced to accommodate the diameter of the work, are clamped to the rip fence. Brace the work against the right unit and move it forward slowly until it contacts the knives and seats firmly in the V. Rotate the work in a counterclockwise direction.

A Setup for Jointing

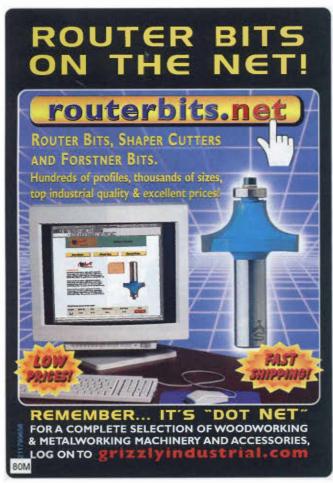
If you don't have a jointer you can use the moulding head, equipped with blank knives, to smooth edges on stock that isn't more than ⁷/8" thick. What's needed is a setup like the one sketched in the drawing. As shown, the arrangement is for a \(^1/8\)" depth of cut. If you want less, the thickness of the infeed and outfeed parts and the reduction in the outfeed part

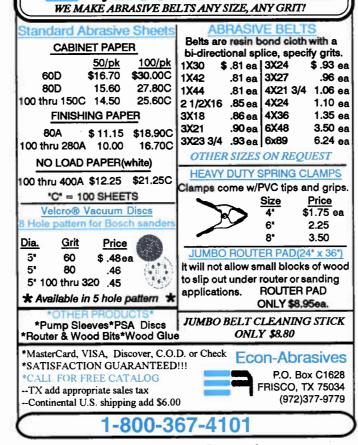


Jointing, with the head equipped with blank knives, is possible by using the setup shown here. Because the knives are 1" wide, the thickness of stock for the application cannot be more than ⁷/8".

of the fence can be adjusted accordingly. Allow the gap at the relief area to be a minimum, just enough for the moulding head knives to spin without a hindrance. An important adjustment — as on a regular jointer — is that the topmost part of the knife's cutting circle be on the same plane as the surface of the outfeed component.

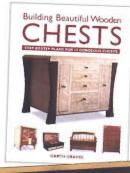
The work piece, moving forward from the infeed area, should pass smoothly over the cutter and onto the outfeed plate. PW

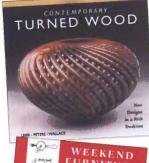




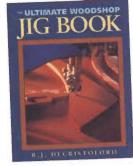
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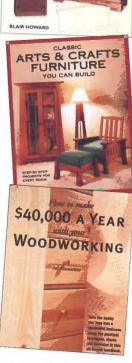
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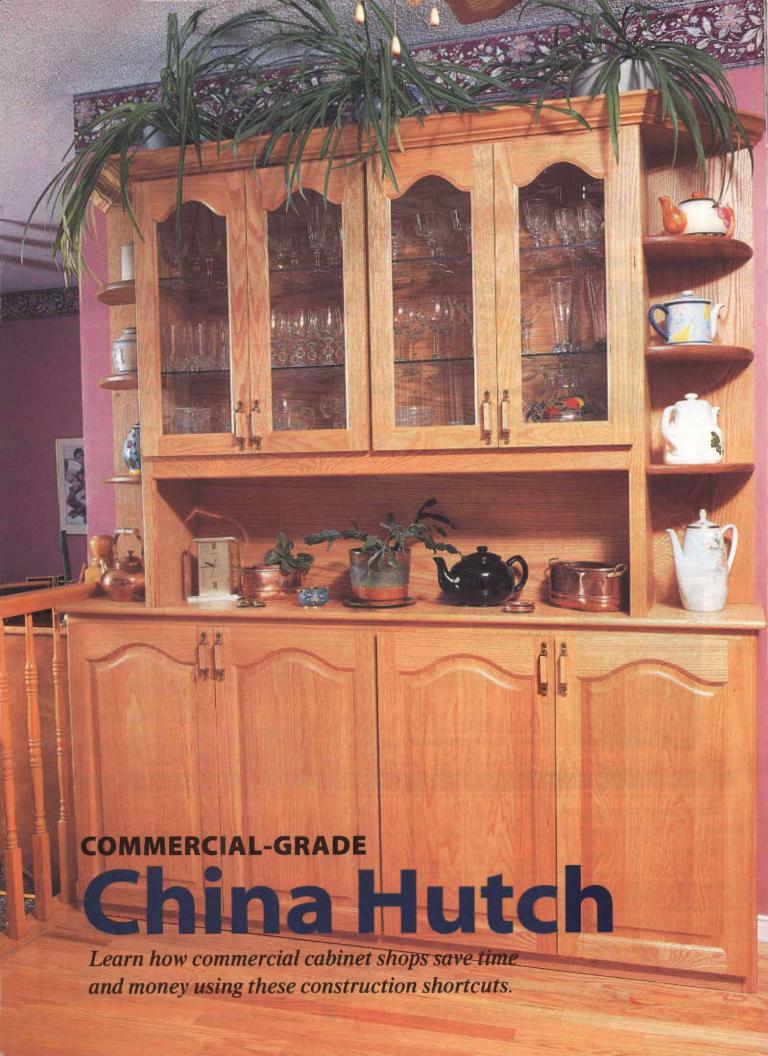
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1 BUILDING THE CARCASE • The bottom is set in a 3 4" x 3 8" deep dado, 2^1 4" up from the bottom. In both the upper and lower cabinets, the back sits in a 3 8" x 1" rabbet. This allows for easier fitting to a wall, and in the upper cabinet, allows room for running wiring for the lighting fixtures.

DOYOU have a storage problem? Are there dozens of dishes and beautiful display pieces that are stored away just crying for a perfect display cabinet? If you're like me, there's always a need for more storage. Well, here's a solution that might fit the bill. A multi-purpose china hutch with display shelves.

This cabinet was built for a friend who had an eating area off the kitchen, next to the family room. Space was an issue because this was a high traffic area, so the cabinet is 12" deep. If space isn't a concern, the base depth can be easily increased. One important note: if you build the 12"-deep version, anchor the cabinet to the wall's studs.

The lower section of the cabinet stores bowls, fondue pots and specialized cookware. It's all quickly accessible so you can easily get out that odd pot Aunt Sarah gave you as a wedding present when she visits. The top section, behind glass doors, features two glass shelves ideal for showing off crystal and glassware. And the side shelves display collectibles.

To complete the cabinet I installed three florescent light fixtures, one on top to shine on the ceiling, another in the upper section and the third behind the wide rail to illuminate the top of the lower cabinet. I used a three-switch receptacle that fit into a single electrical box mounted behind the upper cabinet's bottom rail.

Building the Lower Cabinet • The cabinet is built using solid oak and oak particle board, but use any wood that matches your decor. I used particle board for most of the panels and solid oak for the face frame and shelves.

Danny Proulx is a professional cabinetmaker in Russell, Ontario. He is the author of "Build Your Own Kitchen Cabinets," "The Kitchen Cabinetmaker's Building and Business Manual" and "How To Build Classic Garden Furniture." Proulx is a contributing editor to Cabinetmaker magazine and contributor to Popular Woodworking magazine. You can contact him through his website www.cabinetmaking.com.

Learn the Language

Most commercially built cabinets are constructed using the face-frame method like the one shown here. It's a quick, efficient and sturdy system — once you get the hang of it. However, there are some things you should know before you start to design and build face-frame cabinets. The following is a quick primer on some important points.

What's MDF and particle board? Why should I use these materials to build face-frame cabinets?

MDF, or Medium Density Fiberboard, is a compressed wood and plant fiber product commonly used in the woodworking industry. Particle board (also a composition board) is available in a number of "grades" made of smaller wood particles with varying density. Both particle board and MDF are economical, stable alternatives to solid wood and are less expensive than plywood. Offered in a number of veneered faces, these manmade materials replace large panels of wood at an affordable price and without the concerns of expansion, contraction, warping, splitting or knots. Both are heavier than solid wood and can be damaged more easily. If either material gets soaked, the material will swell significantly, so neither should be used in wet areas.

What's the difference between a face frame and a carcase? The carcase refers to the sides, bottom, top and back — essentially the pieces that make up the box of the cabinet — while the face frame is the solid wood frame that is attached to the front of the carcase.

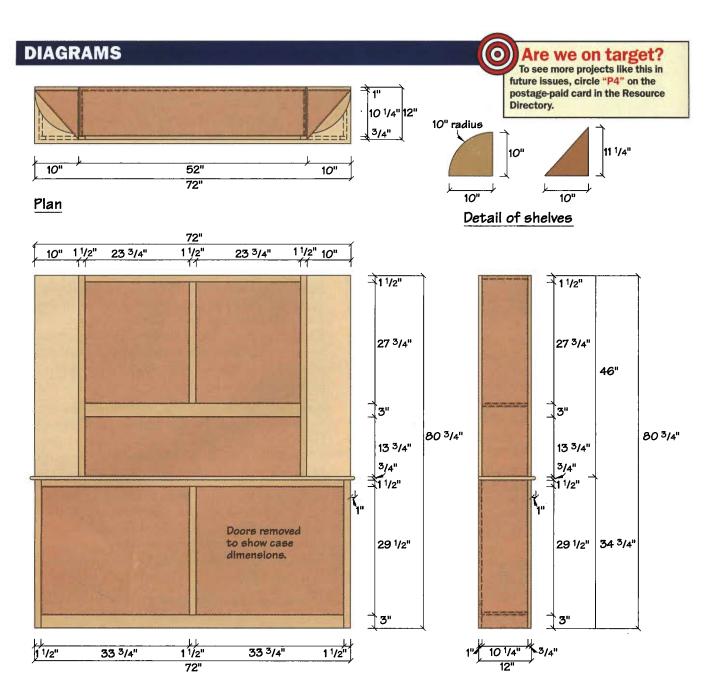
Why should I use the face-frame method to build a cabinet? Face frames allow you to use MDF or plywood carcases while still providing the appearance of solid wood. Face frames offer a wider variety of hardware choices and door designs. The frames can also pull the carcase square and make the carcase more rigid.

Are biscuits a strong enough joint for face-frame cabinets? Yes. Face frames can be assembled using biscuits, dowels or in many lower-quality, high-production situations are assembled from the rear of the face frame with corrugated fasteners.

What are European-style hinges and why should i use them? "European hinges" is the generic name for some amazingly adjustable hinges you install in a drilled-out space in the rear of a door and then attach to the cabinet with a mounting plate. The hinges allow you to adjust the doors on two or three dimensions with the turn of a screw. European hinges are more expensive than traditional hinges and require some specialized installation tools.

How do I attach my cabinet to a stud wail?

With a big screw. Just kidding. Most cabinets designed to be installed include hanging rails, or a sturdier-than-average back plece. In the case of our hutch, the back of the upper section is 34 " material, which is enough to attach it to a stud wall. It would have been possible to use a 14 " back and add a 34 " x 3" rail at the top of the cabinet to use as a hanging rail. While a visible distraction, the rail reduces the weight of the upper section. In our hutch the thicker back does double duty in supporting the long shelves because it is drilled for shelf plns, so the full back was a good decision. The cabinet should be attached to studs in at least three places. If studs aren't in the right places, use drywall "molleys" for more support.



Elevation	Profile

No.	Item	Dimensions T W L	Material	No.	Item	Dimensions TW L	Material
2	Side panels	³ /4" x 11 ¹ /4" x 34"	Oak MDF	2	Side panels	³ /4" x 11 ¹ /4" x 46"	Oak MDF
1	Bottom	3/4" x 10 ¹ /4" x 71 ¹ /4"	Oak MDF	1	Тор	3/4" x 10 ¹ /4" x 51 ¹ /4"	Oak MDF
1	Back	3/4" x 34" x 71 ¹ /4"	Oak MDF	1	Bottom	3/4" x 10 ¹ /4" x 51 ¹ /4"	Oak MDF
2	Shelves	3/4" x 10" x 70 ¹ /2"	Oak MDF	1	Back	3/4" x 46" x 51 ¹ /4"	Oak MDF
2	Stiles	3/4" x 1 ¹ /2" x 34"	Oak	2	Stiles	³ /4" x 1 ¹ /2" x 46"	Oak
1	Bottom rall	³ /4" x 3" x 69"	Oak	1	Middle rall	³ /4" x 3" x 49"	Oak
1	Top rail	³ /4" x 1 ¹ /2" x 69"	Oak	1	Top rail	³ /4" x 1 ¹ /2" x 49"	Oak
1	Middle stile	3/4" x 1½" x 29½"	Oak	1	Center stile	3/4" x 1 ¹ /2" x 27 ³ /4"	Oak
4	Doors	3/4" x 173/8" x 31"	Oak	2	Back boards	³ /4" x 10" x 46"	Oak
2	Cleats	3/4" x 11/2" x 70"	Poplar	2	Top shelves	3/4" x 10" x 11 ¹ /4"	Oak
1	Тор	3/4" x 13" x 74"	Oak	6	Shelves	3/4" x 10" x 10"	Oak
-		Name of the last		4	Doors	3/4" x 123/8" x 281/2"	Oak



2 FACE FRAME • I used double dowels at all the face frame joints to provide a sturdy joint. Drill straight holes to keep the frame flat.

ID When cross-

cutting a veneered

panel with a dado

blade it's common to

tear the veneer. To prevent this, make

two passes with the first cut only 1/8" deep

and the second cut

to the full depth. Even

sharp blades can tear

out because it's usually the waste wood

causing the trouble.

You also can cut

through the veneer with a sharp knife be-

fore the cut.

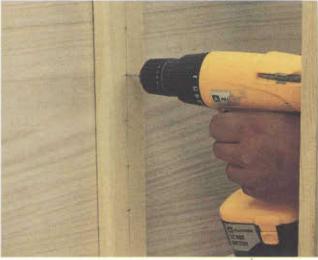
The top is made of ³/4" thick solid oak boards glued up to the required width. The cabinet is built using a face frame method. The carcase is made from particle board panels screwed, nailed or glued together. Then a solid wood face frame is applied to the front. You hang the doors on these. It's a very quick and sturdy way to build cabinets and is a method preferred by commercial cabinetmakers.

First build the lower carcase. Cut the two lower side panels to the sizes given in the materials list, then cut the dadoes and rabbets as detailed in the photo. Note that the rabbet for the back board is cut 1" wide to accept a ³/4"-thick panel, so the rabbet is a bit oversized. As you know, most walls aren't straight so it's difficult to tightly fit a

wide backboard. The extra space on the sides makes it easier to get a tight fit.

Next, cut and install the bottom, securing it in the dadoes with glue, or nail it from the outside of the sides. Then place the back in the side rabbets and secure it using glue and finish nails through the back and into the rabbets and the bottom. The thick back adds weight to the shallow base and allows adequate depth for the adjustable shelf pin holes for the long shelves.

The Face Frame • Now make the face frame. Clamp the two outside stiles to the front of the side panels, holding them flush with the outside edge. Then trim the top and bottom rail to fit between the stiles. Now fit the center stile the same way. Unclamp the stiles and use dowels or biscuits to glue the entire face frame together. The bottom rail is held flush with the top surface of the bottom, and the middle stile is centered



SHELVING • Depending on your use, you may want many shelf location options (such as the 2" spacing I used) or just a few. Either way, a drilling template makes locating the holes easier and will ensure accurate positioning at each location.



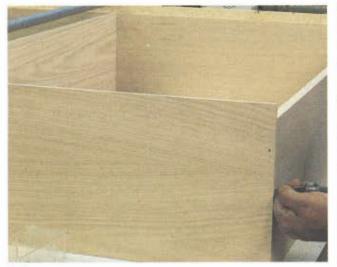
4 CLEATS • Solid wood cleats (poplar is fine) attached to the inside front and back of the lower cabinet strengthen the case, as well as provide a great place to attach the top.

between the two outside stiles. When the frame is dry, nail it to the lower cabinet through the frame, or use biscuits and glue.

Drilling for Shelves • Next, drill holes for the adjustable shelf pins. I used $\frac{3}{8}$ "-diameter brass shelf pins spaced 2" apart. There are two columns of holes in each side, one column in the middle of the back, and another on the inside face of the middle stile. Make a jig for the shelf holes. Now fill nail holes, sand the cabinet and round over the outside edges of the stiles with a $\frac{3}{8}$ " router bit.

Add Cleats for Strength and Support • The top of the lower cabinet is held in place with wooden cleats. Cut and secure two wood cleats flush with the top inside edge

CHINA HUTCH



5 UPPER ASSEMBLY • The upper cabinet is assembled as was the lower, with the bottom dado located 16" up from the bottom of the sides. The nails attaching the top through the sides won't show because the crown moulding will cover this area.

of the back and front top rail. Fasten with glue and screws.

Next glue up enough $\frac{3}{4}$ "-thick oak to form a top that's 13" deep and 74" long. With the top dry and cut to size, slightly ease the two front corners of the top with a sander to eliminate sharp corners. Then round over the top and bottom front and side edges with a $\frac{3}{8}$ " roundover bit in a router.

To attach the top, drill elongated (front to back) clearance holes in the front and back cleats and attach the top using $1^{1}/4^{\circ}$ wood screws making sure there is a 1" overhang on the front edge and at each end. The elongated holes allow the top to shrink and grow across the grain as seasonal changes in humidity affect it.

Make the Upper Cabinet • Cut the two upper side panels to the sizes given in the materials list, then cut the dadoes and rabbets as shown. Note that once again the rabbets in the sides are oversized. The 1" rabbet leaves enough room to route the lighting wires behind the back board. Because this cabinet will be built-in, check with an electrician or your local electrical codes about your wiring plans before you begin.

Glue the top and bottom into the dadoes and rabbets. Nail the top in through the outside edge of the sides because the crown moulding will cover the nail heads.

Next, attach the back board to the cabinet in the rabbets



6 SIDE WINGS • Attaching the backs for the side shelves is a little tricky. I used screws angled through the side rabbets. Pilot drill through the rabbet and into the backs or you stand a good chance of splitting out the wood on this angled attachment.

with glue and finishing nails. Drive the nails through the back into the cabinet sides at a slight angle. Attach the back flush with the top edge of the cabinet's side boards.

Cut, assemble and attach the face frame for the upper cabinet the same way as on the lower cabinet. The two outside stiles are held flush with the sides, the middle rail is held flush with the top surface of the shelf and the top rail is held flush with the top surface of the top. Again, use biscuits to attach the stiles if you prefer.

Once the frame is dry and attached to the cabinet, round over the outside edges of the outer stiles and the lower edge of the middle rail and inside edges of the outside stiles in the lower opening with a ³/8" roundover bit. Be sure to stop rounding over the edges of the outer stiles ³/4" from the top so the crown molding will fit tight to the cabinet top. Drill the adjustable shelf pin holes in the same manner as the base section.

Attach the Shelf Backs • Cut the two solid oak shelf backs to the sizes given in the materials list. I attached each one flush with the upper side boards using glue and 1¹/2" wood screws angled through the rabbets in the cabinet sides. Nails would also work.

Door Sources

When ordering custom-made doors you will have the choice of wood species, style of the door, type of panel (flat or raised) and edge detail options for the inside and outside of the rails and stiles, as well as on the panel itself. Most manufacturers work with ½16" tolerance on the sizes provided by you. If the fit on your doors is very tight you may want to order the doors without any outside edge detail and rout your own after fitting the door.

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Scherr's Cabinet & Doors, Inc.

Scherr's offers 135 door designs in 10 wood species, as well as drawer fronts and dovetail drawers boxes.

To receive their catalog or request information about specific doors, contact Scherr's at 701-839-3384 or visit their website at www.scherrs.com.



ANGLE TOPS • Install the tops using screws or nails through the front corner of the angled boards. They won't show because the crown moulding will cover that edge. Attach the back edge of the top through the back with screws.

Tops and Shelves • Next cut the two angled top boards as shown in the diagram. Attach the tops flush with the top surface of the upper section.

Cut the six radiused shelves using a compass to draw the arc and cut with a jigsaw. Clamp all six shelves together and sand them together to ensure they're identical. Sand the shelves and round over the top and bottom edges of the radius curve with a ³/8" roundover bit.

I made the shelves permanent by attaching them with glue and screws. If you align the shelves with the ³/8"-diameter shelf pin holes, the screws can be inserted through the shelf pin holes into the shelf boards.

If that alignment doesn't suit you, use two screws through the back into the shelf and one directly behind the front stile to keep it less noticeable.

Crowning Effect • Use any style of top moulding. I used $3^{1}/4^{"}$ crown moulding for my project. Some of the angles are tricky, but remember this when cutting angles in crown moulding: place it upside down in the miter box. The front angle on my cabinet was 41 degrees; yours might be different. I cut each moulding at $20^{1}/2$ degrees to equal the 41-degree corner. There's also two little pieces of moulding on each end, and that angle is tricky. To make matters more complicated, the molding is only $\frac{3}{4}$ " long at the bottom.

Ready-Made Doors

For this project, I purchased ready-made cathedral oak doors. If you've never had a reason to purchase doors, it's easier and less expensive than you might think. An average-sized, unfinished red oak raised panel door will cost about \$35. So for the eight doors you could estimate under \$300. If you consider the time, material and possible tooling required to produce the doors shown, \$300 doesn't look bad.



8 THE CROWN • Take your time and make a couple of test cuts on the crown. All that's required is patience to get a nice tight fit. I used a pneumatic nailer to attach the crown quickly and without a lot of clamping.

You'll need four doors for the upper section that are $12^3/8$ " wide by $28^1/2$ " high and accept glass center panels. The four lower doors are $17^3/8$ " wide x 31" high with a solid raised panel center. The doors were installed using Blum European hidden Compact 33 style 107-degree full overlay face frame hinges because of their small stile mounting plate. However, any European-style hinge will work, and many traditional North American-style hinges will also work. Follow the manufacturer's directions for installation.

I ordered two $^{1}/4$ "-thick by $10^{1}/8$ "-deep by $50^{3}/8$ "-long glass shelves for the upper section. Verify the measurements of these shelves and the $^{1}/8$ " glass for the doors on your cabinet before ordering the glass.

Finishing

I finished my cabinet with three coats of oil-based polyurethane. I cut the first coat with thinner by 10 percent and sanded with 220-grit paper between each coat. The final color, your décor, and the type of wood will determine the final finish. However, this cabinet will look great no matter what you decide to use.

Lighting and Installation

Installing lights is optional. I'm a bit of a gadget nut so I installed one 36" florescent lamp on top of the cabinet, one behind the upper section's top rail, and another behind the upper section middle rail.

There's not too much involved when installing this cabinet. I suggest you secure the top section to the base with screws through the underside of the base top into the upper cabinet sides. Also, as I mentioned previously, the cabinet is tall and shallow so I recommend you attach it to the wall studs with a few 3" screws just to be safe.

Have fun building your cabinet — I sure enjoyed making this one for my friends. **PW**

A Bench in the Style of Nicolai Fechin

This Russian-born artist built amazing furniture with only primitive tools. Carving in his style is a great exercise for beginners.

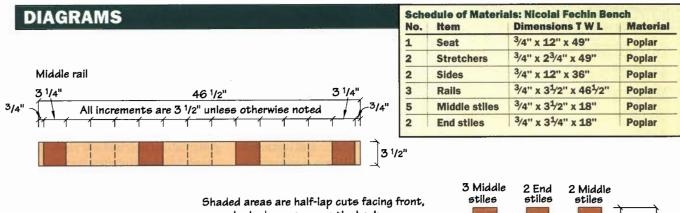
By Christopher Schwarz, managing editor, Popular Woodworking, Opening photo by Christine Polomsky.

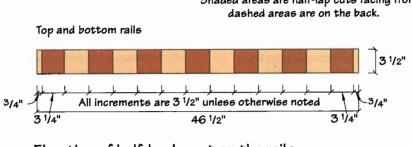


ICOLAI FECHIN (1881-1955) is best known for his paintings, but he also was an accomplished sculptor, builder and woodworker. Born, raised and trained in Russia, Fechin moved to New York in 1923 and eventually to Taos. New Mexico. During the following six years. Fechin transformed his fami-Iv's adobe dwelling into a monument to his building, carving and finishing skills. Every wood surface in the home bears the mark of his chisel or his adze. The furniture, doors, windows and beams were shaped, meticulously sanded and patiently finished to a mellow. leather-like color. The total effect is nothing less than stunning.

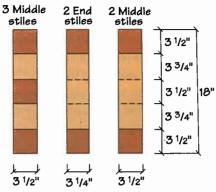
This bench isn't an exact duplicate of one of Fechin's pieces. Instead, it combines elements of several benches. This is a great project for beginners because you can make all of the carvings on this bench with two chisels and a gouge.



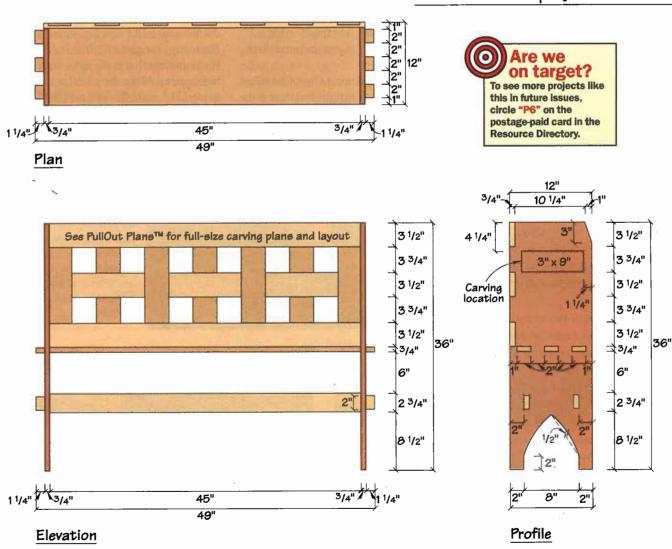








Elevation of half-lap layout on the stiles



FECHIN BENCH

Nicolai Fechin: Painter, Builder and Woodworker

Nicolai Fechin loved his tools. He had a large collection of English and German carving chisels, sharpening stones, a hand-powered grinding wheel, axes, a large adze, hand drills and saws, according to his daughter, Eya Fechin. But he didn't like power tools. He once rented an electric lathe, briefly used it and then returned it.

"He felt that machines interfered with the feeling of the wood and got in the way of what the wood wanted to become," Eya says. "His carvings were so tactile. They want to be touched. They should be touched."

Fechin was born in 1881 into a family of craftsmen living on the shores of the Volga River. His father, Ivan, was a builder who ran his own shop and taught young Nicolai about construction, carpentry, gilding and carving. In 1895, Fechin entered a six-year art program at Kazan. After graduating, he then entered the Academy of Art in Petrograd. After the Bolshevik Revolution, Nicolai had an invitation by the Carnegie Institute to come to the United States in 1923. After a stay in Pittsburgh and four years in New York, the Fechins moved to Taos, New Mexico, where Nicolai transformed his house.

The sad part of this story is that as Nicolal finished work on his beautiful house, his wife asked for a divorce, so he was never able to fully enjoy the fruits of his labor. He never built again. Nicolai and his daughter moved to New York briefly and then to Southern California to a studio in Santa Monica. He died quietly in his sleep in 1955.

His Taos home is now open to the public. For information on his work, contact The Fechin Institute . Box 832 • Taos, NM 87571.

Build the Back • Fechin used only hand tools, and I wanted to try to build this bench in that spirit. However, there were two power tools I simply couldn't part with: a table saw and a detail sander. The bench is assembled using simple but sound joints. The back is built using lap joints. The ends of the assembled back fit into notches in the sides. And the seat and stretchers are attached to the sides with through mortise-and-tenon joints.

The first step is to build the back with lap joints to create the woven effect. Cut the pieces for the back to size according to the Schedule of Materials, then use a dado set in your table saw to cut the lap joints on the stiles and rails. See the diagram for the layout of these joints.

Cut the sides, seat and stretchers to size. Using a coping saw and a chisel, cut the three $\frac{3}{4}$ " x $3\frac{1}{2}$ " notches into each side to hold the back. Now cut the five ³/₄" x 2" through-mortises on each side in the locations shown in the diagram. Finally, cut the 2"-wide x 2"long tenons on the seat and stretchers.

Add Texture • One of the nicest parts of Fechin's furniture is the

wavy, undulating surface he created with his adze. An adze is like a hatchet with the blade twisted 90 degrees. Many come with a long handle, so you straddle the work as you shape it. I used a one-handed Portuguese adze instead. Choose an adze with a blade that curves up like it's smiling at you — sometimes called a gutter adze. (I ground my blade to this shape.) Add texture to all of the parts with an adze; shape the edges with a drawknife. Then go over the surface with a jack plane to even out the places where you got a little aggressive. Finally, sand out the rough spots.

Now cut the arch on the bottom of the sides with a keyhole saw or jigsaw. Shape the opening with a rasp; finish the edges with sandpaper.

Carving • Don't be intimidated by the carrier Once you get the hang of it, you'll be able to carve the entire bench in about seven or eight hours. Begin by laying out the snake-like carving on the sides. Photocopy the pattern in the PullOutTM Plans and attach it to the sides with rubber cement. Make the circular cutouts using 1¹/2" and ¹/2" Forstner bits. Then



PRECISION COUNTS . Because you're dealing with 21 lap Joints, your cuts need to be precise as possible. No matter how careful you are, you might find a little trimming is necessary. I recommend you use a rabbet plane for trimming the sides of the lap joints.

ROUGHING IT . You must be careful when using an adze. The large ones will open up your leg. The one-handed adze will only chew up your thigh. With the onehanded version, you can work with the wood to your side (instead of between your legs) which feels a good bit safer.



define all of the edges with a ¹/₄" chisel. Make your cut about ³/₁₆" deep. Then go back and remove the waste up to that line. Now lay out the 24 circular patterns on the bench's back. These are each 1³/₈" in diameter and carved the same way you carved the sides. Finally, carve the square and faceted depressions on the back, seat and sides. See the short story at right for details on how to do this quick-

ly and cleanly.

Now comes a difficult decision. Eya Fechin, who is Nicolai Fechin's daughter, says her father hand sanded all of the carvings. He started with the coarse grits and ended with the extremely fine grits. The result, she says, is that every carving is perfectly smooth to the touch, inside and out. I wish I had the time to do this. I used Fein Power Tool's fantastic detail sander and progressively finer grits to get the carvings smooth.

It's now time to assemble the bench. Glue the back together. You can glue the tenons into the mortises, as I did. Or make small wedges for the tenons, which Fechin often did. The advantage to making the wedges is that your bench can be disassembled for moving or storage. Attach the back to the sides and seat with

sheet metal screws. Now disassemble the bench to prepare for finishing.

Finishing

Fechin's finishes were an art form in themselves. Eya Fechin says her father used a small gasoline torch to darken areas on the furniture. Then he would use a common stain that was highly diluted with turpentine to even out the look. He always wiped on his finish. Finally, Fechin would apply Johnson's floor wax to his piece, allow it to dry and then buff it with a soft cloth. The result is a soft, smooth, low-luster finish.

I approximated this look using shellac, dye and warm brown glaze. Here's how. Add about ½2 teaspoon of alcoholbased orange aniline dye to a pint of orange shellac. Brush on two coats of the shellac and sand between coats. Now tone the entire piece and the recesses in the carvings. Wipe on warm brown glaze to one area at a time, then wipe it off with a soft cloth. Allow the glaze to dry overnight. Then apply three coats of a clear finish, such as clear shellac. I'll admit it's not as mellow a finish as Fechin's is, but it approximates the look with less work and gives the piece some age. **PW**

RELIEF CARVING • You don't need a bucket of tools to make these carvings, just patience. First use a 1/4" chisel to define the edges of the carving as shown on the right side of the top photo. Then go back with a larger chisel to remove the waste up to the line. A sharp tool and a little care will save you hours of sanding later. Finally, scoop out the center of the circle with a shallow gouge, such as a #5.





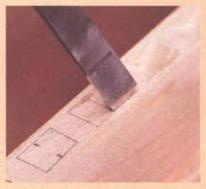
FECHIN BENCH

How to Carve the Faceted Depressions

There are about 250 depressions spaced $\frac{1}{4}$ " apart on this bench. And while they are a lot of work, the effect in the end is worth every minute. Here is the fastest way to cut these details. First make a cardboard template. Cut a rectangle on it measuring $\frac{3}{8}$ " x $\frac{1}{2}$ ". Use this template to mark out all the depressions.



Using a $\frac{3}{8}$ " chisel, mark the center of the depression. Pound the chisel with a mallet to make this cut about $\frac{1}{8}$ " deep.



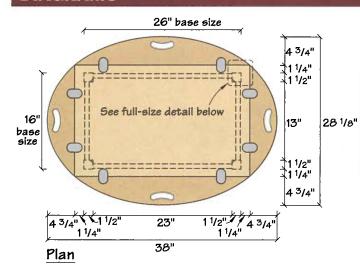
Hold the chisel at an angle and define the sides. You don't need a mallet for this.

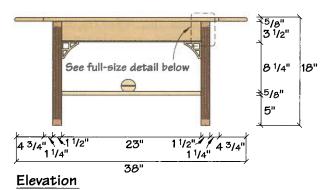


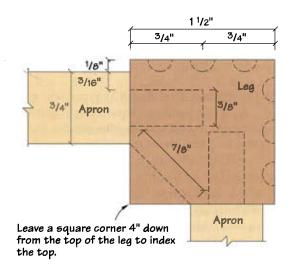
Clean out the waste on the two sides of the depression with the chisel.



DIAGRAMS







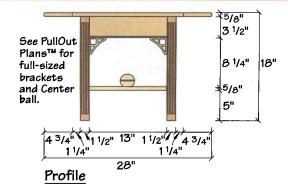
Full-size Plan of the table base corner

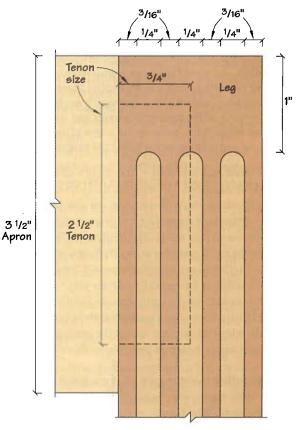


No.	Item	Dimensions T W L	Material
1	Тор	5/8" x 18 ¹ /2" x 28 ¹ /2"	Mahogany
2	Short wings	5/8" x 4 ³ /4" x 18 ¹ /2"	Mahogany
2	Long wings	5/8" x 4 ³ /4" x 28 ¹ /2"	Mahogany
2	Short aprons	3/4" x 3 ¹ /2" x 14 ¹ /2"	Mahogany
2	Long aprons	3/4" x 3 ¹ /2" x 24 ¹ /2"	Mahogany
4	Legs	1 ¹ /2" x 1 ¹ /2" x 17 ³ /8"	Mahogany
2	Stretcher halves	5/8" x 4" x 30"	Mahogany
8	Brackets	¹ /2" x 2 ³ /4" x 2 ³ /4"	Mahogany
1	Tray foot stock	3/4" x 1/2" x 24"	Mahogany
1	Center ball	2" x 2" x 3"	Mahogany

Supplies: All the hardware for this table can be ordered from Lee Valley Tools at 800-871-8158

- Eight Butler tray table hinges part# 00W21.02 (\$6.50/pair).
- Screws part # 91Z05.04 (\$3.20/100).





Full-size elevation of the table base corner



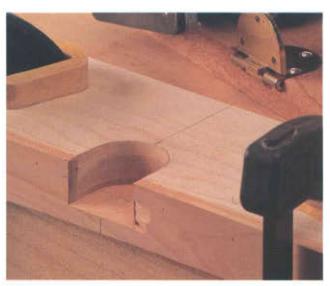


SHAVING AN ELLIPSE. If you are going to change the size of the top, you'll need to use an ellipse-marking jig (top). If not, cut out the wing patterns in the PullOut Plans, Make copies of the wing pattern halves and tape them together. Glue the patterns on the appropriate wings and cut out the oval-shaped wings. Next, clean up the edges of the wings with a block plane and prepare for mortising the hinges (bottom).

Ellipses and Squares • The top is a rectangle set inside of an ellipse. The wings actually touch at the four corners of the rectangle. With the aid of our computer drafting software, I determined the perfect size of a rectangle that yields equal widths on all four wings. The PullOutTM Plans contain a template for the top. If you want to modify the top and base sizes, you'll need an ellipse-layout jig (See issue #98, September 1997, for plans for a simple jig we built to do this job).

Begin by cutting out the parts according to the Schedule of Materials. Next, cut the wings to shape as shown in the photos. Then put the wing parts in place against the rectangle and, using masking tape, attach the wings to the top so they pull up tight.

■ Mounting the Wings • Mark the hinge locations 4" in from each corner and transfer the location to each wing with a knife. The barrels of the hinges don't align exactly with the wing joint, so use the template in the PullOut



ROUTING A MORTISE • Make a jig to rout the hinge mortises. If you use the supplier that we named, use the pattern in the PullOut Plans to make a jig for routing the mortises. If you use a bearing-on-top bit, make sure that you use material thick enough to accommodate the bit and bearing when you make the jig.

Plans to locate the hinge recesses. Rout the recesses on the table side first; then, with a spacer, rout the wing side. There is some chisel work involved in fitting the hinge's spring mechanism to the top and wings. After this is done, attach all of the wings and test the fit.

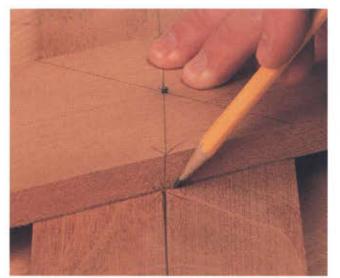
You will notice that after mounting the wings, all four can't fold up at the same time. Routing a roundover profile on the edges of the top and wings will fix this. Rout a ³/8" profile on the top and a ¹/4" profile on the bottom. After this is done, remove the wings. Scrollsaw the handle holes (see the pattern in the PullOut Plans), sand and rout with a 1/4" radius. Finish sand the top and wings; set them aside for finishing.

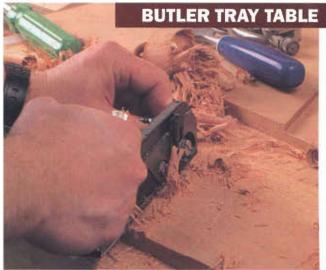
The Pierced Stretcher • The stretcher on this table is strictly for show, and the turned ball centerpiece discourages people from putting anything on the stretcher, including their feet. Rough cut the stretchers to size, then use the pattern in the PullOut Plans to lay out the angled half-lap joints on the pieces. I cut the half laps with a hand saw and a rabbet plane, but a straight edge and a router would work fine. After cutting the half laps, glue the stretcher pieces together.

Next, make two copies of each stretcher pattern in the PullOut Plans. This gives a left and right, and the crosshairs in the center give a good indexing point. Tape the pattern pieces together and affix them to the stretcher blank, then cut the stretcher pattern out using a scroll saw.

Precision is important here because there is little room for error when fitting the stretcher to the legs later on in construction. Take your time and do it right. Lastly, turn a small ball for the center of the stretcher. Drill a $\frac{1}{2}$ " x $\frac{3}{8}$ "deep hole in the center of the stretcher and a deeper hole in the ball. Attach the ball with a dowel after finishing.

Fluting the Legs • Use a router in a table to flute the legs. Set stops at each end of the fence and measure





GETTING THE HANG OF ANGLES • Begin the stretcher layout by marking the centers of each stretcher piece along the length and across the middle. Drill a small hole through each center and place a small finish nail through both pieces. Place this assembly on the 60-degree angle and mark both pieces at the edges where they touch (left). Once you get the angle right, cut the half lap. First I used a hand saw to define the edges, then I used a rabbet plane to hog out the waste (right).

WOOD'WORDS (wood'wurds) n.

BEAD: A round moulding used to remove a sharp corner or break up the joint between two boards.

FLUTE: Basically a concave bead. A decorative element used in architectural columns and furniture.

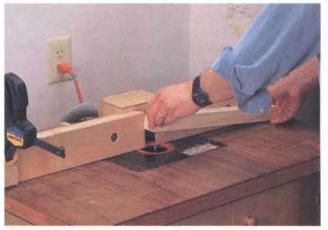
(include the bit width) from the mounted bit to the stop. The distance should be 1" less than the length of the leg. This gives a 1" space at the top and bottom where there is no fluting. Using a $\frac{1}{4}$ " round nose bit, the first setup is $\frac{3}{16}$ " from the bit to the fence and $\frac{1}{8}$ " up. The second is centered on the leg. The photo details the setup necessary to complete this procedure. The diagram shows you the location of each flute.

To complete the legs, first set the jointer fence at a 45-degree angle and cut a chamfer on the inside corner, away from the outer fluted sides. Set the depth of cut so there is an equal amount of width left on each remaining bevel. See the full-sized diagram for details.

Beading the Aprons • The bead at the bottom edge of the aprons will cast a shadow line that separates the aprons from the corner brackets. After beading the aprons, cut $^{3}/8$ " x $^{2}/2$ " x $^{3}/4$ " mortises on the legs in the locations shown in the diagram. Then cut the $^{3}/8$ " x $^{2}/2$ " x $^{3}/4$ " tenons on the ends of the aprons. Check the fit with the mortises in the legs.

Assembly and Finish • The base can now be dry assembled to get the finished size of the stretcher. Set the base upside down and lay the stretcher onto the bottoms of the legs, spaced evenly on all four legs, and mark the joints where they meet the legs. Cut the excess off and sand the ends until the stretcher fits snugly between the legs. Glue the base together and clamp. While the base dries, make eight copies of the corner bracket pattern supplied in the Pull Out Plans.

Lay out the brackets according to the diagram in the PullOut Plans and cut their corners square with a miter saw. Note



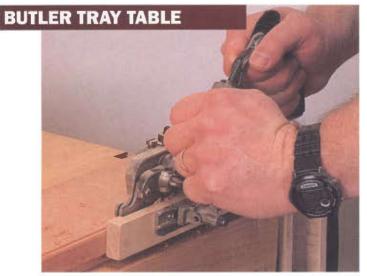
4 DROP-CUT FLUTING • With the router running, hold the leg firmly and gently lower it onto the bit with the end of the leg against the first stop (which isn't visible behind my right hand). Run the leg across the bit to the other stop and lift it straight up.

Now rotate the leg 90 degrees and repeat the process. Reset the fence to rout the flute down the center of the leg. Use a test piece first; then run the center flute on each leg.

the grain direction for strength. Affix the patterns to your wood and cut them out on the scrollsaw. Sand and attach the brackets with small brads and glue.

Now build the tray's feet, which keep the tray centered perfectly on the base. First cut 45-degree miters on the ends of some ³/4" x ¹/2" stock (called "Tray foot stock" in the Schedule of Materials) and cut them to 2" lengths. Using the foot pattern in the PullOut Plans, scrollsaw left and right mitered pieces for each foot. Place the top and base upside down on a blanket. Center the inverted base on the top. Nail two of these corner pieces together and attach them to the top at the inside corner where the long apron meets the leg. Leave a little clearance so the top won't get stuck.

Start the three-step finishing process with a thinned-down red aniline dye. Why red? This will accentuate the red that



5 USING AN OLD TIMER FOR THE BEAD • I beaded the aprons using an old Stanley #45 moulding plane. The bead is a standard $\frac{1}{8}$ " and can also be made with a beading bit in a router table.

is already in the mahogany. Your goal is a bright reddish or pink color when dry. So don't be shocked if your table suddenly looks like it belongs in the circus. Rag it on, preferably with cheese cloth (it doesn't leave lint on the surface). Wipe any blotches down with a clean rag lightly soaked with the thinner used for your dye. Next, reduce some neutral grain filler with oil-based mahogany stain to the consistency of



6 MOUNTING THE STRETCHER • After fitting the stretcher, lay out and drill dowel centers so that the stretcher will attach 5" up from the bottom of the legs.

heavy cream. Rub the stain/filler mixture across the grain leaving a fairly heavy coat. Let it stand for a few minutes until the thinnest part of the application starts to dry. Rub the excess stain/filler out across the grain and finish rubbing lightly with the grain. Apply three coats of clear lacquer, sanding between coats, and you're ready for tea time. **PW**

holiday projects (#58125)



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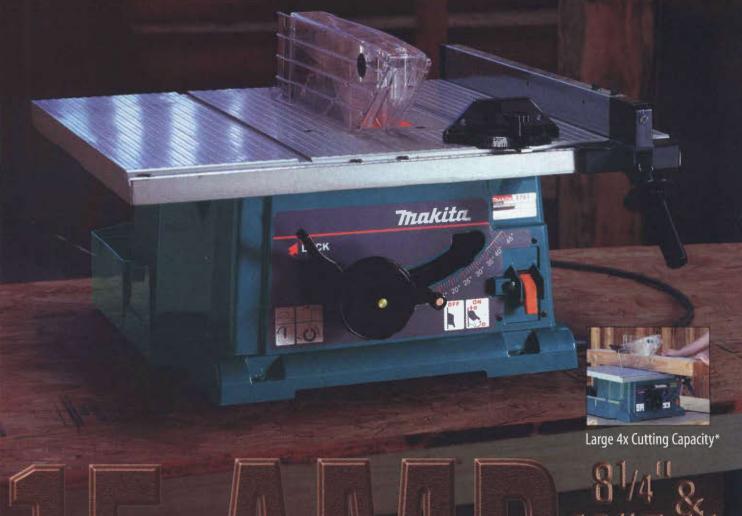
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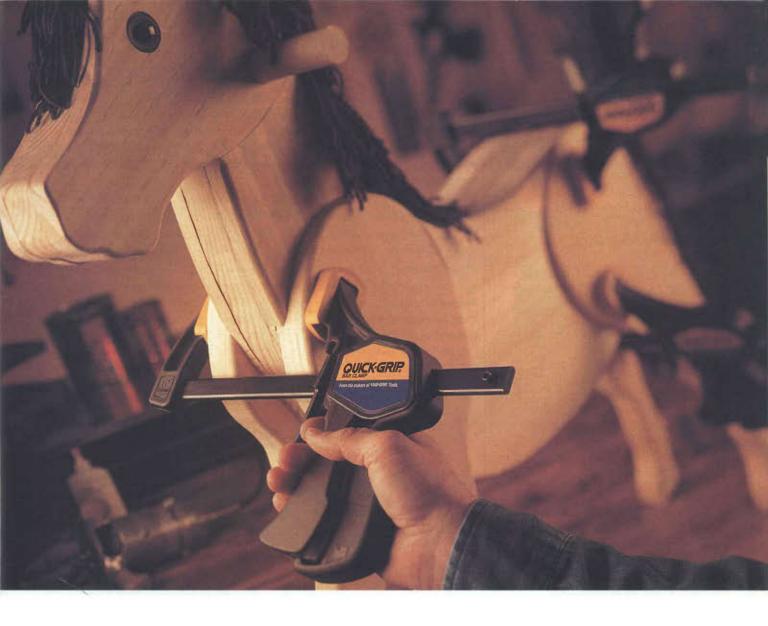
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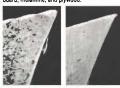
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See American Woodworker April 1998, pp. 64-69.

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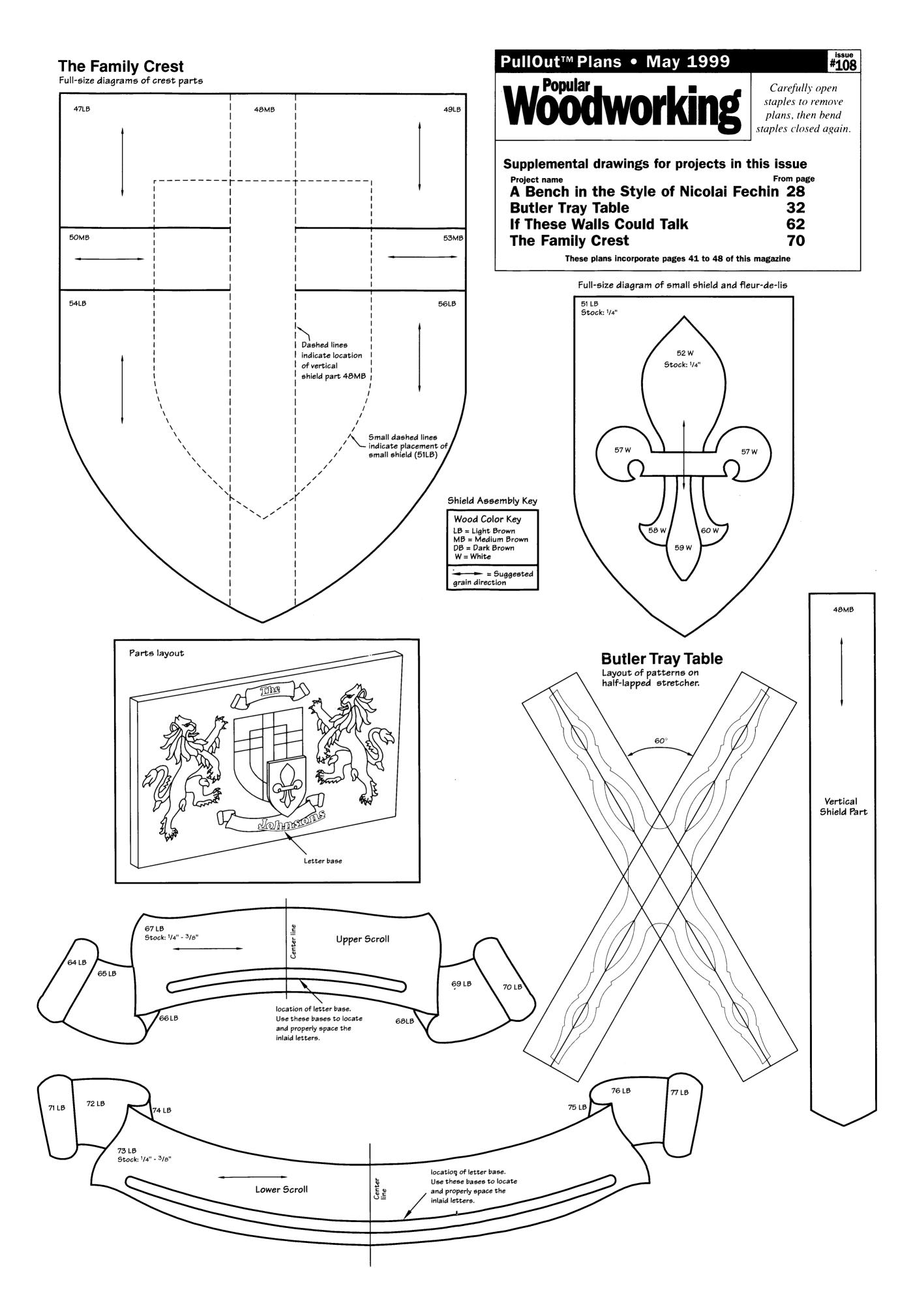


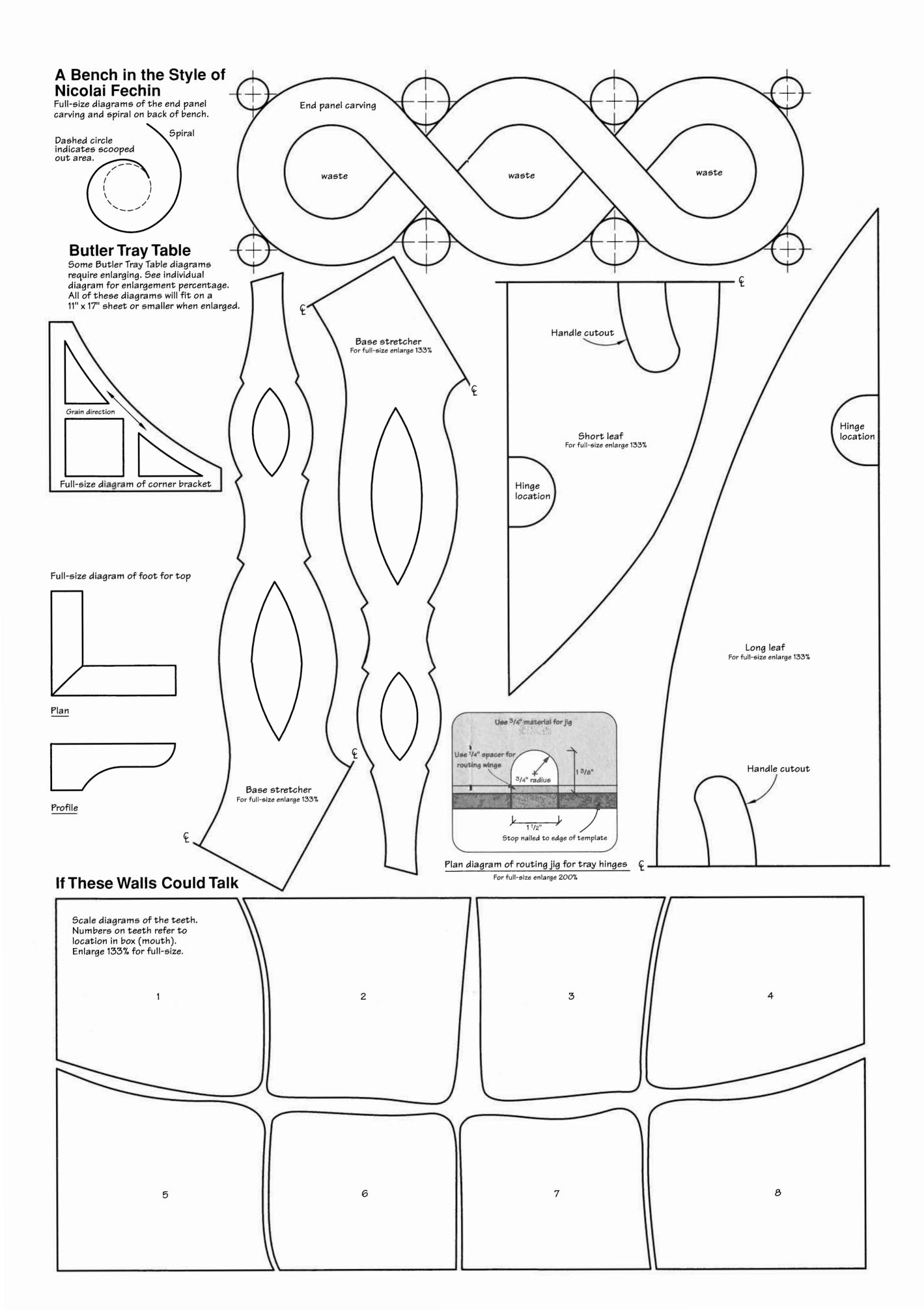


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Norm Falls for Salvaged Timber



MERICA'S BEST-KNOWN master carpenter, Norm Abram, also has a keen interest in salvaged wood. When Abram, host of "The New Yankee Workshop," got word of our "Trees to Furniture" program, it naturally sparked his interest. So much so, in fact, he and a film crew traveled to Cincinnati (where "Trees to Furniture" originated) and spent a day helping salvage a tree in a residential neighborhood.

Their footage will be shown on an upcoming "New Yankee

Workshop" episode along with a project Abram has built using salvaged "Trees to Furniture" cherry lumber.

After getting to know Abram, we learned it isn't just his frugal Yankee upbringing that drew him to our program, but a genuine appreciation for the beauty and special characteristics of recycled lumber.

Popular Woodworking's Associate Editor Jim Stuard talked to Abram about his passion for recycled lumber in the following interview.

NORM ABRAM

PW Over the past couple of years, episodes of "The New Yankee Workshop" have included segments addressing the subject of recycled woods. Some of these included structural timbers from a railroad bridge across the Great Salt Lake in Utah, beams from old industrial buildings in the process of being demolished, barn siding, etc. How long have you been interested in recycling old materials?

NA We were over in London several years ago doing a project for "This Old House" and we ended up going to a place where they were recycling architectural elements from buildings. They were using them to make furniture or cabinets or whatever. And it was interesting to see how clever they were at taking

older wood and cutting it in a way that they could conceal any freshly cut edges and create cabinets, tables and things like that. Later, we did a series for "The New Yankee Workshop" and paid visits to various antique shops in London. The scary part was (trying) to decide if what we were looking at in the shops were in fact antiques or whether they had been made out of the architectural elements. It was really hard to tell with some of them. Actually, they were quite clever with construction, but what really got us going was that you could get an instant patina from the recycled materials that you could never accomplish with new material.

We had tried that earlier, made our own stains. We never were really satisfied with it so that's really where it got started. Plus being Yankees. You know ... we tend to not throw things away.

PW Why do you enjoy using recycled materials? Is it environmental, or more the quality you can find, such as better widths, tighter grains, better color? And do you think that these segments make for a better television show? It's certainly



"I have really found that what I get out of the old boards and timbers is wider boards, tighter grain and material that's much more stable because it is old-growth timber

- Norm Abram

more interesting than just ordering 100 board feet of cherry for delivery.

NA It's a shame to just throw this stuff away. Especially with the pine projects, I have really found that what I get out of the old boards and timbers is wider boards, tighter grain and material that is much more stable because it's old-growth timber. You get some nice thicknesses out of it. Better color is the real key. And part of it is really an environmental issue. Here in New England, landfills are dead for all practical matters. In the town I live in we have a transfer area that is very much designed to encourage people to recycle. However, there still are large dumpsters for residents to throw things such as wood, shingles and anything that they might have from their own personal renovation projects. At least that amount of material seems to be decreasing. Even if it did get thrown in the landfill (wood) isn't toxic. It's going to rot away, but it's just such a waste.

Do these segments make for a better television show? People like it when we go into a factory environment or show where materials come from. I re-

member one question from "This Old House" that was given to a guy who was hanging drywall. We said, "Well, do you know where this stuff comes from?" And he said, "Yeah. It comes from the home center, you know." A lot of people don't think about it but when they see where it originates they get extremely interested.

PW Many of the projects on "The New Yankee Workshop" are antique reproductions. Do you think using the older wood makes the reproduction more true to the original?

NA I would say no. I think the "look" maybe is more true to the original, but I wouldn't try to say, OK, this is more of an accurate reproduction because it's built with similar timbers. In fact we're probably using

lower-grade timber in a lot of these projects than we might (otherwise). So I think it gives it a better look than makes it more authentic. I think the only thing we draw from the antiques is the inspiration and that it's hard to beat some of the things you see from the past.

PW In most situations, using reclaimed wood may actually be more expensive than buying lumber through conventional channels. Do the added benefits of the reclaimed wood justify the extra expense?

NA That's what is shocking, and we have found that it's getting more and more expensive. I think there's a fair amount of demand not only in the furniture industry, but in home building. So it's more expensive than buying through the conventional channels, but how do you assess the added value? I don't think you can. I think it's more of an aesthetic thing. You do it because it's what you want. And if you are going to worry about how much it's actually costing then maybe it's not the choice you should make.

NORM ABRAM

PW An exception to reclaimed wood being more expensive is the "Trees to Furniture" project co-sponsored by *Popular Woodworking* and Wood-Mizer. Our concept is reclaiming city trees and getting good material for pennies and some "sweat equity." What do you think about the program?

NA I think it's a great idea. With the exposure on the show and these articles it's going to become a big source for a lot of woodworkers. We said we hope that this spreads all over the place. You know I would love to see the end result be a network of people who do this. I think that this will eventually happen.

PW Tell me about the project you're building for "The New Yankee Workshop" episode that includes your visit to Cincinnati.

NA We're calling it a bathroom sink base. It was inspired by a design that came from a homeowner in Tucson, Arizona. He had designed this bathroom vanity for his rehab job, and I guess if you're going to classify it you'd say it's a little bit Empire style.

It's a pretty straightforward Black Cherry sink base. There are some small half columns on the front so on the show I take some thicker stock, turn a column and saw it in half to get two halves. The door is slightly recessed with a false drawer front above. The door is a beveled raised panel, but it's raised on both the inside and the outside.

PW I wonder if you could offer some thoughts about people's connection to wood as material that just doesn't happen with metals, plastics or other materials they come in contact with?

NA I don't know, maybe that's not true if you're a machinist. Maybe you're very attached to metals. Wood is warm to the touch, and there is something very aesthetically pleasing about wood and wood grain. You know it's funny. In my house I did something that I was a little concerned about when I first built the house, and that's mixing a lot of different woods



What is 'Trees to Furniture'?

Trees to Furniture is an effort started by two professors/woodworkers in Cincinnati who wanted to turn fallen urban trees into lumber for projects in their home shops. In the last two years, they've figured out the best ways to find the trees and have them cut into usable lumber by other people who own portable sawmills. And they do this for less than 50 cents a board foot.

If you'd like more information about the program, send a selfaddressed, stamped envelope (with two first-class stamps) to Trees to Furniture • 1507 Dana Ave. • Cincinnati, OH 45207. Or you can contact the founders directly:

- Sam Sherrill samuel.sherrill@uc.edu
- Michael Romanos •
 michael.romanos@uc.edu
 On the web: www.woodmizer.com •
 oz.uc.edu/trees

Cincinnati Parks employees bring down a tree that would otherwise end up in the landfill. Norm Abram and one of the founders of the "Trees to Furniture" program then sawed the log into planks for drying with a Wood-Mizer sawmill.

in the same space and actually having woods come together that are quite different. You walk in my front door and it's a Long Leaf Southern Yellow Pine floor. Then there are two wide openings that go into rooms which have quartersawn White Oak floors. And it's great and it works.

PW In addition to economical and environmental reasoning, there is an emotional attachment some people have to a stately tree that's shaded their home, that their kids climbed in and played around while growing up. It's not unusual for the owner of a yard tree to commission a "Trees to Furniture" woodworker to build something for them from their tree.

NA I can remember planting a tree when my daughter was young — you know, a little Japanese Maple. It's not a tree that's going to yield a piece of furniture, but it's there and it grew as she grew and so forth. And I think there is a lot of emotional attachment.

Some of the floors in my house are recycled Long Leaf Southern Yellow Pine, and I tried to get the guy that I bought the material from to see if he could track down a picture of the mill that the timbers had come from. I just wanted a framed picture for my front hall where I have the pine flooring to say, "This flooring came from timbers that were recycled from this mill." You know there's not a personal attachment, but there is history there, and I think that's really important. **PW**

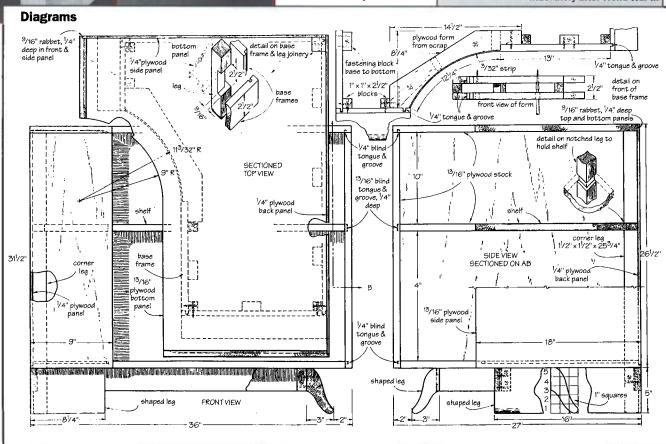
The episode featuring the "Trees to Furniture" effort (episode #1110) will air at 2 p.m. March 13 on PBS (check your local listing).

Be sure to also check out the brand new website for "The New Yankee Workshop" at: www.newyankee.com

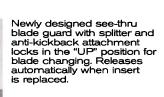
PROJECTS FROM THE PAST CORNE

iven up any corner of your house with this modern bookcase. We used 13/16" Birch plywood for the case edged with thin strips of wood. The method for making the curved base is shown below. The case is built with tongue-and-groove joints. (Today's technology would suggest using biscuits and iron-on veneer tape.) The finish is white shellac. PW





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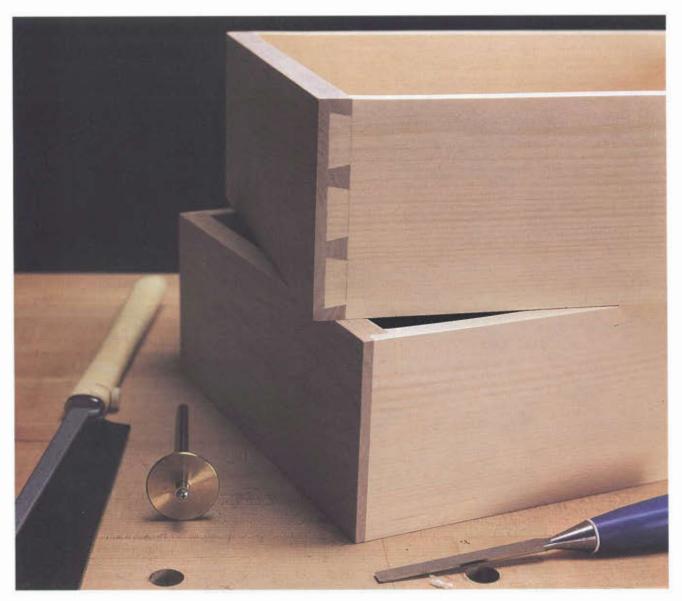
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Fear Drawers No More

If the thought of building drawers gives you the willies, read on to learn the simple secrets to super drawers.

NE OF THE BIG MYSTERIES for beginning woodworkers is how to build drawers. They fear them like the plague. They even pay good money to companies to make their drawers for them. And all their angst is over a little box.

Think about it, most of the stuff you build is a box in one way or another. Cabinets are boxes on walls. Tool chests are boxes with handles. So if you think about it, drawers are really just boxes inside of a box.

Ahhh, you say. It's not just a box, it's a box that has to fit perfectly and smoothly slide in and out. So it's the precision mechanics that spook you. Listen: the trick to drawers is learning one method, and then sticking with it. For a flush, inset drawer, start by measuring the drawer opening. Subtract ¹/8"

By Christopher Schwarz and Jim Stuard, Popular Woodworking.

from the width and length and that's the size of your drawer front (this gives you \(^{1}\)/16" space all around). How deep should the drawer be? Don't worry about it too much. Simply make it 1" less than the depth of your opening and use a stop to hold the drawer flush to the front. Now choose one way to build your drawers. Make your drawers over and over the same way, and soon you'll build drawers that fit perfectly the first time.

We've illustrated two of the most popular styles of constructing drawer boxes. These two practice projects are great for an afternoon in the shop. The first is for the power-tool purist: the simple rabbeted drawer. Then, for the "unplugged" woodworkers, the classic half-blind dovetail drawers. Both styles work in almost any piece of furniture and can be built with just a few tools by the beginning woodworker.

RABBET-JOINT DRAWERS

If you want to build strong drawers in a flash, rabbeted drawers are for you. With just a table saw or a router mounted in a router table, you can build rabbeted drawers just like they do in most production shops. This method is so fast that you could rabbet all the drawers for a 40-drawer tansu chests in just a couple hours. The real trick is to get your table saw set up just right so you don't have to do any hand-fitting. That means cutting a couple test pieces before you start slamming out the parts. So be sure to have some extra fall off from the drawer parts for your test cuts.





The order of these steps is critical because you want to reset your table saw as little as possible. First work on the drawer sides. Raise your table saw's blade to $\frac{1}{4}$ " high. Set your fence for $\frac{1}{2}$ " including the blade thickness. Cut both ends of the sides using this setup with the inside face down on the table.



Now make the second cut on the sides that completes the rabbet. Set the height of the saw's blade to $\frac{1}{2}$ ". Then set your fence so that there's a $\frac{1}{4}$ " space between the fence and the blade. The outside of the drawer side is against the fence. Make this cut on both ends of the sides. No cuts are required on the $\frac{1}{2}$ "-thick back, which nestles nicely into the rabbet on the sides.

Drawer Bottoms: There are many ways to put in a drawer bottom. Here's two ways: Put a $\frac{1}{4}$ " dado stack in your table saw and raise it to $\frac{1}{4}$ " high. Set your fence so there's $\frac{1}{4}$ " between the fence and the *Inside* of the dado stack. Cut the groove on the bottom of all four drawer parts. Another solid option is to make the width of your drawer back $\frac{1}{4}$ 2" less than the sides and to cut the groove for the bottom on the sides and front only. Then nail the bottom to the drawer back. This makes your bottom removable for finishing and replaceable if it ever breaks.



2 Use the same setup to run both ends of the drawer front on edge with the inside face of the drawer front against the fence.



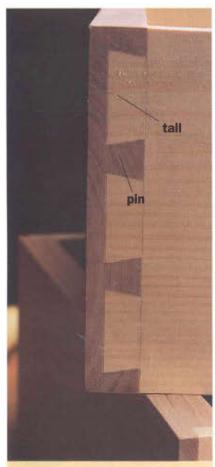
4 Make the second cut on the drawer front's rabbets by keeping the height of the saw's blade at ½". Set your fence to ½" including the blade thickness. Make the cut with the front face up on the table.



5 After cutting the groove for the bottom, assemble the drawer using glue and nails (7/8" or 1" will do nicely). Three nails in each rabbet are enough for your average drawer. Set the nails, putty the holes and sand the sides.

HALF-BLIND DOVETAILS

ure you can cut these half-blind Odovetails on just about any \$99 router jig. But there's something nice and traditional about hand-cutting your dovetails. It shows off your skills, and you can work quietly in your shop without the incessant whining of the router. Finally, you can make your dovetails for any size drawer, whereas many router jigs limit what size your drawer can be, so you have to design your projects around your jig.



Tools for Dovetails

- Sliding bevel
- Marking gauge
- Marking knife
- Backsaw
- · Coping saw
- Chisels

Materials for Both Drawers

Drawer front: 3/4" cherry

Sides: 1/2" pine (#2 common) 1/2" pine (#2 common) Back:

1/4" plywood **Bottom:**



Though this is a source of debate, cut the tails first. Set your marking gauge to ½" and scribe a line all the way around the front end of the side pieces.



Now lay out the tails. First mark the center of the end grain on the sides. Work out from there to determine how many pins and tails you want. Our tails here are 11/4" wide with 5/16" between each tail. Be sure to lay out your tails so the groove for the bottom will be buried in a tail.

Set your sliding bevel to 10 degrees — a good angle for pine. Mark out the location of the tails on both faces of the sides. A marking knife works better than a pencil because the line is finer and it severs the wood fibers, which makes it easier for you to follow your marks.



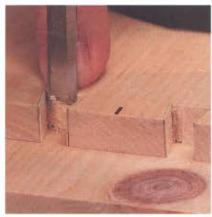
With your marking gauge at the same 1/2" setting, scribe a line on the end grain from the back of the drawer front to locate how far in the tails will penetrate into the front.



Use a saw with a rigid spine to cut the tails. The traditional European tool is a backsaw. We have become very fond of the Japanese-style saws, which cut on the pull stroke. Definitely worth a \$25 to \$50 investment.



removing the waste. After you make the first cut at an angle (above), you can come back and clean out most of the remaining waste (left).



6 Pare down the waste to your scribed lines with a $^{3}/8$ " chisel. Use a $^{5}/8$ " or $^{3}/4$ " chisel to shave the actual tails to your scribed lines. Do this in one quick cut if you can.



Now place your cut tails on top of the end grain of its drawer front mate. Using a sharp pencil, mark the outline of the tails onto the drawer front. This makes the outline for the pins.



On the inside of the drawer front, bring the mark for the end grain straight out to the scribed line. Cut these with a backsaw. You can make the cut 1" or so beyond your scribed line. This will allow you to clean out a lot more waste with your saw. And don't worry, it's a traditional method.



9 Remove the waste around the pins. First chop a line ½16" in from your scribed line (see photo). Then bring your chisel back to your end grain and pop out the waste.



10 Hold your chisel at an angle as shown above to pare out the waste down to your scribed line. Once you make these angled cuts, go back and hog out the waste with your chisel parallel to the scribed line.



11 Finally, fit the pins and the tails. After fitting, use a dead-blow mallet to push the tails into the pins evenly.

Dovetail Details: Dovetails are one of the best mechanical woodworking joints around. There are just a few rules you should keep in mind as you lay out your first (or 100th) set. First, as in all drawer construction, make sure that the drawer sides have the heartwood facing out. This way if the sides cup any more during the life of the drawer, it won't cause the drawer to bind. Second, pay attention to how dramatic the slope is on your talls and plns. Keep the angle between 7 and 14 degrees. Angles less than 7 degrees offer minimal locking strength; those greater than 14 degrees are likely to shear off if the joint is stressed. Any angle between 9 and 11 degrees will offer good appearance and strength in both softwoods and hardwoods. PW

HOW TO FIGURE OUT HOW LARGE YOUR DOVETAILS SHOULD BE.

- 1. Figure out how much space you want between each tail.
- 2. Count the number of spaces between talls (don't forget the two end spaces).
- 3. Multiply that number by the amount of space between your tails.
- 4. Subtract the result from the total width of the side.
- 5. Divide that result by the number of talls.
- 6. That number is the width of each tail.

OUR EXAMPLE

5/16"

4

4 x 5/16" = 11/4"

5" - 144" = 33/4"

33/4" ÷ 3 = 11/4"

144"

Drill Press Table

Turn your metalworking drill press table into a woodworking table in just a few hours and with only a few dollars worth of materials.



DESPITE THE FACT that your drill press is designed mostly for poking holes in sheet metal, it has many uses in a woodshop. It's a mortiser, a spindle sander, it bores huge holes, and — of course — drills holes at perfect right angles to the table. Because the table on most drill presses is designed for metalworking, it's hardly suited for these tasks. So I built this add-on table with features that will turn your drill press into a far friendlier machine:

- First, a fence that slides forwards and backwards as well as left and right on either side of the quill. This last feature also uses the drill press' tilting table feature with the auxiliary table for angled drilling.
- Built-in stops (both left and right) that attach to the fence

Built in stops (both fert and right) that attach to the fence

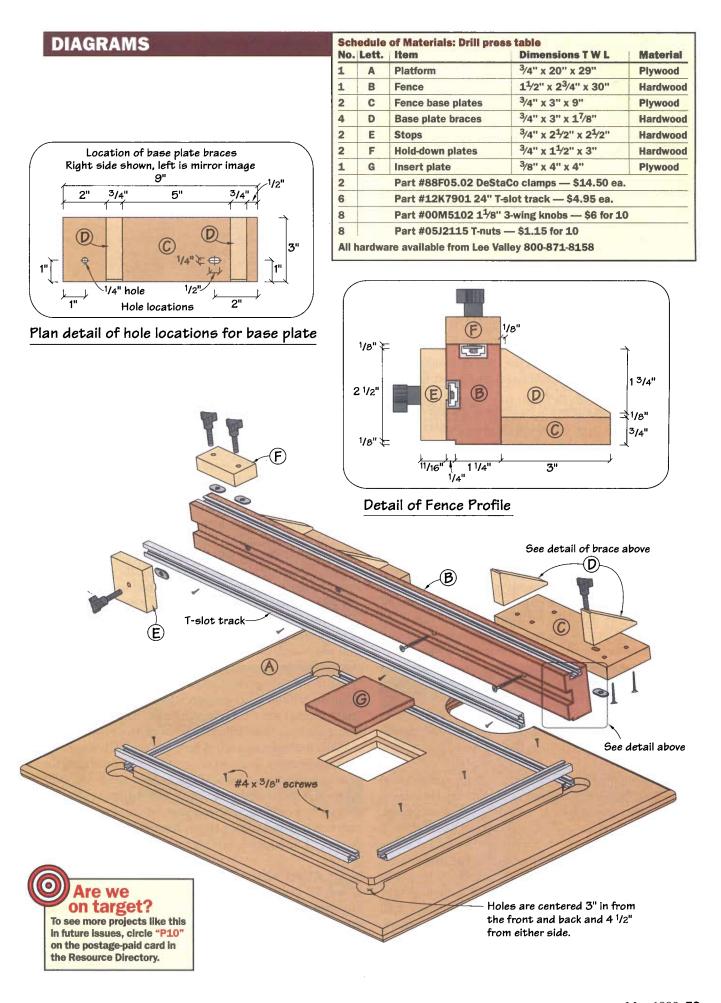
for repetitive procedures such as doweling or chain drilling for mortises.

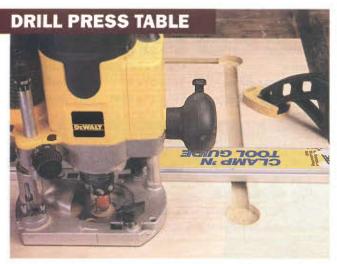
• Hold-downs that can be used on the fence or on the table for any procedure.

The sizes given in the Schedule of Materials are for a 14" drill press, with the center falling 9" from the rear edge of the table, with a 2" notch in the back to straddle the column. Adjust the center location and overall size of the table to match your particular machine.

Start With the Base-ics • The base platform for the table is made from ³/₄" plywood, which should be void-free. Again, adjust the size as necessary to fit your drill press. First you need to get the table ready for the T-track, which is what holds the fence and hold-downs in place. Start by locating

David Thiel is senior editor for Popular Woodworking.





ROUT THE GROOVE • The grooves for the T-slot track allow the fence to be used left-to-right and front-toback on the table to take advantage of the built-in tilting feature of the existing table.

the four recessed holes that allow the T-slot mechanism to slip into the track without disassembling the mechanism. Each hole is $1^{1/2}$ " in diameter and 3/8" deep.

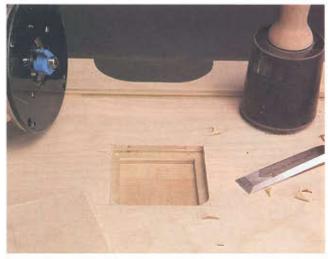
Next, locate the grooves in the center of the holes and use a router with a $\frac{3}{4}$ "-wide straight bit to cut the grooves to a $\frac{3}{8}$ " depth. The T-slot track should fit into the grooves with the top surface just below that of the plywood table. The grooves should be as parallel as possible to one another to allow smooth movement of the fence.

Replaceable Center • Now cut the hole for the 4" x Replaceable Center • Now cut the note for the + A
4" replaceable insert. First locate and mark the position centered on your table, then mark in from that line by $\frac{3}{8}$ " to locate your cutting line. Drill clearance holes in two corners of the square, then use a jigsaw to cut out the center piece. Next, determine the thickness of the material you will use for your insert (the ³/8"-thick Baltic Birch we used is actually metric and shy of $\frac{3}{8}$ ") and set a $\frac{3}{8}$ " piloted rabbeting bit in a router to a height to hold the insert flush to the top surface of the table.

While your jigsaw is still out, locate, mark and cut out the notch in the back of the table. This allows the table to move closer to the drill press' post and tilt without interference.

As a final friendly touch on the table, I used a ³/8" roundover bit in my router to soften all the edges on the table, both top and bottom. You'll get fewer splinters if you do this.

Milling the Fence • The fence is the heart of the table, and the wood should be chosen for durability and straightness. Quartersawn hardwood, carefully surfaced and planed, will do nicely. After cutting the fence to size, use a dado stack to mill two $\frac{3}{8}$ "-deep by $\frac{3}{4}$ "-wide grooves in the fence. The first is centered on the top surface of the fence, and as in the grooves in the base platform, a piece of T-slot track should be used to confirm that the groove is deep enough to allow the track to fit just below the surface of the wood. The second groove is then cut centered on the face of the fence. One other bit of table saw work is the ¹/8" x ¹/4" wide rabbet cut on the inside bottom edge of the fence. This rabbet allows dust and debris to be



RABBET FOR THE INSERT • After cutting the hole with a ___ jigsaw, the opening is rabbeted using a bearing-piloted router bit. Then chisel the corners square and fit the replaceable center tightly into the rabbet. Make a couple extras.

pushed into the rabbet, so your work will fit against the fence.

One option that I considered was adding an indexing tape measure on the fence. Every time the table is moved the tape would need to be readjusted to zero, and for the infrequent use the tape would see I decided against it. A stick-on tape can easily be added to the fence face if that's more to your personal taste and needs.

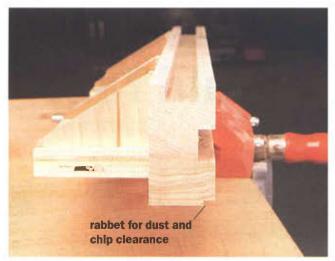
Fence Support Braces • Unlike the fence on a router table, the fence on a drill press table won't see a lot of lateral pressure. So the main purpose of the braces is to hold the fence square to the table at the drilling point. In my case I've also given the braces the job of mounting the fence to the table.

Start by cutting the two base plates and the four braces to size. The braces are triangles with the bottom edge 3" long and the adjoining right angle edge 17/8" long. The third side is determined by simply connecting the corners. Locate the braces on the base plates according to the diagrams and predrill and countersink ³/16" diameter holes in the base plates to attach the braces to the plates.

To mount the support braces to the fence, again refer to the diagrams to locate the proper spacing on the fence. Then drill and countersink screw holes through the face groove in the fence. Clamp the brace to the fence and screw the brace in place.

With the braces attached to the fence, use the T-slot fastener locations on the diagrams as a starting point for drilling the holes in the base plates, but check the location against your table for the best fit. Two holes are drilled in each plate to allow the fence to be moved to the perpendicular position (either to the right or left of the quill), by simply relocating one of the T-slot fasteners. Check each hole in relationship to that position.

Attaching the Track • Assuming you purchased the 24" lengths of track listed in the Schedule of Materials, you should be able to cut the tracks for the table first, leaving fall off that can be added to the two remaining full length tracks to give you the necessary 30" lengths of track for the fence. When attaching the track, first pilot drill the hole in the center of the

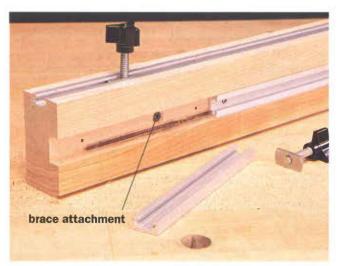


ROCK SOLID • The fence is made of a sturdy, stable hardwood. Cut a groove the length of the top and face of the fence. The grooves support T-slot tracks, which can be used for stops, hold-downs and other accessories.

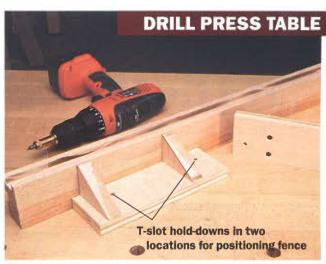
track (a groove is provided in the track to simplify that location), then use a countersink to widen the hole to accommodate a #4 x 5/8" flat head screw. Keeping the screws as flush as possible to the inner surface of the track will make the stops and hold-downs move much easier.

Finishing Touches • Stops and hold-downs designed for use in T-tracks make the drill press most useful. The stops are simply square blocks of wood with one side milled to leave an indexing strip that fits into the slot on the T-slot track. By using the saw to cut tall but shallow rabbets on two edges of each block, the stops are completed fairly easily. For safety, run the rabbet on a longer $2^{1}/2^{n}$ wide piece of wood, then cut the stops to square afterward. The T-slot fasteners are simply inserted into a $1/4^{n}$ hole drilled in the center of each stop block.

The hold-downs are simply blocks of wood with DeStaCo™ clamps mounted to the top. Each block is drilled for two T-slot fasteners, one on either end. Then the clamp is screwed to the



5 LAYING TRACKS • Install the T-slot tracks in the grooves with flat head screws countersunk into the track. The braces are attached to the fence by screwing through the face groove prior to attaching the T-slot track.

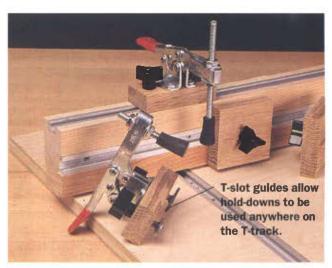


FENCE BRACES • The fence is supported by two simple brackets screwed to the rear of the fence. The location of the triangular braces is important to the track orientation, so follow the diagrams carefully for location.

top surface of the block. While the DeStaCos are good for this application, they aren't as versatile as I wanted. I replaced the threaded-rod plunger with longer all-thread (½4" x 36) to provide maximum benefit from the clamps. The rubber tip of the plunger is important to the function of the clamp, and if you can manage to reuse the existing tip it's very helpful. If not, I found rubber stoppers in a variety of sizes in the local Sears hardware store. After carefully drilling a ½4"-diameter hole two-thirds of the way into the stopper I was able to screw it onto the rod with little difficulty.

Attaching and Personalizing

The table should attach easily to your existing drill press table using four lag bolts countersunk flush into the surface of the auxiliary table. Once attached you should find that the auxiliary table overhangs the metal table quite a bit. One personalized touch I want to suggest is adding small drawers to the underside of the table to store bits, wrenches and chuck keys. **PW**



6 HOLD IT • The hold-downs and stops are made from $\sqrt[3]{4}$ " hardwood. To make the guide to hold the stops square to the fence, cut a $\sqrt[4]{16}$ " x $\sqrt{14}$ 8" rabbet on both sides of the inside face.

If These Walls Could Talk

These aren't George Washington's wooden choppers, but they are fun to build.



HE PIECE FEATURED here is titled "Self Portrait." If you prefer, you may put a small vase of fresh cut flowers on top of it and call it "Blooming Idiot." It's designed to either hang on a wall or sit on a table, mantle, shelf or TV. At first glance this looks like a work of intarsia. Intarsia differs from marquetry in that the individual pieces that form the intarsia are thicker, and the edges are shaped to give the finished piece more of a three-dimensional appearance.

This piece, on the other hand, is a blend of intarsia and sculpture. As my style has evolved, I have incorporated techniques that give more depth to the work. Consequently, elements of a piece are actually three-dimensional rather than simply projecting an illusion of three dimensions. The

Stephen Edwards works wood in Hilham, Tenn. If you'd like to know more about this kind of woodworking you may contact the author, Stephen Edwards, at: woodarts.hypermart.net or at 215 Add Stafford Road • Hilham, TN • 38568.

overall effect is, I think, more interesting.

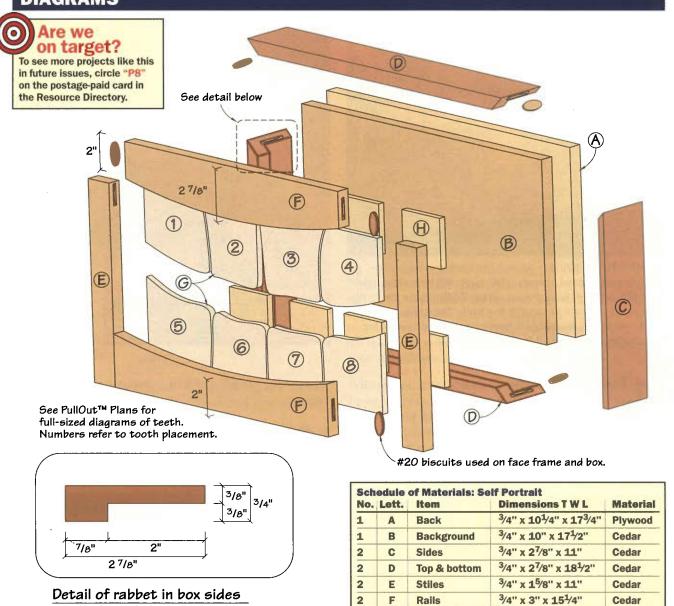
When building this project you'll need only moderate woodworking skills, and a few basic tools and supplies. Once you've completed this piece, you'll be ready for more complicated works like the ones shown on the following pages. For this first piece, I used Eastern Red Cedar for the background, the frame and the mouth. For the teeth I used Yellow Poplar with a whitewash. It's finished with several coats of Zar brand satin tung oil. If cedar isn't available in your area you might want to consider using two other contrasting woods. For the back I used $\frac{3}{4}$ " birch plywood. Any cabinet plywood will do.

WOOD'WORDS (wood'wurds) n.

INTARSIA: A mosaic, usually of exotic woods, sawn, shaped, closely fitted and glued to a support of wood to form a picture.

MARQUETRY: Similar to intarsia except that the pieces of wood that make up the picture are inlaid veneer.

DIAGRAMS



8

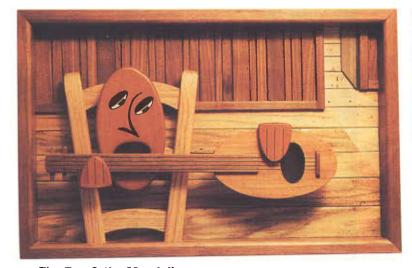
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G

H

Teeth blanks

Spacers







3/8" x 5" x 5"

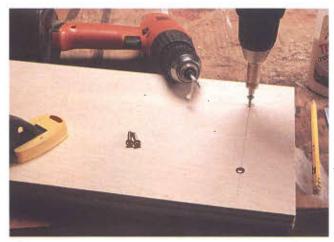
3/8" x 23/4" x 23/4"

Secret Door © 1998 all rights reserved

Poplar

Plywood

INTARSIA



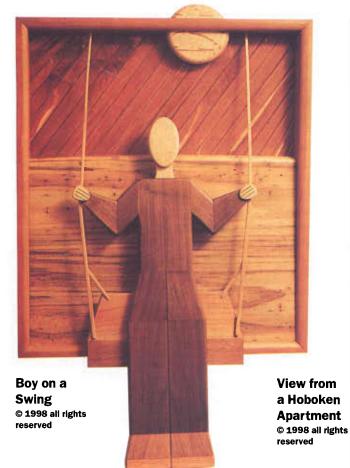
ONE THICK BACK • Attach the background to the back with wood screws. First pilot-drill holes through the back into the background piece. Countersink the screws so they are flush with the back. The construction of the background assembly is now complete and ready for sanding and the tung oil finish.

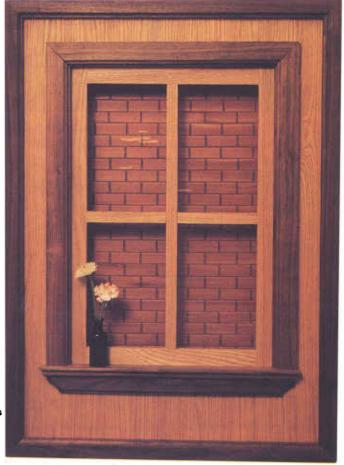
TRIM TO FIT • Be sure to cut your frame pieces oversized so that when you miter the pieces you can cut them down to the perfect length. If you have polyurethane glue on hand, it is an excellent adhesive for this shortgrain joint.

Build the Back Piece • Begin by cutting the plywood back to size. Then select a nice piece of wood for the background. As you can see from the photo of the finished product, mine had a split in it that was interesting so I made sure that it would end up in the center of the "mouth." Cut the solid wood background to size. It's a bit smaller

than the plywood to allow for seasonal shrinking and expansion.

The Outer Frame • To build the outer frame, first cut the sides, top and bottom a little long. On your table saw cut a ³/8" thick x 2" wide rabbet on the inside back edge





64 Popular Woodworking



SAND THE LIPS • First cut out the rails with a band saw. Be sure to cut a little wide of the line. Then sand the cuts smooth. I used a spindle sander for this. Use a light touch because cedar is soft.

of the frame pieces to hold the back assembly. Lay the finished background assembly face up on a smooth flat surface. Miter the ends of the four frame pieces.

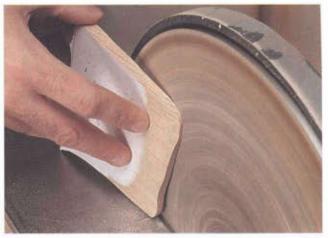
Dry fit them to the background assembly and make sure you have a good fit. When satisfied, use glue plus small biscuits, dowels or nails to assemble the frame. Nail or screw the back into the rabbet.

Open Wide • It's time to build the mouth assembly. Cut the stiles and rails to size. Dry clamp the pieces together as they will sit on the frame and position the assembly on the framed background assembly to make sure you have a good fit. Now unclamp the pieces.

Using the diagram, mark the curves on the top and bottom rails and cut them on the band saw. When the cuts are sanded smooth, you're ready to put the "face frame" together. You can use biscuits or dowels. Glue, clamp and allow to dry.

When dry, roundover the inside edges of this assembly, front and back using a ³/8" quarter-round router bit in your router. Shape the corners that the router bit doesn't reach with rasps and files to match the routed portions. Now hand sand the rounded edges. Use biscuits, glue and clamps to attach this assembly to the assembled carcase. Round the outside edges of the mouth assembly using the same bit that you used for the inside edges. Hand sand and apply a tung oil finish.

A Little Orthodontics • Now the fun part: the teeth. You'll need thin pieces of stock. Using the templates in the PullOutTM Plans, mark the shape of each piece and number them on the back. Cut them on the band saw or scroll-saw. Cut an extra as a practice piece. Be sure that the wood grain runs vertically (like the lines on your teeth). Shape the



4 THIN THE TEETH • Smooth the sawn edges first. Then taper the edges to a uniform thinness to appear like real teeth. To enhance the illusion, remove more stock from the back of the pieces than from the front. Use a light touch and take your time, using your practice piece to get the feel of the procedure. When you've achieved the desired effect, hand sand each piece.

teeth free hand on the stationary belt sander or disc sander.

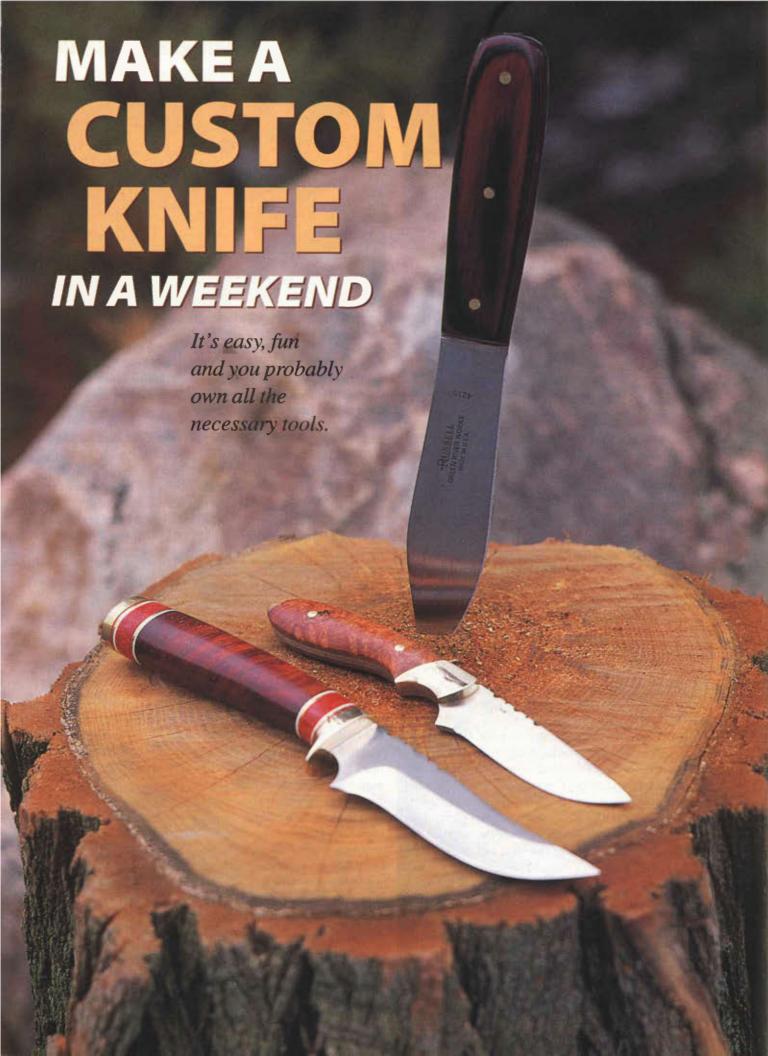
Next lay the completed background assembly face up on your work table. Slide the teeth into position within the mouth assembly. If necessary, trim the edges that are hidden behind the frame to get a proper fit. Leave a gap of approximately ¹/8" between the teeth. This visually defines each tooth and further enhances the illusion. When you're satisfied with the fit and the positioning of your dentistry, remove them from the mouth assembly.

Now you're ready to apply the whitewash to the teeth. I use a bright white acrylic craft paint. Experiment on the practice piece first. Apply the paint with a clean dry cloth and immediately wipe it off with a second clean, dry cloth. You want the teeth to be white yet still be able to faintly see the wood grain. When you have achieved the desired effect, allow the paint to dry and apply the oil finish.

Cut ³/8"-thick plywood spacers that will hold the teeth above the background. With the framed background assembly lying face up on your bench, gently position the teeth within the mouth. When you are satisfied with their position, mark their location, then glue the teeth and spacers in place with a fast-tack white glue, such as moulding glue.

Clamp the teeth as best you can. If you like, you can attach the teeth to the background using wood screws through the back assembly. Be sure that the screws aren't going to protrude through the teeth.

When the teeth have all been installed you can attach a piece of poster board or mat board to the back of the piece for a nice finishing touch. If you're going to hang your piece on a wall, attach a heavy-duty hanger to the back. I use a short length of small chain attached with screws. Be certain that the mounting device attached to the wall is sufficient to support the weight. **PW**



THERE'S SOMETHING SPECIAL about making your own knife. Something that takes us back to our prehistoric roots. Knives were mankind's first tools, and we still rely on them today. There are very few things that have such a long hold on our emotions.

Until recently, creating a custom knife meant learning a blacksmith's skills. But today, you can buy readymade blade designs in hundreds of styles — hunting knives, folders, every type of kitchen cutlery. With a ready-made blade, you can focus on creating unique handles from dozens of different materials.

Knife-making is especially easy for woodworkers. Besides probably already having all the necessary tools, it gives you a chance to use up those expensive hardwood scraps collecting dust in your scrap bin. Later you can graduate to more exotic materials such as bone, Corian (countertop material), special woods such as burls, semi-precious stones, carbon fiber, sea shells, metal and MicartaTM.

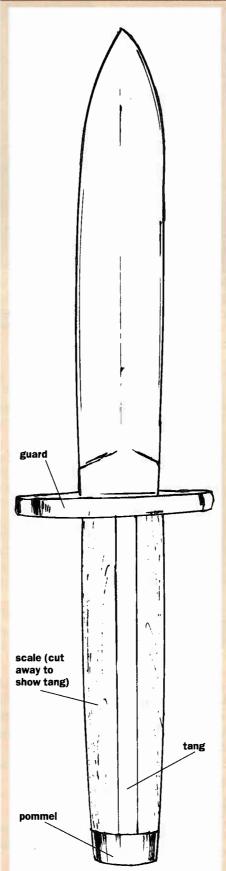
There's a large collector and investor market for custom knives, with some knives fetching prices in the thousands. Yet every one of these knife makers started just as you're about to.

This article will help you build your first knife with just a few hours of enjoyable shop time. You'll learn the techniques, get comfortable with the jargon, and end up with an attractive personal knife. Not bad for 10 bucks and a weekend's work — and most of that time is spent waiting for the epoxy glue to dry.

We're going to show the steps behind building a simple fixed-blade knife in the shortest amount of time, using a knife kit that comes with a blade, handle material, rivets or pins and instructions. Kits cost from less than \$10 to more than \$30 in a wide variety of blade styles. Even if you somehow really goof it up — extremely hard to do — you won't be out a lot of money. The knife shown in the following steps, is the #RH1K Green River Belt Kit from Jantz Supply, and cost \$9. See "Supplies" for more information.

Mark Thompson, the former managing editor of The Family Handyman, is a writer and a knife-loving motorcyclist.

ANATOMY OF A KNIFE



Glossary of Knife-Making

BOLSTER: A decorative metal section separating blade and handle material. Soldered or pinned (riveted) in place.

CORBYS: A type of screw-together rivet used in knife-making.

DAMASCUS BLADES: Made from layers of steel hammered together following an ancient formula, each blade is unique, with unpredictable but beautiful patterns. Very attractive, but also much more expensive than other types of blades.

DYMONDWOOD: Trademarked name for a type of specialty plywood made of hardwoods in a wide variety of colors and color combinations. Very dense and dimensionally stable. A competing brand is Pakkawood.

GUARD: Keeps fingers from slipping onto the blade. Can be single or double, and not all knives will have one. Most often soldered in place.

MICARTA: A man-made plastic that mimics ivory or bone. Extremely durable (it's often used for storebought knives) yet easily worked.

POMMEL OR BUTT CAP: The metal end of a knife. Most common on round tang knives. Not all knives have one.

ROUGE: A buffing compound applied to a muslin wheel on a bench grinder, and used to bring a high polish to handles and blades. There are several types, each with specific applications.

SCALE: Also called "handle scales" are the various types of handle material, finished flat to fit a flat tang blade.

TANG: The unfinished part of the blade that goes under the handle material. It's often, but not always, softer than the blade itself, and thus can be modified. Tangs can be either flat (also called "scale tangs") or round (also called "hidden tangs").

CUSTOM KNIVES



ALL THE PARTS • It's important to lay out all your pieces before you begin so you can decide what changes (if any) you want to make to the blade and if your wood is the right size for the blade.

First-knife Advice

Make it a big one! A bigger knife is easier to make and more tolerant of rookie mistakes.

Buy a "flat tang" type blade and use Dymondwood or Pakkawood handle material, which comes in dozens of colors and saves you a lot of prep work.

Pay attention to the diameter of the holes in the tang if you're going to use anything other than the supplied rivets or pins. If the whole blade has been heat-treated and hardened — very likely — you won't be able to enlarge the holes.

When cutting the handle material, leave an additional $\frac{1}{8}$ " of material all around.

Finish and shape the handle material where it meets the blade before attaching it with epoxy. If you wait until afterwards, you will scar the blade with your sanding and filing.

What You Need

You can make your knife with hand tools, but most of us prefer some powered help: A bench-top belt/disc sander, drill,



2 LEAVE SOME MEAT • Leave about an ¹/8" margin of extra material all around the scribed lines. After cutting the first piece, scribe the second piece, being careful to match sides with the first piece.

vise, band or scroll saw, ballpeen hammer, bench grinder with a muslin wheel, some files and a few small clamps. Nice to have are a drill press and a rotary tool such as a Dremel with a selection of tool bits. Some 30-minute clear epoxy (fresh, please!), and sandpaper rounds out the supply list.

Get Your Tangs in a Row • Lay out the kit and decide just what changes you want to make. If the tang hasn't been heat-treated and hardened, you can change its shape and drill new holes. If it has, then you're stuck. Decide what rivets or pins you'll use. In this case, we used 3/16" brass rod instead of the thin rivets supplied in the kit. Mark the handle material so that after it's cut you can match up sides easily. Put masking tape on both sides of the blade to keep from cutting yourself.

Mark and Cut • Scribe the shape of the tang onto the handle material (called a "scale"). Then cut it to shape using a scroll or band saw. Shape the handle material where

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HOLES FOR RIVETS • Drill the holes for the rivets on your drill press. While the epoxy makes a good bond, the rivets will make that bond even stronger.

it meets the blade with file or belt sander to your satisfaction — a common look is a 30- or 45-degree bevel.

Rivets • Clamp one piece of the handle material to the blade tang, mark it with an awl, then drill the pin or rivet holes. Or clamp both pieces together and drill all the holes at once. If using rivets, you'll need to countersink the rivet head into the handle material. The best way to do this is to use a stepped, countersink rivet drill in a drill press.

Epoxy Time • Using 220-grit sandpaper, clean away any corrosion or metal burrs from the tang. Do a final dry-fitting of all pieces — beveling the ends of the pins with sandpaper or a file will make them fit into the holes easier. There should be no gaps at any joint. Then glue the wood to the tang. Allow the epoxy to dry overnight.

Shape and Pollsh • Now the fun really starts! Start shaping the handle using a belt/disc sander. Take your time, removing material equally from all sides. (You might need to first grind or file the rivet or pin heads down, depending on the handle material thickness.) Start with a coarse grit (60 or 80) to remove a lot of material, and then switch to a 220 or 400 for final shaping. Use files or a Dremel to create finger grooves or other tricky curves. Depending on your nature, you can shape the handle by eye or get precise and measure. The main thing is to create a shape that pleases both your fingers and your eyes. A knife handle should feel like an extension of your hand, flowing into the curves and valleys of your palm, providing a safe and comfortable resting place.

Apply buffing compound (rouge) to your muslin wheel, and begin buffing the handle. Reapply rouge periodically — it's this abrasive compound that's doing the work, not the wheel. The buffing will remove fine scratches from the



4 EPOXY MAKES IT EASY • Mix up some fresh 30-minute clear epoxy and apply it to the blade tang, handle material and rivets. Assemble everything and clamp together (wax paper will keep the epoxy from sticking to the clamps). Clean off any epoxy that oozes out.



5 BUFF CAREFULLY • There are many types and colors of buffing compounds available, but for novices either Jeweler's red rouge or a white rouge is fine. Keep in mind that a buffing wheel is removing material — it's not like getting a shoeshine. So be sure that you work both sides of the handle equally unless you want a lopsided handle.

blade and leave the handle glossy with the grain or color patterns highly visible.

Your first knife is done! You might want or need to hone a razor edge to the blade, or it may be fine as delivered. **PW**

Credits: Expert advice and some of the custom knives shown: Custom knife maker Ken and Paula Largin of Kelgin Knives, Metamora, Ind.



FYOU'RE ONE OF THE MILLIONS OF AMERICANS who've been bitten by the genealogy bug, you might have dug up your family's crest in your research. So what do you do with your crest when you find it? Paint it on your car? Stitch it on your underwear? Probably not. I built this family crest to hang over a mantle or a bar. Even if your family doesn't have an official symbol, you should feel free to adopt this one. Rest assured that people at your next party will be asking you about your royal roots.

First select your material from a variety of ³/₄" hardwoods or cedar. Red cedar has some of the best color variations, and

Rick Longabaugh owns The Berry Basket catalog in Centralia, Wash. If you would like a catalog with more plans like these, call 800-206-9009. Or on the web: www.berrybasket.com

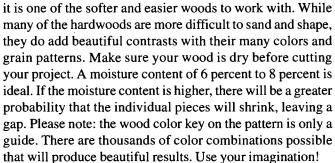
Letter Inlay



Inlaying the letters into the banner gives your plaque a more refined appearance. To begin, stack two contrasting pieces of wood on top of each other. I used a piece of ¹/₄" dark material on a piece of ³/₈"thick light-colored wood. Fasten the two pieces together with nails (+) in the waste areas. Affix the paper pattern, including letters, to the top work piece.



Tilt your scrollsaw's table down to the left 2½ degrees. Use a #60 drill bit or smaller to drill your starter holes in a corner of the letter. Using a #2 blade, cut the letters, following the direction of the arrows. Note: Any inside cuts, such as those for the "O," need to be cut first. After cutting all the letters, cut the outer shape of the banner with your table level.



Make all the pattern pieces by adhering the paper patterns to the work pieces with a repositionable spray adhesive. Copy the patterns from the PullOutTM Plans on a copier, and then stick them to the work pieces with the spray adhesive. This is faster and more accurate than tracing. Cut out the shapes on your scrollsaw.



Separate the two woods and glue the darker letters into the lighter banner. Sand the surface flush and finish.

Tip: Because of the thickness of the scrollsaw blade and the challenge of cutting exactly on the line, it's common to have trouble getting the different pieces of intarsia to fit snug. One solution is to cut, shape and glue one section at a time, such as the lion's head and mane. Then place the head and mane assembly onto the main body pattern (#29) and trace where the two connect. Then cut the body following those lines.

See the PullOut Plans for patterns of the remaining parts and a key to the symbols on this drawing.

Once the individual pieces are cut, arrange them in position on a master pattern. Check the fit between your parts, and sand or trim as necessary.

For the easiest form of intarsia, simply leave all the pieces the same thickness and just round over or sand all the edges for a softer appearance. For the most realistic effect, shape the pieces. While the individual pieces are still in place on the master pattern, determine which pieces will need to be thickest and which will need to be the thinnest. There will be times when it will be necessary to add a $\frac{1}{8}$ " to $\frac{3}{8}$ " spacer on the backside of a work piece in order to give it more depth. For basic shaping, you can use a 1" belt sander, drum sander or disc sander. Then, for refining the shape, I recommend using a finishing sander or sanding by hand.

To assemble, once again put all the pieces into position on the master pattern. Beginning with one of the larger pieces, apply a small amount of wood

1/8" dowel 15DB 10LB **3MB** 5MB 29LB 30LB glue to the edges that meet an adjacent piece. Continue in this manner until all pieces are glued together. Finish the design, plaque, and/or op-42MB tional frame with a penetrating oil such as Watco Danish Oil or 40MR Tung Oil. Allow to

dry completely (24-48 hours), and then secure the design to the plaque with glue. Finally add a top coat of two layers of clear finish.

If you choose to hang your family

crest project without a plaque and/or frame, you will need to secure the design to a thin backing. To do this, assemble the pieces as directed above. Then lay the project on a piece of 1/8" thick plywood to use as a backing. Trace around the outside edge of a design. Remove the project and cut out the shape on the plywood. Use glue to secure the intarsia design to the plywood backing. Note: When cutting the backing, you can either cut on the traced lines and then stain the edge of the backing to match the project, or you can cut the backing slightly smaller ($\frac{1}{8}$ " to $\frac{1}{4}$ ") than the traced lines so it will not show when the project is glued on. PW

Are we

To see more projects

on the postage-paid

card in the Resource

like this in future issues, circle "P5"

Directory.

62LB

25MB

31LE

26MB

on target?

20MB

16LB

18LE

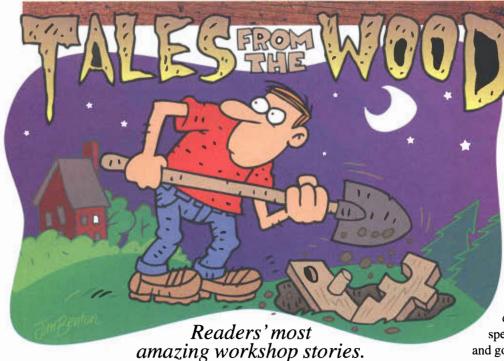
17LB

24LB

28MB

36MB

23MB



The Perfect Gift Everyone Needs — Sooner or Later

A clerk was helping an elderly man who was obviously a feisty curmudgeon. The retired gent says to the clerk, "I need help finding a project to build for my wife. But she didn't use what I built for her last Christmas."

The clerk showed him a nice kit for building a jewelry box. The man says, "That's nice, but my only concern is that she won't like it; she is fussy. And she didn't use what I built her for Christmas."

"How about this nice anniversary clock kit?" the clerk asks. "That's real nice," says the old man. "But, she's real particular. If she doesn't like something, she won't use it. She didn't even use what I built her for Christmas."

"What did you build her for Christmas?" the clerk inquires.

"A coffin!" the old man cackles.

Larry Lucas New Hope, Minnesota

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Turn your favorite tale from the woodshop into a \$1.50 gift certificate from Lee Valley Tools in *Popular Woodworking's* "Tales from the Wood" contest. We're looking for your funniest, most embarrassing or incredible story. And if we can learn something from your yarn — even better.

Each issue, our editors choose the best tale and print it here. Runners-up receive a Veritas Marking Gauge (shown at right) from Lee Valley Tools, the catalog company that features an impressive array of quality woodworking tools, sup-

plies and accessories. One final rule: Please, no stories about people getting hurt. That's not funny.

To make things easier, you can e-mail your tale and daytime phone number to us at PopWood@FWPubs.com or mail it to: Tales from the Wood • Popular Woodworking • 1507 Dana Ave. • Cincinnati, OH 45207. All entries become the property of Popular Woodworking.



I've been woodworking the better part of my life, and have recently been spending a lot of my time using "traditional" (i.e. non-electric) woodworking methods. My major nemesis has been The Scraper.

I've filed, honed, stoned and burnished them for hours, and all I've managed to get is dust — never the wafer-thin curlies I kept hearing about. This continued for about two years. I'd get a nice chunk of hardwood, decide it was time to try again and spend a day with the scraper. I'd fail

and go back to sandpaper.

About halfway through a "Scraper Day," my (then) 7-year-old daughter wandered in. She spent a bit of time working on her project, then got bored and wanted to know what I was doing. I explained what a scraper was, and what it was supposed to do, and I told her I was having a really hard time getting it to work. In classic 7-year-old style, she watched some more, put on a really arrogant face, and said, "It doesn't look too hard. I bet I could do it." After a couple seconds of trying to figure out how she might be able to hurt herself with a scraper, I handed it to her.

She grabbed it, set it on the wood, and produced... dust. Very fine fuzzy

dust. Another pass. More dust. No curlies. No wispys. Turn the arrogance up three or four notches. "You have to sharpen this before you use it!" I hand her the stone (she sharpens her own plane blades). Explain to her the textbook way to prepare a scraper. She hones a bit, grabs the burnisher, and runs it across the edge a couple of times. Time to blow that arrogance away.

Scraper goes to wood. She pushes it across, and off fall the thinnest, finest shavings. We spent the next hour or so with her turning burr after perfect burr, and me making dust. I did eventually figure it out, but she still reminds me about it every time she's in the shop.

James J. Momenee-DuPrie Lee, New Hampshire



How Much CFM Do You Need to Suck Up a Rug?

After being introduced to woodworking by my father, high school woodworking class was rather boring. This changed.

Although our shop would be considered marvelous for a home woodworker, as a classroom it was lacking. So, as an effort to lobby funds, our shop teacher (Mr. H) planned a day for our projects to be displayed before the faculty and school board. His idea was to show the shortcomings of the shop and propose that if we could do this well with what we had we could do better with more.

The day arrives. The shop is spotless, the projects were complete, and everyone filed into the shop for the presentation. The guests oohed and aahed over the coffee tables, shelves and picture frames. Finally it is time for Mr. H's speech.

He performed like a true diplomat. He stated the woes and hardships we faced and praised our excellent work under substandard conditions. He demonstrated the failing equipment and pointed out many ways the teaching environment could be improved. One of these improvements was our ancient dust collection system. It was too loud and all work had to stop for him to give the class direction.

Now, before I go on I must tell you about our vice principal. He was an OK guy, but was considered old and grumpy by most students. We all knew he wore a toupee. But until Mr. H turned the dust collector on to demonstrate its noise and the sanding table hood grabbed it from his head and swept it away, we had never seen him without it. His reaction made everyone look that way. As the roar from the dust collector died and everyone stared quietly to see what happened next. Our vice principal calmly left the shop.

There were giggles, laughs and shaking heads. I don't know if the incident affected the board's decision or not but the woodworking section received a considerable boost in funding the next year. And, by the way, I never enjoyed emptying the dust collector until that day. **PW**

Tony Vickers St. Louis, Missouri

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Jet's JWTS-10CW Contractor Saw



AFTER MORE than two years of constant use in our shop, Jet's JWTS-10CW contractor's saw has held up like a real trooper. It has a great fence, convenient controls and a nice price (about \$800). To improve its performance, we made a few modifications you can make to any contractor's saw, and we had a couple knobs slip after continuous use. But all in all, the Jet saw took a beating and kept asking for more.

SETUP: It was pretty friendly. The 1 ½ hp motor and switch were pre-wired (changing the motor leads to 240 volts is a snap, too). The extension table went together easily, and everything adjusted out well with little fuss. After turning it on we decided to put a link belt on it to reduce the vibration — something we recommend with every contractor's saw. We also replaced the throat plate with a zero-clearance insert — again, do this with any saw.

USE: Jet's Xacta fence has performed very well, and is better in at least one respect than its ideological predecessor, the Biesemeyer. The slippery plastic faces on the fence are easier to replace than those on the Biesemeyer and still provide a smooth, accurate work surface. Adjustment hasn't been a question. The fence has remained parallel and locks in place solidly. The fence indicator tape is easy to read and allows setups to within a \frac{1}{64}" with little fuss.

After using the saw for six months we decided to replace the standard miter gauge with a crosscut/miter sled — miter gauges for all brands of saws are lacking in our opinion. After we added the sled, we liked the saw even more.

The switch is well-placed and positioned for convenience. The mechanisms that raise and bevel the blade have performed OK, but the handles came loose twice and their set screws had to

RESULTS

Popular Woodworking's Endurance Test

JWTS-10CW

NICE FEATURES

- Great fence
- Convenient controls
- No-fuss accuracy
- Solid performance
- Good fit and finish
- Ample power
- Good price at \$800
- Easy setup
- Reliable customer service

MODIFICATIONS

- New link belt
- New throat insert
- Crosscut/miter sied
- Put a nice carbide blade on it (blade not included with saw)

To locate the nearest Jet distributor, contact Jet Equipment and Tools Inc. at 800-274-6848, or at their website at www.jettools.com

be tightened, which is no big deal. The scale that shows you the angle of the blade is, like most other saws, somewhat difficult to read. Dust collection is better than some. The dust is channeled down toward a dust hood, but the open-back design of all contractor saws inhibits good collection.

RECOMMENDATION: Overall, we'd buy the JWTS-10CW again and happily recommend it to you. As an added bonus, we understand Jet now offers this model with two cast-iron wings and a scaled-down table board to extend the practical use of the fence (at about the same price). **PW**

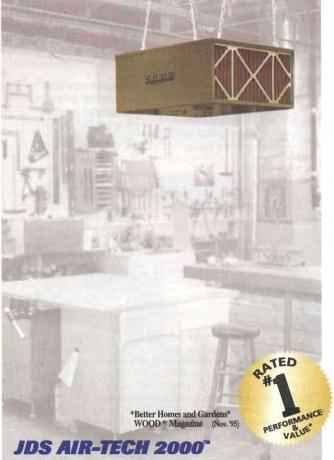
About Our Endurance Test: When a new tool hits the market we do our best to tell you what the benefits and pitfalls are with that tool. While this is good information, we know that the question you really want answered is, "How long will the tool last?" That's what this column is for. We regularly pick a tool we've used in our shop for at least a year that has stood up to our regular use. We make sure the tools we've tested here are virtually unchanged from the versions in the store today. So when you see a tool written up in here, it has passed the *Popular Woodworking* Endurance Test. — *David Thiel, senior editor*







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CAPTION the CARTOON SPONSORED BY Trakita



JIM CARLSON

from Kalamazoo, Michigan, is the winner of our "Caption the Cartoon Contest #34" from the January issue and recipient of the Makita random orbit sander. Congratulations

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> Rod Vining, from Irvington. Alabama

"Paper covers rock; rock breaks scissors; and in this case wood beats metal."

> Eli Morrell, from Bristol. Tennessee





on a postcard to Popular Woodworking, Cartoon Caption #36, 1507 Dana Ave., Cincinnati, OH 45207 by April 23, 1999. Winners will be chosen by the editorial staff. The winner will receive Makita's new 4304T tool-less orbital

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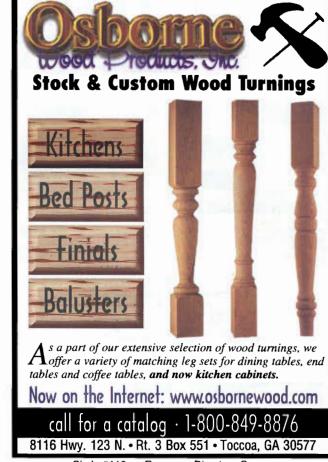
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The Joy of Sanding

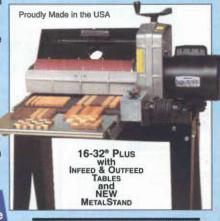
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90°, 2-1/8"

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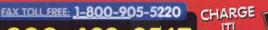


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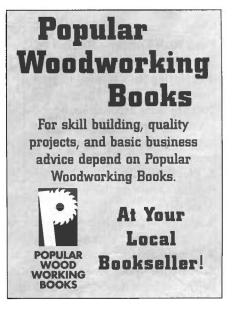
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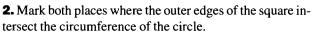


Each issue of Popular Woodworking offers tips and tricks for the woodworker that we've accumulated from readers, contributors and from our own workshop and woodworking experiences. We want to encourage the free exchange of these time-saving and safety ideas for all woodworkers. If you have a good trick, we'd love to hear about it. Send your trick, whether it's one your father taught you or one you came up with on your own, to Popular Woodworking, Tricks of the Trade, 1507 Dana Ave., Cincinnati, OH 45207.

Find Your Center—Revisited

was amused by Percy Blandford's Leentering trick printed in your November 1998 issue. I have always gotten by using a roofing square and a pencil. My method of finding the center of a circle is based on simple geometry.

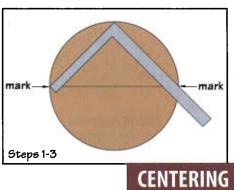
1. Place the outside corner of the roofing square on the outer edge of the circle.

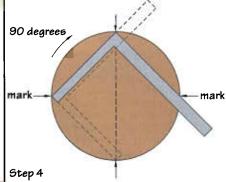


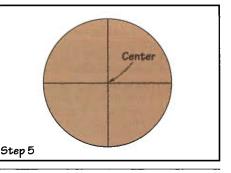
- **3.** Connect the two places marked, forming a diameter of the circle.
- **4.** Move the square 90 degrees from step one and repeat steps two and three.
- **5.** The center of the circle is where the two diameters intersect.

Arnold S. Polk Beaverton, Oregon

ON A CIRCLE



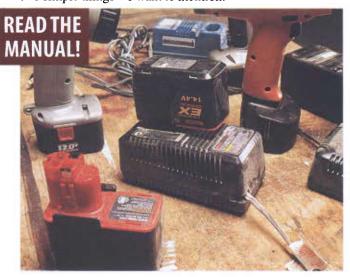




Battery Drain, or Brain Drain?

X Te recently discovered that two of our cordless drill's batteries weren't taking a charge anymore. Both were reputable tool manufacturers, and we thought it unlikely we'd stumbled upon two tools with the same problem from different companies. After playing around with the tools a little, we unplugged the chargers from the power source (which are naturally left plugged in at all times so they are ready to use), plugged them back in after 15 minutes and behold, the batteries accepted a charge. After taking the instruction manuals out of their sealed protective plastic wrappers, we read (to our surprise) that the chargers should be unplugged when not in use.

Whether leaving the chargers plugged in caused the problem or not, we were reminded of two simple things we want to mention.



- 1. Read the manual, and follow the instructions. There's probably a reason they included the information.
- **2.** Depending on what power source you are hooked up to, spikes or variations in your power line may cause the integrated circuit in your charger (or other tools) to drop into a "protective fault" mode. So before you call to complain about a bad tool, step back to the basics and try unplugging it.

From the Popular Woodworking staff

DECIMALS TO FRACTIONS

Good Woodworking, a fellow woodworking magazine from Great Britain, recently published this math tip it acquired from Tom Palermo off the Internet. We thought it good enough to repeat.

To convert a decimai, muitiply it by the denominator for the fractional resolution you want (e.g. 16). Take the closest whole number of the answer and that's the top part (numerator) of the fractions. For example: To convert .46 to 32nds of an inch. multiply .46 by 32, making 14.72. The closest whole number is 15, so the answer is 15/32"



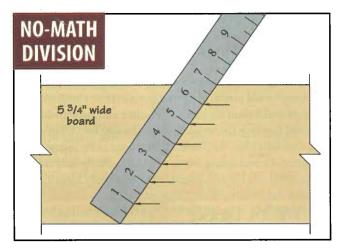
Square Jointer Cuts — Always

To matter how often you square up the fence on your jointer, that perfect 90-degree angle can still manage to elude you. And when you're using that jointer pass for an edge glueup, perfect is preferred. We use a method in the *Popular* Woodworking shop that guarantees a perfect 90-degree angle each time.

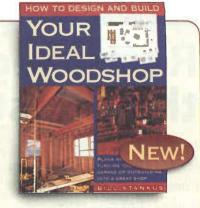
First match your boards for best appearance and mark the faces and joints. Run one piece with the face against the fence, then flip the mating piece so that the good face is away from the fence. When you test the glue joint — even if the fence is off by a fraction of a degree — the edges will be complementary angles to one another and form a perfect glue joint.

If you're gluing up more than two pieces to form a panel, alternate your board orientation against the fence and you'll get a panel with perfect joints and as flat as can be.

From the Popular Woodworking staff



Simple Rule for Simple Division

Finding the center of a board, or dividing it into equal parts is as easy as grabbing. is as easy as grabbing a ruler — and there's no math required. It's an old trick but still a good one. Lay the ruler diagonally across the board. For seven equal widths, align the ruler on the 0 and 7" marks across the board and mark off the intervening inches. Find the center? Keep the rule at seven inches diagonally and mark at the $3^{1}/2^{\circ}$ location. Simple. **PW** From the Popular Woodworking staff 

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Restoring the Chestnut

In the early 20th century, blight killed off most American Chestnuts. Several groups are trying to bring back this once-vital tree.

Tn 1904 Herman W. Merkel, a forester for Lthe Bronx Zoo in New York City, found something very disturbing on the American Chestnut trees (Castanea dentata) that lined the avenues of the zoo's gardens. Cankers, or sores, were forming on the trunks of these beautiful and economically important giants. Soon the trees died. And within 50 years the blight, which probably had been imported from Asia, had spread throughout the entire range of the American Chestnut, from Maine to Georgia and west to Michigan.

Huge stands of flowering chestnuts were Foundation. replaced by acres and acres of bare trunks and stumps. It was an economic and ecological disaster. Chestnut trees were once so common that in the heart of its range, every fourth or fifth tree was a chestnut. Every year train cars filled with the nuts were sent to New York, Philadelphia and other large cities for sale. The tree was rich in tannic acid, which

was used for tanning leather. And the lumber was used for making everything from fence posts to furniture.

Scientists have tried unsuccessfully for generations to find a cure for the blight or to breed trees that can resist the fungus — usually by crossing the American Chestnut with the blight-resistant Chinese Chestnut. Fortunately some small American Chestnuts still sprout and survive for a short time until the blight gets them, and scientists have been working with these tiny progeny for years.

Now, for the first time in generations, it looks like there is hope that the American Chestnut will once again fill the forests. The American Chestnut Foundation says it's close to developing a tree that has all the qualities of the American Chestnut and the blight resistance of the Chinese Chestnut. If all goes well, the foundation hopes to introduce a new American Chestnut to Virginia in 2006, says Shelley Stiles, communications director for the American Chestnut Foundation.

Here's how they're bringing the tree back: They first crossed American Chestnuts with Chinese Chestnuts, which are squat trees, much like an apple tree. Then they began "backcrossing" those trees with other American Chestnut trees and keeping the resulting trees that appear most resistant to blight. The

By Christopher Schwarz, managing editor, Popular Woodworking.



Wood courtesy of the Indiana chapter of the American Chestnut

resistance) have been filtered out. The resulting tree will look just like the old American Chestnuts, but it will be resistant to blight, Stiles says. Other groups are working on ways to bring the tree back, as well. If the chestnut does make a comeback, woodworkers will be one of the beneficia-

ries. Ken Salem of Northampton, Mass., builds custom furniture made from reclaimed chestnut, stuff he usually finds in the floors and

Salem says the grain in chestnut is similar to oak's, though chestnut weighs less and is easier to work. The color varies from blond to almost black, with yellows, browns and even purples in between. Like white oak, chestnut is open-grained and resists rot. However, the grain can be irregular at times. "Wormy" chestnut is the result of boring insects that attacked dead trees.

The wild grain and varying color might seem like sound reasons to avoid building furniture with chestnut. But Salem says he loves to work with the wood for those very reasons. The irreg-

ular grain and color can produce beautiful bookmatched panels, he says. And just the different colors alone are great because you can build an entire piece of furniture out of chestnut that looks like you used several species.

"There is just something about this wood," Salem says. "Maybe it's the nostalgia of it. But every time you cut into the wood, you don't know what you are going to find. It's like each board is a new opportunity, and you are limited only by your imagination."

So if the wood is so nice and was so prevalent, why don't we see old pieces of furniture made from chestnut at antique stores? Salem says he's seen some antiques made from chestnut but says the wood was used more for construction than fine furniture. And when it was used in furniture it was considered a secondary wood to maple, cherry and walnut. And sometimes the antiques dealer mistakenly identifies the wood in the antique as oak, he says.

If you can't wait until after 2006 to build with chestnut, Salem recommends you find people in your area who specialize in reclaiming wood from old buildings. If they're smart, they should be able to find you some chestnut to work with. Expect to spend between \$6 and \$14 a board foot, though, depending on the width of the boards and the color. PW

If you would like more information about the American Chestnut Foundation, you can contact the organization through its website at www.acf.org. Or phone at (802) 447-0110. For more information on Ken Salem's furniture, you can visit his company's website at www.salemboard.com.

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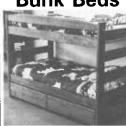
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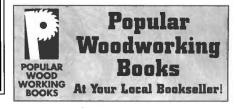
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The latest excuses you can use with your spouse when groveling for a new power tool.

IKE MOST GUYS, few things excite me more than a new power tool. As I'm sure you know, testosterone and power tools are a big part of the male psyche. In fact, one of the things that separates the Jacks from the Jills is Jack's ability to develop a deep, emotional and satisfying relationship with a sliding compound miter saw.

This presents a problem for married guys who want to buy a lot of tools. Married guys always have to come up with satisfactory explanations as to why they need every tool in their garage. I'm not married. I live in a mid-rise apartment building in downtown Chicago until I save enough money to buy a garage (and a house to go with it). So I'm in a similar dilemma with my landlord.

When I was in college, I worked for a builder, so I always had a reason to buy a new tool. The problem was that all the money I made in college went to pay for education necessities such as tuition, books and beer. Now that I've been out of college for a few years, I work in an office where the fax machine is considered a power tool. So I also have to justify the tools I buy because I can't run a lot of power tools in my apartment, and I cer-

Josh Boelter is a freelance writer and amateur woodworker in Chicago. He looks forward to owning his first home so he can move his table saw out of the kitchen and into the garage. He can be reached at boelter@earthlink.net

tainly can't fire up a circular saw in the middle of a marketing meeting. Although I must admit that the temptation to do so is sometimes overwhelming.

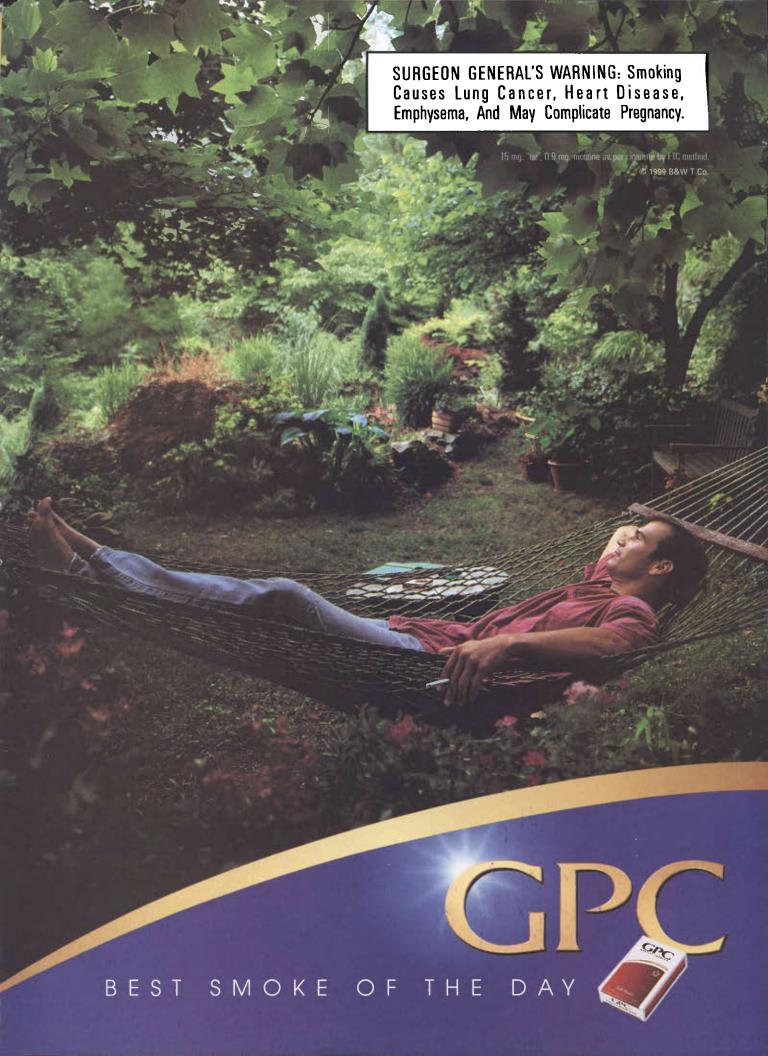
The key is finding the perfect excuse to purchase a tool. When I wanted to buy a table saw last month. I was well aware that I would not be able to use this tool much in my apartment. Sure I'll use the saw when I have a house, but that's at least a year away. The way I saw it, I needed a dining room table for my apartment. I figured that instead of purchasing a table from a furniture store, it was much more practical to buy a table saw and stick it in my dining room.

I could eat off my table saw just as I would eat off a dining room table. But I could also use the table saw to cut a watermelon in half, or to slice onions. It wouldn't work as well to slice tomatoes or to cut my ham and cheese sandwich in half, but overall, the table saw can be a wonderful kitchen appliance. It's really a combination of a dining room table, woodworking tool and melon slicer. When my landlord stops by to see what all the noise is about, I plan to demonstrate that I'm simply slicing cantaloupes for my breakfast. Of course, this justification won't work with my married friends because women typically prefer that their furniture not have saw blades sticking out of the middle of it. Women are weird that way.

A reciprocating saw is a tool that can be used for just about everything on a job site. Unless you're a professional carpenter, however, your wife might wonder why you need yet another power saw. For me, the reciprocating saw is handy when I cook a turkey, or a lasagna. You see, my culinary skills often result in baked goods that are harder than a bowling ball, yet somehow less edible. You simply can't cut through my lasagna with a regular kitchen knife or machete. That's why I use either a reciprocating saw or a circular saw to get through that outer shell. So if you're as bad of a cook as I, you can use the reciprocating saw to carve your home-cooked meals into small palatable portions that you can toss in the trash on your way to Taco Bell.

So don't despair when your domestic situation makes it seem stupid for you to purchase a new tool. With the proper amount of denial and some creative excuses, you can justify any new tool purchase. It's your duty not only as a woodworker, but as a guy. PW

Note to Readers: The preceding essay is a work of satire. It is not advised by most manufacturers that you use a table saw to slice onions. Watermelons are OK, but not onions.



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