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March 1998 #101

Popular Woodworking

1998 TOOL REPORT

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12"X30TX1"	$162	$119	$107	$ 95
10"X40TX1/8" or 3/32"	$156	$119	$107	$ 95
30T 1/8" or 3/32"	$135	$ 99	$ 89	$ 79
9"X40T	$146	$109	$ 98	$ 87
30T	$125	$ 99	$ 89	$ 79
*8-1/4"X40TX 3/32"	$136	$ 99	$ 89	$ 79
8"X40T 3/32"	$136	$ 99	$ 89	$ 79
30T	$115	$ 89	$ 80	$ 71
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Fine Woodworking Magazine test Oct. 96 page 43

After installing your blade and 5 in. stiffener the vibration in my saw went down another 20%. I ran several pieces of hardwood through the saw, both crosscut and ripping, and was amazed at the smoothness. It was like cutting butter, maybe smoother. I have never had a saw blade that cut this smooth.

Rick Price

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DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

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

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For TABLE and RADIAL SAW – 10% to 20%

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12"x60Tx1" or 5/8" 1/8"K	$198	$139
10"x60Tx5/8" 3/32"K	$162	$129
8-1/4"X60T	$150	$109
8"X60T	$150	$109
7-1/4"X60T	$150	$109

OTHER SIZES AVAILABLE – 7 1/4" – 14"

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220mm x 80T x 1/8" x 30mm	---	$159
9" x 80T x 1/8" & 3/32" K	$207	$179
10" x 80T x 1/8" & 3/32" K	$207	$159
12" x 80T x 1-1/8"K	$212	$181

SIZES AVAILABLE	LIST	SALE
300mm x 100T x 1/8" x 30mm	---	$189
12" x 100T x 1-1/8"K	$253	$215
14" x 80T x 1"	$232	$197
14" x 80T x 1"	$266	$226
16" x 100T x 1"	$262	$243
16" x 100T x 1"	$294	$243

Above bore standard.

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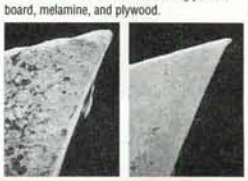

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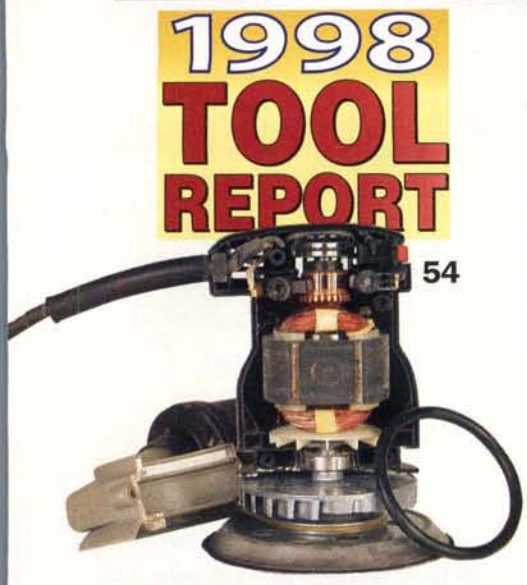


Features

Gothic Table 30

by Jack J. Mullen

You don't need a lot of tools to build this library table, which is inspired by the functional furniture of medieval castles and monasteries.

Ozark Chair 34

by Owen Rein

Use traditional tools and age-old techniques to build this classic Shaker-inspired post-and-rung chair.

1998 Tool Report 54

by David Thiel

Our 12-page special report gets under the hood of today's tools to let you know what's important (and what's not) when deciding which tool to buy. It's like having a tool-junkie friend with you at the hardware store.

G.I. Tools 66

by Christopher Schwarz

The military retires thousands of woodworking tools each year — some of them new in the box. Find out how to get your hands on them.

Band Saw Fence 68

by Horst Meister

Make your band saw even more useful by adding this inexpensive fence that locks down with just a twist.

Boating Bookshelves 70

by Steve Shanesy

Don't let the curves of these boat-shaped bookshelves scare you; the "Little Shop That Could" shows you the easy way to build this dinghy for landlubbers and book lovers.

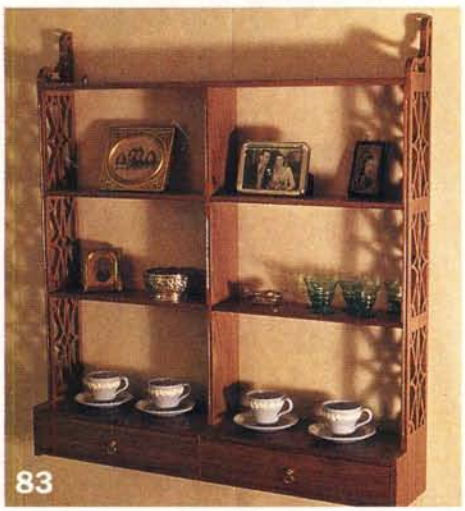
Trees to Furniture 78

Five tips on how to get a group together in your community to turn doomed urban trees into free furniture-grade lumber for your projects.

Colonial Hanging Shelf 83

by David Thiel

The fretwork sides of this 18th century china shelf turn sunlight into a beautiful display of shadow and light.



Project File

This special section, exclusive to Popular Woodworking, *features building basics for six projects.*

Modern Table **39**
A stylish table that couldn't be simpler or quicker to build.

Byrdcliffe Cabinet **40**
One of the more unusual and rare types of Arts & Crafts furniture is also a great project for beginning woodworkers.

Architectural Bookends **49**
Convert small scraps of beautiful or exotic wood into these bookends.

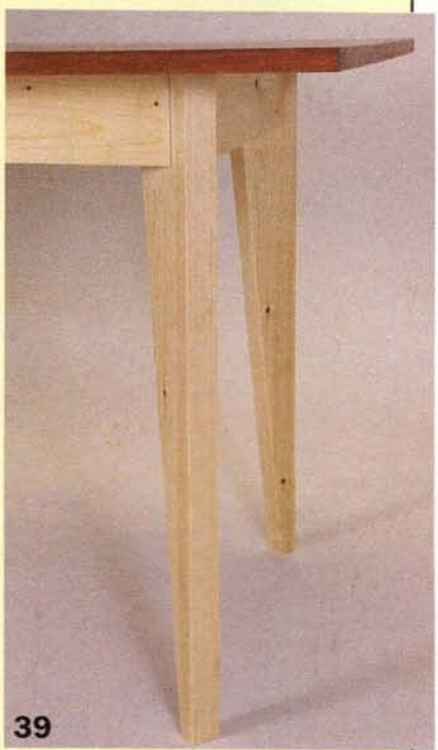
51

49

Sharpening Kit **50**
Keep your sharpening stones safe and handy in this wooden attache, which has an ingenious adjustable clamp for securing your stones while you're using them.

Plate Rack **51**
Dowels, scraps and an afternoon are all you need to build this simple yet handsome plate rack.

Bath Cabinet **52**
If your bathroom needs more storage space, our inexpensive pine cabinet holds all your toiletries.


39

Are we on target?

We want to know what types of projects you want to see in future issues of *Popular Woodworking*. So throughout this issue, you'll see this symbol next to every project. If you like a particular project, simply circle that project's identification number on the postage-paid card located in the Resource Directory at the back of this magazine. We'll use this information to gauge future project selections.

Of course, you should always feel free to continue to write or call us to tell us what you like and don't.

Thanks for your help!

—Steve Shanesy, editor and publisher

Columns

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"This Old Truck"

Cover photo: Pam Monfort/Bronze Photography

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!

The *Popular Woodworking* Crew • popwood@earthlink.net

Steve Shanesy
Editor & Publisher
Specialties: Projects, techniques, article and project selection
(513) 531-2690 ext. 238

David Thiel
Senior Editor
Specialties: Projects, new products and tools, tricks of the trade
(513) 531-2690 ext. 255

Christopher Schwarz
Managing Editor
Specialties: Article submissions, letters, reader contests
(513) 531-2690 ext. 407

Jim Stuard
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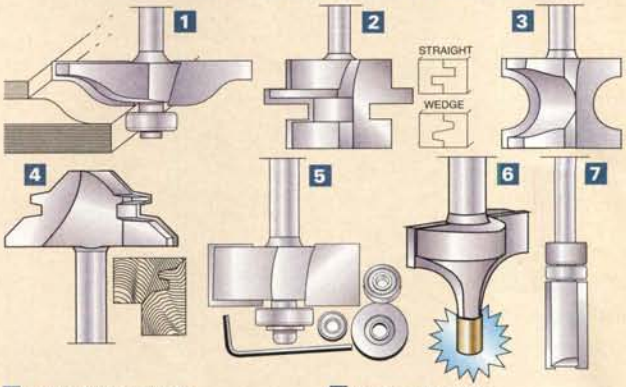

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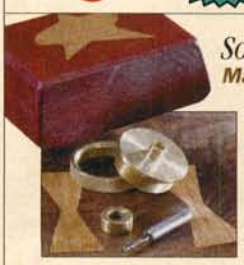

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ADVERTISING

National Sales Representative
Bill Warren, Five Mile River Assoc. LLC
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Tel. (207) 469-1981; Fax (207) 469-3050

Advertising Sales
Joe Wood – Tel. (513) 336-9760
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Classified Advertising Sales
Tel. (513) 531-2690, ext. 219

Advertising Production Coordinator
Debbie Thomas – Tel. (513) 531-2690, ext. 219

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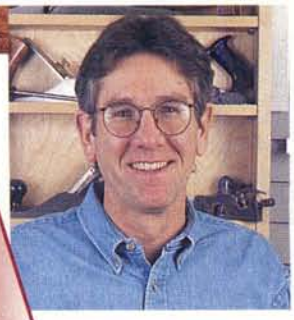

NOT LONG AGO I received a letter from a reader who thought this magazine should force its advertisers to identify the country where their products were manufactured. He surmised that by knowing where something was made, he would know if it was a quality tool. I wish it were that simple. The truth is, of course, a more complicated issue.

Whether you realize it or not, in the last decade many American tool companies have started making some of their tools in Taiwan. You might be surprised to hear that heavy hitters such as Delta Machinery, Emerson Electric (which makes some of Craftsman's tools), Powermatic, DeWalt and Porter-Cable all have some of their products built overseas. And you probably already know that manufacturers such as Jet and Grizzly have been making tools successfully in Taiwan for years.

The truth is that if you wanted to buy your tools from a company that doesn't manufacture overseas, you'd be hard-pressed to do it on a middle-class income. Personally, I think we owe a debt of gratitude to some of the big U.S. companies who have gone to Taiwan to make machinery that performs well and is reasonably priced. If they hadn't, many of us wouldn't be able to enjoy woodworking because the tools would be unaffordable.

Now that these companies have established substantial operations there, they have learned how the "system" works. And so that you'll be better equipped to make informed purchasing decisions, let me tell you briefly how tools are made in Taiwan.

First, let's dispel the myth that all Taiwanese equipment is alike (except for the color of the paint) and that most of it comes from one or two big manufacturing plants.

In fact, nothing could be further from the truth. I know this because I've been to Taiwan. While there may be an occasional exception, nearly every manufacturing operation there uses many small suppliers.

For example, rough castings are made by plant X, taken to plant Y for surface grinding and then go to machine shop Z for drilling and tapping. Ultimately, the part ends up at an assembly-only plant where it comes together with parts that have taken a similar route.

In order to sell machinery made in this fashion with confidence, American tool companies have to keep a sharp eye on quality control at each level because both high-quality tools and junk can come out of the same factory. Dealing with reputable vendors and having their own quality control team in the country is a must to ensure quality. Some off-brand companies will almost literally place contracts with an assembly plant to deliver a machine at X dollars then go home and wait for the container ship to arrive. Obviously, there's no supervision and no quality control.

When choosing Taiwan-made equipment, you should consider carefully if you want to buy from a company you've never heard of. Rely on companies with a good reputation and who have been taking delivery of Taiwan-made goods for a number of years. When you see a price that's too good to be true, it probably is. Walk away. Buy from a reputable source that stands behind its product.

Remember: Anything can be made in Taiwan — from the lowest to the highest quality. It's just a matter of what you're willing to pay, then making sure you get what you paid for. **PW**

Steve Shanesy

This Delta exclusive gives you a lock on snipe control. Patent-pending cutterhead snipe control lock stabilizes the cutterhead during operation, for complete rigidity.

Those who've had a sneak preview have nice things to say about it. Priced in the middle of the pack—we're betting it'll end up at the head of its class.

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From the **PW** *Mailbag . . .*

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: Infeed/Outfeed, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. Our e-mail address is: popwood@earthlink.net. Letters may be edited for publication.

— Steve Shanesy, editor, PW

Flower Tower Power

Here's a picture of the "Magic Flower Tower" I built from the May 1997 issue (#96). On a hot breezy day this gem will drink up a gallon and a half of water and be looking for more the next day. It's been the highlight of our summer plantings and gets many, many compliments. Thank you for making our plantings one of our best ever.

Joseph Wagner
Monroeville, Pennsylvania

More Advice on Not Getting Nailed

This is so funny. In your November 1997 issue (#99) you listed 12 steps to "ouch-less" nailing. For years I have used a comb to help me hold a small nail in place to start it. It works perfectly. Now you have 13!

Florence Haskins
Richmond, Virginia

A Project From Way Back

While browsing through the November 1997 issue (#99), I turned to the "Projects From the Past" page and immediately recognized the featured project as one from an old Delta Machinery publication. So I thought you might find this interesting.

Forty years ago I was looking for plans for a Colonial-style cradle and found exactly what I wanted in a "Deltacraft" publication. I built that cradle for my first daughter, and have made eight more for grandchildren. I am currently gluing up lumber for cradle No. 10. Here's a picture of my most recent effort.

Frank Ryan
Eugene, Oregon

Continued on page 10

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1/4"	3/4"	1/2"	P1212	5.94
5/16"	3/4"	1/4"	P1218	5.94
5/16"	1"	1/2"	P1219	5.94
3/8"	1"	1/4"	P1222	5.94
3/8"	1"	1/2"	P1223	5.94
1/2"	1"	1/4"	P1237	6.88
1/2"	1"	1/2"	P1238	6.95
1/2"	1-1/2"	1/2"	P1242	8.49
5/8"	3/4"	1/4"	P1253	7.95
5/8"	1"	1/2"	P1255	9.44
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3/16"	1/4"	P3104	9.97
3/16"	1/2"	P3105	9.97
1/4"	1/4"	P3106	10.88
1/4"	1/2"	P3107	10.88
5/16"	1/4"	P3108	11.96
3/8"	1/4"	P3110	13.88
3/8"	1/2"	P3111	13.88
1/2"	1/4"	P3114	14.94
1/2"	1/2"	P3115	14.94
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1/2"	1/2"	1/4"	P1806	8.39
1/2"	1"	1/4"	P1809	7.95
1/2"	1"	1/2"	P1810	7.95
1/2"	1-1/2"	1/2"	P1813	9.94

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1/4"	1"	1/4"	P1509	14.67
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3/8"	8°	1/4"	P2207	4.95
3/8"	9°	1/2"	P2209	5.99
3/8"	14°	1/4"	P2211	6.88
1/2"	8°	1/4"	P2215	8.99
1/2"	14°	1/4"	P2212	4.95
1/2"	14°	1/2"	P2213	4.95
1/2"	10°	1/4"	P2217	8.93

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3/8"	1/2"	P2909	13.95
1/2"	1/4"	P2910	14.95
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INFEED/OUTFEED

Continued from page 8

Clerks are People, Too

In Steve Shanesy's "10 Commandments of Finishing" (November 1997 # 99), he states that the advice given by sales clerks is, more often than not, uneducated opinion. I take great offense, as I'm sure many in my occupation do, to this statement. I never give a customer advice based on a guess. I learned early on that a finish can make or break a project. I have spent just as much time on practicing finishing as I have on woodworking.

I always recommend customers try out my advice on a piece of scrap first. I never include such phrases as "works every time" or "never fails." Being a woodworker, I chose a career that allows me to share what I know with others. Being a sales clerk does not make my advice any less credible than that of a magazine editor.

G.W. Perkert
Point Pleasant, New Jersey

Mr. Perkert, let me apologize to you and all your well-informed clerk colleagues out there. Generalizations are never 100 percent true. You know, a knowledgeable clerk is reason enough for me to return to a store time and again. Problem is, more often than not, my experience in a store is more like the following true story. I had to have a piece of redwood for an outdoor project. After coming up empty at a couple lumber yards I got desperate and went to a home center. In the lumber section, I asked the clerk if they had any redwood. His response: "I don't know about red wood, but we do have red oak."

—Steve Shanesy

On Display

In your September 1995 issue (#86) you published plans for the "Collectors' Coffee Table." With the help of his router, my husband, David, dressed up the legs and skirt of the table. We used a dark stain to formalize the table.

Mr. and Mrs. David DeCraene
Cicero, Illinois

Your details do a nice job of dressing up my original version. It's great to see readers modify our projects to better suit their own personal style.

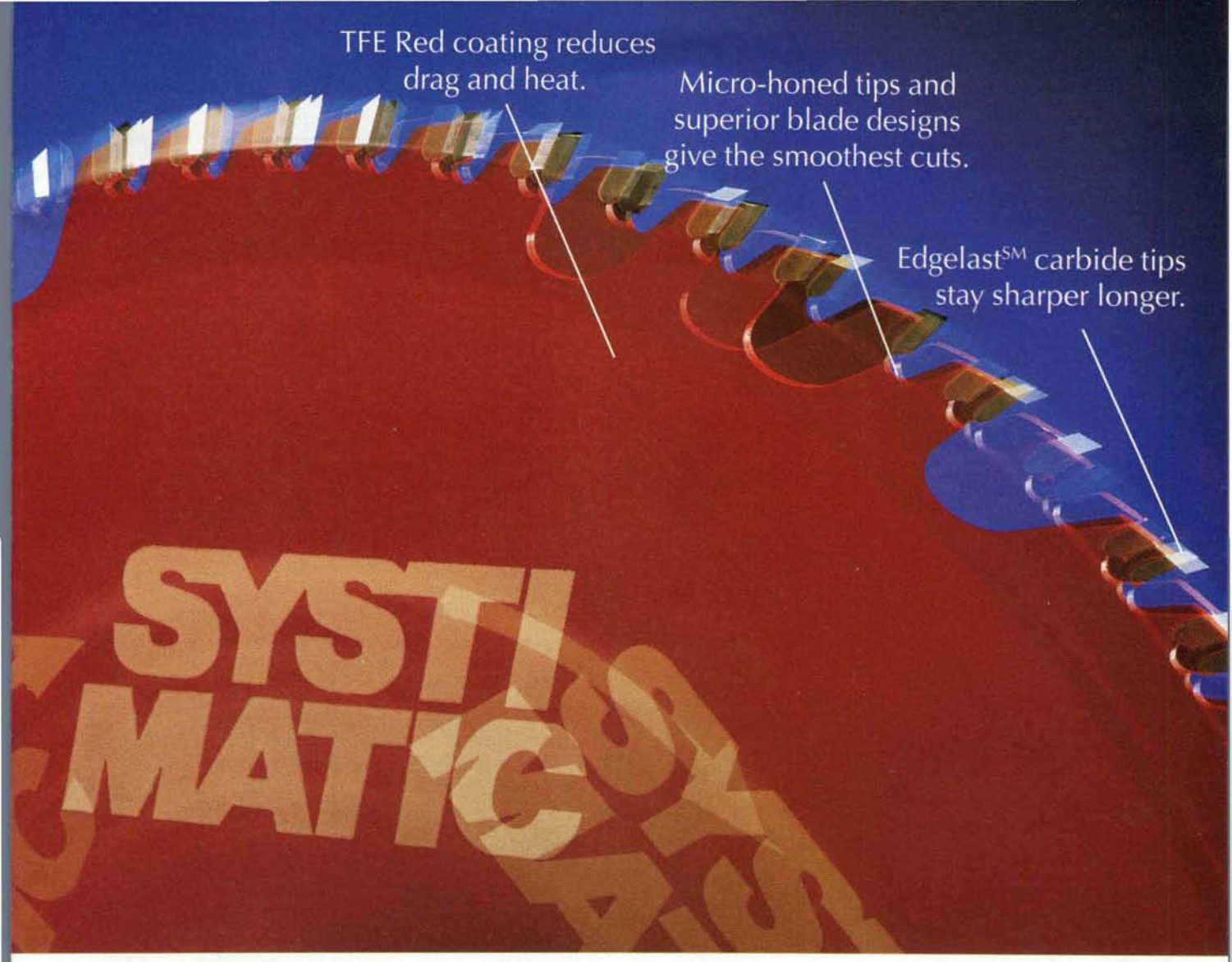
—Steve Shanesy

Stumpy Gets a Nose Job

I liked your "Stumpy the Reindeer Mailbox" (November 1997 #99). I have been making these reindeers for years, but never as a mailbox. One type of reindeer I make has a glowing red nose. Here's how to do this: Drill a hole in the nose to receive an electrical socket for a 7½-watt Christmas light. Then connect a 20" length of 16-gauge electrical wire to the socket.

Joseph Marostica
Lincoln, Nebraska

Continued on page 14



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- 620 to 3100 RPM • 1/2" chuck
- 22-1/2" high, 47 lbs.

ITEM 34231-6SJA $49.99

DRILL PRESS WITH KEYED CHUCK

ITEM 05901-0SJA $48.99

TUNGSTEN CARBIDE TIPPED

ROUTER BIT SET

- Individually organized storage cases. • 1/4" shanks

15 PC. ASSORTED BITS

Includes: 1-1/4" rabbeting♦, 1-3/8" cove♦, 1-1/16" roman ogee♦, 1-1/4" rounding over♦, 1/2" flush trimming♦, 1-3/16" 45° chamfer♦, 1/2" dovetail, 3/4" straight, 1/2" straight, 3/8" V-groove, 1/4" combination panel, 1/4" straight, 1/2" mortising, 1/8" straight, and 1/4" cove
♦Includes pilot bearing

~~$49.99~~ $39.99
ITEM 31164-9SJA

4 PC. ROUNDING OVER BITS

- 1-5/32" long shanks • 2 flutes each
- Sizes: 1/8", 1/4", 3/8" & 1/2"
- Set includes 4 rounding over bits w/ pilot bearing tips

~~$29.99~~ $19.99
ITEM 33078-5SJA

SKIL HD HEAVY DUTY Skil HD 1606-02

PLATE JOINER

- Fully adjustable front fence for 90° and 45° corners
- Plunge depth indicator for easy set-ups
- 4" carbide blade
- 120V, 5 amps, 11,000 RPM
- Kit includes: carrying case, dust bag, joining biscuit assortment, and more

~~$139.99~~ $129.99
ITEM 37110-1SJA

RECONDITIONED PLATE JOINER • Tool only

- Includes biscuits and manual

Skil HD 1605-46R
ITEM 51647-1SJA $63.99

Makita®

LIMITED QUANTITIES

Makita LS1030

10" MITER SAW

- Positive stops at 15°, 30°, 45° left and right and 90°
- Carrying strap and lockdown motor head for easy transport – ultra light 23 lbs.
- Includes: combination blade, socket wrench, and vise
- Maximum cutting - @ 90°: 2-3/4" x 4-61/64"; @ 45°: 2-3/4" x 3-1/2"
- Motor: 12 amps, 115V, 5/8" or 1" arbor
- Factory reconditioned, factory perfect

ITEM 51662-2SJA $139.99

CHICAGO Electric Power Tools

HEAVY DUTY 4-1/2" DISC GRINDER

- High powered 10,000 RPM
- 5/8" spindle with 7/8" arbor adapter
- Motor: 3/4" HP, 115V, 5.18 amps
- High power to weight ratio
- 11-7/8" long
- Spindle lock

ITEM 31135-6SJA $19.99

4-1/2" x 1/4" GRINDING WHEELS (PACK OF 10)

ITEM 06674-0SJA $8.99

CARVING DISC

ITEM 07697-2SJA $29.99

4" DRY-CUT DIAMOND BLADE

ITEM 34441-6SJA $9.99

CHICAGO Electric Power Tools

3/8", 14.4V CORDLESS DRILL KIT WITH KEYLESS CHUCK

High voltage, heavy duty battery gives long run times between charges. T-handle design makes this drill easy to use.

- *Jacobs*® keyless chuck • 6 torque settings
- Variable speed, reversible; 0 to 600 RPM
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, magnetic extension bit, charger, battery, keyless chuck, and carrying case

ITEM 34793-2SJA ~~$49.99~~ $39.99

14.4V BATTERY

ITEM 34794-0SJA $29.99

CONTROLLED PRESSURE, NON-MARRING HARDWOOD CLAMPS

Hardwood jaws distribute pressure evenly, and easily adjusts for non-parallel surfaces and odd shapes. Wood construction helps eliminate workpiece damage.

JAW LENGTH	OPEN JAW CAPACITY	ITEM	PRICE
8"	4-3/4"	04852-3SJA	$3.99
10"	6"	04853-4SJA	$4.99
12"	8-1/2	04854-5SJA	$5.99

CENTRAL MACHINERY

DRILL 1/4", 3/8", & 1/2" SQUARE HOLES

MORTISING MACHINE

Make a square hole in the fraction of the time it takes by hand! Easier layout for professional mortise and tenon joints in furniture, cabinets, and restoration. Fence with hold down clamp keep workpieces from lifting off the table. Large capacity – up to 5" maximum height. Includes fence, workpiece clamp, and 1/4", 3/8", and 1/2" mortising chisels and bits.

- 10-7/8" x 7-3/4" base
- 13-3/8" x 6" table • 60 lbs. shipping wt.
- 3580 spindle speed • 5" throat
- 5" maximum workpiece height
- Accepts .745" chisel shanks
- 1/2 HP, 110V, 2.3 amps

ITEM 35570-1SJA $169.99

7-1/4" ADJUSTABLE

DADO BLADES

Carbide steel tips last up to 50 times longer and can be resharpened. High speed steel blades are denser and stronger for greater impact resistance. Does not have to be removed from saw to adjust cutting width. 4500 max. RPM; 1" arbor with 5/8" adapter

CARBIDE DADO BLADES

TEETH	ITEM	PRICE
24	36911-1SJA	$19.99
40	36912-1SJA	$24.99

HIGH SPEED STEEL DADO BLADES

TEETH	ITEM	PRICE
24	36913-0SJA	$14.99
40	36914-0SJA	$19.99

NEW!

ROUTER PLATE AND GUIDE BUSHINGS

Make clean and accurate edges with your router. No more slipping or stopping during cutting. Allows your router to move easily across the surface. Mount the sub-base plate to the router and the roller edge to the sub-base for trimming laminate or veneers. Comes with a universal plate, mounting hardware, and 5/16", 7/16", 5/8", and extra long 7/16" and 5/8" template guides.

ITEM 36769-0SJA $9.99

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CENTRAL MACHINERY

COMBINATION 4" BELT & 6" DISC SANDER

The 36" long belt operates at 2168 feet per minute and will handle both large & small surfaces plus inside and outside curves. Includes a tilting table that locks at any position from 0° to 45° for bevel sanding.

Table (die cast aluminum): 7-1/2" x 5"; Sanding belt: 4" x 36"; Sanding disc: 6" dia. (die cast aluminum); Disc speed: 1720 RPM; Belt speed: 2168 FPM; Motor: 1/3 HP, 115V, 60 Hz, single phase.

ITEM 36402-1SJA **$69.99**

SANDING BELT CLEANER
• 8-1/2" x 1-1/2" x 1-1/2"
ITEM 30766-1SJA **$4.99**

DELTA®
Delta 36-220

LIMITED QUANTITIES

10" COMPOUND MITER SAW

2-1/2 HP, 15 amp motor. D-handle with trigger switch for positive control. Electric brake automatically stops blade in seconds. Includes dust collection bag, 10" blade with 5/8" arbor, and retractable blade guard.
• Blade speed: 4900 RPM @ no-load
• Capacities: 2-3/4" x 5-3/4" crosscut; 2-3/4" x 4-1/8" 45° right & left miter; 1-3/4" x 5-3/4" 45° left bevel; 1-3/4" x 4-1/8" 45° x 45° compound
• Table diameter: 10-1/2" • Tool wt.: 60 lbs.
• Factory reconditioned, factory perfect

ITEM 06125-0SJA **$159.99**

DRILL MASTER

TiN COATED FORSTNER BIT SETS

Titanium nitride runs cooler, cuts easier, and lasts longer than standard steel! Includes 3/8" shanks and individually organized wooden case. Rockwell hardness range from 55-65 HRC.

20 PC. SET
• 20 sizes from 1/4" to 3/4" by 16ths, 7/8", 15/16", 1" to 2" by 8ths
~~$42.99~~ **$34.99**
ITEM 31130-7SJA

16 PC. SET
• 16 sizes from 1/4" to 2-1/8" by 8ths
~~$39.99~~ **$29.99**
ITEM 32404-8SJA

Pittsburgh®

Pittsburgh LIFETIME WARRANTY

8 PC. WOOD LATHE TURNING TOOL KIT

Made of heavy duty triple tempered tool steel. Tips are 4-1/2" long and precision ground. 10" hardwood handles minimize operator fatigue.
• Contains: 1/4", 1/2" and 3/4" gouge; 1/2" and 1" skew; 1/2" spearpoint; 1/2" parting tool; and 1/2" round

TRIPLE TEMPERED

ITEM 03793-5SJA **$9.99**

CENTRAL MACHINERY

16" SCROLL SAW

• Precision milled 14-1/2" x 8" table tilts 0° to 45° • 1750 SPM blade speed
• Uses pin end blades, 5-1/2" long
• Heavy duty cast iron frame and base reduce vibration • 7/8" blade stroke
• 1/8 HP, 110V, .83 amps

ITEM 34618-5SJA **$54.99**

5 PC. 5-1/2" SAW BLADES
• Pin end type
ITEM 35024-0SJA **$4.99**

CENTRAL MACHINERY

10", 2 HP BENCH TABLE SAW

Die cast aluminum table 25-3/4" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting.
• Max. depth of cut at 90°: 3-1/8"; at 45°: 2-1/2" • Blade sold separately, below
• Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM • Shipping weight: 36 lbs.
• Miter gauge adjusts 0° - 60° left and right
• Blade capacity: 10" with 5/8" arbor

ITEM 35715-3SJA **$89.99**

10" CARBIDE TIP SAW BLADE
• 5/8" arbor • 40 tooth
ITEM 00529-4SJA **$9.99**

RADIAL ARM RASK SAW KIT

RADIAL ARM SAW KIT

Award-winning patented design features easy setup with most 7-1/4" and 7-1/2" circular saws. Makes fast accurate bevels, rips, miters, and crosscuts. Ruggedly built and completely portable.
• Saw and table wood not included
Maximum miter & bevel: 45°; Rip capacity: 15-3/4"; Crosscut: 12-3/4"; Length: 24"; Height: 22"; Weight: 23 lbs.

~~$59.99~~ **$49.99**
ITEM 33576-1SJA

Pittsburgh®

Pittsburgh LIFETIME WARRANTY

10 PC. SPRING CLAMP SET

Vinyl covered tips won't mar your workpiece. Made of nickel-plated, heavy gauge steel, with heavy duty tempered springs and comfortable vinyl coated handles.
• Contains four 1" capacity clamps, four 2" capacity clamps, and two 3" capacity clamps

~~$10.99~~ **$8.99**
ITEM 05968-1SJA

CHICAGO Electric Power Tools

TRIM ROUTER

Now you can tackle those jobs that were too fine or exacting for a standard router. This compact router weighs only 4 lbs. for easy operation. Includes a straight and adjusting conductor to assist in trimming and engraving in both straight and circular patterns.
• 30,000 RPM no load speed
• 110V, 3-1/4 maximum amp draw
• 1/4" collet • 8-1/2" overall length
• 4 lbs. tool weight

ITEM 33833-3SJA **$39.99**

IRON HORSE

Iron Horse TAWS1

SAVES TIME & MAN-POWER

ADJUSTABLE HEIGHT WORK SUPPORT

Heavy duty steel base supports rugged plastic rollers. Use with table saws, miter saws, router tables, radial arm saws and many other power tools. Height adjusts from 25" to 43" for maximum versatility. A must for any shop.

ITEM 02379-5SJA ~~$19.99~~ **$16.99**

FOLDING WORK SUPPORT
This heavy duty support folds for travel and storage. • Adjusts from 28" to 46" high
• 21"W x 19"D base • 6 lbs.
Iron Horse TAWS2
~~$33.99~~ **$25.99**
ITEM 05252-4SJA

LASER LEVELER

Compact high output leveler projects a round dot visible up to 600 feet away. Solid brass construction. Also includes a professional quality built-in spirit (bubble) level. Locking on/off switch.
• 4-1/4" long x 3/4" diameter

~~$59.99~~ **$49.99**
ITEM 36535-2SJA

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Makita 6211DWHE

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3/8" 12V CORDLESS DRILL/DRIVER WITH KEYLESS CHUCK

SUPPLIES LIMITED

• Grip is centered under body for better balance and control
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• Maximum torque: 261 in. lbs.
• 12 torque setting (6 high/6 low)
• Includes drill, TWO extra duty Mak Pak 12V batteries, and charger
• 9-3/8" overall length
• 4 lbs. tool weight
• Factory reconditioned, factory perfect

ITEM 51661-0SJA **$129.99**

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INFEED/OUTFEED

Continued from page 10

Protecting Painted Projects

Enclosed is a photo of a Pennsylvania-German painted dower chest I built from plans I developed after viewing original examples in museums. The paint used is an industrial-grade glossy oil enamel. I would like to overcoat the paint with a clear finish to protect the enamel but have been advised that overcoating may be a problem. I would not be willing to rough the surface for adhesion and do not know what product would be appropriate.

Question: Should I be considering an overcoating for protection? If yes, what and how should it be applied?

Paul L. Stotler
Leonardtown, Maryland

Editor's note: Relax Paul, you're home free. Since the paint used was a gloss oil enamel, it needs no top coat. It's certainly tough enough, and the glossy sheen will make it easy to keep clean. Just dust as needed, and if it requires an occasional aggressive cleaning, use a mild soap (like Murphy's Oil Soap) and water with a damp cloth.

Let me add that it's a beautiful chest and the paint decoration is superb. You should be quite proud of it! It reminds me of chests on display at the Philadelphia Art Museum, which pay tribute to the state's German furniture makers.

'Trees To Furniture' a Good Idea

It was with much interest that I read your article in the November 1997 issue (#99) about the "Trees To Furniture" program. I have often admired some of the hardwood species that line the residential areas of our cities. These trees represent some of the best lumber that is still available.

I catch myself thinking when I see a magnificent red oak or black walnut how much furniture-grade lumber it would yield. Then I realize that the best use of that tree for now is to make shade, absorbing the heat on a summer day and cleaning the air. But unfortunately, trees have a lifespan, and what better use could be made of them than lumber?

Here's a suggestion: You might consider publishing an article on the steps needed to make the green wood into a furniture-grade product. **PW**

Paul Gunzenhauser
Garden Grove, Iowa

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If you're among the first 1000 people who take advantage of this exclusive direct-to-you offer, you'll receive FREE Bonuses! With the 14.4v Industrial Cordless Drill *(to the right)*, you get a **16-Piece Accessory Kit** *PLUS* a **300-Piece Drill Kit!** With the 16.8v Super Drill *(below)* you get a **23-Piece Accessory Kit!** With the 14.4v Cordless Workshop *(below)*, you get a **"5 in 1" Screwdriver Kit!** These bonuses are yours to keep – even if you return the drill set. You're guaranteed to come out ahead!

16.8v Cordless SUPER DRILL!

Here's our famous fully-loaded *16.8 VOLT* cordless drill for just **$69.95** ($8.95 S&H). Item No. 70-HT9. Extra batteries are just $39.95 ea. ($3.95 S&H). Item No. 75-PW9. Upgrade to a One-Hour Smart Charger for only $14.95. Item No. 20-PW9.

Heavy Duty ***3/8" Jacobs® Keyless Chuck***

0-900 RPM, *variable speed, reversible*

200 in. lbs. *of torque.*

6 Precision Clutch Settings

Long-running 16.8v System

14.4v Cordless Workshop!

Thousands have happily paid $69.95 for this SAME powerful 14.4v Cordless Drill Set alone. You get the Drill Set ***PLUS*** a 14.4v Cordless Detail Sander ***PLUS*** a great 14.4v Cordless Worklight now just **$89.95** ($11.95 S&H). Item No. 220-PW9.

Extra batteries are just ***$34.95*** *ea. ($3.95 S&H). Item No. 221-HT9.*

A 10 pc. Sanding Pad Kit w/ 3 fine, 4 med. and 3 crs. pads is just ***$4.95****. ($1.95 S&H). Item No. 2001-HT9.*

Upgrade to a 1-hour Smart Charger for just ***$12.95****. Item No. 222-HT9.*

NEW! Titanium 24 Pc. Forstner Bit Set

Here's an incredible baragin on the *ultimate* Forstner Bit Set containing sizes 1/4" all the way to 2-1/2"! Lesser sets sell for over $150. You get 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 7/8", 15/16", 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", 2-1/4", 2-3/8" and 2-1/2" Forstner bits and a wooden case for just **$79.95** ($12.95 S&H). Item No. 260-PW9.

A Great Tools Direct Exclusive!

Also available: 20 PC Titanium Forstner Bit Set containing 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 7/8", 15/16", 1", 1-1/8", 1-1/4",1-3/8", 1-1/2", 1-5/8", 1-3/4", 1-7/8" and 2" sizes just $49.95 + $4.95 S&H. Item No. 105-PW9.

115 Pc. High Speed Steel, Fully Ground, Titanium-Coated Industrial Bit Set

You could easily pay over $200 somewhere else for this same massive set. You get Fractional Sizes to 1/2" by 64ths, Letter Sizes A-Z and Wire Sizes #1 to #60. It's yours for just **$49.95** ($6.95 S&H). Item No. 108-PW9.

Also available: 29 Pc Titanium Coated Bit Set just ~~$29.95~~ Now 19.95 + 3.95 S&H. Item No. 107-PW9. You save $10!!!

Also available: 21 Pc Titanium Coated Bit Set just ~~$19.95~~ Now 14.95 + 2.95 S&H. Item No. 106-PW9. You save $5!!!

Compare features to Makita® and Dewalt®. Then compare prices!

Industrial 14.4v, 2-Speed Cordless Drill

14.4V PANASONIC BATTERY!

An INDUSTRIAL 14.4 volt cordless drill! Compare features to Makita® and Dewalt®. Then compare prices and see how much you save. Just **$89.95** ($8.95 S&H) Item No. 77-PW9. Extra batteries are just $39.95 ea. ($3.95 S&H). Item No. 78-PW9.

- *Over 230 in. lbs. of torque.*
- *16 Precision Clutch Settings*
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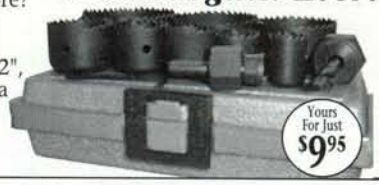
11 Pc. Hole Saw Kit ~Best Bargain Ever!



Our competitors' hole saw kits sell for $14.99 to $29.99 and up. But, why pay more? This is a terrific deal! You get 8 tool steel cups sized 3/4", 7/8", 1", 1 1/4", 1 1/2", 1 3/4" 2" and 2 1/2" plus a handy carry case for just **$9.95** ($3.95 S&H). Item No. 27-0PW9.

15-Piece Carbide-Tipped Professional Router Bit Set

Why pay more for *just 3 or 4* industrial-quality carbide-tipped router bits elsewhere? This 15 PIECE set contains *3/8" Roundover, 3/8" Cove, 5/32" Roman Ogee, 3/8" Slot Cutter, 1/2" Trim, 3/4" x 3/4" Straight, 1/4" x 3/4", Straight, 1/2" x 1" Straight, 1/2" Hinge Mortise, 7° Dovetail, 1/4" Combination Panel, 90° V-Groove, 45° Chamfer, Flush Trim, Bevel Trim plus Wooden Case* now just **$49.95** ($4.95 S&H). Item No. 1090-PW9. 1/4" Shanks.

4-Piece "Roundover" Carbide Router Bit Set

Contains *1/8", 1/4", 3/8" and 1/2" sizes. 1/4" shanks. Pilot bearing for extra clean edges. Wood Storage Case and stand included.* Now just **$29.95** ($3.95 S&H). Item No. 1095-PW9.

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Here's the most powerful grinder in its class and it's yours for just **$34.95** ($6.95 S&H). Item No. 91-0PW9. Why not try it risk-free?

7 AMPS
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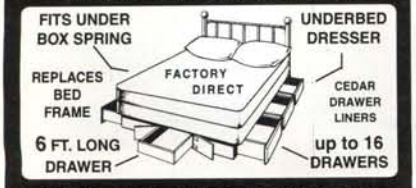

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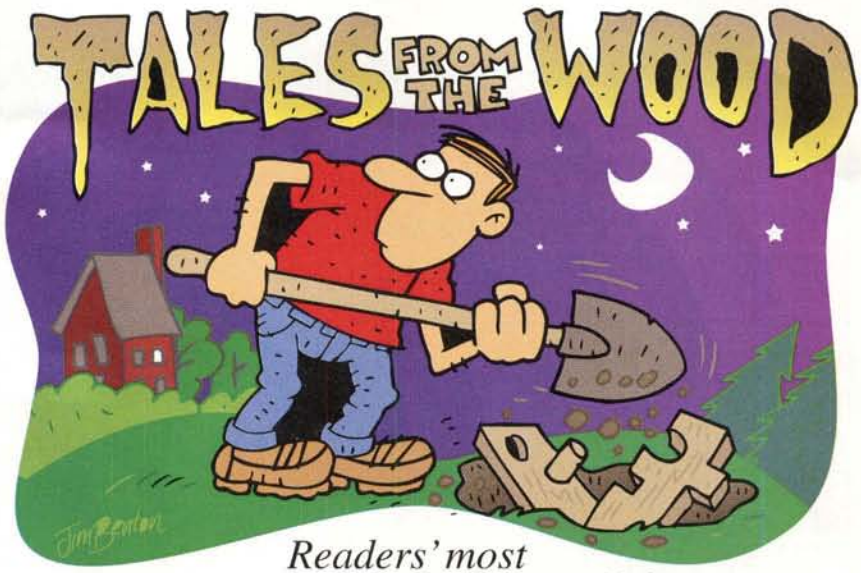

Readers' most amazing stories from their workshops.

WINNER!

So That's What That Switch is For!

I'm a mild-mannered, patient type of guy. I rarely resort to profanity. But a few days ago I was in the process of gluing up some leftover 1x4s and 1x8s into a shelf for a gent's wardrobe I'm building when my cussin' jaw came unhinged.

My formerly trustworthy drill started acting up on me. I was trying to drill 17 pairs of holes for the dowels that would align and strengthen the shelves. The drill bit kept burning and smoking. I had to bear down hard to get the thing to work at all.

But I kept up with it, cussing all the time. I finally got the holes drilled with my doweling jig and lots of elbow grease. The following day I had to make a special tool for setting push tacks into hard wood and again brought out my drill. This time I was working without my doweling jig. And with the bit exposed and a very red face I discovered the nature of the problem.

Have you ever tried to drill 34 holes with your drill running... in reverse?

C.E. Breuer
Edgefield, South Carolina

Continued on page 18

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Turn your favorite tale from the woodshop into a $150 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.

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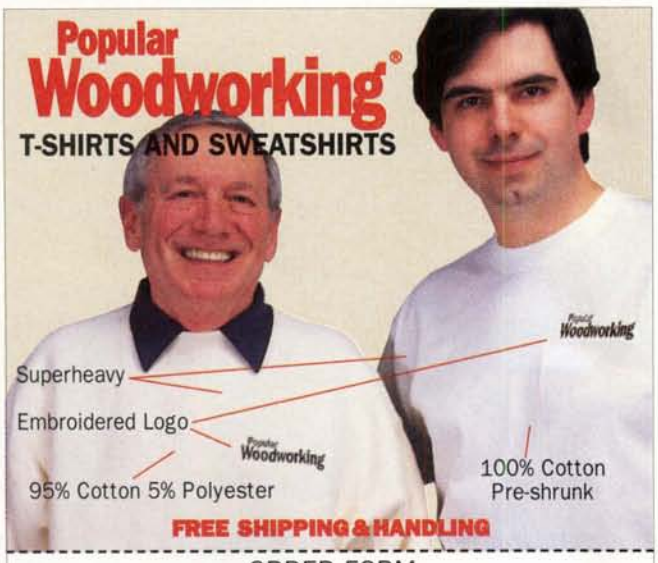

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WOOD TALES

Continued from page 16

A Very Important Lesson and a Very Minor Injury

Editor's note: It's our policy to reject any "Tales From the Wood" entry that involves an injury. However, this story's lesson is so important, and the injury so inconsequential, we decided that this was one tale that needed to be told. So no matter what your manual says, never sharpen your jointer's blades while the machine is running.

I was working in my basement shop one chilly night wearing gray sweatpants and a sweatshirt. I was working with padauk that night, so I was covered with red sawdust that had turned my sweatsuit very red.

I decided to adjust the blades in my 6" jointer, and the manual told me I could both hone and level the blades by slowly sliding a sharpening stone over the edge of the outfeed table into the spinning blades. (The new manual doesn't suggest this by the way.) So I tried it. I must have let the end droop a bit because a blade caught the stone and threw it across the shop. It also pulled my fingers into the blades. Well it scared the "you-know-what" out of me so much I couldn't even look at my fingers. I grabbed a rag, wrapped it around them and ran upstairs. I don't know why, but I thought I should stick my hand in ice so I filled a Ziploc™ bag with ice and water, and still without looking, stuck my hand in.

My wife took me to the emergency room, and I walked in with a blood-red sweatsuit, my face red from wet sawdust and my arm stuck wrist deep in a bag filled with red liquid. You can imagine what it looked like, so they rushed me right to a doctor. Was I embarrassed when he looked at my hand and found that two fingertips had the tiniest bit of skin removed. There wasn't even anything to stitch. He put a bandage on them and told my wife not to let me play with sharp objects!

Today there isn't even a scar or sign it ever happened, but I guarantee you I'm much more respectful of spinning blades.

John Zimmerman
Lowell, Massachusetts

Beware Flying Doors

I'm 23 and have worked with wood since high school, and have never had a serious mishap — until this. I have three siblings: my sister, my brother and my dad's baby — his 1996 Dodge truck. Therefore we all walk on eggshells around the thing. Anytime we did any woodworking we had to pull the tools outside to keep the dust off the truck! On one occasion, I pulled the table saw outside about 20 feet from the truck to rip a door down. (Mind you, there is no guard on this table saw.) I was pushing the door through when it came up off the table. In slow motion, I watched it fly 20 feet behind me and hit the side of my dad's beloved truck! The damage was pretty bad. When the door hit it put a big dent in the side quarter panel. And the door still had enough forward momentum to put a nice long scratch down his passenger door.

Only one good thing came out of this: Dad bought me a shed of my own to put my woodworking tools in! **PW**

Keith Bourgault
Okeechobee, Florida

Advertisement

Why Do Some Woodcrafters Make Big Money While Others Struggle?

Hello, we're Rick and Amy Gundaker, the "Woodchuckers". We've been self employed as woodcrafters for the past thirteen years.

When we first started crafting, we really struggled just to cover our cost. We'll never forget those first craft shows. We were amazed at how some crafters were always busy selling and restocking their crafts, while many other crafters, like us, hardly sold anything. It wasn't until we learned how those successful crafters produced and marketed their crafts that we started to make some *Real Money*.

It didn't take us long to develop some quick and easy methods of our own for cutting, painting and selling our woodcrafts. In less than a year from the day we started, we were making enough money from our woodcrafting business to pay all of our personal bills, including our home mortgage. What a great feeling that was!

You, too, can make the extra money you need while enjoying your hobby. Using your basic woodworking skills, you can create great gifts and turn your woodshop into a part-time or full-time money maker. We know it can be done because we did it, and we've helped many other woodworkers make money, too!

The following are excerpts from letters we've received from woodcrafters we've helped.

"The crafts I make sell for $1.00 to $75.00. I am averaging from $400 to $600 a week, and I'm booked six months ahead. Thanks to your help."

J.R. of Muncy, PA

"My wife is a school teacher. I made her one of your cute designs to set on her desk. Other teachers saw it and she sold eleven of them before the day was over. Keep up the good work."

C.M. of Baltimore, MD

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- Which paints work the best, and which ones not to use
- How to choose paint brushes that will make your painting much easier
- How to avoid the mistakes that we made... and save hundreds of dollars
- and much, much more . . .

There's plenty of room for everyone in woodcrafting. We won't be competing with you and you won't be competing with us. That's why we would enjoy showing you how you can start your own profitable craft business using your basic woodworking skills. You can go as far as you want... *profits are virtually unlimited!*

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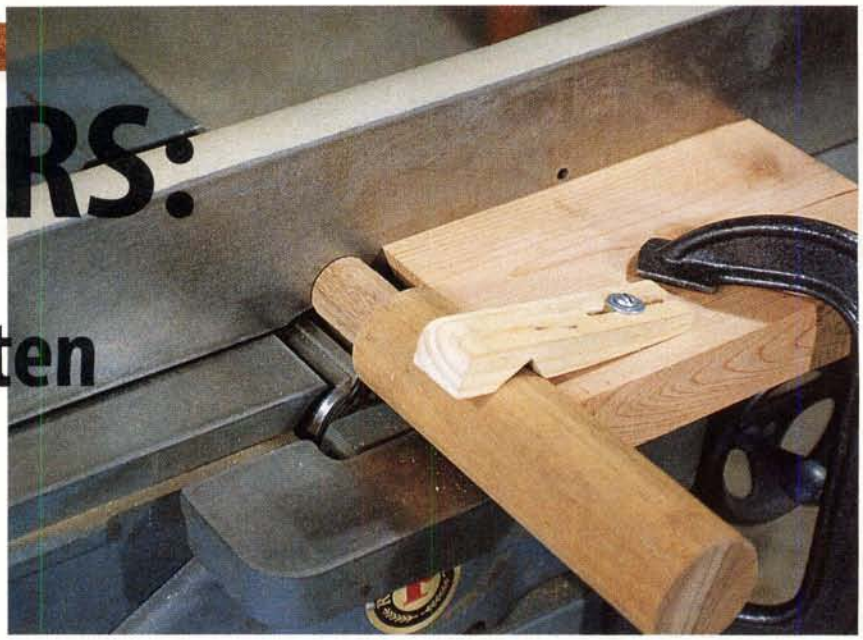
JOINTERS:

1998 TOOL REPORT The Forgotten Power Tool

If you think jointers are just good for giving you a true edge on a board, you don't know the half of it.



Believe it or not, making an integral round tenon is a practical application on a jointer, but you must use hold-downs and the proper fixtures. Be aware that the guard isn't used for this technique so be careful.

A SHOP TEACHER of long ago told me that the second tool to buy (after a table saw) was a jointer. I took his advice and have never regretted it, and I often wonder why some shops lack the tool.

My teacher showed us the "working edge" philosophy — establish two smooth, flat surfaces (an edge and a face) that are square to each other before going further with a board. Making a straight, uniform and even surface is called jointing and is done with a jointer. These surfaces are the ones from which all other dimensions are made and, if the board must be sawed to width, there is a true edge to ride the rip fence. Similarly, if the board must be planed to clean up a rough face or thicknessed to a given dimension, there is a "true" surface to run on the planer's table.

But the reason I'm so happy to own this tool is that there's so much more to a jointer than this basic procedure. I don't know if my shop teacher was aware of it or not, but using a jointer only for edge or face jointing is like using a table saw just for ripping and crosscutting. After becoming familiar with the machine, you'll find it practical for chores ranging from simple edge-planing to forming tenons on round stock **(drawing 1)**.

The Tool

A jointer consists of a horizontal cutterhead (usually with two or three knives) mounted beneath and between the "infeed" and "outfeed" tables. The length of the knives determines the tool's size and the maximum width of stock that can be surfaced; 6" being a reasonable choice for home shops. The depth of cut that the machine can make on a single pass, which can range from 1/16" to 1/2", is established by the vertical adjustment of the infeed table.

On some units, both tables are adjustable. And while this affects the procedures you use to align the knives and the tables, it has only a minimal effect on the work you can do. Standard equipment on all jointers is a fence that can be tilted and moved across the tables. Except for chores like chamfering or beveling, the angle between the fence and tables must be 90 degrees.

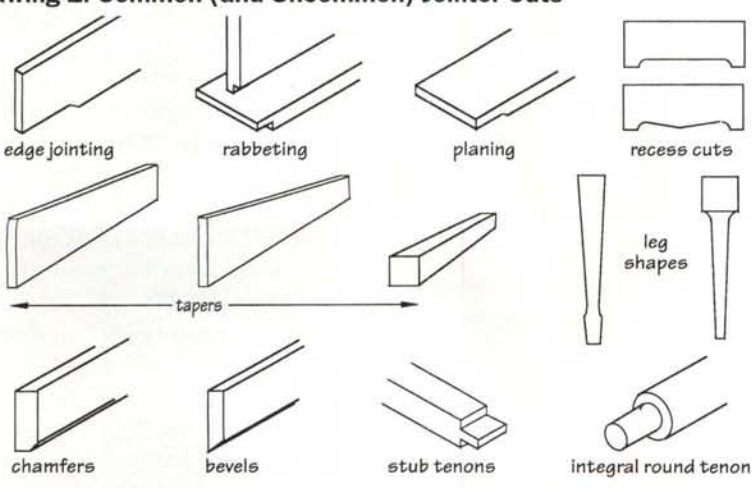
The horizontal plane of the outfeed table must be tangent to the cutting circle of the knives. Check this by placing a straightedge on the table so it extends over the cutterhead. Rotate the head by hand. Each knife should just barely touch the straightedge. Because jointer designs differ, follow the instructions in your owner's manual for making this critical adjustment. When the relationship is correct, work will pass smoothly over the cutterhead and firmly onto the rear table **(drawing 2)**.

Rabbets and Tenons

The jointer is an excellent tool for rabbeting and tenoning. It produces cuts with flat, smooth cheeks and square shoulders. I choose the jointer over a

Continued on page 22

Drawing 1: Common (and Uncommon) Jointer Cuts



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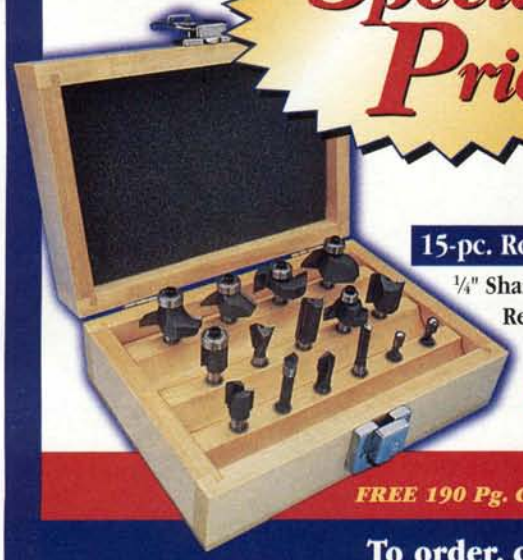

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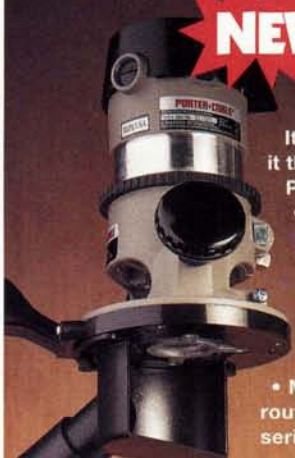

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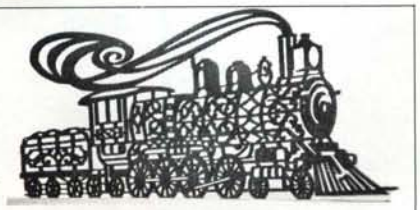

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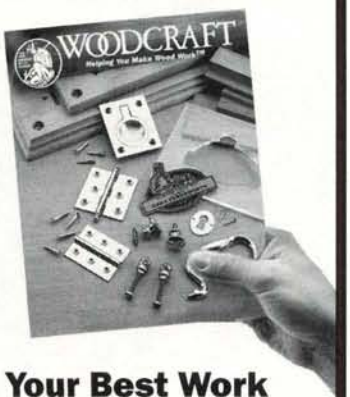

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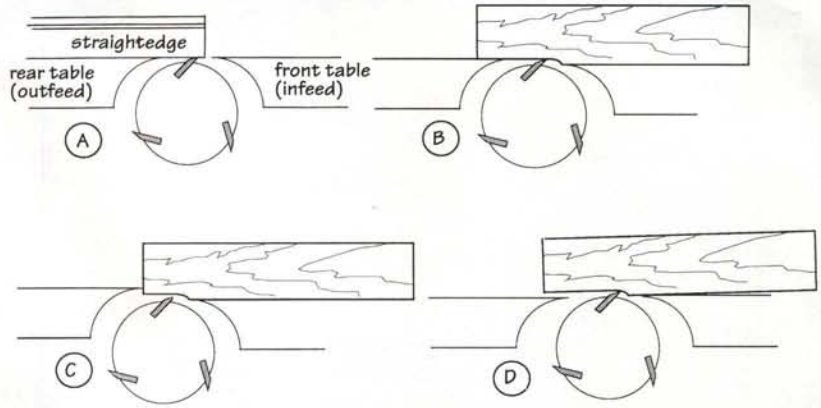
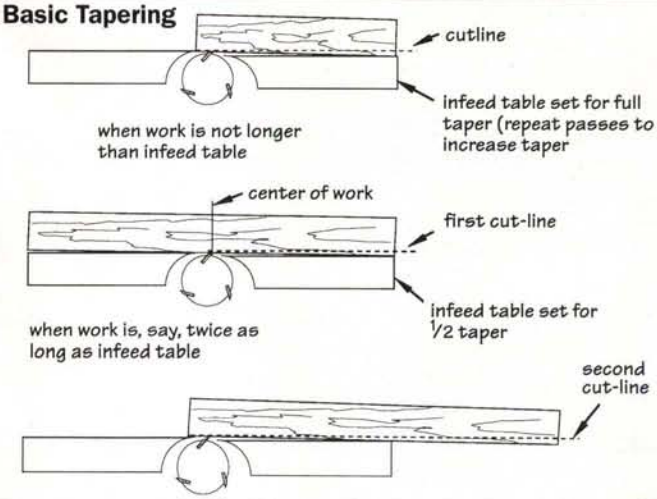
Drawing 2: Jointer Alignment



A — Horizontal plane of outfeed table must be tangent to cutting circle of knives
B — When alignment is correct, work will pass smoothly over cutterhead onto rear table
C — Outfeed table too high
D — Outfeed table too low

Drawing 3: Basic Tapering



dadoing tool for this kind of work. The width of a rabbet is established by the position of the fence; its depth by adjustment of the infeed table. Place the work firmly on the rabbeting ledge and snugly against the fence, then advance it past the cutterhead. A clamped hold-down aids in producing accurate results **(photo 1)**. To form a tongue, flip the stock and make a second cut **(photo 2)**.

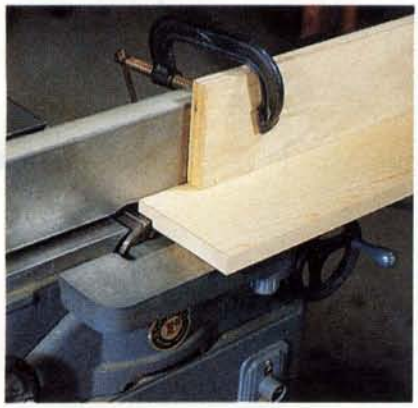
Tenons are just back-to-back rabbet cuts. But because they are made cross-grain, you can expect some tear-out at the end of the cut **(photo 3)**. Therefore, start with wood that is a bit wider than you need so you can rip off any imperfections. When you need several similar tenons, do the initial shaping on wide stock and then rip the parts you need to width. Use a backup to move the work when forming tenons on narrow stock — and use a clamped hold-down to keep the work in position.

Bevels and Chamfers

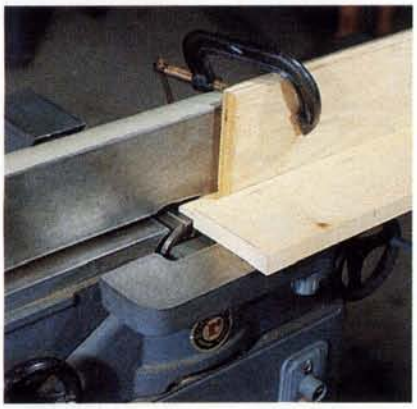
The jointer fence can be tilted in either direction, but I prefer to use a closed angle because it provides a nook that snugs the work and helps maintain its position during the pass. The addition of a hold-in is also a good idea **(photo 4)**. It's usually necessary to make more than one pass to achieve a full bevel. Chamfer cuts are made the same way, the only difference being that you don't remove the entire edge of the stock.

Tapering

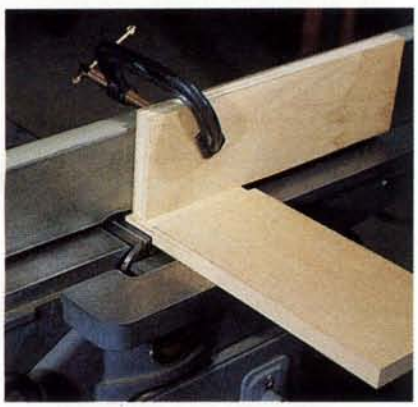
To do a simple taper, set the *infeed table* for a particular depth of cut and then position the work so the starting point of the taper rests on the forward edge of



1 I use the jointer for rabbeting more than any other machine. Cuts are smooth and precise and the machine is easy to set up for the chore. A clamped block helps keep the work flat on the table. Because you have to remove the guard, be especially careful with where you put your hands.



2 A tongue is formed by inverting the stock and making a second pass. Adjust the clamped hold-down block to suit.



3 Tenons are back-to-back rabbet cuts. Because they're run against the grain, some tear-out can occur at the ends of the cut.

Continued on page 24

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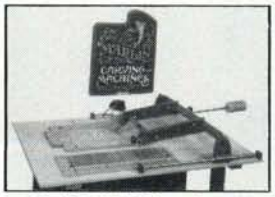

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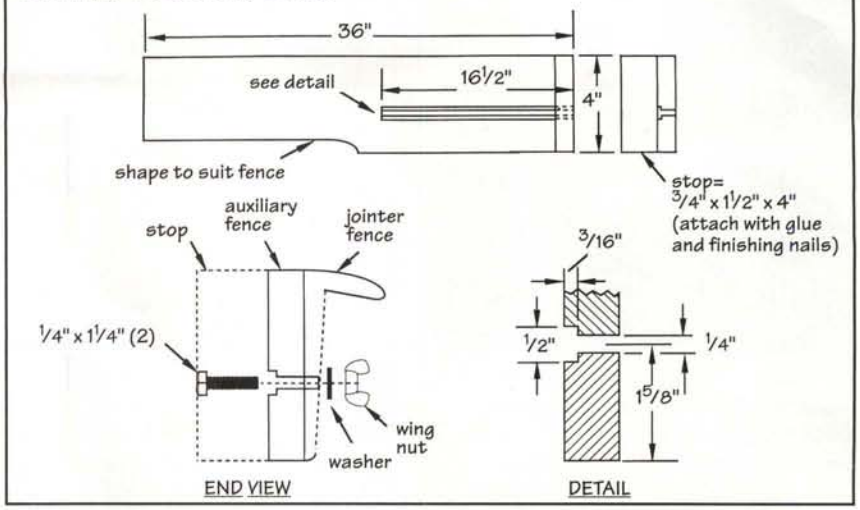
Continued from page 23

Drawing 4: Auxiliary Fence



the outfeed table. It's a fairly simple procedure so long as the work piece isn't longer than the infeed table **(drawing 3)**. For longer work, a different procedure is followed. Mark the working divisions that are shorter than the length of the infeed table and divide the depth of the cut into an equal number of divisions. For example, if the board is 24" long and you need to taper it ½", mark the center point of the board and set your depth of cut to ¼". Make one cut from the center mark; then a second cut from the end of the board.

Tapering is one situation where a long fence can be handy. A long board clamped to the regular fence can help, but a special one that can be a permanent accessory is better. The one I made for my 6" jointer is adjustable and incorporates a stop that's needed when doing some other type of jointer work **(drawing 4)**. Some jointers have holes bored through the fence that are perfect for this accessory.

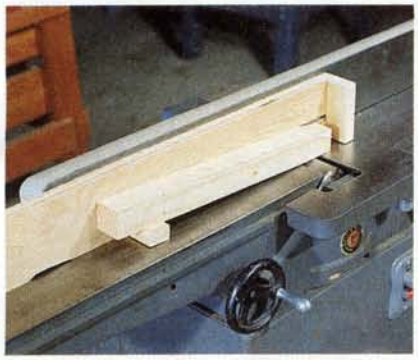
Short tapers are formed by standing at the rear of the machine and pulling the work across the knives as shown in **photo 5**. Start by lowering the infeed table for the depth of your cut and place the work over the knives where the cut must start. Use a stop block to establish that position and place a suitable height block under the aft end of the work. The block can be clamped to the table, but this will result in a slight curve running the length of the taper. If the block is attached to the work so that the two pieces move together, the taper will be flat. I do this by using double-sided carpet tape to keep the height block in place.

4 The jointer makes perfectly smooth bevels and chamfers. I prefer to work with the fence at an acute angle (less than 90 degrees).

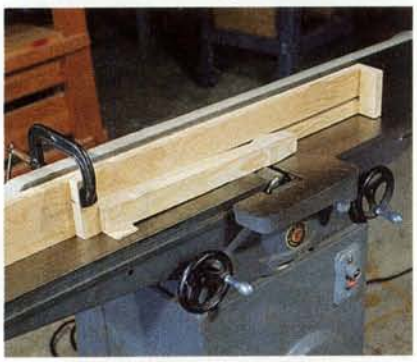
Start the cut by placing the work free of the knives and braced against the stop block. Then pull the work toward you after lowering it to contact the knives.

A companion taper, needed to complete the leg shape shown in drawing 1 is formed in the same way. In this case, two stop blocks are used — one to start the cut, the other to control its length **(photo 6)**. The slight roughness at the end of these cuts of this type can be easily sanded away.

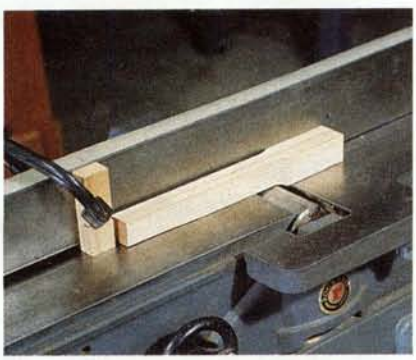
A type of leg shape that requires a similar reduction on four sides of the parent stock is another jointer function **(photo 7)**. It's like making surfacing cuts of limited length. The work is placed on the infeed table and moved forward until it contacts the stop block.



5 Form short tapers by bracing your leg against a stop block and pulling it across the knives. Use a hold-down to keep the work in place as you pull it for the cut. Always keep the guard in place, even though it isn't shown in these photos.



6 A companion taper to complete the leg shape is formed the same way. In this case use two stop blocks. Brace the work firmly against the front stop block before you lower it for the cut. A small nail, tapped in the aft end of the stock will make the leg easier to pull across the knives.



7 A leg shape that needs to be reduced in size for a limited length is a straightforward chore for the jointer. The work is placed on the infeed table and moved forward until it contacts the stop block. Then the cut is repeated on the remaining three sides.

Continued on page 26

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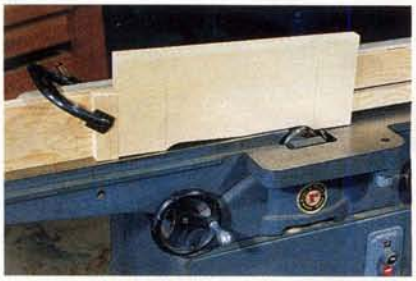
Continued from page 25



8 This photo shows a recessing cut with only the infeed table lowered. The second cut is made after reversing the stock's position.

9 The jig in the drawing above makes round tenons easier than you might think.

Recessing

A recessing cut is good for cabinet bases and bottoms of table and stand legs. If both tables of your jointer are adjustable, then lower them for the depth of the cut you want to take and make the cut in one pass. If the rear table is fixed, then make a second pass after the stock has been reversed **(photo 8)**. This leaves a raised center that can remain as an added detail or it can be ripped off your stock. In either case, use two stop blocks. One to brace against the start of the cut, the other to control the cut's length.

Round Tenons

The jointer can form integral tenons on round stock, but the job must be done carefully and with the jig in **drawing 5**. Lock the fence in place to gauge the length of the tenon and set the jig's hold-down so it secures the work while still allowing you to turn it **(photo 9)**. With the machine on, move the work forward slowly until it meets the fence and then turn it in a clockwise direction. The density of the material will affect how deep you can cut. In any case you will get better results by getting there in stages.

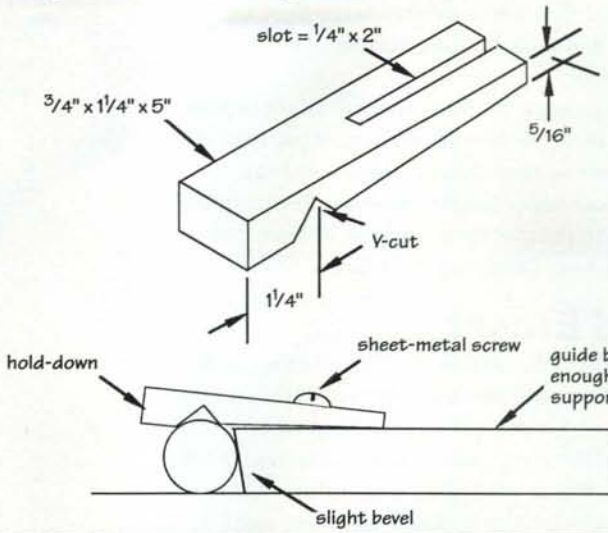
10 **Frequent honing of the knives will keep them sharp. Wrapping most of the stone will prevent it from scratching the table.**

Don't use this technique on small-diameter dowels or on short pieces. If you need short components, start with stock that is long enough for safe handling and then saw off the part you need.

Honing Knives

Frequent and careful honing of your knives will keep them keen for a long time. To hone them, first unplug the machine, cover part of a fine carborundum stone with paper and place it on the infeed table as shown in **photo 10**. Raise the table and rotate the cutterhead by hand (see **"Tales From the Wood"** to learn why this is critical) until the stone rests flat on the bevel of the knife. Stroke the knife lengthwise four or five times. Hone each of the knives with the same number of strokes. **PW**

Drawing 5: Round Tenon Jig



R.J. DeCristoforo is a member of Popular Woodworking*'s advisory board and the author of more than 30 how-to books.*

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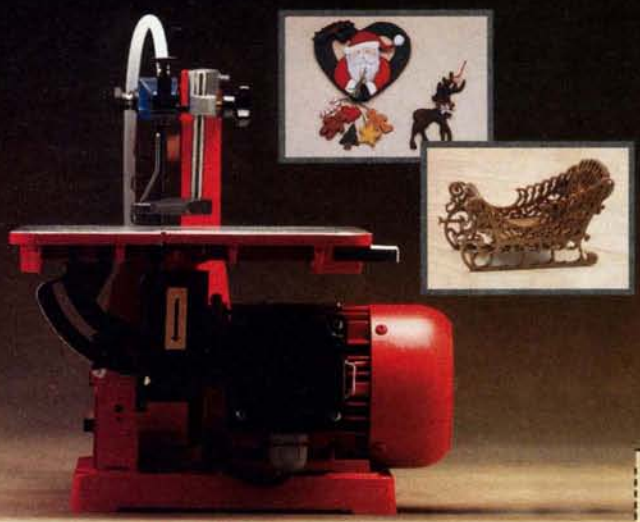

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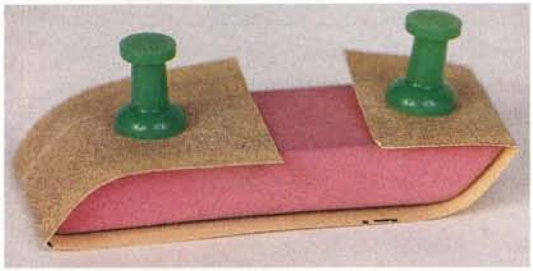
Each issue of *Popular Woodworking* offers tips and tricks for the woodworker that we've accumulated from readers, contributors and from our own workshop and woodworking experiences.

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.

The Wood Eraser

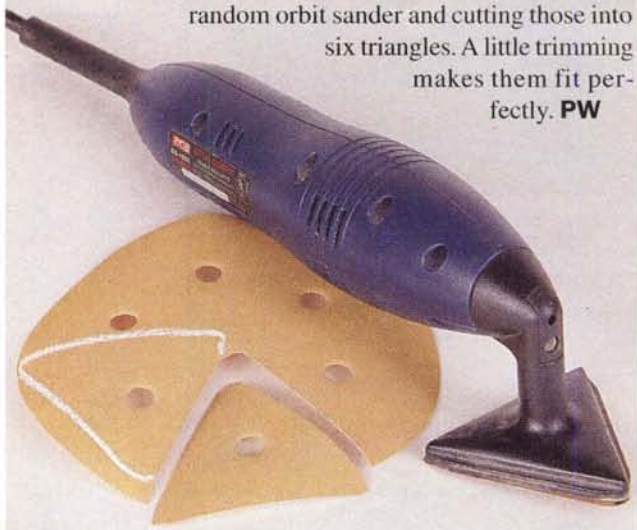
A regular sanding block is often too big for sanding small work. So I made this simple and inexpensive sanding block using a rubber eraser. Simply wrap a strip of sandpaper around the edges of the eraser and secure it with thumbtacks (we used pushpins, which work OK). The eraser is firm enough for sanding and just right for delicate jobs.



Yue Ma
Burnaby, British Columbia

It's All in How You Slice It

The sticky-back triangular sandpaper for my detail sander is really expensive. I've found I can save lots by making my own by buying 6" sticky-back disks for a random orbit sander and cutting those into six triangles. A little trimming makes them fit perfectly. **PW**



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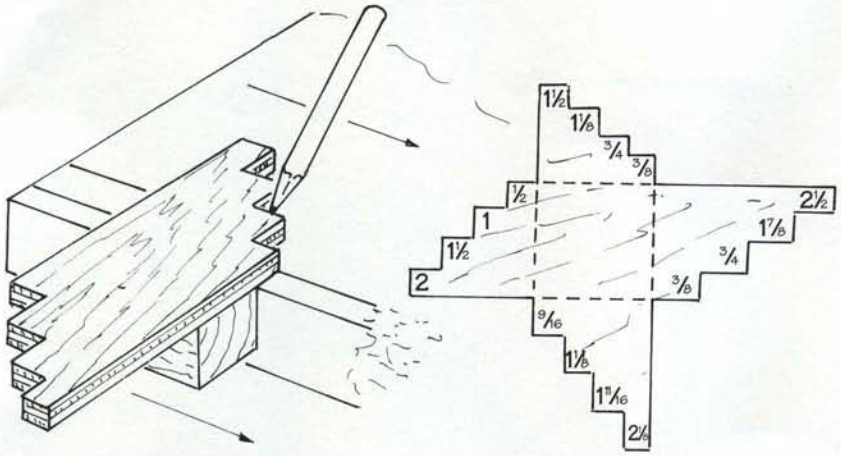
Measure for Measure



I've been using notched pieces of wood as pencil gauges for years. I found there were some measurements I needed frequently, so I made a block with several sizes, and eventually made a single gauge to incorporate all the sizes I commonly use.

I first made a two-way gauge with four marked distances on each side. The top is ¼" plywood attached to a 1" square strip that is 2" long. This gives me eight settings. I then went a step further and made a four-way gauge attached to a 2" square guide block, which gives me 16 settings. So with the two gauges, I am able to draw pencil lines at 24 different distances from an edge. I rubbed the gauges with wax to make them look nice and to help them slide easily.

Percy W. Blandford
Warwickshire, England

Bring That Old Dinosaur Out of the Closet

Don't throw away those old plastic computer diskette holders that store the obsolete 5¼" disks! They're perfect for storing the pads for your random orbital sander. Many of the diskette storage boxes even have plastic dividers, which are great for separating your grits. If you don't have one of these old boxes, you can pick them up at a garage sale for a couple bucks.

Vincent W. Koehler
Geneva, Illinois

Cheap Hardwood For Doll Furniture (Sorry, No Ash)

If you've ever built miniature furniture out of thin stock, you probably know that materials are very expensive. And not only is ¼" and ⅛" stock costly, it's also hard to find. Recently I discovered a much cheaper source for the specialty lumber: my local cigar store! Most tobacconists will give you their leftover cigar boxes (or they'll sell them to you at a low cost). In many cases these boxes are made from pretty nice ¼" or ⅛" mahogany.

Simply dismantle the boxes and sand off any printing, and you'll have as much wood as you need, at a fraction of the cost from the catalogs.

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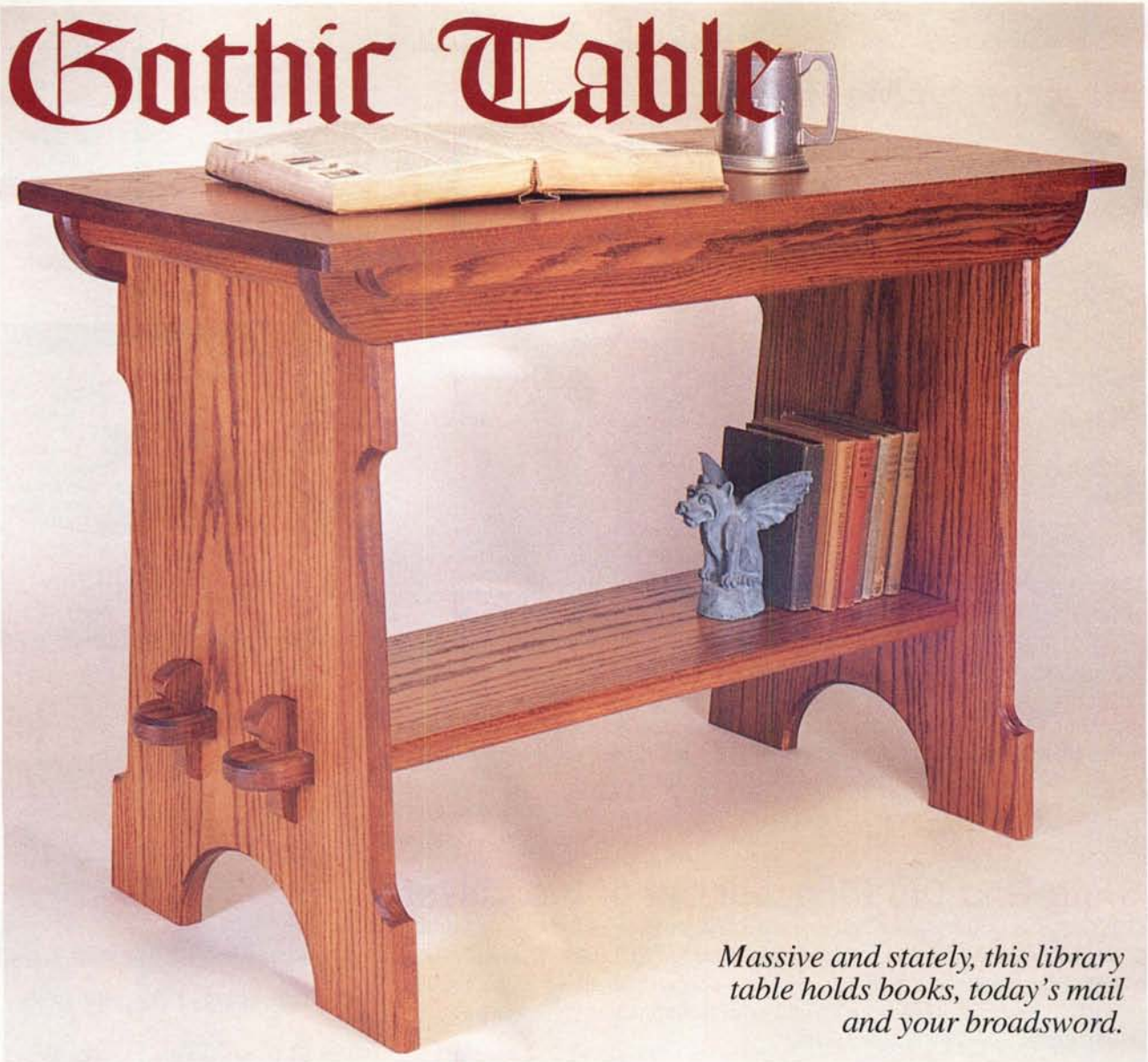
Gothic Table



Massive and stately, this library table holds books, today's mail and your broadsword.

OK, SO YOU DON'T LIVE IN A FORTIFIED CASTLE. That doesn't mean you can't dress up a corner of your Ranch home with this Gothic Revival-inspired table. The styling of this trestle table even fits in nicely with Arts & Crafts furniture. Plus, for the king on the go, the entire table knocks down in about 10 minutes — just enough time to slip out the back when the Huns are storming the gate.

For this table, I chose to use 5/4 oak, which was a common material in medieval and Gothic Revival construction (though our 16th century ancestors would have used green wood straight from the forest). For those members of royalty on a budget, you can use pine and stain it dark to achieve the same look with less money and less heft.

STEP 1 Begin the Base • First rough out your 1 1/8" stock for gluing up the large panels. You're going to have to use at least two boards for the sides, so here's a tip on selecting wood: For the two sides, look for boards that have a nice cathedral (see the "Wood Wurds"). Arrange your boards so that the cathedral pattern is in the center of the sides and glue straight-grained boards on either side. This makes each side look more like a single board and makes the seams difficult to detect. For the top, put the seam in the middle.

Surface and joint the edges and glue your panels to the sizes in the Schedule of Materials. Clamp and let dry.

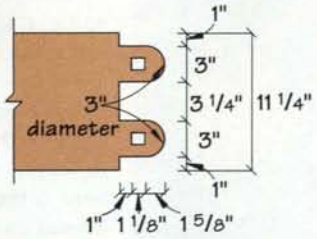
Joint one long edge of each panel and crosscut to length. Then rip the panels to size. Remove any glue squeeze-out and scrape the panels flat. Rough sand them to 80 grit.

Start construction with the sides and stretcher. Lay out the pattern for the sides following the diagram. Then lay out the tenons on the stretcher according to the diagram. For the mortises, first use a sharp knife to mark their locations then cut the mortises.

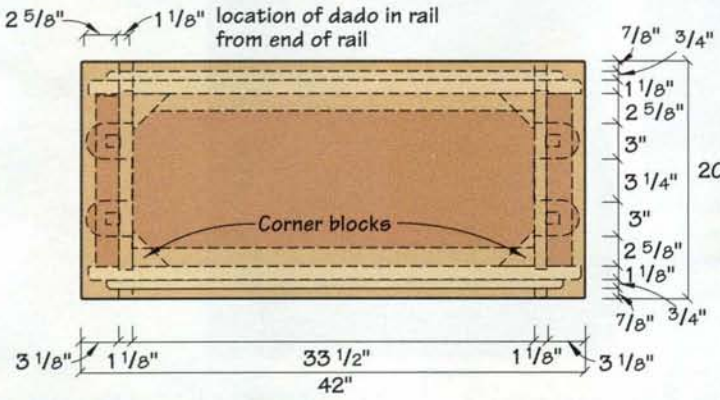
Now cut your tenons. Rip the sides that create the edge cheeks on the table saw by drawing a stop mark on your panel about 3/4" to 5/8" before you want to stop your cut. This will keep you from cutting into the shoulder.

Cut the outside shoulders by crosscutting them on your table saw. Set your blade height to 1" and run the board on edge using the slot miter gauge and a backing board. Cut all

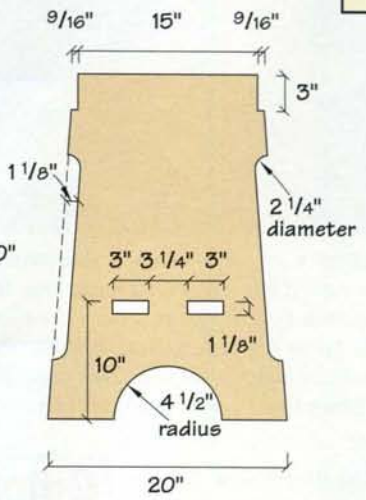
Diagrams

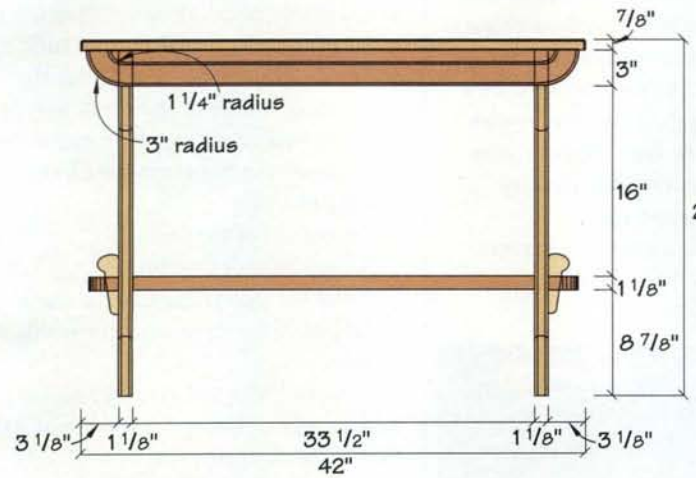


Layout of tenons on stretcher

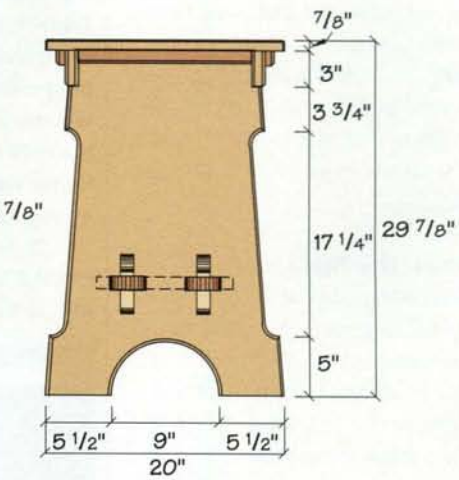


Plan





Elevation



Profile

GOTHIC TABLE

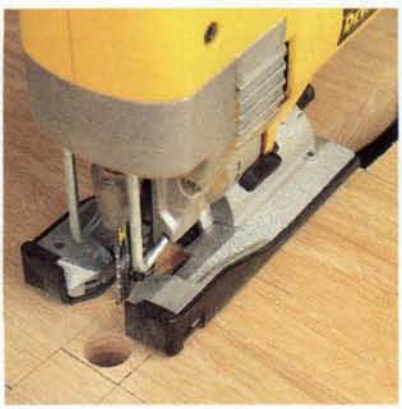
Schedule of Materials: Gothic Table

No.	Item	Dimensions T W L	Material
1	Top	7/8" x 20" x 42"	Oak
2	Ends	1 1/8" x 20" x 29"	Oak
1	Stretcher	1 1/8" x 11 1/4" x 41"	Oak
2	Side rails	1 1/8" x 3" x 41"	Oak
2	Decorative trim	3/4" x 1 1/4" x 41"	Oak
2	End cleats	1 1/8" x 2" x 14 1/2"	Oak
4	Wedges	1" x 1 3/4" x 5"	Oak

Are we on target?

To see more projects like this in future issues, circle "P9" on the postage-paid card in the Resource Directory.

1 BIG MORTISES • Cut these massive mortises by drilling a 1" clearance hole with a Forstner bit and then jigsawing out the hole as close to the line as you can get. Check your opening with a small square and clean up the opening with a four-way rasp until it's square.



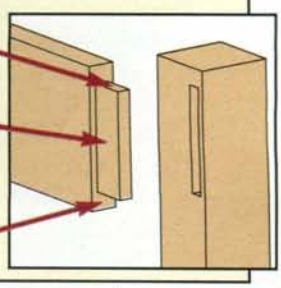
WOOD´WORDS (wood´wurds) n.

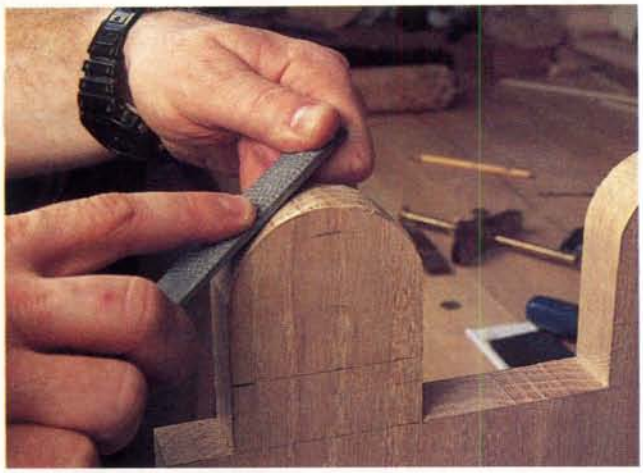
Cathedral: A peaked grain pattern that resembles a church spire or pointed mountaintop.

Edge Cheek: The edge of a tenon that runs the thickness of the board.

Face Cheek: The edge of a tenon that runs the width of the board.

Shoulder: The part of the tenon that seats against the mortise.





2 CRITICAL TENONS • Here I'm shaping the tenons with a rasp after I roughed them out on a band saw. Notice the pencil marks on the tenon. The two dark lines show where the side will go on the tenon. Note that the location of the mortise is a little inside that line. This pulls the whole table tight when the wedges are inserted.

3 CHAMFERS ALL OVER • Chuck a chamfer bit into your router and cut a ¼" x ¼" chamfer on the outside edges of the piece that aren't part of the joinery. Shown here is the chamfer cut on one edge of the end cleat.

four corners. To finish cutting away the waste material on the corners, clamp the stretcher into a vise and use a handsaw to finish the cut.

To form the center shoulder, band saw out the waste between the two tenons. Clean up your cuts with a chisel and a rasp. Fit your tenons into the mortises in the sides.

STEP 2 Finish the Base • Lay out the radii on the ends of the tenons according to the diagram. Then lay out the mortises for the wedges, also called keys. Use a piece of scrap 1⅛" material to determine where the sides will fit on the tenons. Then mark the mortises ⅛" in toward the panel so your wedges will pull the side tight against the stretcher.

Cut the radii on the tenons with a band saw or jig saw. Drill a clearance hole for the mortises and then jigsaw out the waste.

With all your mortises and tenons cut, band saw out the shape on the sides and clean them up with a block plane.

The sides are captured in place at the top by dadoes cut across the width of the two side rails. The diagrams show the location for the ¼" x 1⅛" dadoes, as well as the radii on the ends of the rails.

The decorative trim uses a similar radii detail that you can cut at this time. The last pieces to cut are the end cleats used to attach the top.

Going Medieval?

If you like the looks of this Gothic Table, try building the Glastonbury Chair that was featured in the September 1997 issue of Popular Woodworking (issue#98). It was the only chair that survived when Henry VIII burned Glastonbury Abbey 450 years ago.

To order a back issue, call (513) 531-2690 ext. 320. Issue #98 is $4.50.

STEP 3 Chamfer • If you haven't noticed, the table's parts look hugely oversized at this point. A chamfer detail on most of the edges will lighten their appearance. Rout a ¼" x ¼" chamfer on the outside edges of the stretcher, side rails, decorative trim, end cleats and panels. Do not cut the chamfer on the following places:

- The bottom of the feet.
- The top edge of the sides.
- Where the side rails meet the sides.
- The part of the tenons that are inside the mortise.

Cut an ⅛" x ⅛" chamfer on the top and corners of the top (don't chamfer the bottom of the top panel).

STEP 4 Assembly • Lay out your wedges according to the diagrams in the PullOut™ Plans and band saw them to size. Fit the wedges to the mortises. Use a bench plane to thin the backs and sides of the wedges to fit the mortises.

Assemble the base by knocking the wedges home. To keep from denting the wood, use a dead blow hammer or a hammer with a block.

Temporarily clamp the side rails into the dadoes on the ends. If your end cleats are a little long, cut them to fit your opening. Now drill holes for the screws. From the inside of the sides, drill 3/16" clearance holes through the sides and into the two end cleats. Ream them out horizontally (against the grain). This will prevent

4 SIZING WEDGES • The wedges in the PullOut Plans are a little oversized, so you'll have to cut them down a bit to get a snug fit. The best way to do this is to run them flat against a bench plane that you're holding down against your work bench. Take light passes on the back and sides, then try to fit the wedge into the mortise. Continue shaping until the wedge pulls the joint snug. If the round head of the wedge is touching the tenon, then you've cut your wedges too small. Start again.

your screw heads from snapping when the wood moves. Then drill clearance holes in the end cleats for the screws that will attach the top. Drill oblong holes that run the length of the grain through the cleats to attach the top. Again, this will prevent your table from self-destructing when the wood breathes with the seasons. Countersink all the screw holes and attach the end cleats.

Make four corner blocks to reinforce the base by diagonally cutting two 3/4" x 3" x 3" blocks. These attach the sides to the side rails. With the base still in clamps, pilot drill and attach the blocks in the locations shown in the diagram.

Screw the decorative trim flush to the top from the inside of the rails. To attach the top, set the top upside down. Put the base upside down on the top and attach the base with #10 x 1 1/4" screws. A smaller screw might snap from wood movement.

Disassemble the entire table and sand your parts thoroughly to 150 grit. You can finish this table many ways. We chose a staining method as old as gothic design. We used "asphaltum" that we rendered from plastic roof cement (see the story on **"The Road to a Fine Finish"**). You also could use brown glaze or an off-the-shelf brown stain.

No matter what stain you choose, cover the table with two coats of clear finish. For an antique look, use a ring of keys and a gingerly touch to put small dings and scratches on the surfaces that would typically get worn. **PW**

Jack J. Mullen is a designer and writer of spy, detective and occult fiction in Vero Beach, Florida. He was an architect for 35 years, a member of the British Institute of Architects and Engineers and now concentrates on residential design and house plans. The table was constructed by Associate Editor Jim Stuard and finished by Editor Steve Shanesy.

The Road to a Fine FInish

In ancient times, wood was colored with whatever material was available that could impart a desirable color. One of the oldest finishing materials is asphaltum, a petroleum-based tar. Today asphaltum is dirt cheap and readily available in plastic roof cement. Yes, you read that right, $4-a-gallon plastic roofing cement that fixes leaks in your gutters and flashing. And one gallon can last for years. It gives oak a beautiful brown glow. It's easy to apply. And it's cheaper than almost anything else on the shelf.

Now before you start globbing that sticky goo on your projects, you have to do a couple things to the mix to make it work. Plastic roofing cement is made of petroleum asphalt, calcium carbonate (the stuff they once used to stripe football fields and baseball diamonds), cellulose fibers, silliceous earth (usually sand) and magnesium carbonate. To make your finish, you want to render the tar from the cellulose and sand. Here's how:

First take a tennis-ball sized scoop of the roofing tar and plop it in a coffee can. Add a cup of mineral spirits to dilute the tar and a couple ounces of VMP (varnish-makers' and painters') naphtha, which will make your finish dry more quickly.

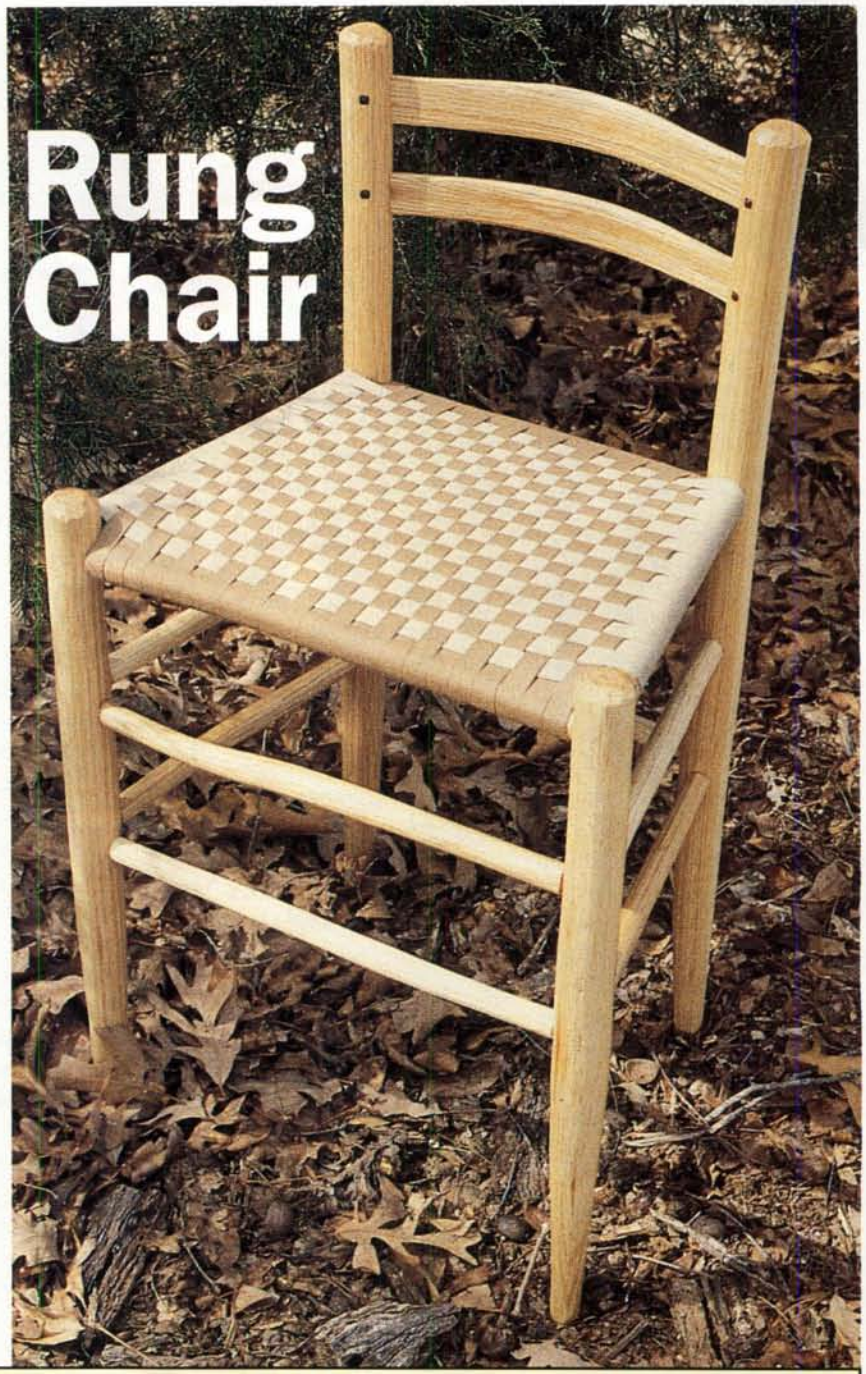
Stir the ingredients together with a stick and squeeze the solid material against the side of the can, forcing the liquid out of the solid blob. Pour the liquid off into another can and repeat. Another method would be to push the mixture against an old piece of household screen over a bucket.

After you've separated the liquid from the cellulose stuff, you need to strain it. You can pour it through a disposable paint filter from your hardware store or even use your spouse's old pantyhose (ask first).

Control the color by adding more black stuff or diluting the mix with more mineral spirits. When you're satisfied, wipe the finish on your raw wood and then wipe it off. Let it dry overnight before applying your clear finish. I think you'll find "asphaltum" has many of the qualities as premium dark stain. PW

OZARK Post & Rung Chair

This traditional seat is great for guitar players, children and your lower back.



THIS SHAKER-INFLUENCED CHAIR is of post and rung design (which dates back about 400 years), and was originally intended for use at a treadle sewing machine. Guitar players particularly like this chair, because its seat is 2" to 3" higher than a dining chair's, and the low back gives extra lumbar support. It's also a good chair for children at the dinner table who would otherwise need a phone book.

As with all projects, hands-on work begins with material selection. Hardwoods that are straight-grained and free of knots provide the best strength. I've found oak, ash, maple and hickory to be both flexible and strong.

After selecting your lumber, prepare all the pieces according to the Schedule of Materials and — if you're using green wood — the Traditional Wood Preparation information below. The legs and spokes are rough to cut octagonal shape, which brings you halfway to a round, but still leaves flat sides that come in handy later. The pieces are later rounded with a spokeshave (if the grain is straight), or they can be turned on a lathe. It would also be a good idea to make a few extra spokes, just in case.

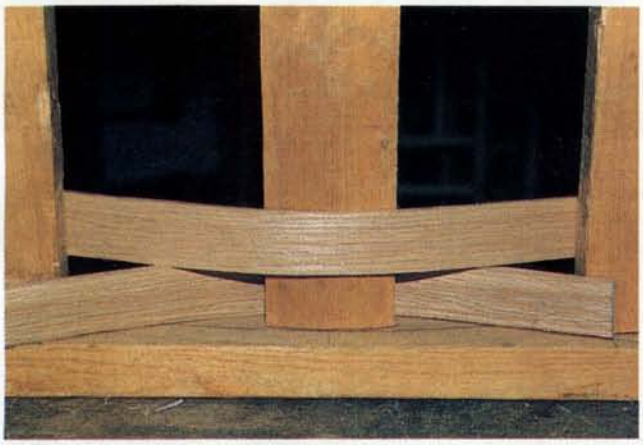
Traditional Wood Preparation

Traditionally the wood for post and rung legs is a little green, while the spokes are dry. This makes a tight joint because the green wood of the legs dries, causing the mortises to squeeze tight around the spokes. I've seen 80-year-old chair frames made this way with the joints in good shape.

I prefer to cut my own lumber for the advantage of working with green wood, as well as being able to follow the grain and use it to the best advantage for beauty and strength. The construction steps in the article can also be used with milled lumber, though you might consider using a construction adhesive instead of carpenters glue, as adhesive has greater ability to fill gaps and will remain flexible.

Even though green wood is preferable for the legs, it's a good idea to let them dry a little to set the bends and to harden the surfaces to get a good smooth finish. I air dry the legs for about a month, and the spokes for at least that long. I finish drying the spokes in an oven on low until they're good and dry. Slats made from green wood take about two weeks to dry, while slats made from dry wood that has either been soaked or steamed only take a few days to dry. It's important to keep good air flow around the pieces while drying.

In preparing pieces for bending, it's important to use clear wood and to have the grain aligned as well. Any variations in the grain can cause irregularities in the final bend. It's also helpful to make the pieces extra long for added leverage when putting the pieces in the bending jigs.



1 BENDING JIG • If you're working with dried wood, the pieces will need to be soaked for a few days, or put in a steamer prior to bending.

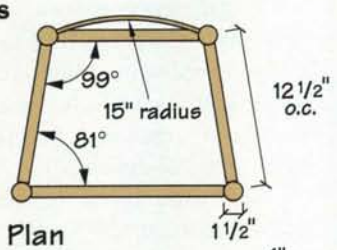
2 SPOKES • To turn the spokes, you'll need a set of calipers set to the outside dimension of the hole drilled in the testing block, a small skew chisel, a 1" flat chisel, a 3/8" spindle gouge and an awl. In this photo, the 1" flat chisel is shaping the tenon to the final dimension (top). After the tenon is cut, flatten the sides of the tenon with a whittling knife to keep the mortises from splitting.

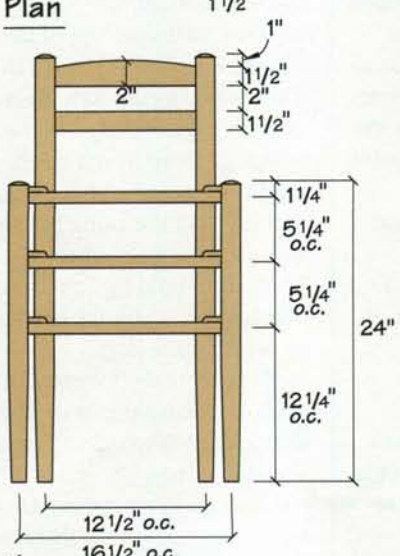
STEP 1 Bending the Slats • As it takes a little time to set the bends in the slats, this should be your first step. My bending jig is made out of four pieces of wood. The center post is a 2x4 with chamfered corners. The two side posts are made from a 2x4 ripped in half and nailed to the fourth piece of wood, with 16" between the centers of the two posts. The slats are set in the jig and then left to dry until the wood holds the desired shape.

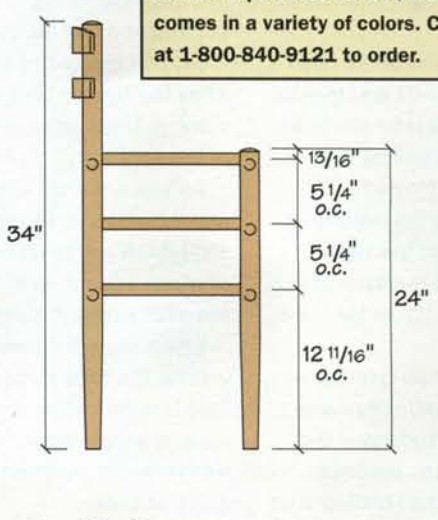
STEP 2 Tenons on the Spokes • There are several ways to make the tenons on the spokes. They can be whittled with a knife, rounded off with a spokeshave, cut with a spoke auger (a device that fits into a brace and works like a pencil sharpener), or turned on a lathe.

I've tried all these ways, and my favorite is the old-time, reciprocating foot lathe because it's cheap and easy to make. It also works better than a power lathe for cutting tenons on the ends of a piece of stock because there is no live center to contend with. First, use an awl to mark the center of each end

Diagrams







Schedule of Materials: Post & Rung Chair

No.	Item	Dimensions T W L	Material
2	Back legs	1 1/2" x 1 1/2" x 34"	Hickory
2	Front legs	1 1/2" x 1 1/2" x 24"	Hickory
3	Front spokes	7/8" x 7/8" x 17"	Hickory
8	Spokes	7/8" x 7/8" x 13"	Hickory
1	Slat	5/16" x 1 1/2" x 16"	Hickory
1	Slat	5/16" x 2" x 16"	Hickory

Shaker tape costs about $7.50 for a 10-yard roll and comes in a variety of colors. Call Shaker Workshops at 1-800-840-9121 to order.

Weaving the Seat

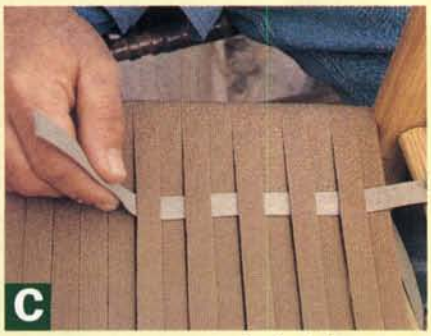
I weave the seats of my post and rung chairs with either hickory bark, white oak splits or Shaker tape. The hickory bark and the white oak I make myself. For the Shaker tape, see the Schedule of Materials.

All three materials are woven in the same basic manner, with the only difference being in how the pieces are joined together and the amount of slack left in the warp. The thicker the material, the more slack is needed.

For this chair I used narrow Shaker tape of two contrasting colors. Shaker tape is relatively thin, and this chair has a small seat, so the warp can be left a little snug. A simple over-one, under-one weave is used to create a checkerboard design.

A

B


C

To start, attach the tape to the back of the chair by looping the end of the tape around the back spoke next to one of the back legs. Then, with a needle and thread, stitch the loop closed (see photo A). Never start a seat by nailing the material to the chair frame.

Run the tape along the bottom of the seat to the front of the chair. Loop the tape around the front spoke coming up from the bottom then over the top.

Continue with the tape running over the top of the seat heading towards the back of the chair. Loop over the back spoke from the top covering where you started and go back across the bottom to the front again. Lay this pass next to the first and keep going (photo B). When the whole seat is wrapped front to back you've created the warp.

The last run of the warp is brought under the seat and across to the side next to the inside of the back leg. From there it wraps around the side spoke coming out on the top of the seat. Now you are ready to start the seat's weave.

First stitch the different colored tape onto the end of the warp on the underside of the seat. The checkerboard pattern is then woven by going over one, under one, over one, etc. with the weave. Only the top layer of the warp is woven to start (photo C). Each run of the weave is pulled tight and the next run is started opposite to the one before. If the first run started at over-one, then the next run should be started by going under-one. After the top run is complete, use the same process to weave the underside of the seat.

As you continue with the weave, make sure to keep your lines straight. If you need to stitch on a new piece, do it on the underside of the seat where it won't show.

When there's no more room to weave, it's time to tie off the end. This is done on the underside of the seat by simply tacking the end of the weave to the warp with a couple of quick stitches.

3 HAND-CUT MORTISES • With the mortise locations marked, put the front legs aside and start cutting the mortises in the back legs first. The rectangular mortises for the slats are ¼" wide x 1" deep and should have a flat bottom. These mortises are marked out on the quarter grain, so they will run parallel to the growth ring, and then chopped out with a ¼" mortising chisel in line with the growth rings. After chopping out the general shape, clean up the sides with a 1" flat chisel.

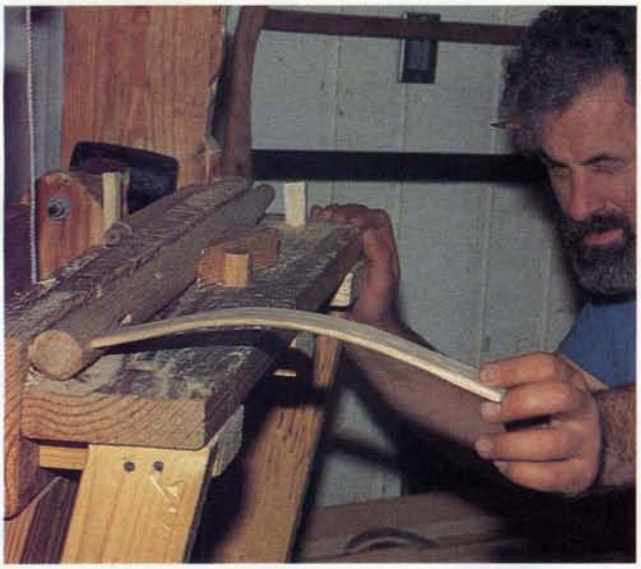
of the spoke, then set the spoke in the lathe and mark the length of each tenon at 1".

Turn the tenons using a skew chisel to first cut the shoulders, then use a spindle gouge to rough out the diameter of the tenon, leaving it a little oversized. A 1" flat chisel is then used to turn the tenon to its final ⅝" dimension.

Next, use a flat chisel to chamfer the end of the tenon, and finally cut a "locking ring" in the middle of the tenon with the skew chisel as shown in the photo. This locking ring, which is flat on the outside edge and tapered on the inside, will be grabbed by the green wood of the legs as it expands. Using a testing block drilled with the same bit you'll use to make the mortises, check each tenon for fit. They should fit tight, so if a tenon is a little loose, mark the end and tighten it up with a shim later.

Next, round off the rest of the spindle with a spokeshave or on the lathe, and then give each spindle a final polish with wood shavings.

With the spoke removed from the lathe, flatten the sides of the tenon with a whittling knife — perpendicular to the growth



4 FINDING THE RIGHT ANGLE • Loosely secure the back leg in the vise with the opening of the slat mortises facing toward you. The front of the leg is down. To get the correct angle for drilling the mortises, place one of the slats in its mortise and slightly rotate the leg up until the slat is in the proper position with the line of the back of the chair parallel to the bench. This takes practice and careful eye-balling.

5 FOR TIGHT MORTISES • If one of the tenons is a little loose it can be tightened with a single wood shaving wrapped to cover the top and bottom of the tenon. A little extra glue should be placed on the tenon as well. With a mallet, drive the spokes home until their shoulders seat against the leg.

6 MORE EYE-BALLING • Loosely clamp the front legs to the bench with the spokes pointing up from the shelf at a 90 degree angle. Now rotate the upper front leg toward you 2" (which is half of the difference between the length of the front spokes and the length of the side spokes). This creates the necessary angle for drilling the front side mortises. Secure the leg firmly and drill the mortises. Flip the panel over and drill the side mortises in the other front leg the same way. This process is repeated to drill the back side mortises with one difference, instead of pulling the upper leg toward you to create the correct angle, push the upper leg away from you 2" out of square.

rings — to keep the mortises from splitting later.

The tenons for the slats are made from the ends of the slats. First trim the bottom edge of the slat flat and straight with a whittling knife. Then mark the 2" top slat at a 1 1/2" height on both ends. Next, starting in the middle of that slat, trim the top down to the 1 1/2" marks at the ends to form the arch.

After the slat has been shaped to your liking, round off all the top and bottom edges leaving no sharp corners. The ends will be chamfered so they'll slip easily into the mortises, but it's best to wait to fit these into the mortises during assembly. Smooth the front and back surfaces of the slats with a cabinet scraper or sandpaper then rub with wood shavings to polish.

The legs are turned to their finished 1 1/2" diameter but left long. To give the chair a more graceful appearance, I taper the bottom of the legs down to about 1 1/8" diameter, starting the taper about 9" from the floor.

STEP 3 Make Mortises • Determine the location and size of the mortises according to the diagram. This also means deciding which leg will go on which side of the chair. Also consider that the mortises should be drilled at an angle to both the growth rings and the rays in the legs to help prevent splitting of the wood around the mortises. Trim the bottom of all four legs square where they will rest on the floor, then measure up from the bottom to lay out the mortises.

STEP 4 Spoke Mortises • Once the slat mortises are cut, start drilling the mortises for the spokes. Drill only the mortises *between* the two back legs at this time. Position the slats in their mortises using the method shown in the photo and knock in wedges to secure the leg tightly.

After marking the centers, the mortises are drilled using a brace and bit, though a drill press can also be used with a vice for holding the legs. The centers are eye-balled and when the Band-Aid wrapped around my bit reaches the front edge of the shelf, that's my depth stop. Though rustic, the process has served for hundreds of years (except for the Band-Aid). You may have a similar method to determine proper depth.

The process is repeated for the other back leg, then the mortises for the front leg spindles are drilled. Again, only drill the mortises *between* the two front legs. The top of each leg is then rounded off with a whittling knife.

7 PEGS • These walnut pegs are both visually attractive and further *reinforce your* mortise-and-tenon joint.

STEP 5 Chair Assembly • To assemble the chair, first glue one set of spindles in one of the front legs. Place the spokes in the mortises with the flattened sides of the tenons running parallel to the leg length.

The spokes are positioned this way so that when they are driven home, the force will be exerted on the top and bottom of the mortises rather than from side to side. This reduces the chance of splitting the mortise.

Put glue in the mortises of the other front leg and drive it on to the other end of the three front spokes, completing the front panel of the chair.

Check to make sure that the two front legs are in line with each other. If they are not, a little leverage can push them in line. This process is repeated for the back panel, with the addition of gluing the slat mortises.

STEP 6 Join the Front and Back • With the front and back panels assembled it's time to drill the mortises for the side spokes. To accommodate the shape of the seat, the back side mortises are drilled at an angle to the back at 99 degrees, while the front side mortises are drilled at 81 degrees.

The side mortises are drilled above the front and back spokes (except for the bottom back mortise) but lowered 1/16" so the drill will cut into the top of the front and back tenons. This creates a saddle notch with the side spokes locking in the front and back spokes. Mark the centers of the 5/8" side mortises 9/16" above the centers for the front and back mortises (except the bottom back, which is marked below). Find the proper angle to drill the mortises using the method in the photo.

Glue up the front side mortises and drive in all the side spokes. Then glue up the back side mortises and drive on the back panel. This completes the chair's basic frame.

Check the frame for squareness. If it's a little off, this can be corrected with a little push here and there. Band clamps can pull a frame into square until the glue has set.

STEP 7 Peg the Slats • As a finishing touch, I drill 1/4" holes and peg the ends of each slat with a square-headed walnut peg.

Check the completed frame for any unsightly marks that can be scraped off. Clean up any excess glue and apply your finish. I use three, four or five coats of 100 percent tung oil. The last coat is wet sanded with 400 grit wet/dry sandpaper. You're now ready to weave the seat.

Whether you've used hand tools or power tools to make this chair, you'll have years of use out of this classic, versatile piece of craftsmanship. **PW**

Owen Rein *has been making chairs professionally in this manner for 15 years and teaches chairmaking. You can write to him at P.O. Box 1162, Mountain View, AR 72560.*

Good Chair Design

There are many ways to make a chair, but whether you're using hand tools or modern powered equipment, the first thing to consider is design.

Good chair design is demanding because chairs need to conform to the irregularities of the human body and to hold it in the proper position for the given situation. Lounge chairs require a different center of gravity than a dining chair or work stool.

In my almost 20 years of chair making, I have developed most of my designs through the time-consuming method of trial and error. I encourage my students to do the same and not copy other chairs. Having said that I must also point out that there are indeed a few specific rules for good chair design that the would-be chair maker should keep in mind.

1 Seat height should allow the user's feet to rest comfortably on the floor. The underside of the thigh should be supported by the seat without undue pressure from the front spoke.

2 Work chairs can be higher. Lounge chairs, lower.

3 Table or desk chairs should have seats 10" to 11" lower than the top of the work surface.

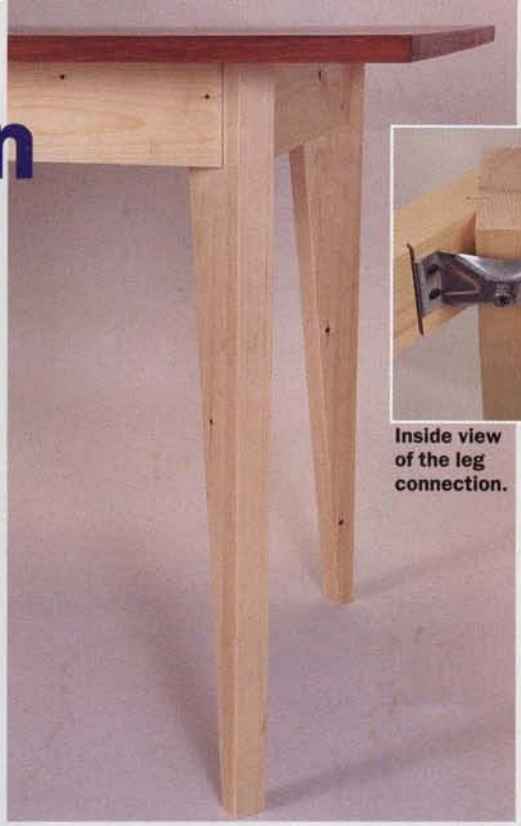
4 Backless stool seats should be level with the floor.

5 Chairs with backs should have the seat tilted rearward. This is important because the rearward tilt shifts the center of gravity to the back of the chair. I achieve this tilting of the seat by simply shortening the back legs of the chair. Low-back work chairs and bar stools have the back legs shortened 1/2", dining chairs about 3/4", rocking chairs 1 1/2".

6 All chairs with backs, (except low backs no higher than 12" or so) should have the backs tilted rearward relative to the plane of the seat so that the angle formed by the seat and the back is greater than 90 degrees. This is necessary to accommodate the outward curve of a person's shoulders.

Humanscale 1-2-3 **published by the MIT Press is a useful book that includes very complete and specific technical information on proper chair design.**

A Quick Modern Table



This is *the* table for those with limited time and money. All you need are three 8'-long premium grade 2 x 4's, a partial sheet of plywood, a set of steel corner braces ($3) and an afternoon. That was my investment in getting this table ready to finish. And if you don't like the table's size or leg style, just change it.

STEP ONE: If you have a planer, clean up your 2 x 4's enough to square up the corners. Now cut the legs and aprons to length.

STEP TWO: Taper the legs. Just draw the line (see layout in the PullOut™ Plans) and cut it with the band saw. Then clean up the angle cut with a bench plane.

STEP THREE: On the ends of the aprons, make a 45-degree cut, but make sure they remain the intended length. Now remove the sharp edge of the miter cut by turning the parts over and cutting another 45-degree angle, leaving about a 3/16" of flat (see diagram detail).

The secret to holding the legs and aprons together is the spline. You can use biscuits, cut a groove with your router or make a 1/8" saw kerf cut on your table saw. I then cut my splines from 1/8" baltic birch plywood. If you don't use baltic birch or biscuits, use a 1/4" thick spline.

Inside view of the leg connection.

STEP FOUR: Now make one more shallow cross cut near the inside ends of the aprons. The location may vary depending on the steel corner braces you buy. Position the kerf such that the short leg of the brace fits in the dado.

Pilot drill into the leg for the lag screw. Use a lag screw to pull the corner brace to the leg, which in turn cinches the aprons to the legs.

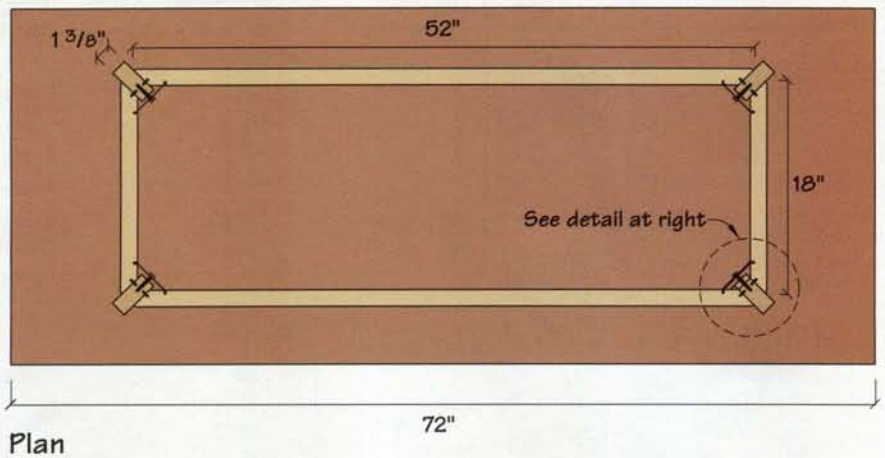
STEP FIVE: After cutting the top to size, finish the plywood edges with adhesive-backed veneer tape. You can apply it using an ordinary iron. Fix the top to the base using cleats; two for each long edge and one for the short ends.

STEP SIX: For finishing, remove the top and sand all the parts to 150 grit. I used a water-based aniline dye on the top, so I first raised the grain with a damp cloth, then I resanded the table with 150. Rag on the dye (Moser's Golden Amber Maple) to a uniform color and let dry.

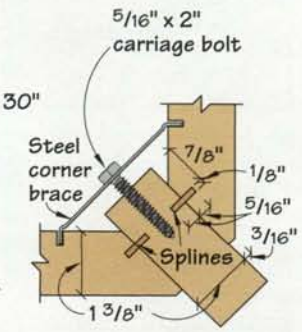
Cover the table with a couple coats of clear finish, sanding lightly between coats with 360-grit sandpaper. **PW**

—Steve Shanesy, PW staff

Diagram



Plan



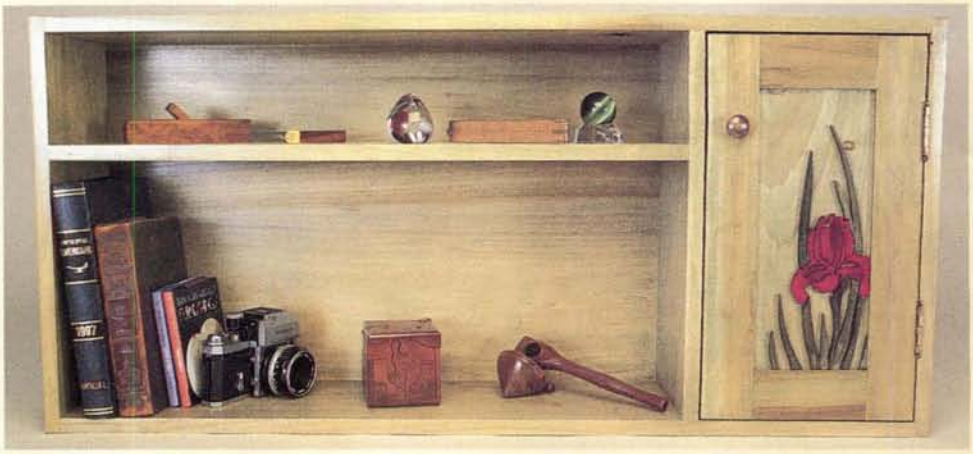
Detail of corner joint

Schedule of Materials: Modern Table

No.	Item	Dimensions T W L	Material
1	Top	3/4" x 30" x 72"	Plywood
4	Legs	1 3/8" x 3 3/8" x 28 1/4"	Pine
2	Stretchers	1 3/8" x 3 3/8" x 18"	Pine
2	Stretchers	1 3/8" x 3 3/8" x 52"	Pine

Are we on target?
To see more projects like this in future issues, circle "P6" on the postage-paid card in the Resource Directory.

BYRDCLIFFE CABINET



The furniture built by the Byrdcliffe Arts & Crafts Colony between 1903 and 1905 is rare, unusual and expensive. Luckily, it's cheap and easy to build at home.

Instead of pricey quartersawn white oak, many Byrdcliffe pieces were built from inexpensive poplar. And instead of the fussy ammonia fuming process used by many Arts & Crafts manufacturers to color their furniture, many Byrdcliffe pieces were left uncolored to show off the grain. Our project is inspired by a hanging cabinet that sold at auction for $3,740.

STEP ONE: Cut the pieces to size according to the Schedule of Materials. Pre-sand the cabinet parts, then assemble the frame with biscuits or dowels. Make sure the shelf and divider are flush to the front of the cabinet. Glue and clamp until dry.

STEP TWO: Next rip the rails and stiles for the door, making a 1/4" wide by 5/8" deep groove in the center of one long edge of all four pieces to receive the panel. The groove also holds the tenons in the rails. Then cut 1/4" x 9/16" tenons on both ends of the door's rails using a dado stack. Cut a 1/4" x 1/2" rabbet on all four edges of the panel. Sand the parts, then assemble the door with the rabbet facing the back of the door. Glue and clamp.

STEP THREE: Cut a 1/4" x 3/4" rabbet in the back of the cabinet with a rabbeting bit chucked in a router. Glue up the poplar for the back. When dry, nail the back into place. Be sure to allow some space for the back to expand. If you want to make the cabinet weigh less, use 1/2" poplar plywood for the back, but be sure to then cut the shelf and divider 1/4" wider. (Don't use less than 1/2" plywood if you plan to hang the cabinet by screwing through the back.)

STEP FOUR: Cut mortises for the hinges and hang the door before finishing. Finish sand the cabinet. The best way to stain the cabinet green is by spraying on aniline dye diluted with alcohol. I used an inexpensive Preval™ Power Unit aerosol can (it costs about $4 at craft and hardware stores). After you spray the dye on, wipe it down immediately with a rag moistened with denatured alcohol to minimize blotching.

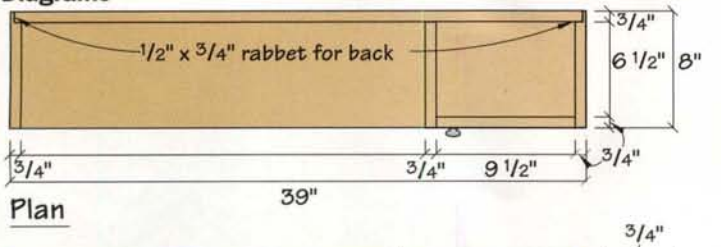
STEP FIVE: Cut the iris flower pattern from 1/4" poplar with a scroll saw or coping saw (see the PullOut™ Plans). Dye the pieces, then glue them to the panel with a "super" glue. Cover the cabinet with two coats of clear finish. **PW**

—Christopher Schwarz, PW staff

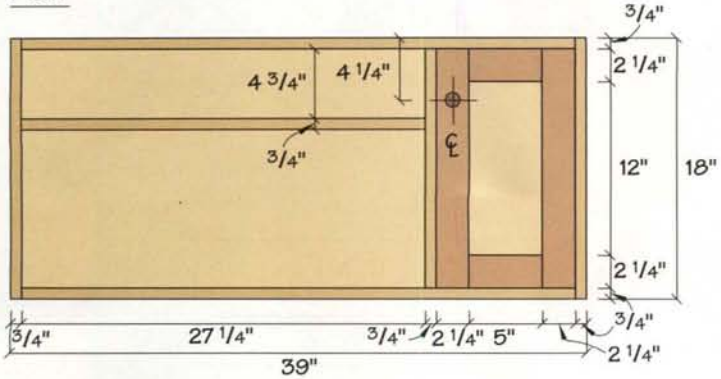
Schedule of Materials: Byrdcliffe Cabinet

No.	Item	Dimensions T W L	Material
2	Sides	3/4" x 8" x 18"	Poplar
2	Top & Bottom	3/4" x 8" x 37 1/2"	Poplar
1	Shelf	3/4" x 7 1/4" x 27 1/4"	Poplar
1	Divider	3/4" x 7 1/4" x 16 1/2"	Poplar
1	Back	3/4" x 17 1/8" x 38 1/8"	Poplar
2	Rails	3/4" x 2 1/4" x 6"	Poplar
2	Stiles	3/4" x 2 1/4" x 16 1/2"	Poplar
1	Panel	1/2" x 6" x 13"	Poplar

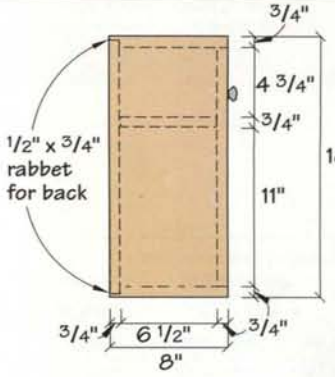
Diagrams



Plan



Elevation



Profile

Are we on target?

To see more projects like this in future issues, circle "P3" on the postage-paid card in the Resource Directory.

PullOut™ Plans • March 1998 #101

Popular Woodworking

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

INSIDE

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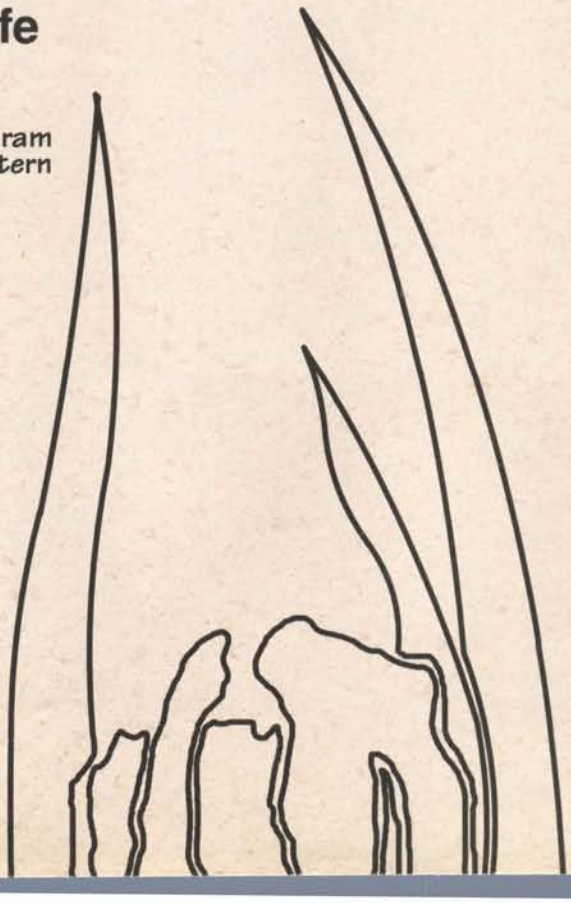
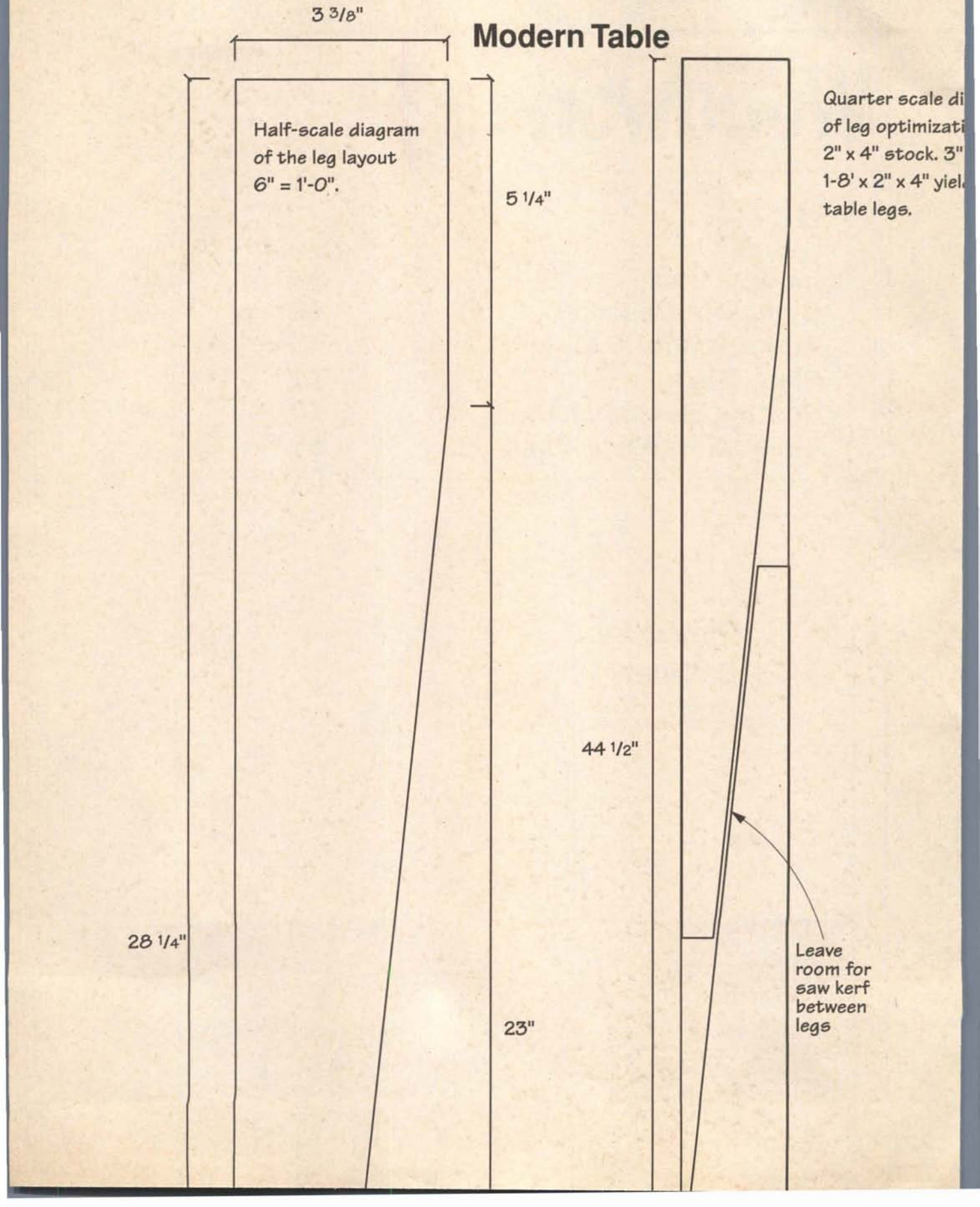
Byrdcliffe Cabinet

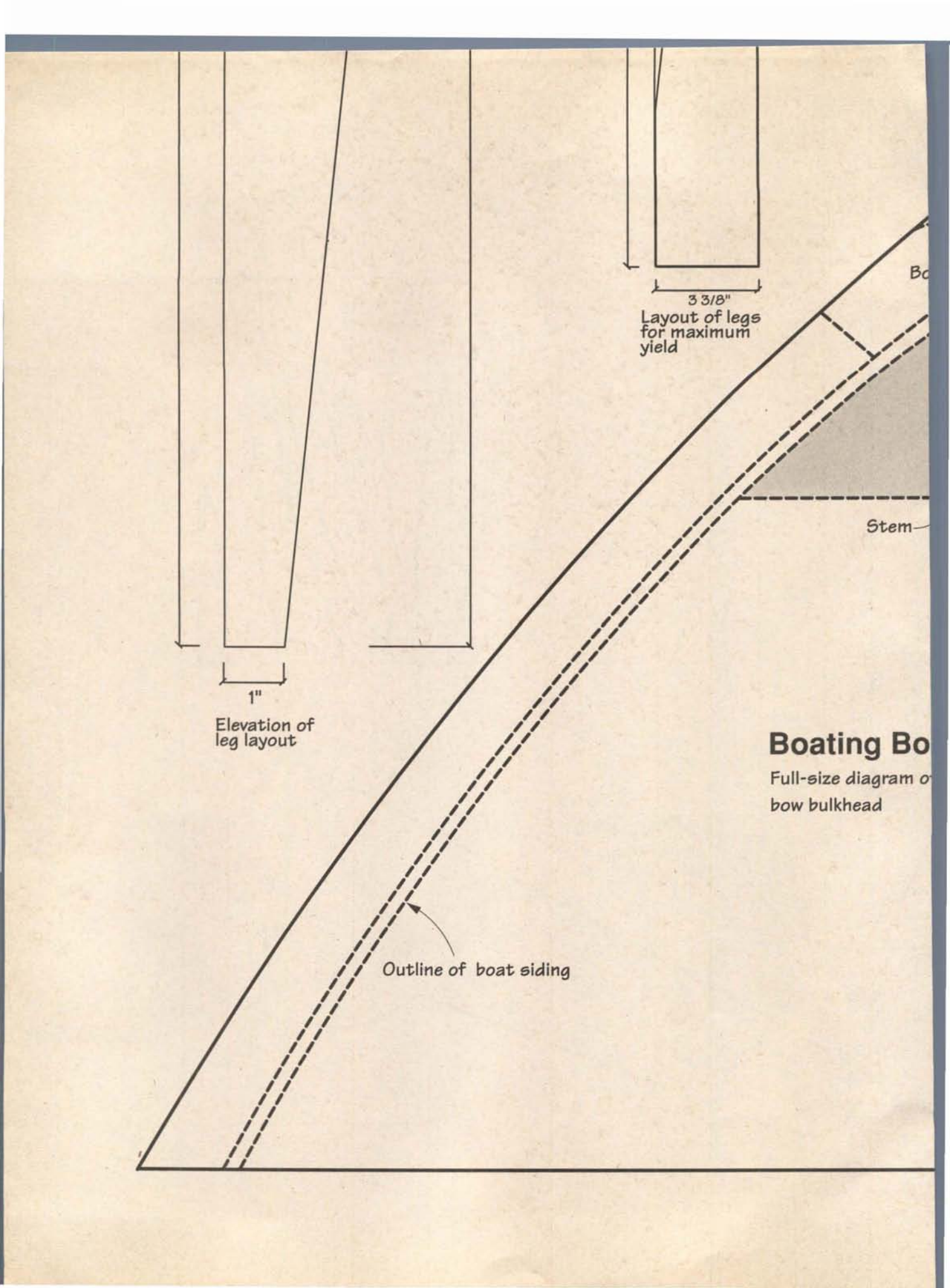
Full-size diagram of flower pattern



Modern Table



Quarter scale di
of leg optimizati
2" x 4" stock. 3"
1-8' x 2" x 4" yiel
table legs.



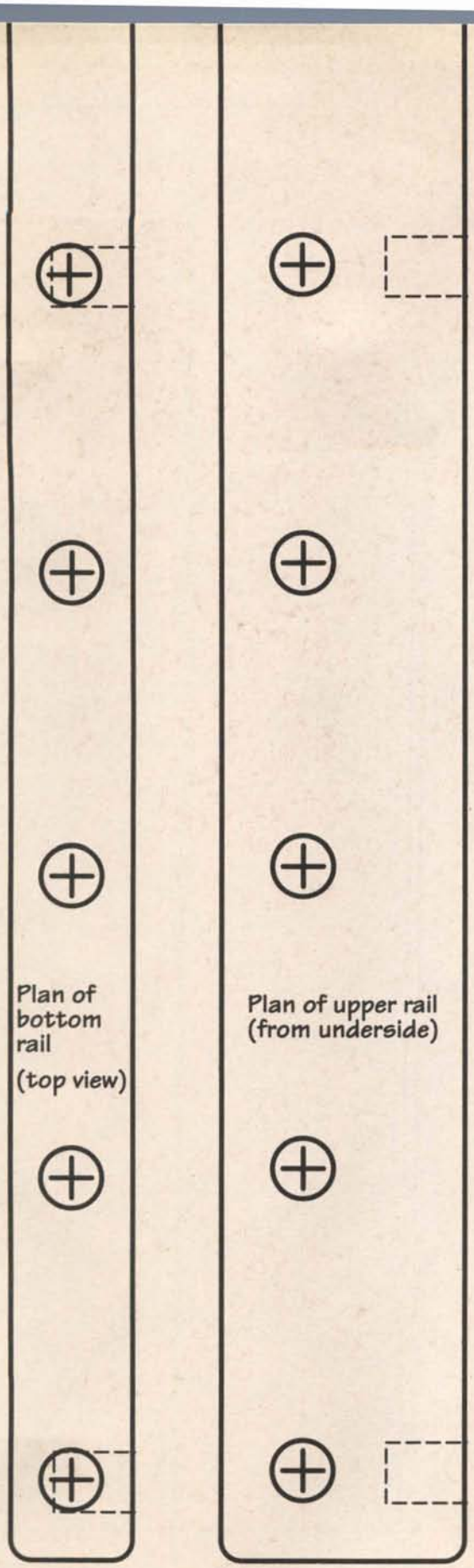
Boating Bo

Full-size diagram o
bow bulkhead

Gothic Table

Full-size diagram of slightly oversize tenon pin.

ower rail


Plan of bottom rail
(top view)
Plan of upper rail
(from underside)

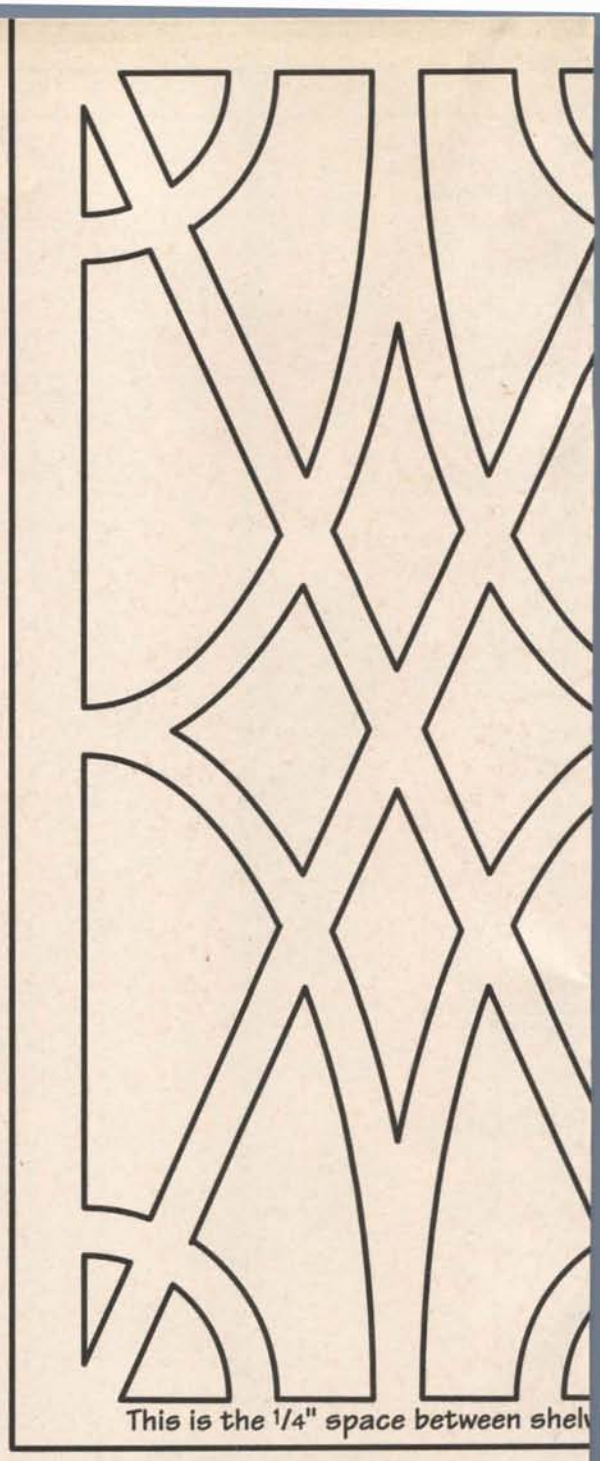
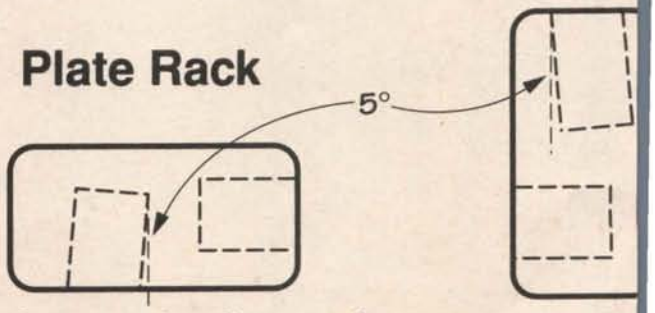
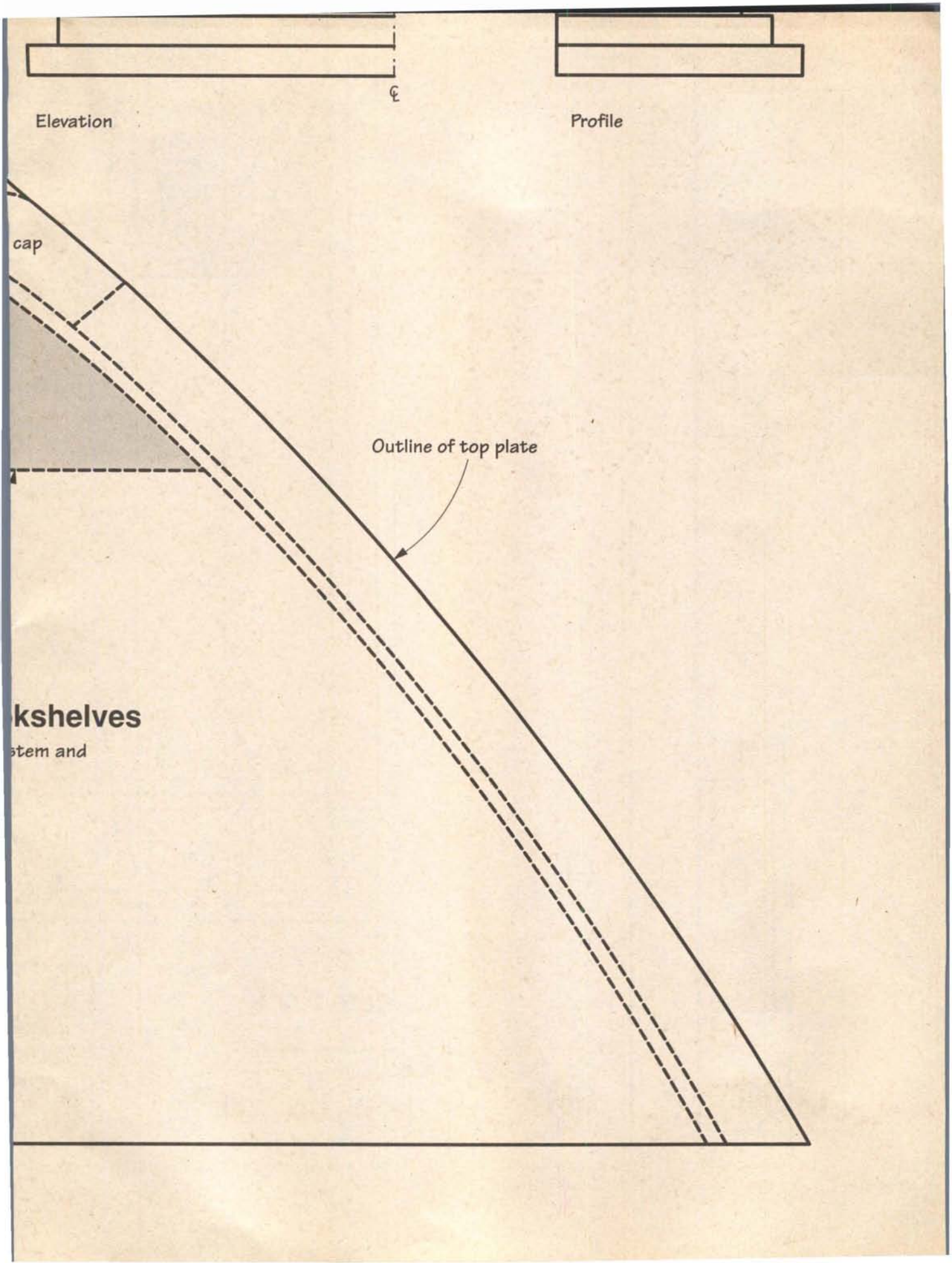

This is the 1/4" space between shelv

Plate Rack


5°
Cross section of upper rail
Cross section o

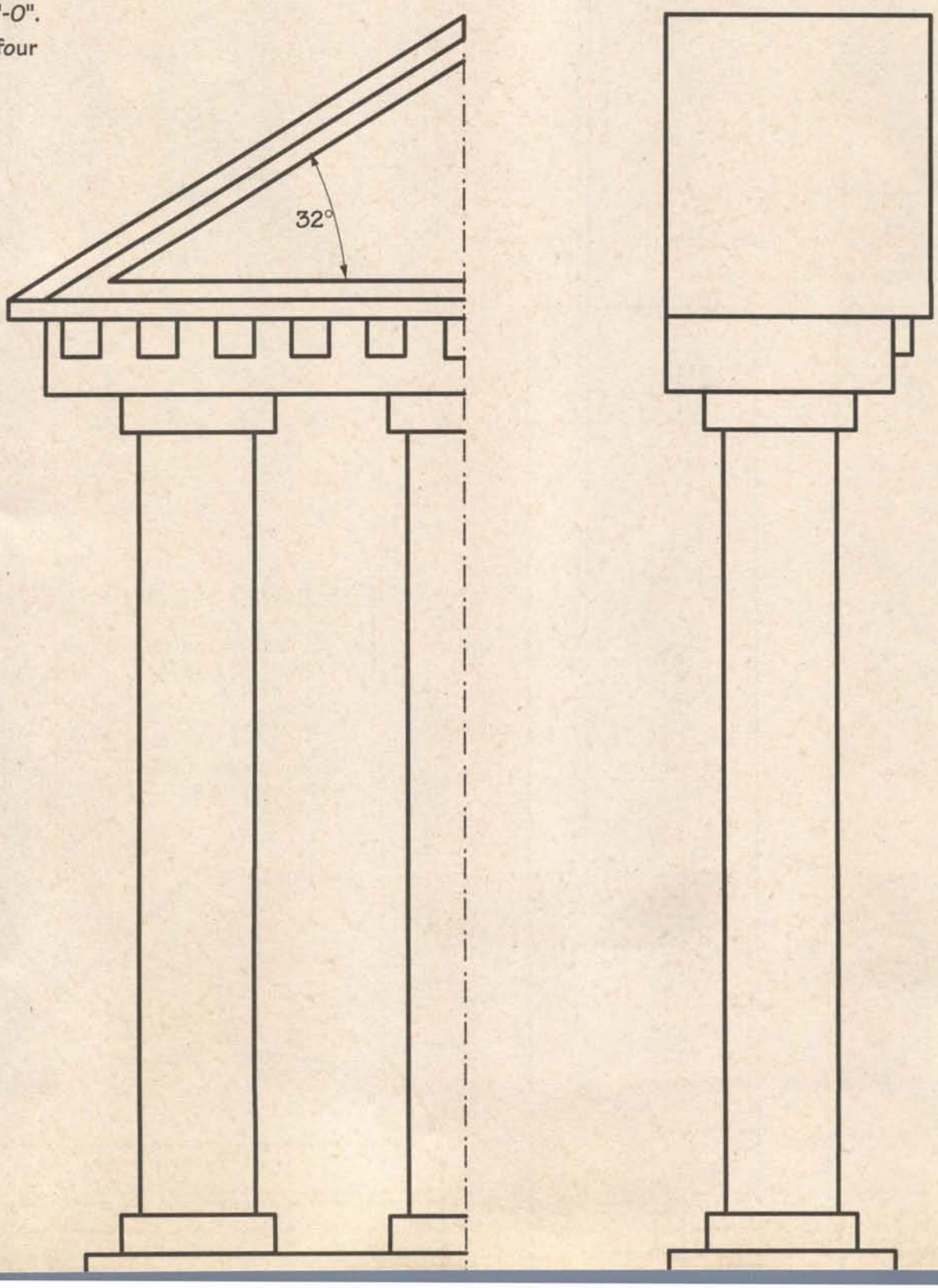


kshelves

stem and

Architectural Bookends

Full-size diagram of bookends



Modern Table

Full-size diagram of table base corner layout.

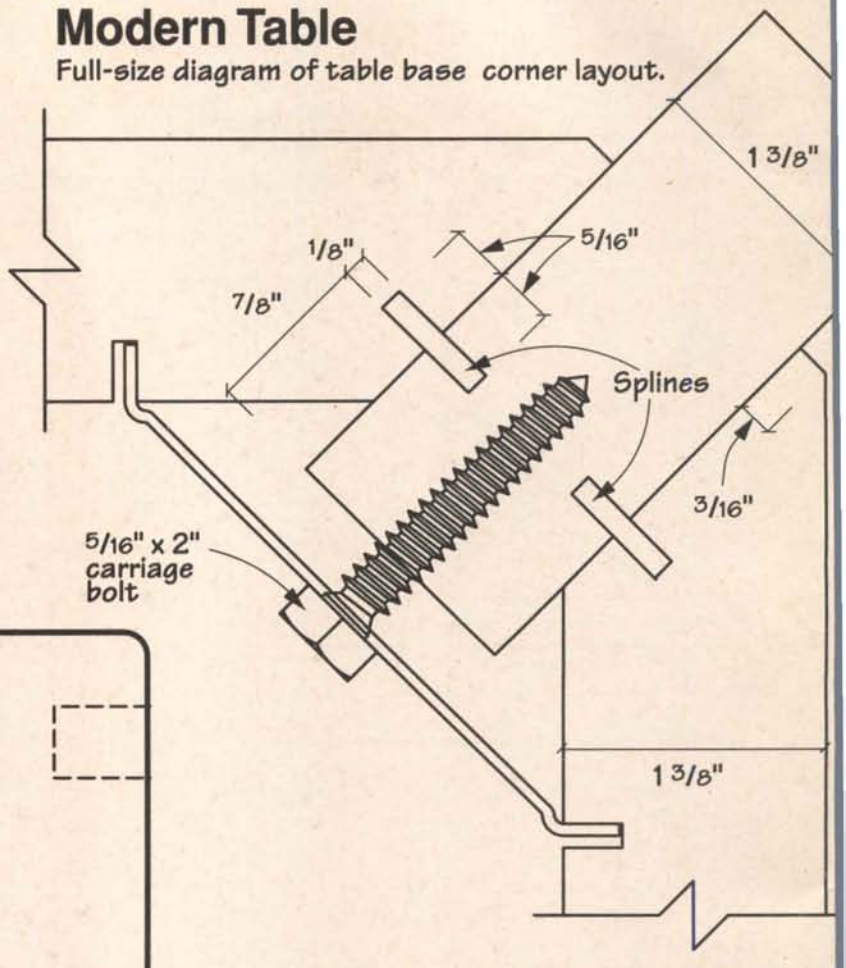
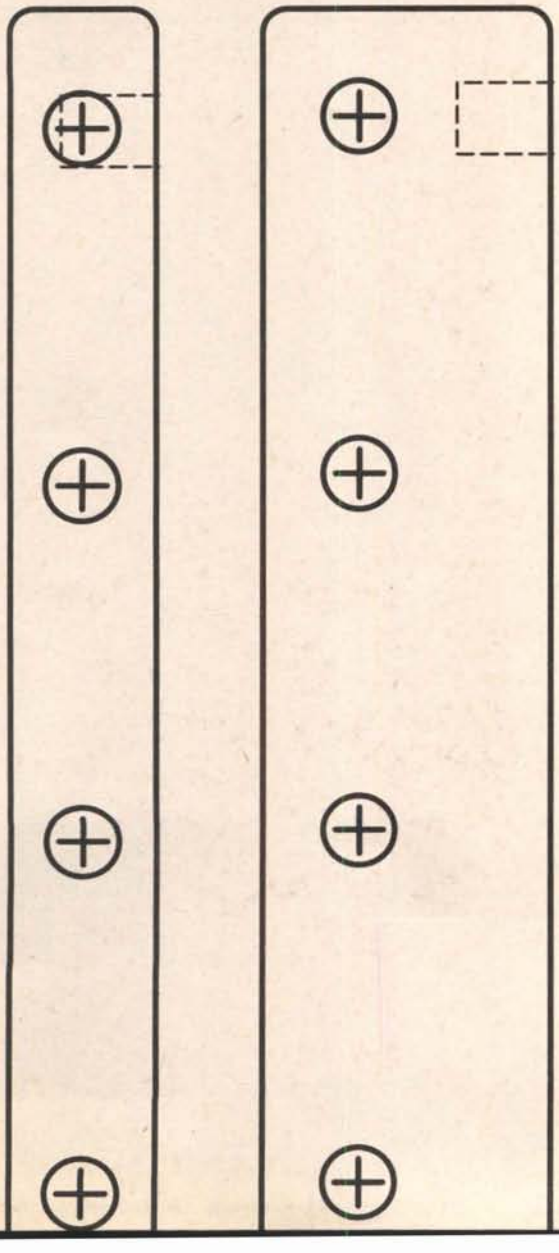


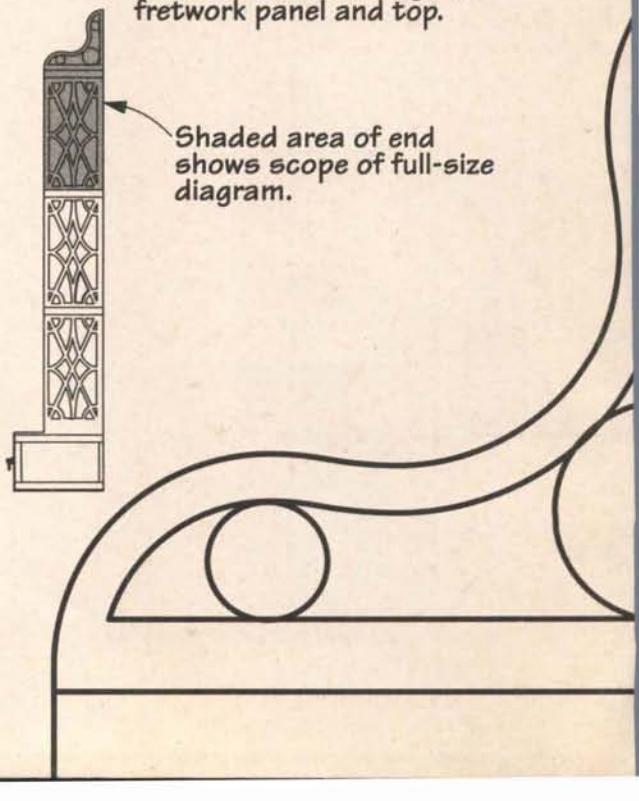
Plate Rack

Full-size diagrams of drilling layouts for 3/8" dowels.

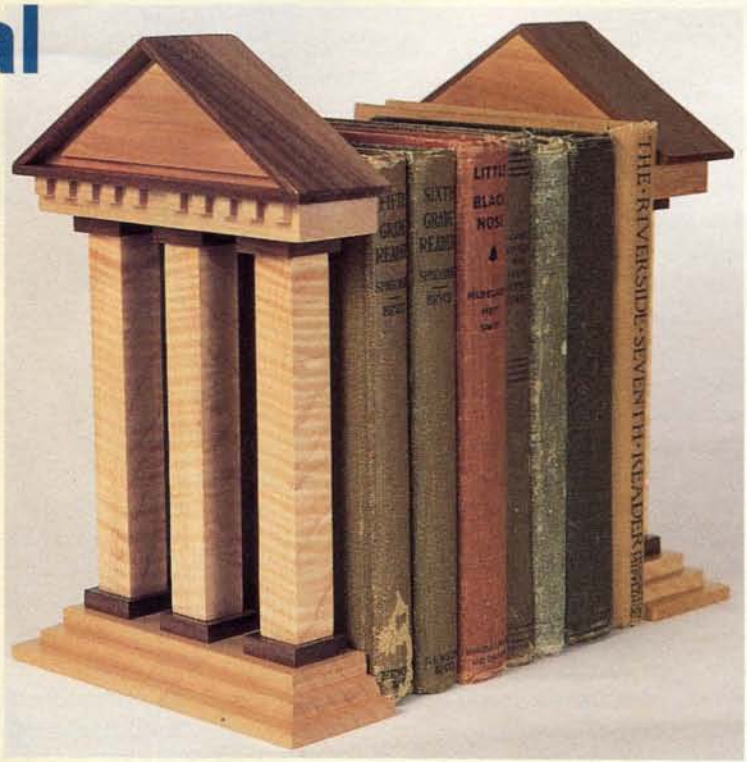


Colonial Hanging She

Full-size diagram of end section, including one fretwork panel and top.



Architectural Bookends



While cleaning up my shop, I found a few scrap pieces of curly maple, walnut and cherry that I didn't want to throw away. After a few minutes of thinking what I might do with these small treasures, I decided on a pair of sharp-looking bookends.

STEP ONE: Rough the pieces to the sizes given in the Schedule of Materials. A thickness planer is great for running the materials to the different thicknesses (especially the 1/8" walnut), but all of the sizing can be accomplished on the table saw if careful.

STEP TWO: Shape the base by setting the table saw's rip fence for 1/2", with the blade set at 1/2" high. Run three sides on edge, then reset the fence for 1/4" and the blade height to 1/4" and run the three sides again.

Next, reset the fence to 1/2" including the blade, and set the blade height to 1/4". Now run the three edges with the top of the base flat against the saw table. Be very carful with this step as it will eject the waste from behind the saw at a very fast speed. If this makes you nervous, set a stop on your miter gauge and don't use the rip fence for the cuts.

Next, reset the fence for 1/4" with the blade, and the height for 1/2" and repeat the process. Your bases are now complete.

STEP THREE: Cut the dentil detail on the architraves next (see the diagram). This was done by simply marking the 1/4" x 1/4" block locations on the pieces, then setting the table saw blade height to 1/8". Remove the 1/4" below the dentil work using the rip fence, moving the setting once to complete the 1/4" kerf. Next, simply use a stop block on the miter gauge to remove the material between the dentil mouldings.

STEP THREE: The last unusual cut is the 1/8" wide x 1/4" rabbet made on the front of the triangular pediment blocks. These were carefully run on the table saw with the fence set for 1 3/8".

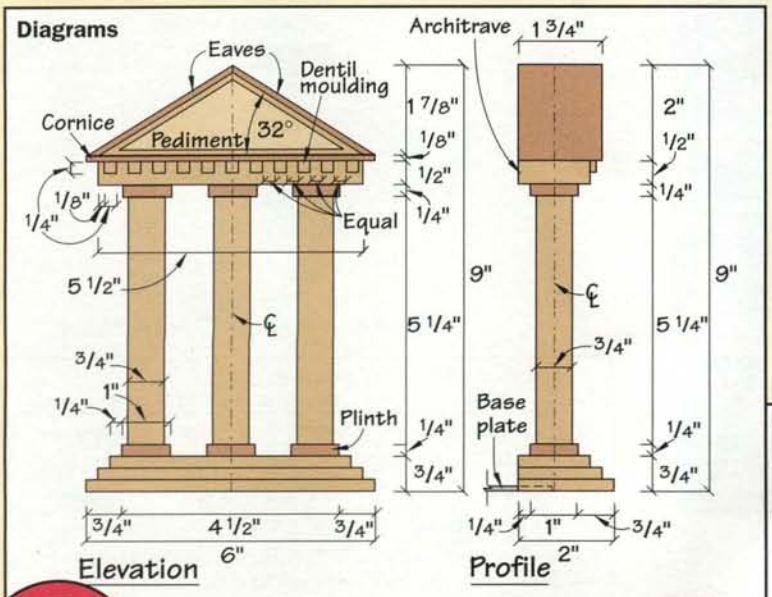
STEP FOUR: Start assembly by gluing the eaves to the pediment, leaving the ends long; then sand the ends flush to the bottom of the pediment, and glue the cornice in place.

While these pieces are drying, drill a clearance hole in the center of each of the capital/plinth blocks. Then drill a pilot hole in the center of both ends of each column. Finally, mark and drill clearance holes in the step bases and the architraves. Countersink the holes. With the holes complete, use #6 x 1 1/2" flathead screws to mount the columns to the steps and architraves.

STEP FIVE: The last step is to glue the pediment assembly to the column assembly. I finished the pieces with a coat of clear lacquer. To complete the assembly, I purchased a 3" x 12" aluminum push plate for a door and cut it to make the supports. If you want the pieces to sit flush, the supports can be recessed into the step section. **PW**

— David Thiel, PW staff

Diagrams



Schedule of Materials: Architectural Bookends

No.	Item	Dimensions T W L	Material
6	Columns	3/4" x 3/4" x 5 1/4"	Maple
12	Caps/Plinths	1/4" x 1" x 1"	Walnut
2	Step bases	3/4" x 2" x 6"	Maple
2	Architrave	1/2" x 1 5/8" x 5 1/2"	Maple
2	Pediments	1 1/2" x 1 3/4" x 5 1/2"	Cherry
2	Cornices	1/8" x 1 3/4" x 6"	Walnut
4	Eaves	1/8" x 1 3/4" x 3 5/8"	Walnut
2	Supports	1/16" x 3" x 4"	Aluminum

Are we on target?

To see more projects like this in future issues, circle "P5" on the postage-paid card in the Resource Directory.

Sharpening KIT

I used to keep my sharpening stones wrapped in grimy old towels that I threw into a beat up Army bag. This was a risky way to carry around $75 worth of stones — one false move could break these brittle beauties.

So I designed this nifty briefcase to hold my stones, honing oil and even a homemade clamp that secures the stones while I'm using them. The briefcase handle (which I bought at a hardware store for a few bucks) slides easily into the tail vise on my bench to hold the case fast while I'm at work. Thanks to these little innovations, sharpening is easier.

STEP ONE: Cut the pieces of the outside shell to size according to the Schedule of Materials. Miter the corners of the four sides and biscuit the plywood lid and bottom into the four sides. Glue, clamp and allow to dry. I used polyurethane glue, which might be overkill, but I figured with all the honing oil leaching into the box, I'd rather be safe than sorry.

STEP TWO: Clean up the outside edges of the box and cut the box lengthwise to make a top and bottom on your table saw. I set my rip fence for 1 1/4" for this cut, which makes the top of the box slightly smaller than the base and lets my thickest stone protrude 1/4" above the edge of the bottom so I can grab it easily. Lay out and mount the hinges.

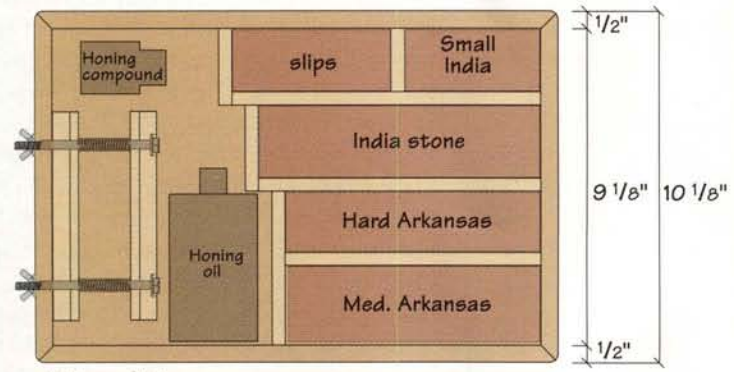
STEP THREE: Build the clamp from scrap hardwood. Cut a 1/4" x 1/4" rabbet on one edge of each of the clamp pieces. This rabbet will hold the stones in place. Drill holes in the clamp pieces and the side of the box for the 4"-long 1/4" bolts. I put compression springs on the bolts between the clamps and washers and wing nuts on the outside. The clamp works great.

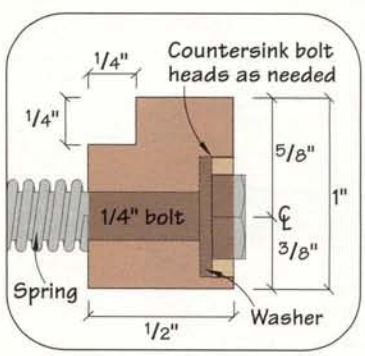
STEP FOUR: Now comes the custom part. Measure your stones and build compartments for them with 3/8" x 3/4" strips of hardwood. I used a "super" glue to affix the wood. Then cut and glue strips of plywood into the bottom of each compartment to get all the stones to sit at the same level. I glued a piece of 1/4" plywood to the inside of the lid to keep the stones from rattling.

STEP FIVE: Remove the clamp hardware and close the box. Put a 1/4" roundover on all the outside edges, including the corners. Mount the briefcase handle and catches on the front of the box. Then put a couple coats of an oil finish on the box, and you're ready to go. **PW**

—Jim Stuard, PW staff

Diagrams





Full-size detail of Clamp Block

Schedule of Materials: Sharpening Kit

No.	Item	Dimensions T W L	Material
2	Lid and bottom	1/2" x 9 1/8" x 14"	Plywood
2	Ends	1/2" x 2 3/8" x 10 1/8"	Maple
2	Sides	1/2" x 2 3/8" x 15"	Maple
2	Clamp blocks	3/4" x 1" x 6"	Maple

Approximately 4' of 3/8" x 3/4" divider strips and a piece of 1/4" plywood in the top big enough to retain the stones.

Are we on target?

To see more projects like this in future issues, circle "P4" on the postage-paid card in the Resource Directory.

Plate Rack

If you're one of those people who has plates you want to show off, or if you would just enjoy the convenience of having plates within reach, this plate rack is for you. Not only is it an attractive addition to the kitchen, it also is a simple weekend project.

This one was made out of oak and then stained and finished with polyurethane to ward off any liquid mishaps that might occur in the kitchen.

STEP ONE: Cut the oak strips to size according to the Schedule of Materials; then cut the dowels to length. You will need about 10 dowels that are 36" in length for the project.

STEP TWO: Use a 1/8" roundover router bit on all the rails to smooth the edges.

STEP THREE: Lay out the drilling locations in the rails as shown in the diagram for the angled and straight holes for the dowels. Then drill 1/2"-deep 3/8" holes for the dowels and check the dowels' diameter against your bit to find a snug fit.

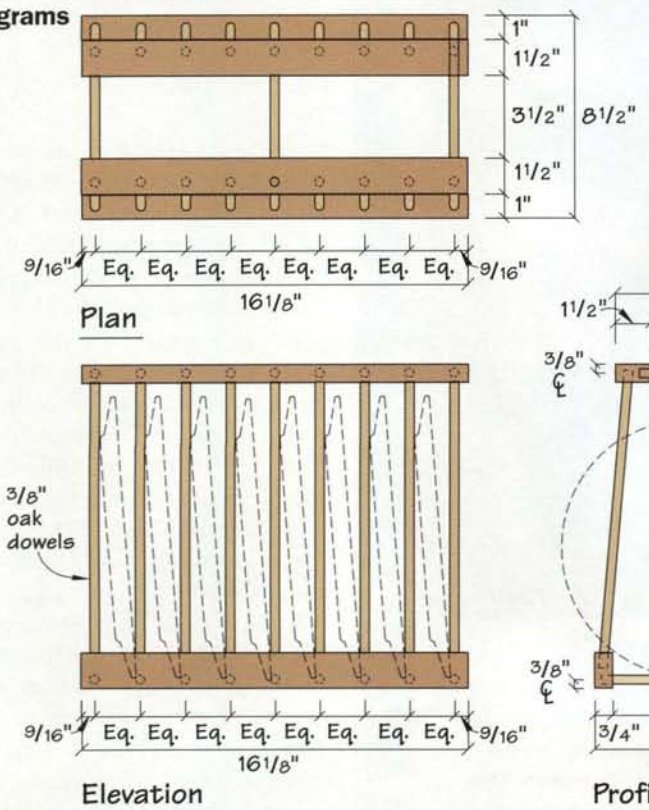
STEP FOUR: Before assembly, sand and stain the rails to get even stain coverage around the dowels.

STEP FIVE: Glue the rack together with the dowels, then stain the dowels and let them dry for the recommended length of time on the stain container.

STEP SIX: Apply three coats of polyurethane. **PW**

—Jim Stuard, PW staff

Diagrams



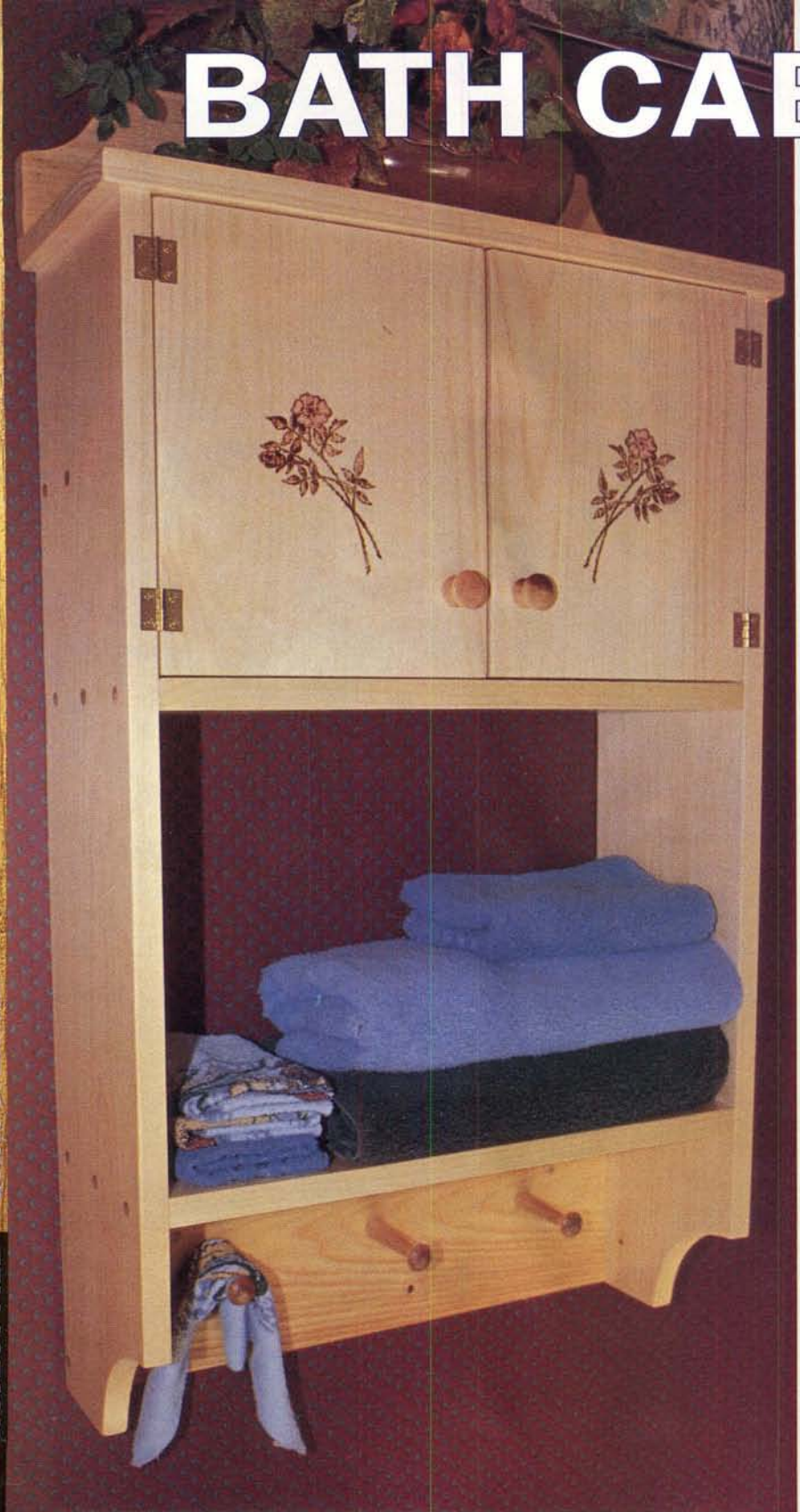
Schedule of Materials: Plate Rack

No.	Item	Dimensions T W L	Material
3	Top dowels	3/8" x 4 1/2"	Oak
3	Bottom dowels	3/8" x 7 3/4"	Oak
18	Divider dowels	3/8" x 12 3/4"	Oak
4	Frame pieces	3/4" x 1 1/2" x 16 1/8"	Oak

Are we on target?

To see more projects like this in future issues, circle "P12" on the postage-paid card in the Resource Directory.

BATH CABINET



In many homes there's a small bath or washroom that's always short of storage space. We designed this small wall unit to store the things you need in such a room: linens, towels, soap and bandages.

The simple wild rose pattern on the doors sets this piece apart and offers a chance to try woodburning.

STEP ONE: Select your wood and cut out the parts. We used white pine 1 x 8s for this cabinet that had only small, tight knots. We think these add real personality to the project. Cut the wood to length and width according to the Schedule of Materials.

STEP TWO: Draw a 2 1/4" radius with a compass on each end of the top trim board. Draw a 3 1/2" radius at the bottom front end of the two sides. Cut these two marked curves with a band saw or jig saw a little shy of the line. Then use a drum sander to power sand to the line.

STEP THREE: Mark and drill the screw holes according to the diagram. The entire project is assembled with screws covered by 3/8" flush plugs, which were purchased at the hardware store. Drill 3/8" holes that are 5/16" deep on the sides, top trim board and peg board. Then drill a 5/32" hole in the center of the 3/8" hole to accommodate a 1 1/4" drywall screw. This leaves enough room for the 3/8" plug. Then drill the holes for the hanging pegs. Mark the locations as shown in the diagram and drill 1/2" holes 5/8" deep for the 3 1/2" Shaker pegs, which are sold by many catalogs.

Now drill the holes that do not need plugs in the rest of the cabinet. In the top of the cabinet, drill five equally spaced holes 3/8" from the back edge. On the bottom shelf, drill three 3/8" holes 5/16" deep. Make these holes 3/8" from the back edge, with a screw placed 3" in from each end and one 9 1/4" from one end. These holes are for 1 1/2" drywall screws.

STEP FOUR: Now that all the parts are cut and drilled, it's a good time to sand them. After assembly you can finish sand the entire project, but now's the time to do the hard work while you can still lay the pieces flat on your bench. Be sure to

Shop Tip: Drum Sander for Cheap

If you don't have a drum or spindle sander, use your drill press. You can buy attachments that quickly mount in your chuck. Extend your drill press' table with a 3/4" piece of plywood or particle board. Bore a hole in the center for the lower part of your sanding drum to ride in. This allows you to sand the entire edge of the board and eliminates ridges.

break all the sharp edges with a piece of 120 grit sandpaper.

STEP FIVE: Begin assembly by attaching the top trim board to the top of the cabinet with carpenters glue and screws. Clamp and set aside to dry. Then attach the bottom shelf to the board for the pegs in the same manner. When these are dry, attach these two assemblies to the sides with screws and glue. Now glue and screw the two other shelves in the locations shown in the diagram.

STEP SIX: Begin building the doors by gluing up a few pieces of your leftover pine into two panels. Make these a little oversized so you can trim them to fit later. Clamp and allow to dry. Sand the doors to the same grit you sanded the rest of the cabinet. Cut a 45-degree bevel on each end of the four cross pieces. Then attach two cross pieces (or battens) with glue and screws to the back of each door to retard warping.

Mark and drill holes for the wooden knobs. Make sure you don't drill into the cross pieces. Trim the doors on your table saw so they clear your cabinet's frame with 1/16" at the top and bottom and 1/8" at the center. Cut mortises for your hinges and hang the doors to make sure everything swings freely.

STEP SEVEN: We used a woodburning tool and colored pencils to make the roses on the door. If you don't want to give woodburning (or pyrography) a try, you can paint the roses on the doors or even scroll saw them out of a piece of 1/4" pine and glue them to the cabinet.

If you've never done any woodburning, this is an excellent beginners' project. However, you might want to try it on a piece of scrap first to get the hang of it. Begin by tracing the pattern onto your doors with a piece of carbon paper. With the outline tip on your woodburner, boldly highlight all the lines. Using the same tip, accent and shade the rose, bud and leaves. When you are satisfied with your results, color the rose and the bud with a red colored pencil. Then, with a fine-grit sandpaper, lightly buff off some of the color. You can create an antique look with this method. Then add small amounts of color to the leaves with a green colored pencil and sand the image lightly.

STEP EIGHT: Glue your screw plugs into the holes and finish sand the entire piece. Clean the cabinet of small particles and cover with two coats of your favorite clear finish. We use lacquer. Polyurethane also works well, but be aware it will yellow the wood a little more. **PW**

—Marge and Harvey Gordon

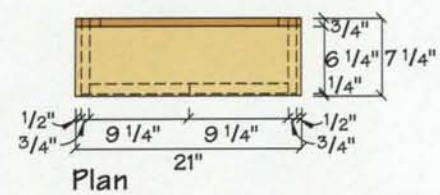
Diagram

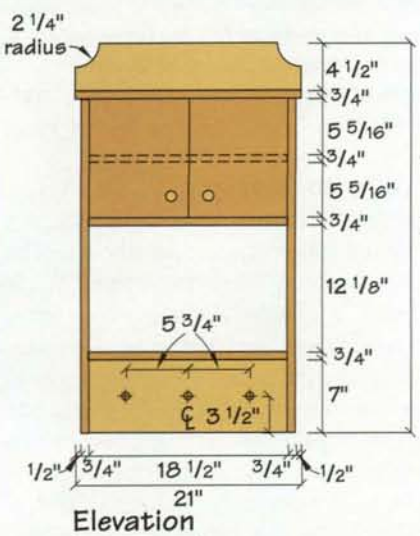
Are we on target?

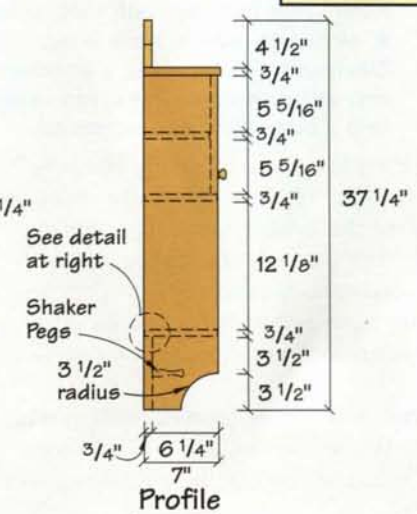
To see more projects like this in future issues, circle "P2" on the postage-paid card in the Resource Directory.

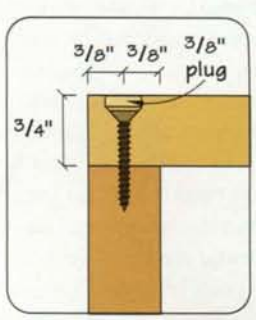
Enlarge image to 150 percent

Diagrams









Schedule of Materials: Bath Wall Cabinet

No.	Item	Dimensions T W L	Material
2	Sides	3/4" x 7" x 32"	Pine
1	Top trim	3/4" x 4 1/2" x 21"	Pine
2	Shelves	3/4" x 7" x 18 1/2"	Pine
1	Top shelf	3/4" x 3" x 18 1/2"	Pine
1	Peg board	3/4" x 7" x 18 1/2"	Pine
1	Top	3/4" x 7 1/4" x 21"	Pine
4	Cross pieces	3/4" x 1" x 9"	Pine
2	Doors	3/4" x 9 1/4" x 11 1/4"	Pine

Popular Woodworking

1998 TOOL REPORT

Hank Lynch (left) and Milt McCracken look over some of the features on Jet's 8" stationary jointer. Hank is manager of The Edward B. Mueller Co. in Cincinnati, Ohio. Mueller, a woodworking machinery and supply company, not only sells and services a broad selection of tools, but can provide advice to help a customer make a decision.

THERE'S NO SUCH THING as the perfect tool for every woodworker. While an 18-volt cordless drill might be perfect for the construction site where it's used eight hours every day, it might be overkill in a cabinet shop where it's used once a day, or even less often in the home shop.

This simple fact makes tool reviews in magazines an imperfect science. So instead of telling you what we thought were the "best" two or three tools in each category (like other woodworking magazines), we decided to do things differently. Inside our 1998 Tool Report you'll find clear explanations of what are the key features of a tool — for example, the horsepower and rpms in a router. Then you'll see a chart that compares many manufacturers' tools on these and other factors, such as the tool's street price.

Why did we do it this way? Well, if you've ever been tool shopping, you know that information is a hard commodity to come by. Some clerks don't know a collet from a collie, and they couldn't tell you why one sander is $39 while a similar-looking one is $89. Catalog shoppers get a little more information, but it's hard to judge which of the tool's features are critical when making that fateful purchasing decision.

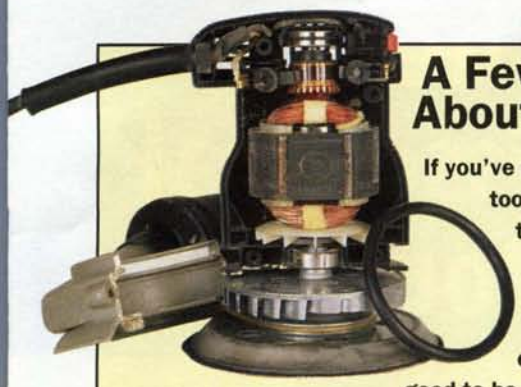
So how did we decide what were the key features of each tool? In addition to calling on our staff's 47 years of woodworking experience, we consulted with tool manufacturers, tool repair gurus, retailers, authors of books on particular tools and readers. We even took one reader tool shopping to learn how frustrating it can be to be a tool buyer.

We chose five tool categories to focus on this year: routers, random orbit sanders, planers, jointers and scrollsaws. We've also included a look at router bits and scrollsaw blades, because without proper tooling, the machines aren't likely to live up to your expectations. **PW**

Let's Go Shopping...

Milt McCracken of Erlanger, Ky., is a retired assistant principal who has been woodworking for about 50 years. While much of his woodworking is done out of love for family and friends, he also makes some custom pieces to sell. Having been a tool shopper for at least 40 of the 50 years, we thought we'd get his reaction to the many ways to shop for tools.

Not surprisingly, one of the best resources for tool information that Milt



A Few Words About Motors

If you've ever compared two tools with identical features but wildly different prices, it might have occurred to you that the inexpensive tool is too good to be true. Could be. And it may have a lot to do with the motor.

There are two types of motors: induction and universal. Induction motors are used on stationary tools. They run quietly at a specific speed for a long time. But they're big and don't fit in portable tools. Universal motors run at high speeds for shorter durations (in routers, for example). They're noisier than induction motors and are engineered to deliver shorter bursts of power.

In tools that use universal motors, much of the price is the motor. So sometimes it's profitable to "reduce" the cost of the motor. You can cut costs by changing the size of the motor's rotor, thereby reducing the field size, the number of windings required and the amount of materials needed to make the motor. Because the number of windings has been reduced, there's less material to dissipate the motor's heat, hastening the motor's demise. These cost-cutting measures don't necessarily reduce the tool's horsepower, so some manufacturers play up the horsepower statistic on the tool's package. The truth is: When you're buying a tool with a universal motor, ignore that horsepower statistic and go right for the amperage rating.

The problem with horsepower is that it may be the tool's "developed" horsepower, or the peak horsepower right before the motor fails. While interesting, this isn't the kind of information to base a purchase on. As a rule of thumb, 7.5 amps roughly equals one horsepower of performance with that tool running for hours at a time. So if the box lists 7.5 amps and 1¾ hp, you may be looking at a motor that is rated for "developed" horsepower that actually operates closer to 1 horsepower continuously.

Another important thing to remember: A 3 horsepower router is only going to be rated for a maximum of 15 amps. Why's that? Underwriters Laboratory only certifies standard household plugs up to 15 amps of current. (Though some household circuits are rated for 20 or even 30 amps.) So to keep the tool "household friendly," the motor is rated for only 15 amps. This keeps the manufacturer from having to fit the tool with a more "industrial" plug that won't fit standard household receptacles. Tool experts told us these tools are designed to perform at a higher amperage level on 20 or 30 amp circuits. PW

has is woodworking magazines. He also spends a fair amount of time poring over woodworking catalogs to see what information can be found.

On our shopping trip, we visited some large home center stores, a specialty woodworking retail store and a woodworking machinery store. I'm sorry to say that except for the dedicated machinery store, Milt was a little disappointed with the selection of tools, and even more disappointed at the "knowledgeable staff" available to help us at the home center stores.

At one mega-center, we finally had to stop a clerk to ask if the store sold the DeWalt scrollsaw. The clerk was holding a chuck key, so we thought she might be the person to ask about tools. Instead, she said, "I dunno," and after a pause said she could maybe find someone that might know. We left. At other home centers we were either ignored or had to vigorously search for assistance.

While we know that these observations are a generalization and that a few home center stores have great clerks (one in particular in our city seems to hire retirees who happen to be tool junkies), I'm fairly certain all our readers have more stories about undereducated store clerks than stories about clerks who intelligently guided them in their tool search. Milt agrees. His visits to home center stores are primarily for comparison shopping. That's not to say he finds the cheapest price, then buys. Actually he may find out what price range a tool is available in, then go back to the woodworking machinery store and spend a little extra for the benefit of reliable service and knowledgeable support.

He's also a strong advocate of shopping for rebuilt name-brand tools — with a new tool warranty. For example, a Sears repair center that Milt haunts happens to carry rebuilt tools by Porter-Cable, DeWalt and Ryobi. Rebuilt Skil, Bosch and Makita tools are also available from factory service centers.

After our day of shopping, Milt concluded that the moral to the story is you should shop for tools by first getting information from catalogs and magazines, then if you need to hold one of the tools in your hands, head for the stores.

By the way, in a case like that, all you're likely to be able to do is hold the lifeless tool in your hands. There aren't a lot of stores that are set up to let you plug a tool in and run it for a test. The exception was the woodworking machinery location and the specialty retail woodworking store.

If you're in a store and have a question about a tool, you might be better off looking for someone like Milt hanging around. It seems he and a number of other time-tested woodworkers bite their tongues when they hear poor tool information being given at retail stores. Fairly often he'll wait till the clerk wanders away, leaving the shopper with a puzzled look on his face, then step over and make a friendly suggestion. Nothing to be ashamed about, woodworkers are almost universally a friendly lot and willing to share their experience.

And if you happen to be a "Milt," don't bite your tongue. Most of us woodworkers don't mind hearing other people's opinions on tools, no matter how much we think we know. **PW**

—David Thiel, PW staff

The Essential Router

OFFERING the versatility to make rabbets, dadoes, grooves, edge details, spline slots, biscuit grooves, mortises, dovetails and much more, this affordable tool has probably done more to bring woodworking into the home shop than any other.

Available as either a fixed-base or plunge-base tool, the router has become more user-friendly, precise and convenient in recent years. One feature that was not available on any production routers as this issue went to press is the Jacobs RouterChuck, which allows bits to be changed without wrenches or spindle locks. As this accessory becomes available in early 1998, it will likely become standard on many routers.

Features

When considering whether to purchase a fixed-base or plunge-base router (or both) consider their benefits: A fixed-base router can be 20 percent cheaper than a plunge model, and is easier to use in a router table. While a plunge router can plunge cut easily, and is designed to adjust accurately to multiple depths. In a perfect world you'd own both, but if one or the other is the only option, spend the extra money and get the more versatile plunge router. If you want the benefits of both in one router, check out Porter-Cable's 1 1/2 hp router kit (Model 693), which offers both plunge and fixed bases for their venerable model 690 motor for about $200.

Price

The routers detailed in the accompanying chart are priced from $58 to $280, and that isn't as high as the prices go. In most cases the differences in price will be directly related to amperage, horsepower, variable-speed control and plunge- versus fixed-base style. There is some price difference between manufacturers on seemingly similar routers. (See "A Few Words About Motors" for a possible explanation.)

Horsepower

Routers listed are available ranging from 7/8 hp to 3 1/4 hp in the fixed-base category. Routers below 7/8 hp should be considered trimmers, and as such are a specialty item. We've excluded plunge routers over 2 hp in this report as it's the staff's opinion that these routers are beyond the needs of the vast majority of our readers. Additionally it is the staff's opinion that router tables are most efficient when used with fixed-base routers; plunge routers are unwieldy when mounted upside down in a cabinet.

The amperage you need is determined by how you'll use the tool. Most woodworking applications will be adequately met by a 8- or 9-amp router (often sold as a 1 1/2 hp model). If you need to move the router more easily or are doing detail work, one of the smaller 7-amp routers might be for you. Conversely, when using frame-and-panel cutters, or larger profile bits, a larger horsepower router (10 amps or higher) mounted in a router table will provide the best performance and safety.

Speeds

The routers listed offer fixed or variable speed controls ranging from 8,000 to 30,000 revolutions per minute. Again,

FIXED BASE

Brand & Model	Price	HP/ AMPs**	Speeds (rpm)	Standard collet	Spindle lock	Comments
Craftsman 17504	$58	1 1/2/8	25,000	1/4"	Yes	Built-in worklight
Black & Decker 7604	60	1/5	30,000	1/4"	No	
Ryobi R160K	65	1 1/2/8	25,000	1/4"	Yes	Dual-depth scale
Ryobi R165K	72	1 3/4/8.5	25,000	1/4"	Yes	Dual-depth scale
Craftsman 17505	78	1 3/4/8.5	15-25,000	1/4"	Yes	Built-in worklight
Makita 3606	92	1/7	30,000	1/4"	Yes	
Craftsman 17506	98	2/9	15-25,000	1/4"	Yes	Built-in worklight
Porter-Cable 100	110	7/8/6.5	22,000	1/4"	No	
Ryobi R180	120	2/9	25,000	1/4", 1/2"	Yes	Dual-depth scale
Bosch 1601A	132	1/7	25,000	1/4"	No	
Ryobi RE170	150	1 3/4/8.5	15-25,000	1/4", 1/2"	Yes	Dual-depth scale
Milwaukee 5682	150	2/12	26,000	1/4", 1/2"		
Bosch 1602A	152	1 1/2/9	25,000	1/4"	No	
DeWalt DW610	154	1 1/2/9	25,000	1/4", 1/2"	No	
Porter-Cable 690*	160	1 1/2/10	23,000	1/4", 1/2"	No	
Bosch 1604A*	160	1 3/4/11	25,000	1/4", 1/2"	No	
Ryobi RE185	170	2 1/4/9.5	15-20,000	1/4", 1/2"	Yes	Soft start motor
Milwaukee 5660	189	1 1/2/10	24,500	1/4", 1/2"		
Porter-Cable 7536*	215	2 1/2/13	21,000	1/2"	No	
Porter-Cable 7519	250	3 1/4/15	21,000	1/2"	No	Soft start motor
Porter-Cable 7518	280	3 1/4/15	10-21,000	1/2"	No	Soft start motor

*Also available in D-handle model **7.5 amps= about 1 horsepower of continual use

PLUNGE

Brand & Model	Price	HP/ AMPs**	Speeds (rpm)	Standard collet	Spindle lock	Comments
Skil 1840	88	1 3/4/9	25,000	1/4"	Yes	
Ryobi R175	100	1 3/4/9	25,000	1/4"	Yes	
Makita 3621	107	1 1/4/7.8	24,000	1/4"	No	
Skil 1845:44	112	2/10	8-25,000	1/4"	Yes	Soft start motor
Ryobi RE175	120	1 3/4/9	15-25,000	1/4"	Yes	Soft start motor
Hitachi M8V	155	2/7.3	10-25,000	1/4"	Yes	Soft start motor
DeWalt DW615	165	1 1/4/8	8-24,000	1/4"	Yes	Soft start motor
Bosch 1614EVS	184	1 1/4/7.8	12-23,000	1/4"	Yes	Soft start motor
Porter-Cable 693	185	1 1/2/10	23,000	1/4", 1/2"	No	
Craftsman 27510	185	2/12	22,000	1/4"	No	
DeWalt DW621	219	2/10	8-22,000	1/4", 1/2"	Yes	Dust collection port
Bosch 1613 EVS	227	2/11	12-22,000	1/4", 1/2"	Yes	Soft start motor

your usage will determine the best choice. Generally all routers are capable of performing average woodworking tasks. Higher rpms will likely produce a smoother cut as the number of cuts per inch is increased. But higher amperage does not equate to higher rpms. You will note in the chart that rpms are similar across the spectrum. Lower rpms are often beneficial in making large-profile cuts in one pass, while a high-speed, low-amperage router can produce the same profile in two or three passes of increasing depth.

Collet sizes

Most routers accept bit shanks of either 1/4" or 1/2" and many have interchangeable collets that accept both sizes. As mentioned in the accompanying router bit overview, there are some advantages to using 1/2" shank bits, but the option of being able to use either size should be a strong selling point.

Spindle lock

Spindle locks make changing the cutter a little easier by requiring only one wrench. As mentioned earlier, this feature might become a moot point when router chucks become common.

Trigger and switch location

The location of the trigger can be the difference between enjoying using your router, or finding it awkward and dangerous. Being comfortable with the operation of your tool should be a primary safety concern. So you might want to try a friend's router first. **PW**

Choosing the Best Router Bit for You

There are probably 2,000 styles of router bits available today from dozens of reputable manufacturers. In general, many are quality products that will provide you with good performance. The trick then is deciding which one, or ones, to purchase.

Having chatted with a number of woodworkers about purchasing router bits, one of the first questions to tackle is whether to buy a multi-use set or buy the bits as you need them. I've done both, and have found the latter to be cheaper. By purchasing bits as you need them you build a set that accurately reflects your needs. Sets frequently include bits that, while their application is known and appreciated, may go unused for a long time.

Next, determine the type of bit your router accepts. If your router only accepts 1/4" shanks, your shopping selection has been reduced, but not necessarily limited. Given the option, 1/2" shanks are preferable as they provide a more stable cut. That said, there are a number of cutter shapes that are small enough to give good performance with 1/4" shanks.

Bits are basically available in two types of material: high-speed steel or carbide. Carbide bits can be found as a solid carbide cutter, or as a steel blank with a carbide tip brazed in place. Overall, carbide cutters are more expensive, but they stay sharp much longer than high-speed steel bits, though they require specialized sharpening processes most woodworkers can't do. High-speed steel *can* be sharpened by the home woodworker if required, but in our opinion, there aren't a lot of reasons to buy high-speed steel bits.

The next question is the number of flutes (or cutting surfaces) per bit. Bits are offered with a single- or double-flute option, though the single-flute is harder to find these

days. The double-flute bit is the more expensive option, but the finish of the cut reflects the expense. The double-flute design offers twice as many cuts as a single flute in the same amount of time, thus improving the smoothness of the finish. As an added benefit, the double-flute bits provide a better finish with slower (below 22,000 rpm) routers.

From here it gets a little more subjective. Bits are offered in straight-flute, shear and in some cases, spiral designs. Shear cutters have slightly angled cutting edges to offer a paring motion. This provides an easier cutting action that reduces wear on the tool, and also offers a cleaner cut in end grain or figured woods with less tear-out. The shear bits also provide improved waste removal, again reducing wear on the tool and bit. Spiral cutters, ideal for small mortises, are available as upward or downward cutters. Upward cutting bits provide excellent waste removal, while downward cutting bits offer improved edge finish.

Another option to consider strongly is the guide feature. Bits are available with no guiding feature (commonly used with a fence attached to the router base); a fixed or integral guide pin; or a ball-bearing guide. Integral guide pins are cheaper but can burn the edge; bearing guides offer a clean and easy cut, and also offer the choice of changing the size of the bearing to adjust the cut profile without buying a new bit.

One last design consideration. Many of the larger cutting knives are now offered in anti-kickback designs (standard in Europe). These bits have beefy bodies behind the cutting flutes that limit the amount of space between each flute, reducing kickbacks. In addition to safety, these bits also offer extra support behind the flute, which gives a more stable cut. And the extra material also dissipates heat, improving the life of the bit. PW

CONTACTING MANUFACTURERS

AMT - 800-435-3279
or circle 176 on the Resource Directory Card

Black & Decker - 800-762-6672
or circle 177 on the Resource Directory Card

Bosch - 800-301-8255
or circle 178 on the Resource Directory Card

Bridgewood - 800-235-2100
or circle 179 on the Resource Directory Card

Craftsman -
Contact your Sears store or circle 180 on the Resource Directory Card

Delta - 800-438-2486
or circle 126 on the Resource Directory Card

DeWalt - 800-433-9258
or circle 181 on the Resource Directory Card

Dremel - 800-437-3635
or circle 182 on the Resource Directory Card

Excalibur - 800-357-4118
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Grizzly Imports - 800-541-5537
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Hitachi - 800-829-4752
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JET - 800-274-6842
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Lobo - 562-949-3747
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Makita - 800-462-5482
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Milwaukee - 800-414-6527
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PS Wood - 800-939-4414
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Porter-Cable - 800-487-8665
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Powermatic - 800-248-0144
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Skil - 800-301-8255
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Shopsmith - 800-543-7586
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Star Tool Corp. - 888-678-8777
or circle 193 on the Resource Directory Card

Sunhill Machinery - 800-929-4321
or circle 194 on the Resource Directory Card

Tradesman - 800-243-5114
or circle 195 on the Resource Directory Card

Woodtek - 800-645-9292
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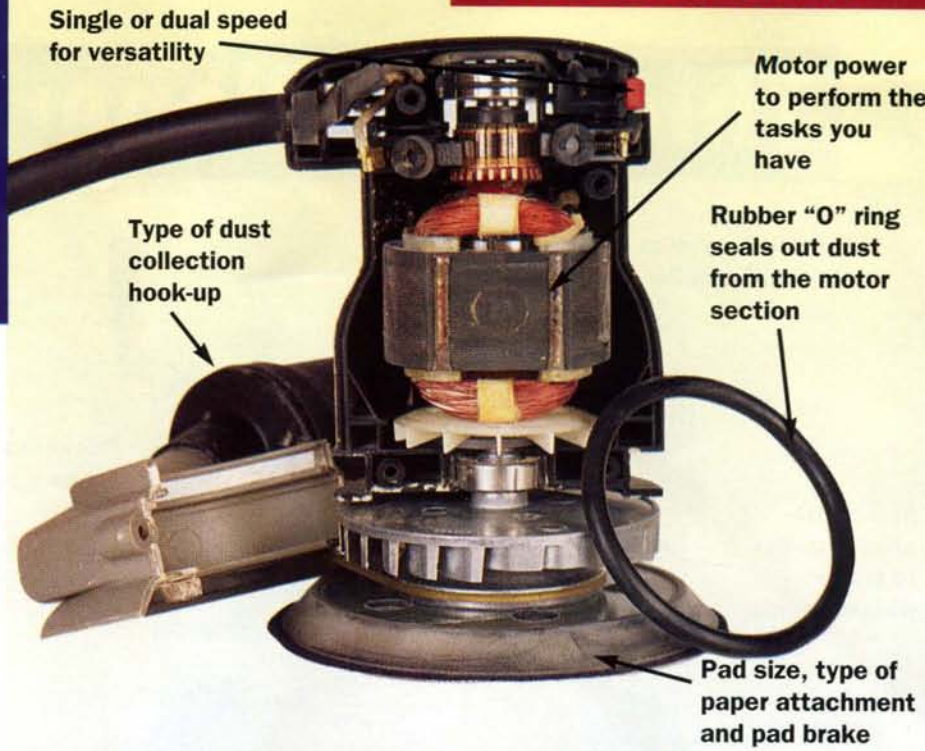
An integral pin-guided bit (far left, note the burned surface of the pin), a non-guided bit, center, and on the right a bearing-guided bit.

The anti-kickback design offers a much smaller gullet space to avoid anything being trapped between the wings. The extra material also improves the stability of the cut.

Above left is an upcut spiral bit, which is excellent for removing waste in moritse operations; center is a straight flush cutting bit; and on the right is a shearing flush cut bit for cleaner, easier operations with dense or highly figured woods.

Random Orbit Sanders



IF YOU OWN, or have shopped for, a random orbit sander then you know there are quite a few styles available; the three categories are right angle, in-line and palm-grip. In the many sanding applications we have run across in the *Popular Woodworking* shop we've had very few reasons to use any style random orbit sander other than the palm-grip design. On occasion we have used a right-angle sander to remove material in a hurry, but not enough to justify spending money on two sanders. In light of that, we've listed only palm-grip sanders in the chart.

Price may be the determining factor in this category. There are not that many differences between random orbit sanders. Priced from $38 to $95, random orbit sanders are a great deal.

Amps

Let's face it, no one likes to sand, so the faster and more efficient the sanding process, the happier the woodworker. If there is a factor to help you make a purchasing decision it should probably be the amperage. While the rpms might seem to indicate the performance of the tool, many of the rpms listed are without load, or while not in contact with wood. The amps indicate the aggressiveness much more accurately. The models listed range in amperage from 1.7 to 2.4 amps, with one of the newer models (Bosch 1295DH) offering two speed/amp levels, giving a slight range in aggressiveness.

Pad Type and Diameter

The sanding pad on a random orbit sander is what puts the rubber to the road. Beyond manufacturers' differences in composite construction, the two decisions are size and type of paper attachment.

The chart lists sizes of 4½", 5" and 6". For most applications 5" has become somewhat of an industry standard for home and small shop use. If your sanding work includes a lot of large top finishing (and you don't use a thickness sander) a 6" pad may improve your ability to provide an even, flat surface.

Sanding discs are available in both pressure sensitive adhesive (PSA) or hook and loop (similar to Velcro™). The hook and loop paper is a bit more expensive, but it offers the option of changing between grits, while the PSA discs aren't reusable once removed.

Dust Collection

Sanding in a small shop can quickly become unpleasant and a health hazard because of the dust floating in the air. While most manufacturers offer some type of dust collection on their random orbit sanders, a vacuum attachment is still the only truly efficient method.

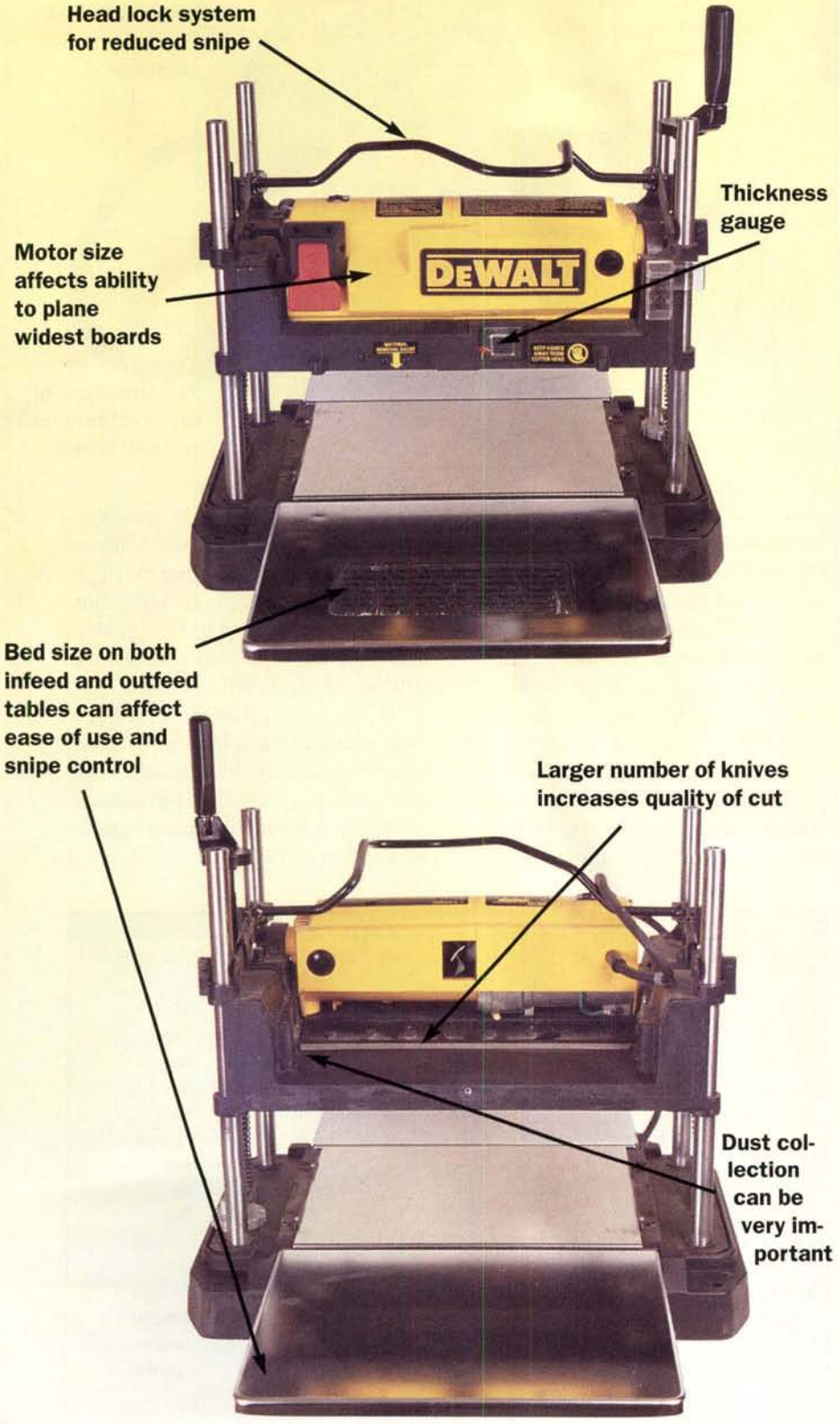
If you're not set up for vacuum extraction, consider the different "onboard" dust collection methods available. There isn't a significant difference between canisters and bags, but the canisters usually hold up longer. **PW**

RANDOM ORBIT SANDERS (PALM GRIP ONLY)

Brand & Model	Price	Pad dia.	Pad type	Pad brake	Orbits Per minute	Amps	Dust collection
Craftsman 27714	$38	4½"	PSA	No	11,000	2	NA
Black & Decker R0100	39	5"	HL	Yes	12,000	2	Bag
Ryobi RS240	39	5"	HL	Yes	10 - 14,000	2.4	Bag
Ryobi RS112	41	4½"	HL	No	11,000	2	NA
Porter-Cable 332	60	5"	PSA	Yes	12,000	1.7	NA
Porter-Cable 333/334	65	5"	HL/PSA	Yes	12,000	1.7	Canister
Makita B05010	65	5"	HL	Yes	12,000	2.0	Bag
DeWalt DW420	67	5"	PSA	Yes	12,000	2	NA
Milwaukee 6018-6/6019-6	67	5"	PSA/HL	No	12,000	1.8	Bag
Bosch 1295D/1295DP	75	5"	HL/PSA	Yes	12,000	2.2	Canister
Makita B05001	75	5"	HL	No	10,000	1.7	Vac
DeWalt DW421/422	75	5"	HL/PSA	Yes	12,000	2	Canister
Porter-Cable 335	87	6"	HL & PSA	Yes	9,000	1.7	Canister
Bosch 1295DH	91	5"	HL	Yes	12 - 15,000	2.2/2.4	Canister
DeWalt DW423	95	5"	HL	Yes	7 - 12,000	2	Canister

(PSA-Pressure sensitive adhesive; HL-Hook and loop)

Thickness Planer



THICKNESS PLANERS are a tool than many of us don't have in our home shops. Not because we don't want or need one, but because they've been too expensive. A few years ago, manufacturers developed lightweight, portable planers for finished millwork on the construction jobsite. The contractors' benefit has been the home shop's boon.

While still not cheap, these smaller, lightweight machines have become more affordable. And while the larger models are still more stout and will likely outlast the smaller models, the so-called "suitcase" planers perform very well. For average home shop use, these portable machines fit the bill, and are a bargain if you figure what you've been paying for surfaced lumber.

Maximum Material Size

One of the key factors in choosing a portable or floor model planer will be the maximum width of lumber the machine can handle. Currently, portable models offer a maximum cut width of 12½". In most cases this is sufficient for most woodworkers. However, if your woodworking tends towards table tops, you might benefit from a 13" or 15" planer. While 20" planers are available, the cost becomes prohibitive, and we've not included them in this report.

The maximum thickness a planer can handle is fairly standard (about 6"), and will likely not impact your decision unless you have a specific task in mind. A more valuable piece of information is the cut the planer can make in one pass. This varies from 1/16" to 1/4". If your woodworking requires quick removal of material, the larger depth of cut decreases the time spent feeding boards into the machine.

Number of Knives and RPMs

By virtue of the physics involved, the number of knives mounted on the cutterhead and the speed of those knives are directly related to the smoothness of the cut. All things being equal, the more knives and the higher the rpms, the better the cut.

That said, though no portable planer offers more than two knives (which is the minimum to balance the cutter-

head), that doesn't mean they make a poor cut. In fact, many of the portable planers offer high-quality cuts.

However, if you are continuously planing dense materials, you might find that a three-knife machine with a 2-hp motor provides a better, easier cut than a similar two-knife machine. Carrying that thought further, the higher the horsepower, the better the machine can handle wider and denser woods, without bogging down. Again, how you use the machine determines what you need.

Other Features

The size and design of the infeed and outfeed tables are worth paying attention to. These tables partially determine the amount of snipe produced by the machine, and how easily the machine is to operate by one person. The more adjustable the tables, the easier it is to help eliminate snipe. The longer the tables the less you have to scramble to catch a board on the outfeed side.

An accessory worthy of mention here is the roller stand. If you're in a one-person shop you can spend a lot of time chasing boards around a planer. A roller stand or outfeed table won't catch the boards for you and move them out of the way, but they will give you time to start the next board before the previous one hits the floor.

These knives, which are standard on the DeWalt planer, are a hybrid of sorts. They offer the benefits of resharpening while also offering some of the elements of a quick-change system.

It's also good to pay attention to the blade types and to the ease of changing them. A number of machines are now offering disposable, double-edged high-speed steel cutter knives. The knives are priced to make it affordable to replace them, rather than sharpen them. In addition, cutterhead design and some jigs now being offered by manufacturers are making it easier to replace and adjust new or resharpened knives. Remember: The machine's performance will only be as good as the knives. When it's easier to keep knives sharp, your work will improve, the tool will be safer and it will operate more efficiently.

All planers offer a gauge of some sort to determine the thickness of material you're planing. Most woodworkers will tell you not to trust it unless it's just for a ballpark estimate. Bottom line, the gauges are only as reliable as your ability to set, maintain and read *them* accurately. I put thickness gauges in the same category as the factory-provided miter gauge on a table saw: If you have to use it, do so at your own risk to accuracy.

Finally, take a couple of minutes to investigate how easy it is to hook dust collection hoses to the machine. If you've ever stood on the receiving end of a planer, you know the mess they make. Some machines come standard with dust hoods or vacuum hook-ups, some offer them as accessories. But even as accessories, check the ease of installation.

If there's one type of tool that deserves dust collection system as a standard accessory, it's the planer. You may want to even price out a small dust collection machine and build it into your budget for a planer. You'll save time in the work shop, make it a much nicer place to work and probably improve your health. **PW**

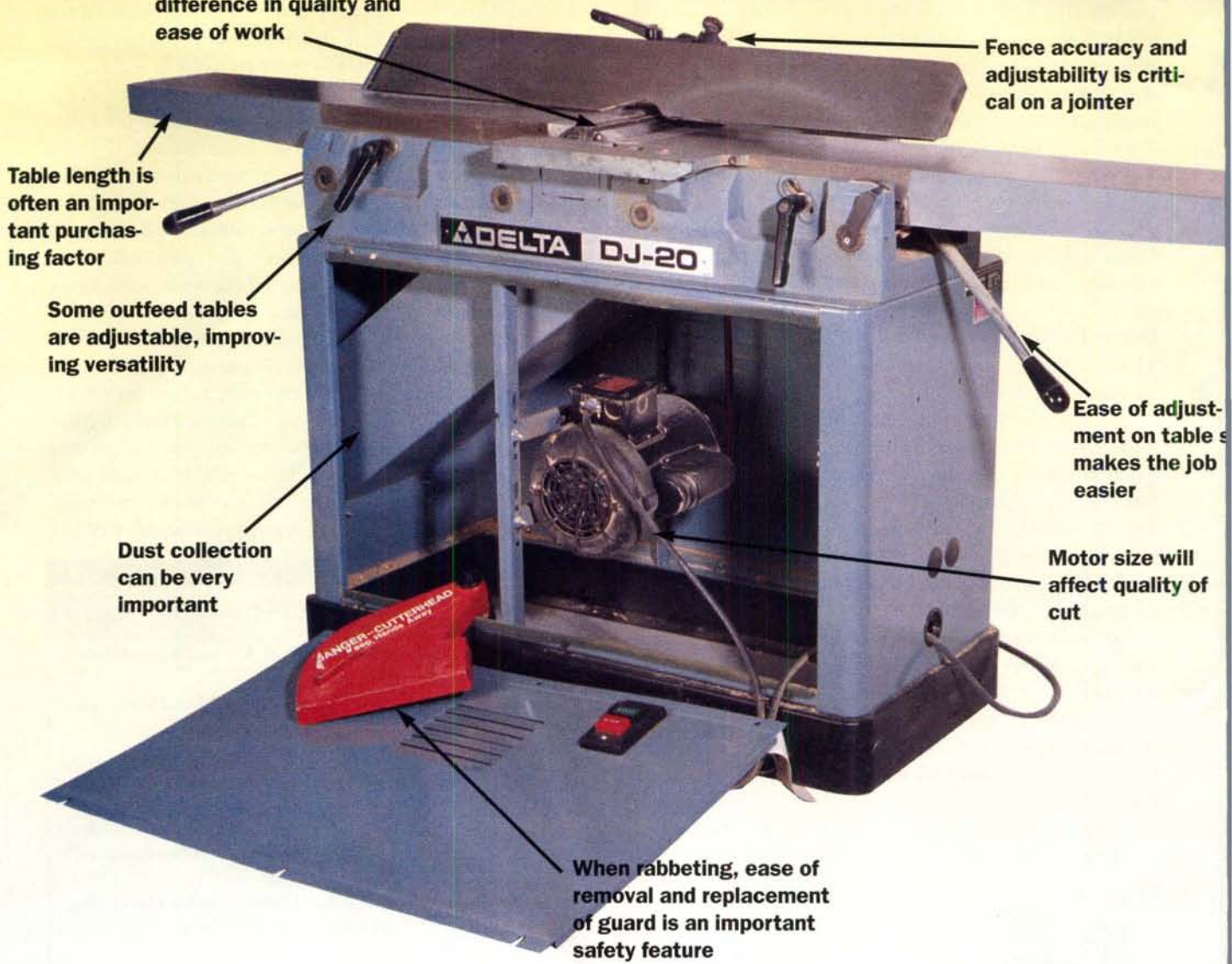
PORTABLE

Brand & Model	Price	Max Stock	Max Depth	# Knives x rpm	Motor	Comments
Delta 22-540	$329	6" x 12"	3/16"	2 x 8,000	15 amp	Double-edged blades
Penn State 125	329	6" x 12"	3/32"	2 x 8,000	2hp	
Reliant NN912	330	6" x 12"	1/8"	2 x 8,000	2hp	W/stand & extra knives
Woodtek 900853	349	6" x 12"	1/8"	2 x 8,000	16 amp	
Star S3712	350	6" x 12 1/2"	1/8"	2 x 8,000	2hp	
AMT 4652	375	6" x 12"	1/8"	2 x 8,000	20 amp	Double-edged blades
Bridgewood BW-12P	389	6" x 12"	1/4"	2 x 8,000	16 amp	
Ryobi AP12	390	6" x 12 5/16"	1/8"	2 x 8,000	14 amp	Double-edged blades
Jet JWP-12-4P	395	6" x 12 1/2"	3/32"	2 x 8,000	16 amp	Double-edged blades
Lobo WP-0012	395	6" x 12 1/8"	1/8"	2 x 1,600	2hp	
Delta 22-560	399	6" x 12 1/2"	1/8"	2 x 8,000	15 amp	Double-edged blades
Grizzly G1017	399	5" x 12"	1/16"	2 x 8,500	2hp	
Tradesman 8312	399	6" x 12 1/2"	1/8"	2 x 8,000	15 amp	
Craftsman 23378	420	6" x 12 1/2"	3/32"	2 x 8,000	2hp	
DeWalt DW733	450	6" x 12 1/2"	1/8"	2 x 10,000	15 amp	
Makita 2012	499	6" x 12"	1/8"	2 x 8,000	12 amp	Double-edged blades

FLOOR MODEL

Brand & Model	Price	Max Stock	Max Depth	# Knives x rpm	HP	Comments
Grizzly G1021	765	6" x 15"	1/8"	3 x 5,000	2	2 speed feed rate
Star S3715	875	6" x 15"	1/8"	3 x 5,000	3	
Lobo WP-1015	869	8" x 15"	1/8"	3 x 5,000	3	
Sunhill CT38B	879	6" x 15"	1/4"	3 x 4,500	3	
AMT 4490	890	6" x 15"	1/8"	3 x 4,800	2	2 speed feed rate
Reliant DD37	895	6" x 15"	1/8"	3 x 4,500	3	2 speed feed rate
Bridgewood BW-15P	949	6" x 15"	1/4"	3 x 4,500	3	2 speed feed rate
Lobo WP-0015	999	6" x 15"	3/16"	3 x 4,500	3	2 speed feed rate
Woodtek 875001	1,085	6" x 15"	1/8"	3 x 4,850	2	2 speed feed rate
Jet JWP 15HO	1,249	6" x 15"	1/8"	3 x 4,500	3	Dust chute included
Delta 22-675	1,200	6 1/2" x 15"	3/16"	3 x 5,000	2	2 speed feed rate
Craftsman 23374N	1,300	6" x 15"	1/4"	3 x 3,600	2	2 speed feed rate
Powermatic 15	1,330	6" x 15"	1/8"	3 x 4,500	3	2 speed feed rate

Versatile Jointers



INTERESTINGLY, JOINTERS get purchased for home shop use less often than planers. This goes counter to my training, since preparing lumber always starts on the jointer. Whether working with surfaced lumber from the local lumber yard or 100-year-old cherry from the tree in the backyard, you need to put a straight, square edge on the wood.

Jointers can be used as machines unto themselves, or as a companion to a thickness planer. On their own they provide an easy method to make a straight and square edge on material. They make good edges for glue joints, straight edges to use against the table saw's rip fence, and they remove cup, twist or warp by surfacing the face of a board.

For a more extensive overview of the uses of the jointer, see this issue's Tool Talk, "The Forgotten Power Tool," by R.J. DeCristoforo.

Features

An important consideration when purchasing a jointer is how wide a board the machine can surface. Once again, your choice depends on the type of work you will be asking of your jointer. They are available in 4", 5", 6" and 8" widths (with industrial models going even wider). While the 4" and 5" models are designed primarily for hobby work, they might be OK for your needs, as long as you're sure you'll never want to flatten a board wider than 5". If you're deciding between a 6" or 8" jointer, cost might be your deciding factor. A word of advice here: Many woodworkers I know who bought a 6" jointer to save a couple of hundred dollars regretted the decision down the road. So that's something to think about.

Another dimension of consequence is the bed length on the jointer. If you anticipate that most of your jointing will be performed on material shorter than 48" in length, a shorter bed is adequate

BENCHTOP JOINTERS

Brand & Model	Price	Cut width x Bed length	# Knives x Rpm	HP
AMT 4800	$99	5 1/8" x 25 1/8"	2 x 8,000	7/8
Star S3100	159	4" x 31"	3 x 5,000	1/2
Craftsman 23632	185	5 1/8" x 26 1/2"	2 x 8,000	7/8
Tradesman 8215	199	4 1/8" x 26"	2 x 10,000	5.8 amps
AMT 4540	259	6 1/8" x 30"	2 x 10,000	1 1/2
Craftsman 23628	260	6 1/8" x 31"	2 x 10,000	1 1/2
Delta 37-070	279	6 1/8" x 30"	2 x 6-11,000	10 amp
Ryobi JP155	370	6 1/8" x 28"	2 x 8-16,000	10.5 amp

FLOOR MODEL JOINTERS

Brand & Model	Price	Cut width x Bed length	# Knives x Rpm	HP
Lobo JT-1007	$299	7" x 42 1/2"	3 x 4,500	1
AMT 4124	379	6" x 46"	3 x 3,450	1
Lobo JT2206	379	6" x 42 1/2"	3 x 4,500	1
Grizzly G1182Z	395	6" x 47"	3 x 5,000	1
Woodtek 801-589	395	6" x 42 1/2"	3 x 3,450	1
Bridgewood BW-6R	399	6" x 45 1/2"	3 x 4,500	1
Delta 37-190	399	6" x 46"	3 x 4,800	3/4
Jet JSL-6J	399	6" x 46"	3 x 4,850	3/4
Tradesman 8202A	399	6" x 42"	3 x 4,000	1
Reliant DD39C	400	6" x 45 1/2"	3 x 4,500	1
Craftsman 23224	480	6 1/8" x 45"	3 x 5,000	2 1/2
Star S3104N*	485	6" x 47"	3 x 5,000	1 1/2
Jet JJ-6CSX	490	6 1/16" x 46"	3 x 4,800	3/4
Powermatic 54	550	6" x 45 1/2"	3 x 4,500	3/4
Grizzly G1018	660	8" x 65"	3 x 5,000	1 1/2
Star S3107N*	785	8" x 65"	3 x 5,000	2
Woodtek 907064	800	8" x 65 3/8"	3 x 4,500	1 1/2
Reliant DD40	800	8 1/8" x 66"	3 x 4,500	2
General 1180-1	937	6" x 42 1/2"	3 x 4,200	NA
Bridgewood BW-8J	949	8" x 66"	4 x 4,500	1 1/2
JET JJ-8CS	1,190	8" x 66"	3 x 5,500	2
Delta DJ-15	1,275	6" x 55 1/2"	3 x 5,500	3/4
Craftsman 20651N	1,450	8 1/8" x 88"	3 x 3,450	1 1/2
Delta DJ-20	1,650	8 1/2" x 76 1/2"	3 x 5,000	1 1/2
Powermatic 60	1,700	8" x 72"	3 x 7,000	1 1/2

*Also available with smaller hp motor.

and can save a fair amount of money. If, however, you think you'll be edging or facing 6' or 8' boards on a regular basis, spring for the longer bed.

In terms of performance, jointers work a lot like planers, so read the section on planers to get the skinny on the number of knives, motor size and rpms. And while a jointer's performance depends in part on the specie of wood you're working with, in general most jointers are capable of performing the average woodworking tasks.

Other features to look for include how easy it is to adjust the fence's angle; how easy it is to raise and lower the infeed table; and if the outfeed table can be adjusted to true up the machine and perform other operations. These features differ from machine to machine, manufacturer to manufacturer and are largely a cost consideration.

Also, as with the planers, pay attention to the dust collection options on the machine. Is a port provided? Does it require an attachment? Also find out how easy it is to change the blades. Although planers are being introduced with disposable knives, that trend hasn't become common with jointers. So it's necessary to remove the knives, have them professionally sharpened and replace them accurately enough to provide a premium cut. **PW**

David tries out the very first 18-volt cordless drill on the market at a workshop for our readers.

Our Tool Man: David Thiel

The man behind all the opinions in *Popular Woodworking*'s 1998 Tool Report is Senior Editor David Thiel. David has been taking tools apart and putting them back together (sometimes to the point where they actually work) for more than 20 years. David's not an engineer, however. As a kid, he learned woodworking from his father in a professional cabinet shop, where his father's tools saw a lot of abuse and repair.

As a result, David examines tools not with calipers and ohm meters, but with an eye for how the home woodworker will actually use (and abuse) the tool. If you've got a question about a tool, give him a call at (513) 531-2690 ext. 255.

You Can Do The Strangest Things With a Jointer

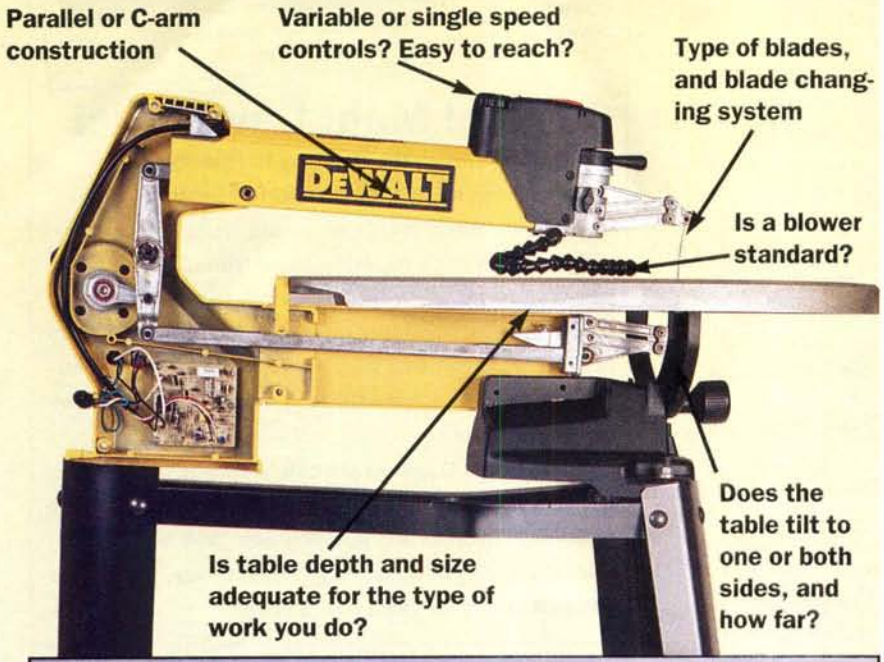
Jointers do more than just straighten a board. In fact, you can use your jointer like a dado stack and make clean precise cuts — if you know how. To learn how, see part one in this issue of R.J. DeCristoforo's Tool Talk: "Jointers: The Forgotten Power Tool." Here are just some of the unusual things your jointer can do:

- **Make round tenons on a dowel.**
- **Cut intricate leg shapes, including tapered legs and legs with feet.**
- **Make recess cuts for bases of cabinets or moulding.**
- **Cut clean rabbets.**
- **Make perfect tenons.**

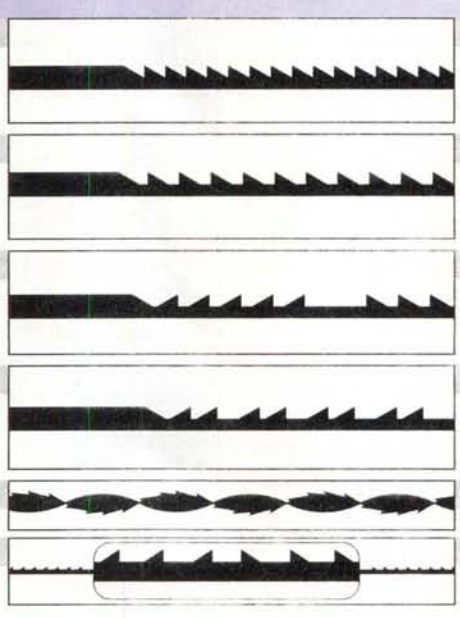
Scrollsaws

A LOT OF WOODWORKERS (myself included) haven't always considered scrollsaws to be a real woodworking tool. We felt that it was great for crafty things, but it didn't really have much use in a cabinet shop. If you still harbor these opinions, check out the Colonial Hanging Shelf or the Byrdcliffe Cabinet elsewhere in this issue. Unless you're real handy with a fret saw, you'll love a scroll saw for these projects.

Scrollsaws have come a long way in the past few years. It used to be there were two types you could buy: The professional model for the truly dedicated scroller; or the reasonably inexpensive tool that worked adequately for weekend crafters. Happily a mid-range price level has been added that includes many of the best features of the higher-priced models.



Blade Type	Universal Number	TPI
Scroll Blades		7
		10
		15
		20
Skip Tooth	9	11.5
	5	12.5
	2	20
	2/0	28
Reverse Skip Tooth	7R	11.5
	5R	12.5
	2R	20
	2/0R	28
Double Skip Tooth	7	13
	5	16
	3	23
	1	30
Spiral	0	46
	2	41
Precision Ground	9RG	8
	7RG	10
	5RG	12



Your first consideration in choosing a scrollsaw is how often you intend to use it. If you are ready to enter a new phase of woodworking by doing fretwork designs, intarsia or are just very serious about producing a lot of scrollsawn craft items, you'll want to consider a mid- to higher-end tool. If you think it would just be nice to have around every now and then, you may put your needs in the less expensive category.

Many of the scrollsaw models listed are differentiated only by the addition of variable speed. Different woods and types of cuts benefit from the variable speed option. If you expect to be working primarily in pine and producing fairly simple patterns, the variable speed feature may not be worth the money.

The size of the scrollsaw (the throat capacity from the base of the arm to the blade) is important because it affects the thickness of material you can cut.

If you expect to use the tool more than once a month, or for any extended period of time, seriously consider a "quick-release" blade attachment. These are offered as options on machines using both pinned or plain-end blade types.

Another recommended feature for any extended scrollsaw work is a blower that forces air across the work surface to move dust out of the way of the cut. Though most saws offer this as a standard feature, some do not.

The type of arm that's best for you will also depend on your type of work. Parallel arm actions move the blade in a straight up-and-down action providing a very clean cut: good for fine and tight radius work. The C-arm action moves the blade in a slight forward and back arc, which makes a more aggressive cut, but can also reduce the turning radius and leave a rougher cut. **PW**

Scrollsaw Blades

Saw blades are the business end of any scrollsaw, and there is a wide variety to choose from.

In truth there is not one single scrollsaw blade that can be used for all types of cutting. Instead, there are many different types of scrollsaw blades designed for rather specific cutting tasks. Choosing the right type of blade for the task at hand is not particularly difficult if you follow the accompanying chart. As a general guideline, the right blade will depend on your saw type, the material type and thickness you are cutting, the complexity of the cuts you are making, the cutting speed of your saw, and the cut-edge finish you would like.

All scroll saw blades fall into two rather broad categories: pin-end and plain-end blades. As a rule, plain-end scroll saw blades come in a greater variety of sizes and tooth patterns, which makes them popular for intricate cutting tasks. Pin-end scroll saw blades, on the other hand, are easier to change and are therefore popular for general cutting tasks.

Scroll blades are commonly described in teeth-per-inch; this is an indication of how smoothly they will cut most wood. As a rule the greater number of teeth-per-inch, the smoother the finished cut edges will be. The second part of that rule is that there should be two to three teeth in contact with the wood at all times. If you're cutting ½" material, six teeth-per-inch will do well. Scroll blades are good for general cutting and some finished work in the shop. They are better suited for cutting thicker materials and hard woods.

Fret blades are much thinner than conventional scroll blades and can therefore be used for cutting fine or intricate designs. All fret saw blades have a skip-tooth design — a tooth is missing from the pattern — which helps to quickly remove sawdust from the cut, resulting in a cooler blade that will stay sharp and last longer.

One variation to the basic fret blade is the reverse-tooth blade. This blade has the bottom inch or so of the teeth facing upward, while the remainder of the teeth point downward in the conventional manner. Different patterns are available, such as blades having six, seven or nine bottom teeth facing upward, eliminating splintering, or tearout, of the bottom cut.

In addition to regular skip-tooth fret blades, double-tooth skip blades are a good choice for beginners learning scrollsaw basics.

Spiral blades are conventional scroll blades machine twisted so their teeth point outward in all directions. Spiral blades enable you to make very sharp turns in the workpiece. They are available in fine- and medium-tooth patterns and are suitable for a variety of finish cutting applications.

Many scrollsaw blades are stamped by a machine, resulting in a blade that is rougher on one side — commonly the right side. This means that the blade will pull to one side. Some manufacturers offer precision-ground scroll saw blades. Although they are more expensive, they will cut much cleaner patterns than machine-stamped blades. PW

— Excerpted from Don Geary's, Getting The Very Best From Your Scroll Saw, *published by Betterway Books.*

BENCHTOP SCROLLSAW

Brand & Model	Price	Throat/ arm type	Tension/Blade release	Strokes per min.	Table tilt Left - right
AMT 4391	$89	15"/P	S/S	1,725	45 - 0
Tradesman 8350SL	99	15"/P	Q/Q	1,725	45 - 0
Delta 40-530	109	16"/ P	Q/S	1,750	45 - 0
Grizzly G1572	110	15"/C	S/Q	1,725	0 - 45
Delta 40-560	159	16"/P	Q/Q	850/1,725	45 - 0
Lobo JS-0022	159	22"/C	Q/S	1,720	15-45
Tradesman 8365SL*	159	16"/P	Q/Q	400-1,800	45 - 0
Dremel 1672	160	16"/P	Q/Q	890/1,790	45 - 0
Grizzly G1060	160	22"/C	S/Q	1,720	0 - 30
Penn State VS-15	160	15"/P	S/Q	400-1,800	0 - 45
Ryobi SC165EVS*	165	16"/P	Q/Q	500-1,700	15 - 45
AMT 4602	169	16"/P	S/S	890/1,780	45 - 0
Pro-Tech 3303	169	16"/P	S/Q	400-1,600	50 -15
Grizzly G1257	170	16"/C	S/Q	400-1,800	0 - 45
Delta 40-540*	179	16"/P	Q/Q	400-1,800	45 - 0
Tradesman 8368	179	16"/P	Q/Q	400-1,800	45 - 45
Craftsman 23609*	180	16"/P	S/Q	500-1,700	45 - 0
Skil 3333	277	16"/P	Q/Q	1,725	0 - 45
Craftsman 23616	280	23"/P	S/S	825/1,725	45 - 0
AMT 4671	320	23"	S/S	825/1,725	45 - 0
DeWalt DW788	490	20"/P	Q/Q	300-1,750	45 - 45

FLOOR MODEL SCROLLSAWS

Brand & Model	Price	Throat/ arm type	Tension/Blade release	Strokes per min.	Table tilt Left - right
Reliant AL18	$200	18"/C	S/S	850/1,720	30 - 0
Reliant DD26	250	26"/P	S/S	1,720	30 - 0
Woodtek 826398	399	21"/P	Opt./S	170/1,370	45 - 15
Craftsman 23640	430	20"/C	S/S	300-2,000	0 - 45
Delta Q3 40-650	480	18"/C	Q/Q	300-2,000	9 - 45
PS Wood 14	599	14"/P	Q/Q	1,060/1,575	45 - 35
RBI Hawk 216VS	649	16"/P	S/Q	300-1,450	45 - 45
PS Wood 21	799	21"/P	Q/Q	170/1,370	45 - 35
Shopsmith 555685	850	20"/P	Q/Q	500-1,450	45 - 45
PS Wood 21 EVS	899	21"/P	Q/Q	170-1,370	45 - 35
Excalibur EX19SD	939	19"/P	Q/Q	400/1,400	45 - 45
Hegner Multimax 14v*	999	14"/P	S/Q	400-1,700	45 - 0
RBI Hawk 220 Ultra	999	20"/P	Q/Q	300-1,725	45 - 45
Hegner Multimax 18v*	1,199	18"/P	Q/Q	400-1,700	45 - 12
Excalibur EX19VS	1,169	19"/P	Q/Q	60-1,500	45 - 45

*Also offered in a single speed model. Q = quick release system S = standard release system

G.I. TOOLS

When Uncle Sam is done with his circular saw, he wants YOU to buy it.

IF YOU WANTED to buy a used 36-foot gunboat or Huey helicopter to deal with your pesky neighbors, you'd probably head down to your local military base to see if they had any surplus items to sell. But you might be surprised to learn that military bases can also be a good source for finding used woodworking equipment.

The U.S. military sold more than 600 woodworking tools to private citizens in 1996, according to the U.S. Defense Reutilization and Marketing Service. (Personally I think their estimate of the number of tools they sell is a little low. Every time I check their web site, I find at least 300 tools up for grabs.) The military sells everything you would need for your home shop: cabinet saws, mortising machines, power sanders, routers, jointers, planers, band saws and lathes.

That's because every U.S. military base in the world has to build things from wood, and many bases even have woodshops that personnel can use for pleasure in their spare time.

"The tools might come from the hobby shop," says Tim Hoyle, public affairs specialist with Defense Reutilization Marketing Services. "Maybe the base is closing or there isn't enough interest in the hobby shop to keep it open."

Once the base decides it can't use the tools, they go into

Tools by Phone

Even if you don't have a computer you can still buy used tools from the military; it's just going to take a little more leg work. The first step is to find a military installation near you that has surplus sales. You can look in the government pages of your local phone book (they're usually called the blue pages). Call the main number of the base and ask for the number for the DRMO (Defense Reutilization Marketing Office).

That office should be able to tell you about any upcoming sales that include woodworking tools. Some DRMOs also print up catalogs for their auctions, according to Defense department officials.

If you're having trouble locating a military base near you, or the phone number for your local DRMO, call the Department of Defense Customer Service Center at 1-888-352-9333. This number dumps you into one of those automated answering systems where you press "one" or "two" depending on what sort of information you need. You want to press "three" to get to the Defense Reutilization and Marketing Service (DRMS). A customer service representative should then be able to help you find a base or a DRMO. Be sure to ask for the hours of operation because some of the offices are open only a few hours a day and some are open only on weekends.

Military officials say it's easier to find the tools you need if you have a computer, so they recommend calling your local library, many of which offer free or low-cost use of their computers and internet connections. Also, some DRMOs actually offer free use of their computers to members of the public looking for military surplus. So you might want to try there, too.

What it All Means

Once you find the listing of woodworking machinery the military is selling, here's how to decode the information.

ST JULIENS CRK VA.	SANDER	322000SANDER	N7027272469903	A	1	EA	24-8003 0263	J	H9	04-SEP-97
NUERNBERG GER.	MORTISER, 220V	322000V034104	W81JD97080J671	A	1	EA	52-8301 0409	A	G8	17-JUL-97
HANAU GER.	SAW SABER ELEC	322000G010331	WK4EX57213N044	A	1	EA	52-8400 0098	B	A2	22-AUG-97
CORPUS CHRISTI TX.	TENONER	3220000258356	W45N7V71830655	A	1	EA		B	B4	31-JUL-97
BRAGG NC.	TABLE SAW	322001SAWTABL	W81DC[illegible]72450100A	A	1	EA		A	H9	10-SEP-97
BARKSDALE LA.	SANDER,DISK	3220009357861	FE460[illegible]72320111	A	1	EA		A	H7	25-AUG-97

where the tool is located

what general type of tool is for sale.

FEDERAL CATALOG STOCK NUMBER
This number is the federal government's stock number for this brand and model of tool. On the internet, you can click on some of these numbers and it will call up a data sheet. For others, you'll have to ask the DRMO.

DOCUMENT NUMBER
This is the number the federal government has assigned to this particular tool.

DEMILITARY CODE
"A" means this tool doesn't need to be demilitarized. Few woodworking tools do.

How many are for sale

RSC CODE
A "J" means the tool is for retail sale in a military-run store. "A" or "B" means the item is up for bid or will be shortly.

CONDITION CODE
The condition of the item for sale. See condition codes for an explanation.

Condition Codes

All of the items the military puts up for sale are assigned a code that indicates roughly the shape they're in. The items in the best condition are given a code between "A1" and "A6," with A1 being the best condition: unused. A6 means the item will soon need repairs. As the letters get higher (C, D, E, all the way to H) the condition of the tool gets worse. Any code higher than D6 means the tool needs repairs.

a system where they can eventually end up for sale to you.

The quality of the tools runs the gamut: A few are unused and still in the box, many are still working with some dings and dents, while still others are good only for parts or for melting down to reclaim the steel.

The hardest part of buying tools from the military is finding the tools and figuring out how to buy them. Some tools are for sale in military-run retail stores that are either on or near the bases. Some are for sale by sealed bid. Still others are sold at auction. Here is a primer for hunting down the tools you want and getting in touch with the people who can sell them to you.

If you've got access to a computer, modem and web browser, you're in good shape. (If you don't have a computer, see the story "Tools by Phone" on this page.) The easiest way to find surplus tools is by visiting the web site of the Defense Reutilization and Marketing Service **(www.drms.dla.mil)**. This is the central clearinghouse for all surplus military equipment that is going up for public sale. Here you can buy cargo trucks, clothing, printers, bricks and even fire hose.

Once you access their home page, you want to enter the "Public Sales" section (the link for that is at the bottom of the page). Then you'll be asked how you want to search their inventory. You can search using key words. (Good luck. I always struck out with key words.) Or you can search using the appropriate Federal Supply Code (FSC). The Defense Department has a list of all the supply codes at their home page you can print out (in case you're also looking for a gunboat). Here are the codes for woodworking equipment:

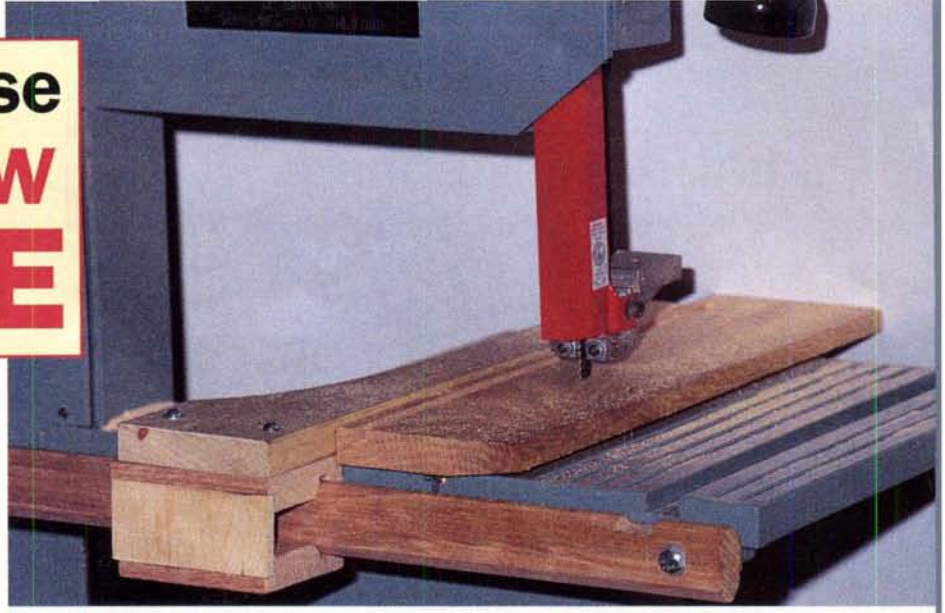
- **3210** is the code for sawmill and planing mill machinery. This is mostly, but not all, really big stuff.
- **3220** is the code for most woodworking machines such as table saws, routers, jointers and the like.
- **3230** is the code for tools and attachments for woodworking machinery, such as saw blades and log splitters. Sometimes there are shop tools filed in this code, too. A search in late 1997 showed a drill press, hand drill and electric chain saw for sale in this category.

Once you type in one of these codes, your screen will fill up with a large list of codes. Unless your computer has an enormous monitor, things will look pretty garbled. To decipher all the different codes, see "What it All Means" on this page. Once you've found a tool you're interested in, you need to call the Defense Reutilization Marketing Office (DRMO) at that base (for the phone number, look on their web page, in the phone book or call 1-888-352-9333). The employees in that office will be able to tell you if that tool is going to be sold at auction, through sealed bid or by some other means.

Then it's just a matter of getting to the base on time, opening your checkbook wide and borrowing a pickup truck to haul it home. **PW**

—Christopher Schwarz, PW staff

Quick-Release Band Saw FENCE



I WAS DOG TIRED of clamping a board to my band saw's table whenever I needed to rip stock, but I wasn't $100 tired, which is what a commercial rip fence costs.

Instead, I built my own hardwood rip fence that attaches and detaches with the turn of a handle. The guide fence is fastened to the clamp carriage with two machine screws, and it stays aligned because it rides on double v-ways. Even better, the fence floats 1/8" above the table, so chips can't build up between the fence and work.

The following dimensions are accurate for my Delta band saw; you might need to adjust them for your saw.

STEP 1 Make the Guide Rail and Rail Shim • These two pieces are held in place against the band saw's table. The rail shim merely spaces the guide rail away from the band saw table to make room for the clamps, so all you need is a hardwood strip the length of your table. The bolt clearance holes will be drilled when you drill the holes in the guide rail.

The guide rail is cut from a 23" piece of clear, straight-grained hardwood. The long edges of the rail are chamfered at a 45-degree angle on all four sides, leaving a 3/16" flat on the top and bottom. To avoid tearout, it's best to rough all the chamfers first with a router, then take a very light finish pass. These chamfers form the ways that guide the rip fence, so take your time.

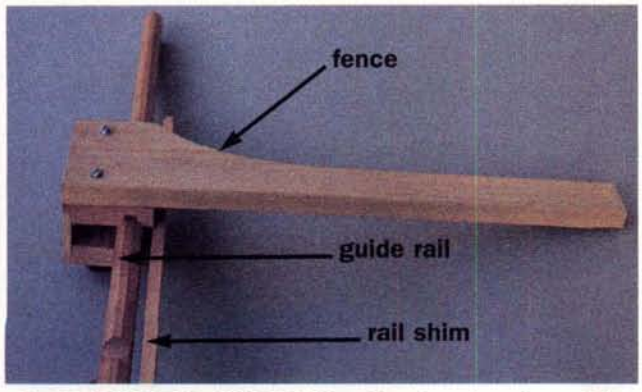
Mount the guide rail and shim to the edge of your band saw table. The top surface of the guide rail should sit about 1/4" below the surface of the table. Many tables are pre-drilled with mounting holes. If yours is, measure the locations and compare them with those in the diagram. If they agree, you're home free. If they don't, adjust the location accordingly. If your table isn't pre-drilled, I'm afraid there's a little bit of steel work ahead of you.

STEP 2 Cut the Clamp's Chamfers • I had a plastic handle with a threaded brass insert, so I used it to clamp the fence in place. If you make the T-handle, bore the recess cut first, then bore the clearance hole for the T-nut's shank.

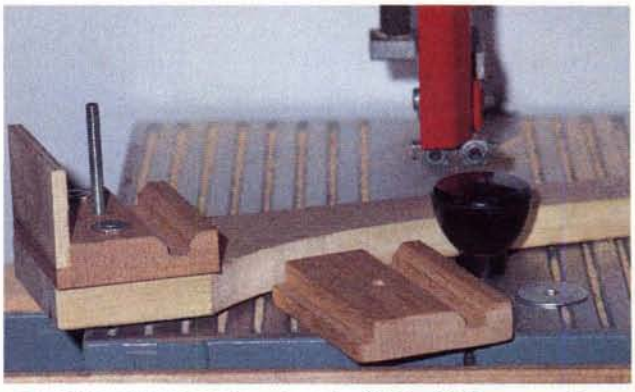
The top and bottom clamp plates are mirror images of each other, so the groove, rabbet and chamfering set-ups can be made on one 8" piece, which is crosscut to two 4" lengths. The groove locations are detailed in the diagram.

STEP 3 Rabbet for the Pressure Plate • To complete the clamp and pressure plate assembly, rabbet the rear edge of the piece as shown, but hold off making the pressure plate until you've fitted the plates to the rail.

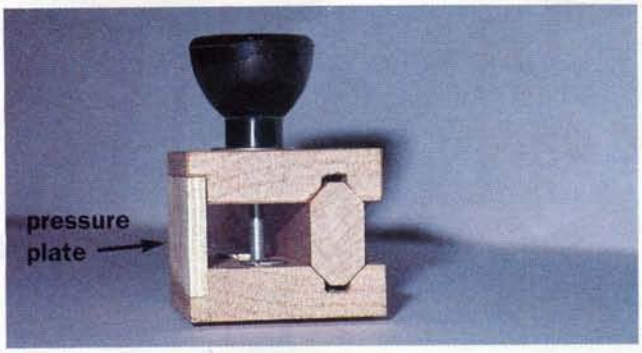
Cut the stock in half, then clamp the halves together



1 PREPARE THE GUIDE RAIL • Here's a top view of the fence. The guide rail and rail shim run through the *clamp in the middle* of the photo. Lay out the bolt hole locations on the rail, then clamp the guide rail and shim together and drill the appropriate clearance holes through both. Mark the location of the miter gauge slot and cut an oversize notch that clears the miter gauge's guide bar, then bolt the rail and shim to the table.



2 BUILD THE CLAMP • Cut the 3/8" x 3/8" groove first, then mount a 1"-diameter 45-degree chamfer bit and cut the chamfers without moving the fence, so the alignment will be perfect. Again, use multiple passes to form the chamfers. Test fit the rail in the groove while the guide rail is bolted to the band saw table. The board's top surface should be about 1/8" above the table.



3 ADD PRESSURE PLATE • Cut the pressure plate and glue it into the rabbet in the top plate. The fence will still work if the pressure plate is glued into both rabbets, but you'll have to remove the guide rail to clear the table for freehand work.

with the ways facing each other and counterbore a 5/8" flat bottom hole 5/16" deep to house the head of the carriage bolt. Then drill through for the 1/4" carriage bolt.

Now clamp the top plate and bottom plate to the rail. Make sure the two plates are parallel to the top of the table, then measure the gap between the two rabbets to determine the pressure plate's width.

Cut the Fence and the Assembly

Next lay out and cut the rip fence. Sand the saw marks from the edges, and true up the working edge of the fence.

Run the carriage bolt through both clamp plates and spin the T-handle. Clamp the assembly to the guide rail on the left side of the blade, then clamp the fence to the top plate with C-clamps. Line up the fence to the table using a large square, then drill two holes through both the rip fence and the top plate using a drill that is the same size diameter as the body of the #10-32 T-nuts.

Disassemble the fence and plate assembly, and press the #10-32 T-nuts into the bottom of the top plate. You might have to predrill holes for the T-nut prongs if the plate is a very hard wood.

Reassemble the carriage, then screw the fence to the top plate with 1 1/2" long #10-32 roundhead machine screws. Use washers under the heads of the screws. Line up the fence to the table with a square and screw the machine screws down tight. A test cut will tell you if you need to adjust the fence for blade drift.

The versatility of this rip fence is terrific. To add an extra-long fence, all I have to do is drill two holes in a long board and screw it to the fence's top plate. For sawing tenons, I just add 16 inches of 2 x 4s with the working face planed square to the bottom. I'm sure there's more opportunities just waiting to be discovered. **PW**

Horst Meister is a toolmaker from Riverside, Calif. He has been working wood for more than 31 years.

Schedule of Materials: Band Saw Fence

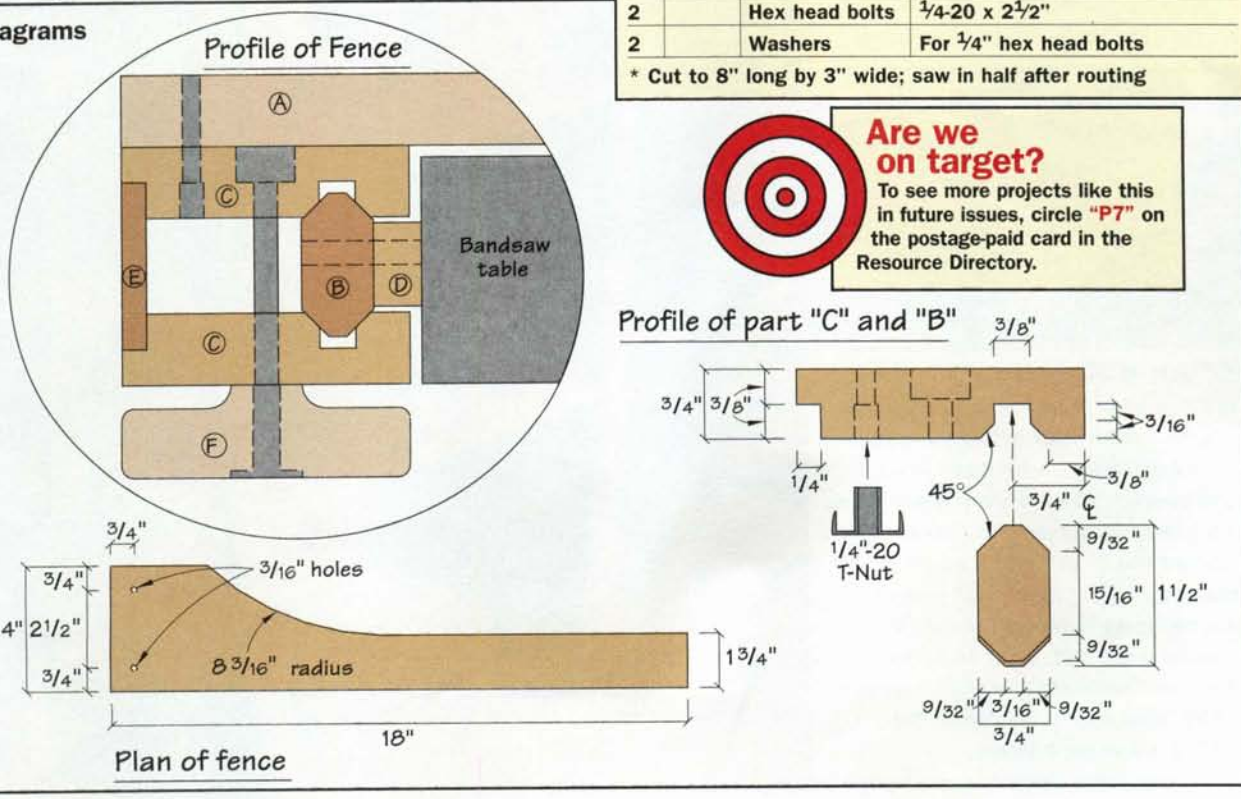
No.	Letter	Item	Dimensions T W L	Material
1	A	Fence	3/4" x 4" x 18"	Maple
1	B	Guide rail	3/4" x 1 1/2" x 23"	Oak
2	C	Clamp plates	3/4" x 3" x 4"*	Oak
1	D	Rail shim	3/8" x 3/4" x 12"	Oak
1	E	Pressure plate	1/4" x 1 3/4" x 4"	Plywood
1	F	T-handle	1" x 3/4" x 3"	Maple
1		Carriage bolt	1/4-20 x 3 1/2"	
2		Machine screws	#10-32 x 1 1/2"	
2		T-nuts	#10-32 medium	
1		T-nut	1/4-20 medium	
1		Fender washer	1/4" ID x 3/4" OD	
2		Hex head bolts	1/4-20 x 2 1/2"	
2		Washers	For 1/4" hex head bolts	

* Cut to 8" long by 3" wide; saw in half after routing

Are we on target?

To see more projects like this in future issues, circle "P7" on the postage-paid card in the Resource Directory.

Diagrams



BOATING BOOKSHELVES

Rustic shelving — without cutting apart that old canoe.

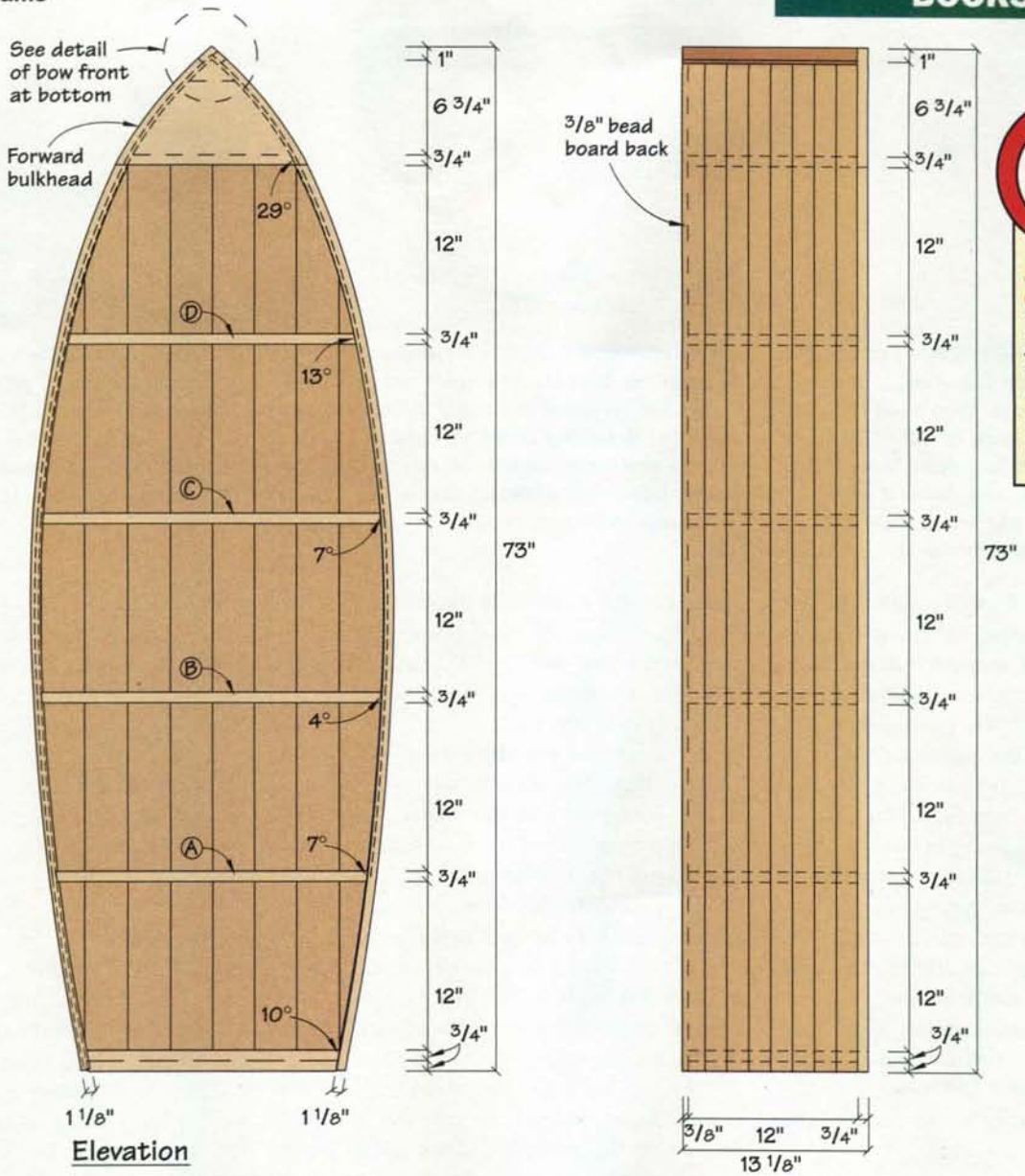
ON A SUNDAY OUTING I wandered into a small town and came upon a handmade sign along the side of the road that simply said "FISH DECOYS, OPEN." What a discovery. First, I wasn't aware there were decoys used to attract fish. Second, it so happened that this modest little shop behind the owner's home was the studio of S. Robbins, one of the most highly regarded carvers and painters of fish decoys. As he worked at his bench, I browsed through the shop showroom and admired his beautifully detailed work.

In one corner were examples of what I thought was his most interesting work. They were displayed on shelves that had been fitted into an ancient canoe that had been cut in half at its midsection and stood on end. Not having a canoe to lop in half, I came up with this shelving project as a variation on his theme.

As a "Little Shop That Could" project the ship shelves offered some chal-

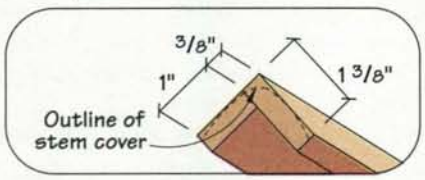
Editor's Note

In issue #91, I built this workshop on wheels, which folds in half for storage. Then I outfitted it with $498 in tools and equipment. Reckoning many of you work in small shops with limited tools, I wanted you to know that we can work that way, too. "Little Shop" projects are designed to be built simply. For a copy of issue #91, send $4.50 to Popular Woodworking • Back Issues • 1507 Dana Ave. • Cincinnati, OH 45207 • Ask for #58066.

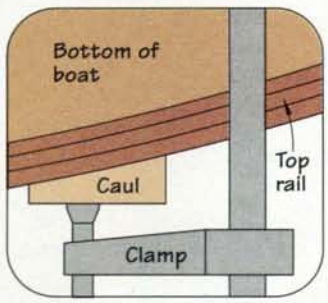


Elevation

Profile



Detail of stem cover



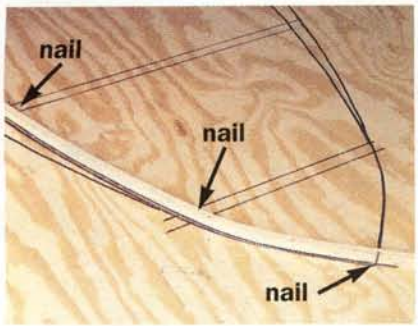
Detail of clamping caul

Are we on target?

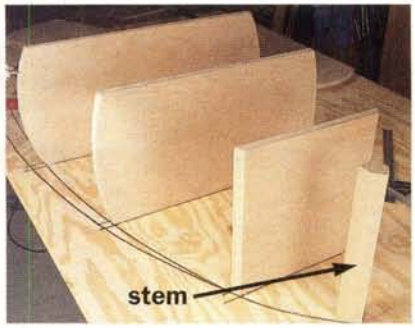
To see more projects like this in future issues, circle "P10" on the postage-paid card in the Resource Directory.

Schedule of Materials: Boating Bookshelf

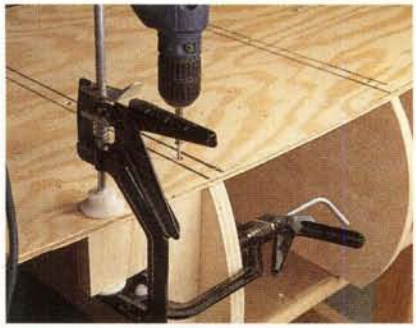
No.	Item	Dimensions T W L	Material
1	Bottom	3/8" x 24" x 72"	Bead board ply
1	Bottom shelf	3/4" x 12" x 18"	Birch ply
1	A Shelf	3/4" x 12" x 22"	Birch ply
1	B Shelf	3/4" x 12" x 24"	Birch ply
1	C Shelf	3/4" x 12" x 24"	Birch ply
1	D Shelf	3/4" x 12" x 20 1/2"	Birch ply
1	Fwrd blkhd	3/4" x 12" x 12"	Birch ply
1	Stem	1 1/2" x 3 1/2" x 12"	2x4 stock
1	Top plate	3/4" x 14" x 10"	Birch ply (shape to fit)
2	Top rails	3/4" x 1 1/8" x 72"	Pine (cut to fit)
1	Stern rail	3/4" x 1 1/2" x 16 3/4"	Pine
1	Stem cover	1/2" x 1 1/2" x 12 3/8"	Pine
16	Siding	1/8" x 1 7/8" x 78"	Temp. hrdbrd (Duron)



1 MAP THE BOTTOM • Start at the stern. Place the stick to the inside of the nail, then bend it around the outside of the nails at the other shelf locations, then inside the nail at the bow. Draw a pencil line following the stick. Repeat the process for the other side.



2 SHELVES IN PLACE • Here you can see that the shelves I cut fit inside the layout of the "hull" on the plywood. Note that I was still planning to use a curved bow at this stage. I soon gave this up and opted for straight-sided shelves.



3 SCREW THE SHELVES • I used an "L"-shaped piece of plywood to keep my shelves square to the bottom as I fastened the shelves. Clamp it to the shelf and back as shown then screw the shelves in place.

lenges that the limited equipment I had to work with wasn't prepared to overcome. I'll add that the hull geometry underwent a "midstream" change from how I had originally envisioned it. You see, I wanted the sides of the boat to curve not only bow to stern, but also top to bottom. In photo 2 you'll notice that the ribs (shelves) of the hull curve on the outside. I discovered, when trying to apply the "siding" to the ribs, that the compound curves created by the curve in the ribs caused the siding to head off in odd directions.

After scratching my head and reading about lapstrake boat building, I decided I could live with a hull that was straight from top to bottom. The rest was smooth sailing.

A Word About Materials

During a trip to the lumber yard I also learned that my initial plan to use clapboard siding to cover the hull was too expensive. My alternative was 1/8" thick tempered hardboard called Duron™. It's great for this application because the material is dense so the sawed edges don't fuzz up. The yard also had 3/8" thick plywood that sported a bead board detail that looked appropriately "boaty" and so I bought it for the vessel's bottom.

STEP 1 Lay Out Your Bottom • Before cutting any other material, first make a full-size layout of the boat bottom showing the outside shape and the location of the shelves. Start by cutting the bead board plywood oversized to 26" x 74". Strike a centerline on the back of the plywood from its top to bottom.

Next lay out the shelf locations. Use the diagram to establish the curve of the boat side and rip a piece of bendable wood to 1/4" thick and about 84" long (I used 3/4" clear pine).

To establish the proper bends, pound a small finish nail at the location of each shelf. Place the nail on the edge of the shelf line at the bottom shelf, then place the next nails at each shelf edge less the 1/4" thickness of the bending stick. Do this at all shelf end locations, and set the last nail at the bow on the center line. Then insert your bending stick into the nails as shown in the photograph.

STEP 2 Cut Out the Shelves • Next, verify the shelf lengths on your layout against the lengths given in the Schedule of Materials. Use the degree settings given in the diagram for cutting your shelf ends. These angles will give you a better surface to nail and glue to when applying the siding for the hull.

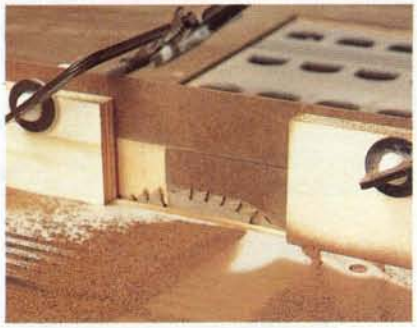
With the shelves complete, cut out the bow stem piece from a short length of 2 x 4. The actual point of the stem piece turned out to be a 45-degree angle.

Now cut out the bottom following your drawing. Because you're cutting from the bottom using a jigsaw, there won't be any tear out on the good side. Speaking of the jigsaw, readers who have followed this series might notice that it's a new acquisition for the "Little Shop." After cutting more round and odd shapes than I care to remember using my muscle-powered compass saw, I treated myself to a $55 Skil Classic Jigsaw. It is the first substantial new tool I've added to my initial $498 tool investment.

STEP 3 Begin Assembly • Before attaching the shelves, apply veneer tape to the shelves' front edges. This will cover the plywood edge, giving it the appearance of solid wood. Veneer edging is available pre-glued and is easy to apply using an ordinary iron. Trim any veneer overhang and presand the shelves. Next, drill and countersink holes through the boat bottom and screw the shelves in place.

STEP 4 Cut the Skin • To prepare the 1/8" hardboard siding, first rip 16 pieces to 1 7/8" wide. To make this task easier, I first ripped two 9" widths off the big 4' x 8' sheet. I then crosscut the pieces to about 78" in length, leaving enough to cover the side and trim to length when done. The last step in preparing the pieces is sawing a bevel on one edge to allow overlapping pieces to seat together without producing a gap (see photo).

STEP 5 Attach the Siding • To apply the siding, set your craft upside



4 MAKE YOUR OWN SIDING • I made this simple jig to safely and accurately cut the bevel on the hardboard siding. Sandwich a scrap piece of hardboard between the two plywood pieces to create the opening through which you push the long strips of siding. Set your table saw to cut a 7-degree angle and run the hardboard through the slot.

5 ATTACH YOUR SIDING • After the first piece is in place, use a 1⅝" wide spacer block to mark a pencil line at each shelf location to give you the location of the next piece of siding. Apply adhesive to the edge of each shelf where the strip will be nailed. Use only one nail at each shelf and two nails at the stern and stem. Locate the nails so that they are covered by the next strip.

6 IT'S A BENDING FORM — AND A BOOKCASE! • You'll be better off with an extra set of hands when you begin gluing up the strips, so hail a mate for some help. If you're on your own, just glue one set of strips at a time and you'll be OK.

down on a level surface so you can nail the first piece starting at the bottom. Because the hardboard is too dense to nail through without splitting, first drill clearance holes. I didn't use a lot of nails, just enough to keep the strips in place, but I did use a modest dab of Liquid Nails™ at each fastening point for each strip. Start nailing at the bow with the strip length overhanging slightly.

When one side is completely covered, trim any overhang at the bow so it doesn't interfere with attaching the siding on the next side. It need not be a pretty cut because the bow will eventually be capped. For now, leave any excess at the stern. Proceed with covering the second side. When done, let your project sit for a couple hours to allow the adhesive to cure.

Before trimming the siding at the stern, use some scrap to make a ¾" build up and apply it with glue and nails to the front edge and sides at the stern. With the build-ups in place, use its edge to guide your saw to trim the overhang.

STEP 6 Laminating The Top Rails • Because you can't bend a piece wide enough to cover the top edge of the boat's sides, it's necessary to laminate the wood into the required shape. This is done by cutting thinner, bendable strips, then gluing them back together on a form using clamps. While this can be a lot of trouble, we're in luck because the necessary bending form is already made — it's the bottom of the boat!

Start by cutting ¾" thick pine into ⅜" wide strips that are about 72" long. Cut six strips in all. Before gluing up, have three clamps ready and make two clamping cauls each for the stern and bow end. The caul's face that contacts the wood strips should closely match the contour of the boat's shape, while the edge that goes against the clamp should be square to the clamp face (see diagram). These are easy to make and need not be perfect. Make two cauls for the bow end that match the bulkhead, and another two cauls that match the side shape at the stern.

After both strips have dried, clean them up by sanding, then cut them to length. So that the top rails butt to the top plate at the bow, the rails are cut at an angle, and should overlay the front edge of the forward bulkhead by ½". This will give you enough surface to nail the rail to the bulkhead. The other ¼" gives you room to glue the top plate in place. Nail the top rails in place by fastening them to the shelves.

Make the top plate by setting a slightly oversized piece of plywood in position on the bow. Mark the bow shape on the underside of the plywood with a pencil. Then measure the overhang of the top rail on the outside of the boat, and add that dimension (approximately ⅝") to the pencil lines to determine the necessary overhang of the top plate. Use your jigsaw to cut the shape, then use the edge tape veneer to cover the plywood edge. When done, nail and glue the top plate in place.

Stem Cap and Stern Rail

Only two more pieces, and the hard work will be done. Fashion the stem cover following the diagram. I shaped the outside to a rough form using a block plane. When done, nail it in place. The stern rail bridges the two side rails at the bottom. Match the angles at the ends formed by the rails and nail in place.

Before sanding and finishing, set the nails and fill with putty. Sand only the wood parts and the Duron where you have used putty. I finished the wood parts with one coat of polyurethane to protect it from my green paint, then painted the hull with two coats. Lastly, I lightly sanded the first coat of polyurethane and brushed on a final coat.

Now, if I only had some of those fabulous looking fish decoys to display in my "boat" shelf. **PW**

—Steve Shanesy, PW staff

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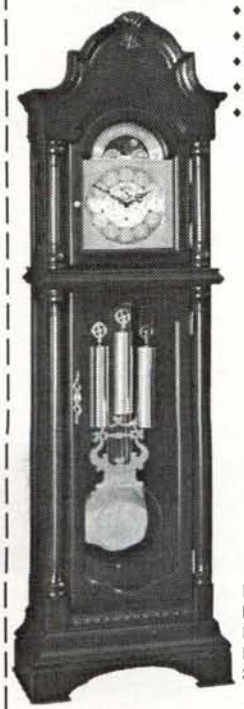

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NEW PRODUCTS

Popular Woodworking **endeavors to provide readers with accurate, useful information on the newest woodworking tools and products by testing most of them in the *Popular Woodworking* shop. We consider cost, design and benefit, and add our comments about tested items to help you make future purchasing decisions.**

"Senco's new line of air fastening tools, priced for the home woodworker, offers quality and features reflecting their years of experience."— PW

Senco Announces Accuset™ DIY Line

Contact: Senco Fastening Systems 888-222-8144

Available: Spring of 1998 at home center stores and retail woodworking and lumber locations.

Features:

- A100LS ($120) drives ¼" crown staples ½" to 1"
- A150LS ($160) drives ¼" crown staples ½" to 1½"
- A125BN ($110) drives brads from ⅝" to 1¼"
- A200BN ($150) drives brads from ⅝" to 2"
- Each tool features rear exhaust to keep oil and dust off wood, visible load indicator, spring-loaded quick-release clip latch, plastic carrying case and safety glasses
- A headless pinner and an angled finish nailer are scheduled for release at a later date

For more information, circle #170 on the Resource Directory Coupon.

"These saws feature an excellent cut, good price and a comfortable soft-grip handle for better control."— PW

The Bear Saw™ from Vaughan & Bushnell

Contact: Vaughan & Bushnell Mfg. 800-435-6000

Retail Price: $19 to $26, available at home center stores.

Features:

- Designed to cut on the pull stroke for faster, more accurate cuts
- Thin, spring-resistant blades with ground triple-edge teeth
- Available in four different styles for rough and fine finished carpentry, cutting PVC and other common construction materials
- All four blades, from 8" to 13", are interchangeable on all the handles

For more information, circle #171 on the Resource Directory Coupon.

"The $80 model is a good router at a friendly price. For another $20 you get soft-start and variable speed."— PW

Skil's New Plunge Routers Offer Affordable Performance

Contact: S-B Power Tools 800-301-8255

Available: At most home center stores.

Features:

- 2HP, 10-amp model 1845 Classic Plunge Router ($100) operates within 8,000 - 25,000 rpms; includes soft-start feature and fine adjustment for bit positioning; ¼" collet
- Model 1840 ($80) offers 1¾HP, 9-amp motor that operates at 25,000 rpm; ¼" collet
- Both models offer a collet lock for one-wrench bit changes and a template guide adapter

For more information, circle #172 on the Resource Directory Coupon.

"Inexpensive option to a set of Forstners bits. Great for the weekend woodworker."— PW

Wolfcraft® Offers Adjustable Bit

Contact: Wolfcraft 630-773-4777

Retail Price: $11

Available at home center stores and in catalogs.

Features:

- **Makes flat-bottomed holes on a drill press; bit adjusts from 5/8" to 1 1/2"**
- **Provides an alternative to expensive Forstner bit sets, which require frequent sharpening**

For more information, circle #173 on the Resource Directory Coupon.

"Increased performance make these tools a professional-level drill — and they still feel great in the hand."— PW

Ryobi's Jobsite Drills For Demanding Work

Contact: Ryobi 800-525-2579

Retail Price: $130 - $230

Available at home center stores.

Features:

- **12-, 14.4- and 18-volt cordless center-handle drills are designed for professionals and serious do-it-yourselfers**
- **24-position Jacobs industrial keyless chucks**
- **Two batteries per tool, with one-hour diagnostic chargers**
- **Two-speed variable gear boxes offer 0-300/0-1,000 rpm for 12-volt; 0-350/0-1,300 rpm for 14.4 and 18-volt**
- **All three sport Ryobi's Power-Grip, no-slip texture**

For more information, circle #174 on the Resource Directory Coupon.

Porter-Cable's New Tools for Biscuits and Dovetails

Contact: Porter-Cable 901-668-8600

Retail Price: $83 dovetail jig; $225 plate jointer. Available at wood specialty stores and catalogs.

Features:

Model 557 Plate Joiner

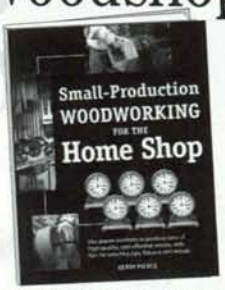
- **7.5 amp motor is the highest amp rating in the market**
- **Includes 2" and 4" diameter blades for joining material using standard biscuits, or Porter Cable's new FF-sized biscuit**
- **Offers seven cutting depths for maximum versatility**
- **Fence tilts from 0° to 135°, and does not require removal for flush cuts**

Model 4112 Dovetail Machine

- **Handles stock up to 12" wide and from 1/8" to 3/4" thick**
- **Automatically positions workpiece for best pin and tail locations; cuts both 1/2" blind and 1/2" rabbetted dovetails**

For more information, circle #175 on the Resource Directory Coupon.

Save Time & Money in Your Woodshop!



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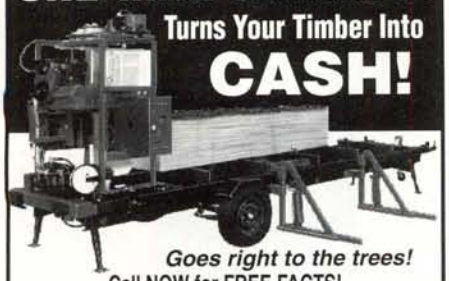

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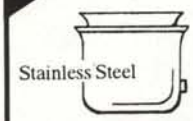

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When will your subscription expire?

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Circle #143 on Resource Directory Coupon

CAPTION the CARTOON

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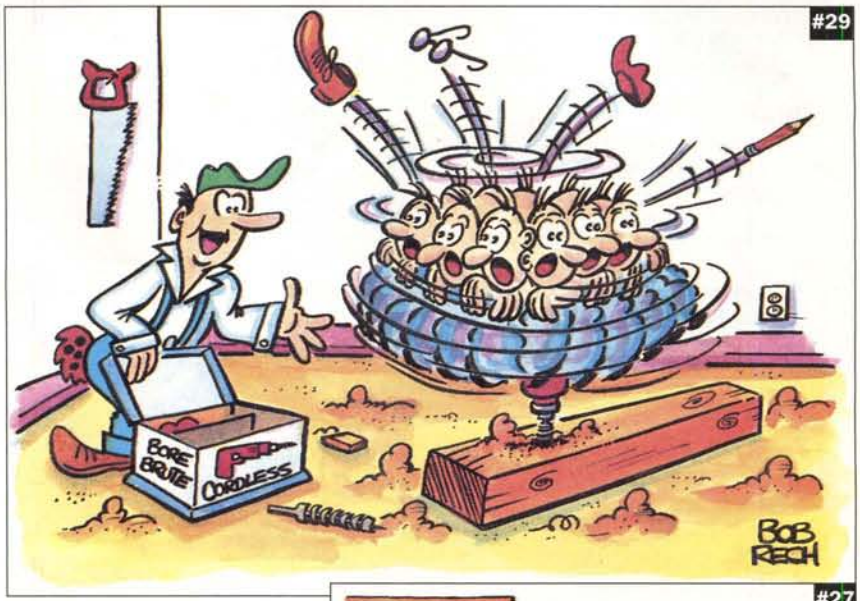

"Well.... The PullOut Plans said to cut on the inside of the line."

Thomas Held from New Freedom, Pennsylvania, is the winner of our "Caption the Cartoon Contest #27" from the November issue and recipient of the Ryobi drilling system.

Congratulations Tom!

The runners-up receive a one-year subscription to *Popular Woodworking*:

"I don't know, Harry. First he pulled a rabbit out of the dust collector, and now this!" — **Clark Gravedoni,** from Ishpeming, Michigan

"That does it! I'm not buying any more blades from the Houdini Tool Company." — **Doug Ahmann,** from Woodbury, Minnesota

"I guess we should have expected this when we decided to start building magician props." — **Garfield Anderson,** from South Holland, Illinois

"I knew I never should have gotten the kids that Siegfried and Roy video!" — **Jessica Milano,** from Littleton, Colorado

"American Woodworker got me into this mess, but I'll let* Popular Woodworking *get me out!" — **Glennie Cox,** from Thurmond, North Carolina

"In* Popular Woodworking, *page 28, Steve Shanesy said, 'Just follow my clearly written instructions.' I did!" — **Wayne A. Kamps,** from Spokane, Washington

illustrated by Bob Rech

Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*, Cartoon Caption #29, 1507 Dana Ave., Cincinnati, OH 45207 by Feb. 19, 1998. Winning entries will be chosen by the magazine's editorial staff.

The winner will receive Ryobi's new 5" Random Orbit Palm Grim Sander (RS240) with a powerful 2.4-amp, 12,000-orbits-per-minute motor. And they'll also receive Ryobi's lightweight 1/6th-sheet elliptical-motion sander (S551), which gets in small spaces other sanders cannot.

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

Sassafras

(Sassafras albidum)

Other Common Name: White Sassafras

Growing Regions: Sassafras is abundant and is found in the Atlantic coastal states west to Texas and Iowa. The tree prefers moist, particularly sandy, soils of uplands and valleys, and is often found in old fields, clearings and forest openings, according to "Woods of the World."

Characteristics of Tree: The tree is small and sometimes found in the same lumber bin as ash, which it resembles. The tree is aromatic and is usually between 40 feet and 90 feet tall. The trunk's diameter ranges from 24" to 60".

Characteristics of Wood: Sassafras is a straight-grained coarse wood with some interesting patterns and has a characteristic smell as it is being cut. The wood degrades little but might check some when dried. Sassafras is resistant to decay so it is used in fence posts and window sills. The heartwood is initially pale brown, but it darkens to dull orange-brown after it is cut.

Finishing Characteristics: Takes stain well; lacquer warms the appearance of the wood considerably.

Workability: Works without difficulty with most ordinary tools in planing and other machining operations, and yields clean, finished surfaces. It glues and screws well, though nailing takes some care.

Common Uses: Boats, posts, interior construction and trim, fence posts.

Special Features: The bark of the root produces an oil that is used to scent soaps, medicines and other products. Small roots are also used for making Sassafras tea, which is considered to be a tonic.

Midwest Price: About $4 a board foot, 4/4 good. **PW**

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Trees To Furniture TAKES ROOT

Woodworkers across the country and beyond are organizing their communities to harvest waste trees.

Wood-Mizer Products visited our magazine's offices here in Cincinnati to show readers and other woodworkers the new LT15, their most affordable portable sawmill ($4,495). Here the two founders of the Trees to Furniture product are sawing some incredible spalted maple veneer.

RESPONSE to the article in the November 1997 issue about the Cincinnati "Trees to Furniture" project has been amazing. People in more than 100 towns across the United States and even some foreign countries have called, written and e-mailed us about starting a program in their community.

In addition to all the home woodworkers who have called us, we've had country agricultural agents, social workers, owners of woodworking supply stores and even a Canadian Indian tribe contact us for help and advice on starting their own effort.

For those thinking about starting your own program to turn urban trees into great lumber for your woodshop, here are five tips on getting the log rolling:

1. Find Two Friends — You don't need a lot of people to harvest urban trees. In fact, all you really need are three strong backs that can move a few logs. So get a couple other woodworking friends to help. Show them one of our free brochures (see below for how to get one). Remember: The first program in Cincinnati was started by just two guys.

2. Find a Sawmill Operator — Call Wood-Mizer's toll-free number (800-553-0182), and they'll find sawyers in your area who cut lumber for a nominal fee. Sawmill operators we've talked to charge between 15 cents to 45 cents per board foot — far less than you'll pay at any lumber yard. The sawmill operators will have the expertise to help you get started once you're in the woods.

3. Find Some Logs — Your city, county or township is going to have a department that cuts down trees that are a public hazard. This is a good place to start looking for logs. Look in your phone book's government pages for a public works department, a park board or the county extension agent. Any of these offices should be able to tell you who is responsible for cutting urban trees. Offer to bring them a brochure so they can see what the program is about. You also could try calling tree-cutting services. They might prefer giving you the logs instead paying for them to be put in the dump.

4. Call the Local Media — This might not sound like a necessary step, but it is. The local paper in Cincinnati wrote several stories about our program, and the result was hundreds and hundreds of phone calls from people who wanted to give us logs. In fact, we got more calls and offers than we could possible handle. Plus, we received calls from people who were interested in getting involved in cutting trees with us. If you call your local newspaper, first ask for the newsroom, then ask for either the city editor or an assistant city editor. These are the people who make assignments to their reporters. Explain the program briefly. Offer to send them a brochure and invite them to come see you saw some logs (the process makes for great photos). If you need more brochures, call us at (513) 531-2690 ext. 407.

5. Take Pictures — In future issues, *Popular Woodworking* is going to feature people all over the country who are sawing their own lumber. We'd love to see pictures of your effort, including pictures of whatever you build from the lumber. Send them to the address below. **PW**

What is Trees to Furniture?

A couple years ago, two University of Cincinnati professors decided they could probably get wood for their projects by harvesting trees felled by storms, age or new construction. They turned out to be right and have since harvested thousands of board feet of lumber for less than 50 cents a board foot. Woods such as walnut, cherry, maple and even osage orange.

Locals who own portable sawmills cut the logs into boards for pennies a board foot; the professors store the wood on stickers until it's dry. Then they build furniture.

If you want more information on how to start a "Trees to Furniture" program in your area, or if you'd like to find out if there's one forming in your area, do one of the following.

• WRITE US • Send a self-addressed stamped envelope (with two first-class stamps) to Trees to Furniture, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207.

• E-MAIL US • Let us know you're interested by sending your address and phone number to popwood@earthlink.net.

• VISIT THE WEB • Wood-Mizer Products has a registration form at its website: www.woodmizer.com.

Popular Woodworking Back Issues

Back Issues only $4.50 and $3.50 postpaid.

All 1994 and 1995 issues just $4.50

September 95 Country wall cupboard; collector's coffee table; turning on the table saw; porch swing; review on chisels and gouges.

July 95 Mission style coffee table; mortising jigs for your router; french provincial corner cupboard; kids' chairs and table set; fundamentals of spindle turning; kit furniture review.

May 95 Router bit basics; walnut buffet; sportsman's desk; carving luxury cars; finishing with wax; country farm table; authentic wooden drum.

March 95 Preparing stock; traveling lawn chair; flap-top table; T. Rex whirligig; cedar-lined hope chest; pier table.

January 95 Handkerchief table; toy chest; legless coffee table; corner computer desk; how to co-op your shop.

November '94 Carve a loon; library steps; a chest for silver flatware; carving sailor sam; using the tormek grinder.

September '94 Hope chest; deck furniture; jewelry box; cantilevered rocking horse; bit storage cabinet; revolving bookcase; dual biscuit joinery.

July '94 Display trays; the art of pipe making; coffee table; three small boats; vanity stool; cartridge box; chip carving.

May '94 Turned spice canister; cedar blanket chest; tambour wall desk; woodworker's V-block; contemporary desk; nail storage cabinet; nautical flower box.

March '94 Sewing and knitting box; planer stand; carving in the blue whale; walking canes; table saw power feed; walnut quilt rack.

January '94 Doll cradle; carving King Lear; child's sleigh; lathe ornaments; beehive octagonal clocks; crayon battleship.

All other issues just $3.50

November '93 Tea bag tote; mighty might excavator; chess cabinet; carving; axe cover; welcome basket; rocking horse; handy stool; 6-foot ladder.

September '93 Folding desk; nesting tables; band saw circle cutting jig; wind harp; child's rocker; BB target; marquetry; carving.

July '93 Loft a duck; a simple cabinet; making pine burl tables; colonial handkerchief table; puzzle chair; fairy tale birdhouse; making bow saws; toddler's toybox.

September '92 Carved nut bowl and cracker; knock down couch; oak burl jewelry box; shop caddy; peter putter; old mill wheel; roll top desk II; desktop dolphin.

May '92 Lumber storage rack; spiral turning; belt buckles; carved corner cabinet; outdoor furniture; jointer push blocks; wooden jack plane; glass wall sconce.

July '91 Chippendale mirror; biscuit-joined table; gardening stool; laminated picture frames; miter jig; Swiss-style chip carving; trastero; turn a teacup.

March '91 Dust bench; benchdrop clamp; sailor's work; compact disk storage; spiral lamp bases; dinosaur bank; kitchen storage rack; occasional table; turned and carved bowl.

September '90 Roadrunner whirligig; log turning; serving cart; country mailbox; piano music box; toy carousel; cube and canister drum sanding system.

July '90 Victorian mailbox post; plate shelf; bee hive jewelry box; sliding miter table; writing desk; bentwood Indian boxes.

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January '90 Coffee table; Folding candelabra; ladle; firewood box; butterfly figures; cedar-lined chest; extension cord reel; pole lamp.

November '88 Panel doors; silver chest; corner pewter hutch; country sconce; Massachusetts lowboy.

January '88 Preparing stock by hand; bentwood boxes; heather's desk; medieval bookbinding; inlaid dice; build a box of dominoes; box joints on the table saw.

November '87 Antique wall cupboard; relief carving; wooden buttons; couch and chairs; handscrew clamps.

September '87 Dovetail joinery; half-bind dovetails; joiner's toolbox; nightstand; Connecticut River Valley desk; utility bench.

July '87 An interview with James Krenov; bed; crotch wood table dish; dinner table; carving an Arabian stallion part II.

March '87 Building a butcher block work table; ladder-back rocker; amazing folding stool; making knives.

January '87 Universal table saw; veneered vertical tambours; backgammon board.

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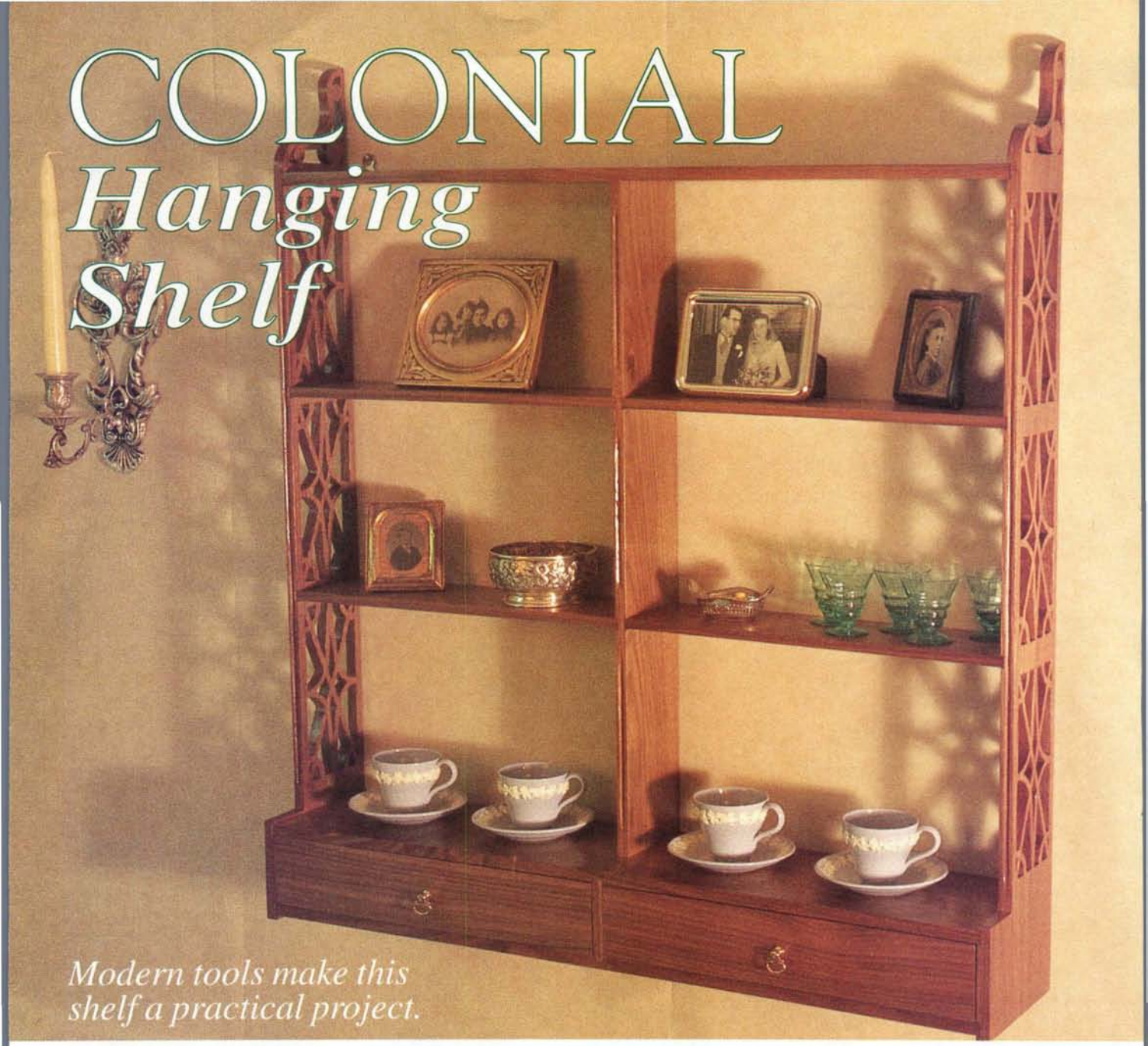
COLONIAL *Hanging Shelf*



Modern tools make this shelf a practical project.

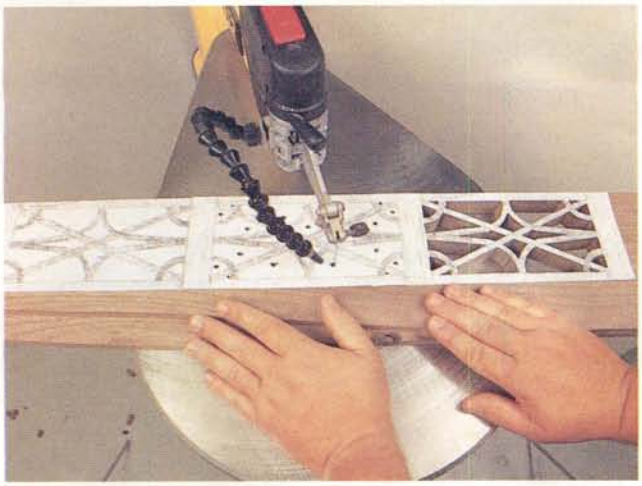
THE GENERAL DESIGN of this hanging shelf became popular in the 18th century when people became interested in collecting china. Both Thomas Chippendale and George Hepplewhite included pierced shelf designs in their cabinetmaker's guides published in the middle and late 1700s. While this is a fairly simple design, the fretwork adds elegance to the appearance — and a fair amount of time to the construction. While I was using my scroll saw to cut the fretwork, I could only imagine how laborious the process had been for our colonial wood brethren who made do with a fret saw.

STEP 1 **Rough Lumber and Some Brads** • The shelf is made almost entirely of 1/2" walnut, with the exception of the back and parts of the drawers. These also can be walnut if it strikes your fancy. Other historically appropriate woods include mahogany or satinwood, but I happened to have some 1/2" walnut that had been resawn from some 8/4 used for another project.

Start by cutting the two side pieces 1" oversize in length. Double up the two sides and then tack them together with 3/4" brads in the 1" excess at the top, and within the 2" space to the front of the scrollwork and above the drawer section. This holds the pieces firmly together while the scroll work is done, and you won't hit a nail with the blade.

The template for the scrollwork is included in the PullOut™ Plans. Copy the template and use rubber cement to mount the paper to one side. Drill clearance holes in the waste sections of the pattern and then get comfortable. Photo one shows one section completed, and the second section just begun.

Once the scroll work is complete, mark the location of the drawer section 4" up from the bottom of the side. Then set your table saw for 4" and rip the sides from the top down to-



1 SCROLL SAW TIME • Cutting through 1" walnut on a scroll saw can be a little taxing. Choosing the proper blade for this task can make things a lot smoother (I recommend a 5R or reverse-tooth blade with 12 teeth per inch). The length of the sides can be problematic for maneuvering on the scroll saw, but the end effect of a single pierced piece is worth the effort.

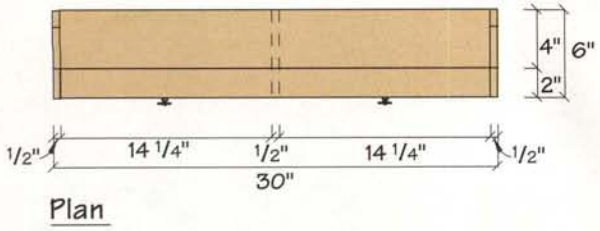
2 A DRY FIT • With the dadoes made on the sides, center partition, top shelf and drawer section top and bottom, dry-fit the shelf unit and use a 1/4" rabbeting bit in a router to form the rabbet for the 1/4" back in the drawer section. Chisel out the corners to complete the rabbet.

Schedule of Materials: Colonial Hanging Shelf

No.	Item	Dimensions T W L	Material
2	Sides	1/2" x 6" x 33"	Walnut
2	Top & bottom	1/2" x 6" x 29 1/4"	Walnut
1	Top shelf	1/2" x 4" x 29 1/4"	Walnut
1	Center partition	1/2" x 4" x 24 7/8"	Walnut
1	Drawer divider	1/2" x 3" x 5 11/16"	Walnut
4	Shelves	1/2" x 4" x 14 1/2"	Walnut
1	Back	1/4" x 3 1/4" x 9 1/2"	Plywood
4	Drawer fronts/backs	1/2" x 2 3/4" x 14 1/4 "	Walnut*
4	Drawer sides	1/2" x 2 3/4" x 5 11/16"	Walnut*
2	Drawer bottoms	1/4" x 5 1/4" x 13 7/8"	Plywood

*Other materials can be substituted for drawer sides and backs

Diagrams



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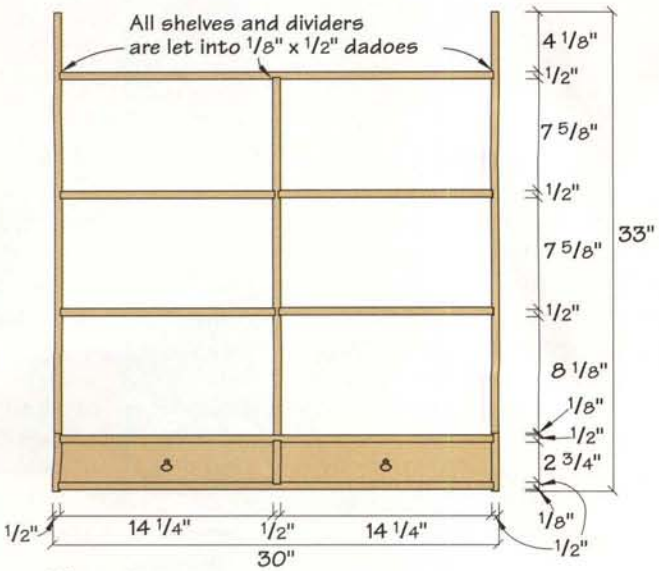

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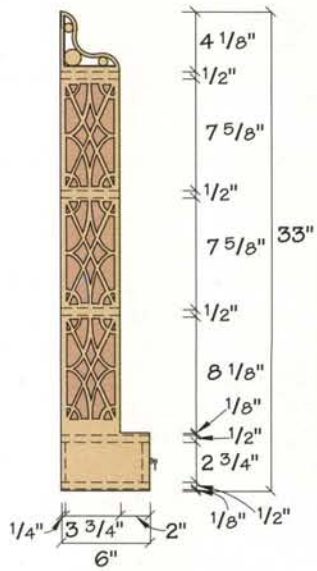

Profile

Are we on target?

To see more projects like this in future issues, circle "P8" on the postage-paid card in the Resource Directory.

3 HANDMADE DETAIL • I used a beading tool to add the flute detail to three front edges. Any number of details can be used, or none at all if that's your preference. If you've never used a beading tool before, it may take a couple of minutes to get the feel of the cutting action. Take it easy and let the tool cut a little at a time.

4 DRAWERS • The drawers for this shelf were assembled using half-blind dovetails cut with a dovetail jig. If you have the time on your hands, you also can cut these by hand. And if you're not entirely comfortable with dovetails, you can always use tongue-and-groove joints to assemble your drawers.

ward the drawer section. Stop your cut before the blade intersects the drawer area. Then use your band saw to complete the cut, and again to cut on the 4" line to separate the waste from the sides.

While the sides look nice now, there's still a fair amount of sanding ahead. I used a 3/4" wide strip of 1/8" plywood and a lot of small pieces of 120 grit sandpaper to work between the fret spaces to smooth all the surfaces. A small rasp and triangular file also were useful.

STEP 2 Dadoes and Dry Fit • Now that the hard part is done, the rest is joinery. Using your table saw, cut 1/8" deep dadoes in the locations shown in the diagram. While not deep enough to provide significant structural support, the dadoes make assembly easier and provide some strength without weakening the sides.

With the dadoes complete, dry-fit the shelf to check for any irregularities. While I had the shelf clamped up I decided to run the 1/4" x 1/4" rabbet for the drawer section back. I left the drawer divider out for this step. Photo two shows the rabbet complete.

With everything fitting correctly, sand the inside surfaces through 150 grit, then glue and assemble the shelf. Start by attaching the shelves, top and drawer section top and bottom to one side. To provide extra strength, I nailed each shelf to the sides with two small brads. Now attach the center partition between the top and drawer section top, and also attach the drawer divider. Finally, attach the other two shelves and glue and nail the other side in place. Clamps across the shelf unit are a good idea, even with the use of the brads. Check the shelf to make sure it is square, then set it aside to allow the glue to dry.

STEP 3 Fluted Front • To add a more visually interesting feature to the otherwise plain front, I used a beading tool to add a simple flute to the three vertical fronts, stopping 1" from each intersection. The cutter I used is available through Lee Valley Tools 800-871-8158, and can be purchased with the handle (# 05P04.01 - $34.95) or separately (#05P04.04 - $8.50). I made my own handle by cutting a kerf down one end of a marking gauge and adding a bolt. The marking gauge is still perfectly usable as a marking gauge, making it a dual-purpose tool.

STEP 4 Dainty Drawers • While not of significant size, the two drawers provide ample room for a number of small items, and give the shelf a feel of more substance. I used half-blind dovetails on the drawers with the 1/4" plywood bottoms captured in a 1/4" x 1/4" groove on all four sides. Photo four shows one drawer assembled, while the other drawer is shown ready for assembly.

After the drawers are assembled, sand the entire piece through 150 grit, slightly knocking off the sharp edges.

STEP 5 Finish and Brass • I finished the piece with a few coats of lacquer. You may decide to add a stain to darken the piece, but walnut is so pretty by itself I prefer to let the wood do the talking. To complete the drawers, install the brass pulls (Lee Valley # 00A46.02, $5.45 each).

The shelf is now ready to hang in an appropriately visible place. A location near a window works very well as the sunlight shining through the fretwork casts wonderful shadows on the walls. **PW**

—David Thiel, PW staff

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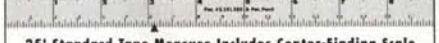

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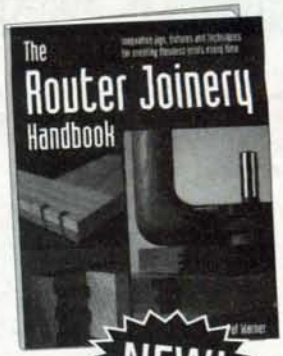

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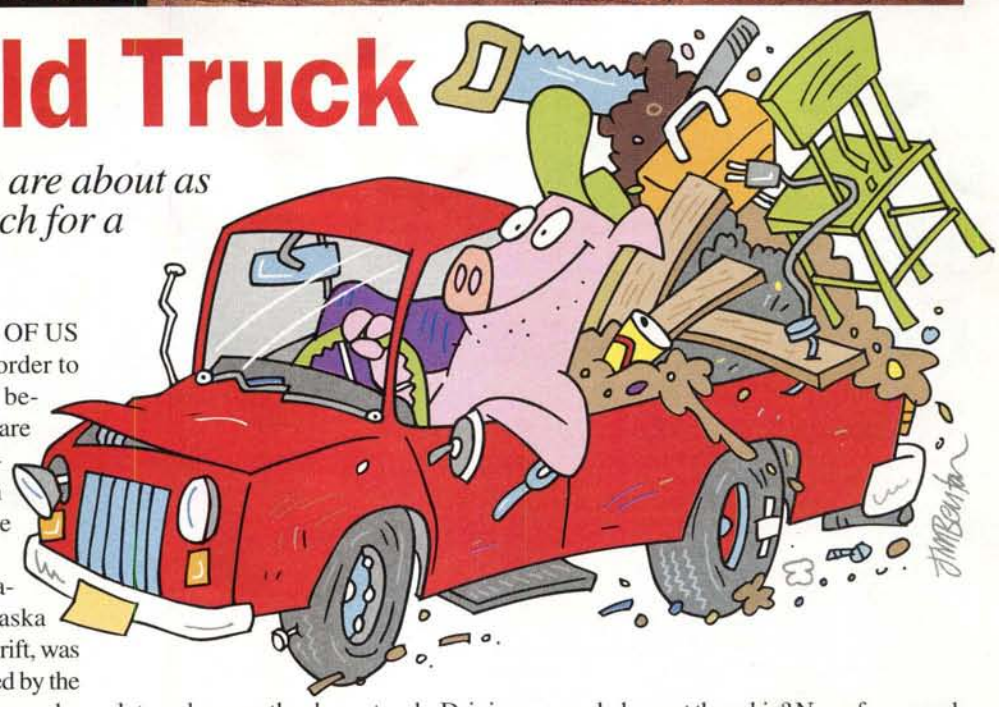
POPULAR WOOD WORKING BOOKS

This Old Truck

Pretty pickup trucks are about as useful as a wristwatch for a garden snake.



NINETY-FIVE PERCENT OF US who work wood do so in order to own an old pickup truck. And, because woodworkers as a group are probably the stingiest, most penny-pinchin' group of grown-ups on earth, some of these trucks can be pretty ugly.

My uncle, a rancher and waterfowl carver in western Nebraska who's locally renowned for his thrift, was so cheap that when he was insulted by the trade-in offered on his old luxury car, he just cut the top off that four-door Lincoln and used it for hauling hay and fence posts. He said the suicide doors made it particularly useful. Now that was an ugly truck.

One of my woodworking friends traded a piece of his furniture for an old truck that the owner had used for his construction company. There was a long period of time when every time the construction guy had done a pour for a customer he'd use his pickup to haul any leftover cement to his house where he was pouring a big driveway, square by square. Now this was in upstate New York, mind you, where they pour more salt each winter than God in Gomorrah, so naturally, the truck corroded somewhat. When I last saw it, all that was left of the truck bed was concrete. Essentially, it looked like a concrete barrier on wheels. The concrete was embedded with bits of rusty sky blue metal (the original color of the monstrosity) and the rust stained the concrete indescribably.

Another of my old woodworking buddies bought an old dump truck that rivaled the concrete pickup in ugliness. It was not one of those great big honkers you think of when you think of dump trucks. No, this was an extremely foreshortened but burley one-ton job that got about three miles to the gallon and had a top speed of about 25 miles per hour in fourth gear. Occasionally my pal would let me borrow the dump truck. Driving that puppy loaded with manure for the garden or carrying a load of wood through the yuppie-infested woods of Connecticut was a pleasure few of you have probably experienced. I'd be cruising along at my majestic 25 mph, taking up about three-fourths of the winding road when some Saab or Beemer with delusions of Le Mans would come roaring round the corner, playing at life. As soon as they'd see me, the smoke would come pouring off their tires as they stood on their brakes and they'd swerve toward the ditch like a sinner searching for salvation. As their toys slid to a halt, their faces were universally revealing: no anger, just an epiphany of relief; and I'd wave at them with good will as I regally lumbered past. I'm sure those feelings of mine were somewhat akin to the guys who walk their mastiff or pit bull through the bad parts of town or who bring out their collection of really big guns as if sharing a religious experience. Now that was a great truck.

The awe that any of these trucks produce is the reason we own them, and consequently, for a woodworker, a pickup is more than a vehicle. It's more like a statement of character. And frankly, a new pickup cannot make such a statement. Are you really gonna slam one-half ton of rough-sawn lumber into the bed of your brand-new truck? Gonna scrape that table saw into the truck so you can do some work down at the cabin? Nope, for a woodworker, new pickups are as useless as show poodles and 10 times as prissy. I know it's stereotypical, but I'm highly suspect of woodworkers with new trucks — and the same might be said about trucks with elaborate stereo systems or mag wheels. Heck, my uncle says, "Mag wheels alone are ruinin' the country." And out in western Nebraska even automatic transmission and air conditioning are suspect.

Foreign or domestic? Gun rack? Four-wheel drive? In the Nebraska vernacular, "It don't much matter." No, what matters is the work they do and the faithfulness they demonstrate in the fulfillment of that work. Woodworkers revere old trucks for the work they can do in the same way they like old tools. There's a parody of Stonehenge called Carhenge out in the sand hills by Alliance, Neb. Lots of American and foreign autos buried snout first in the dirt of western Nebraska. Nary a truck there though, not even an old toothless one.

I sold my old contractor's saw a couple months ago, and I was tempted by somebody who wanted to trade it for a pickup. But I'm holding out for my uncle's "truck." So what do I drive now? You got it, a minivan. **PW**

***Andy Schultz** is a furniture maker and woodworking writer who lives in Lincoln, Nebraska.*

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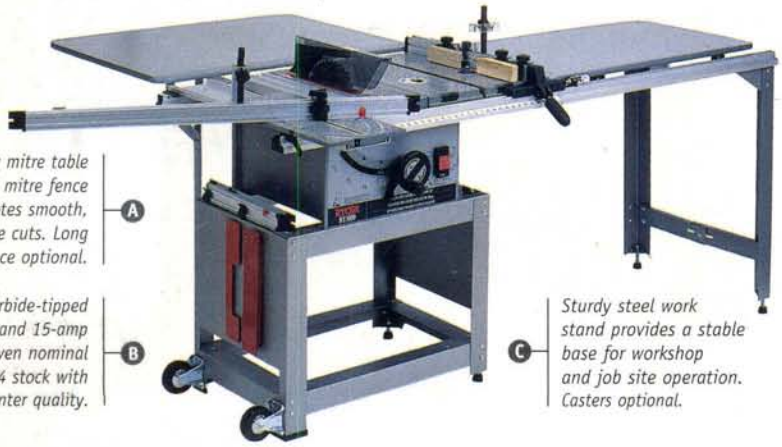

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