

BUILD THE ULTIMATE MEDIA CENTER

WIN FREE TOOLS!
 Pages 13, 14, 18 & 61

WOODWORKER'S JOURNAL

"America's leading woodworking authority"™



(page 32)

Classic Adirondack

The perfect summer project
 from wood that never fails!

(page 44)

PLUS:

OUTDOOR
FINISHING TIPS

TEAK END TABLE

OUTRAGEOUS
ECCENTRIC TURNING

SIMPLE DRILL
PRESS TUNE-UP

POWER PLANERS
IN THE SHOP

August
2011



Display until September 5, 2011

9 DADO SETS TESTED
 Improve Your Table Saw's
 Versatility and Efficiency (page 62)



Grizzly Industrial®

**HIGH QUALITY
MACHINES AT
INCREDIBLE PRICES!**

PURVEYORS OF FINE MACHINERY®

6" Jointers

- Motor: G0452 - 1 HP, 110V, single-phase
G0452Z - 1½ HP, 110V/220V, single-phase
- Precision ground cast iron table size: 7½" x 46"
- Cutterhead speed: 4800 RPM
- Max. rabbeting depth: ½"
- Approx. shipping weight: 270 lbs.

**LARGE
CAST IRON
FENCE**



G0452 4 KNIFE CUTTERHEAD
ONLY \$445⁰⁰

**FREE
SAFETY
PUSH
BLOCKS**

G0452Z SPIRAL CUTTERHEAD
ONLY \$715⁰⁰

\$69⁰⁰
ANYWHERE IN
LOWER 48 STATES

**BUILT-IN
MOBILE BASE**

8" x 76" Jointers

- Motor: 3 HP, 220V, single-phase, TEFC, 3450 RPM
- Precision ground cast iron table size: 8" x 76¾"
- Deluxe cast iron fence: 36"L x 1¼"W x 5"H
- Cutterhead speed: 5350 RPM
- Max. rabbeting depth: ½"
- Approx. shipping weight: 560 lbs.

**FREE
SAFETY
PUSH
BLOCKS**



**BUILT IN
MOBILE
BASE**

G0490 4 KNIFE CUTTERHEAD

~~\$945.00~~ **SALE \$925⁰⁰**

G0490X SPIRAL CUTTERHEAD

~~\$1250.00~~ **SALE \$1195⁰⁰**

\$139⁰⁰
ANYWHERE IN
LOWER 48 STATES

15" Planer

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table
- Table size: 15" x 20"
- Max. cutting height: 8"
- Max. cutting depth: ⅛"
- Cutterhead knives: 3
- Cutterhead diameter: 3"
- Cutterhead speed: 5000 RPM
- Feed rate: 16 & 30 FPM
- Approx. shipping weight: 675 lbs.

**Product
Reviews &
Awards
ONLINE**
grizzly.com



**PRECISION GROUND
CAST IRON BED &
INFEED/OUTFEED TABLES**

**BUILT-IN
MOBILE BASE**

G0453 ~~\$1050.00~~ **SALE \$995⁰⁰**

\$139⁰⁰
ANYWHERE IN
LOWER 48 STATES

20" Extreme Series® Planer with Spiral Cutterhead

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table
- Table size: 25¾" x 20"
(56" x 20" with extensions)
- Max. cutting height: 8⅝"
- Max. cutting depth: ⅛"
- Cutterhead speed: 5000 RPM
- Feed rates: 16 & 20 FPM
- Approx. shipping weight: 909 lbs.



**MADE IN
ISO 9001 FACTORY!**

G1033X ~~\$2995.00~~ **SALE \$2895⁰⁰**

\$169⁰⁰
ANYWHERE IN
LOWER 48 STATES

**EXTREME
SERIES**



17" Ultimate Bandsaw

- Motor: 5 HP, 220V, single-phase TEFC, 1725 RPM
- Precision ground cast iron table
- Table size: 25½" x 21" x 2" thick
- Cutting capacity/throat: 16½"
- Max. cutting height: 16"
- Blade size: 160" - 162" L (⅛" - 1⅜" W)
- Blade speed: 4500 FPM
- Approx. shipping weight: 784 lbs

MADE IN ISO 9001 FACTORY!

G0636X ~~\$2150.00~~
SALE \$2100⁰⁰

**2009 BEST
NEW
TOOLS
Winning**
\$139⁰⁰
ANYWHERE IN
LOWER 48 STATES

**EXTREME
SERIES**



19" Ultimate Bandsaw

- Motor: 5 HP, 220V, single-phase TEFC, 1725 RPM
- Precision ground cast iron table
- Table size: 28" x 24"
- Cutting capacity/throat: 18⅜"
- Max. cutting height: 19½"
- Blade size: 166" - 168" L (⅛" - 1¼" W)
- Blade speed: 4975 FPM
- Approx. shipping weight: 810 lbs

MADE IN ISO 9001 FACTORY!

G0701 ~~\$2995.00~~
SALE \$2950⁰⁰

\$169⁰⁰
ANYWHERE IN
LOWER 48 STATES



1-800-523-4777

TECHNICAL SERVICE:
570-546-9663
FAX: 800-438-5901

3 GREAT SHOWROOMS! BELLINGHAM, WA • MUNCY, PA • SPRINGFIELD, MO

**THIS OFFER VALID
JULY 20th - AUGUST 3rd
SEE ALL SALE SPECIALS
AT GRIZZLY.COM®**

AWFS SHOW SPECIALS TWO WEEKS ONLY!

10" Jointer/Planer

- Motor: 2½ HP, 220V, single-phase, 3400 RPM
- Jointer table size: 12½" x 40½" x 16"
- Planer table size: 9¼" x 23½"
- Max. cutting width:
jointer - 10¼", planer - 9¾"
- Max. planer cutting height: 8¼"
- Cutterhead knives: 2 HSS
- Cutterhead speed: 6500 RPM
- Planer feed rate: 16 FPM
- Approx. shipping weight: 378 lbs.

**GERMAN DESIGNED
& ENGINEERED**



**FREE
SAFETY
PUSH
BLOCKS**

**9¾" PLANING
CAPACITY**

G0675 \$1195.00

SALE \$1050.00

\$89
ANYWHERE IN
LOWER 48 STATES

10" Left-Tilting Table Saw with Riving Knife & Cast Iron Router Table

- Motor: 3 HP, 220V, single-phase
- Table size with wings: 27" x 48"
- Arbor diameter: 5/8"
- Max. dado width: 13/16"
- Max. cutting capacity:
8" L & 25½" R of blade
- Max. depth of cut:
3" @ 90°, 2½" @ 45°
- Approx. shipping weight: 546 lbs.

**FREE 10"
CARBIDE TIPPED
BLADE!**



**MOTOR COVER
& DUST HOOD
INCLUDED**

G1023RLW ONLY \$1175.00

\$139
ANYWHERE IN
LOWER 48 STATES

Cyclone Dust Collector

- Motor: 1½ HP, 110V/220V, single phase, TEFC, 3450 RPM
- Air suction capacity: 775 CFM
- Static pressure at rated CFM: 1.08"
- Intake port: 6" with included 5" optional port
- Impeller: 13½"
- Overall dimensions:
38¼" W x 23¼" D x 68½" H
- Approx. shipping weight: 210 lbs.

**THE POWER OF A
2 STAGE CYCLONE IN
A NEW COMPACT SIZE!**



G0703 \$850.00

SPECIAL \$795.00

\$69
ANYWHERE IN
LOWER 48 STATES

10% OFF

Orders of \$500 or More*

- 1) **ORDER ONLINE:** Visit **grizzly.com** and enter Coupon Code **WJAWFS10%** at check out.
- 2) **ORDER BY PHONE TOLL FREE: 1-800-523-4777**
Give Coupon Code **WJAWFS10%** to receive your discount.
- 3) **PURCHASE AT ONE OF OUR 3 SHOWROOMS**
Give Coupon Code **WJAWFS10%** at check out.

Showroom Locations:

Bellingham, WA • Muncy, PA • Springfield, MO

OFFER ONLY VALID FROM 7/20/11 TO 8/3/11

**COUPON CODE
WJAWFS10%**

**NOTE: This promotion excludes shipping charges and cannot be combined with other offers or applied to previous purchases.*

10" Cabinet Table Saws with Riving Knife

- Motor: 3 HP, 220V, single-phase
- Table size with extension:
G0690 - 27" x 40"
G0691 - 27" x 74¾"

**FREE 10"
CARBIDE TIPPED BLADE!**

- Blade tilt: left
- Arbor: 5/8"
- Arbor speed: 4300 RPM
- Max. dado width: 13/16"
- Max. rip capacity:
G0690 - 29½", G0691 - 50"
- Max. depth of cut:
3½" @ 90°, 2¾" @ 45°

- Approx. shipping weight: G0690- 542 lbs.
G0691- 572 lbs.

3 HP LEESON® MOTOR!

**CAST IRON
TRUNNIONS**



G0690 \$1295.00 SALE \$1250.00

G0691 WITH EXTENSION RAILS

\$1395.00 SALE \$1350.00

**Product
Reviews &
Awards
ONLINE**
grizzly.com

\$139
ANYWHERE IN
LOWER 48 STATES



**FREE
2011 CATALOG!**
THOUSANDS OF HIGH
QUALITY MACHINES & TOOLS

grizzly.com®

OVER 12,000 PRODUCTS ONLINE!

(Circle No. 16 on
PRODUCT
INFORMATION
form)





Woodworker's Journal

Contents

August 2011



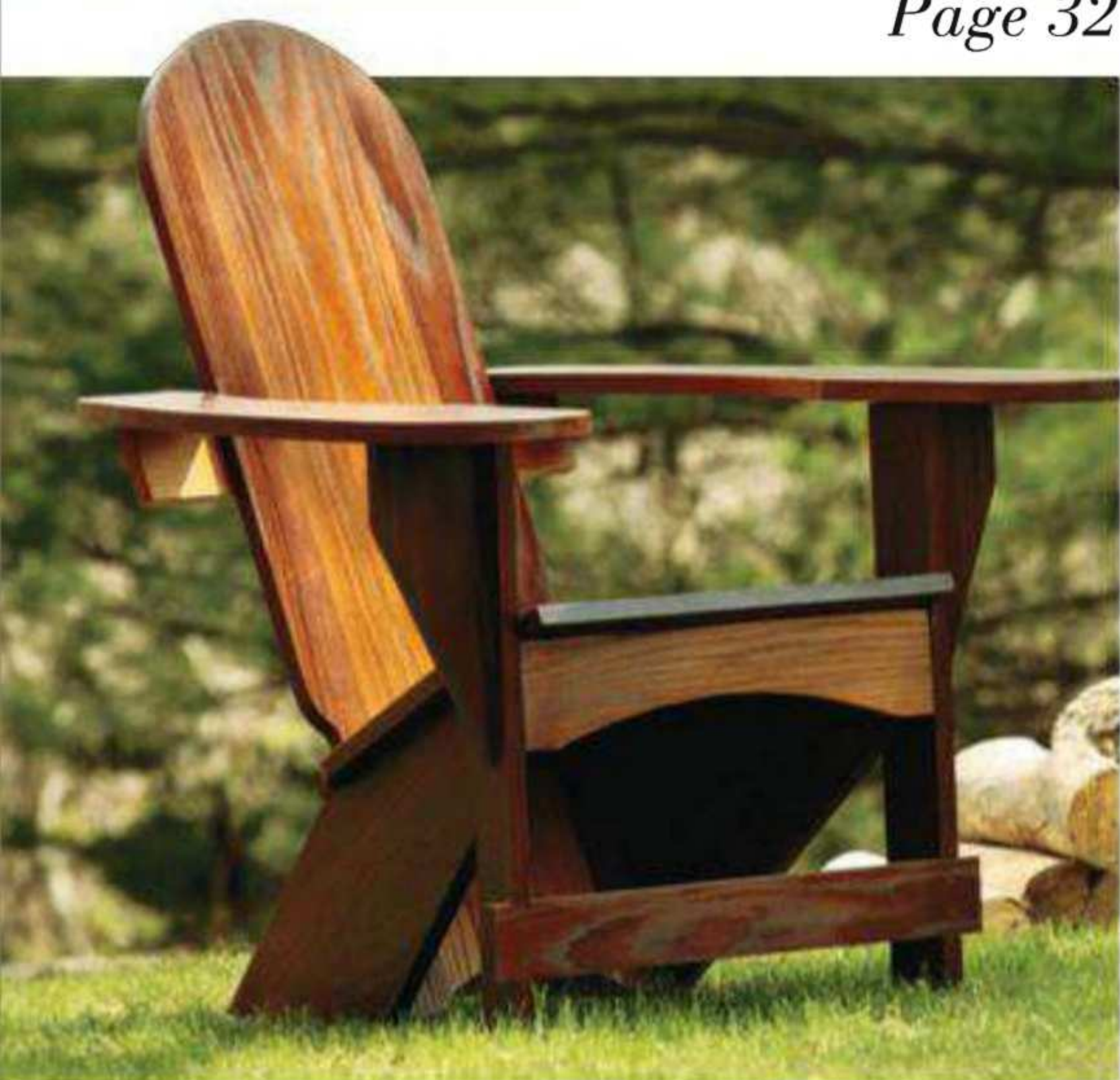
Volume 35, Number 4

Page
32

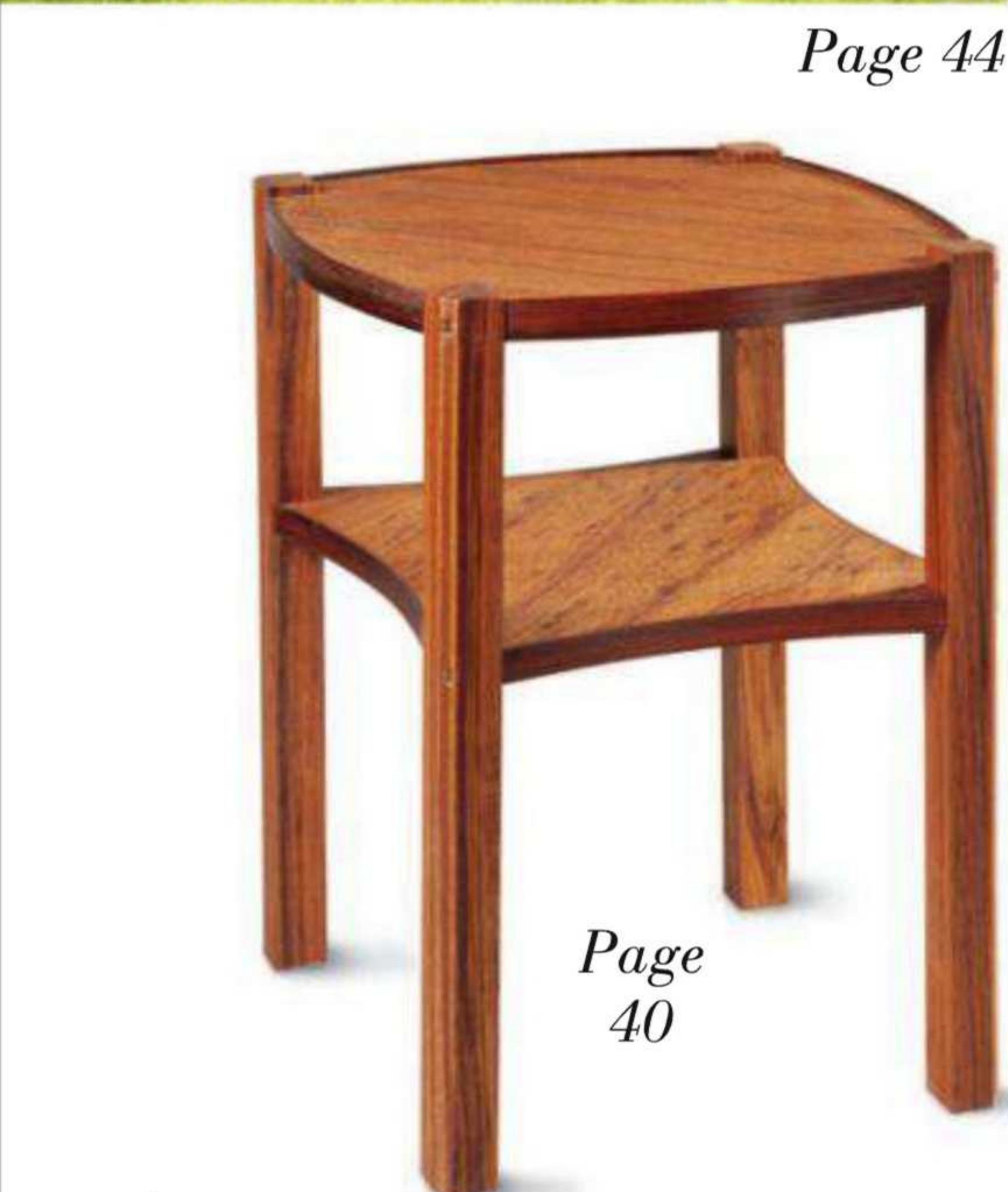
Page 32



Page 26



Page 44

Page
40

26 Eccentric Turning

By Jeff Day

Mark Sfirri disdains symmetry: the off-kilter turning whiz produces multi-axis, asymmetrical pieces.

30 The Art of Design, Part III

By Ian Kirby

Our master woodworker covers the architectural elements of good casegoods design.

32 Slide-out Media Center

By Frank Grant

Never throw your back out again when trying to reach behind your TV and DVD player. This piece features a unique sliding center section and top to provide instant access to all of your wiring.

40 Occasional Table

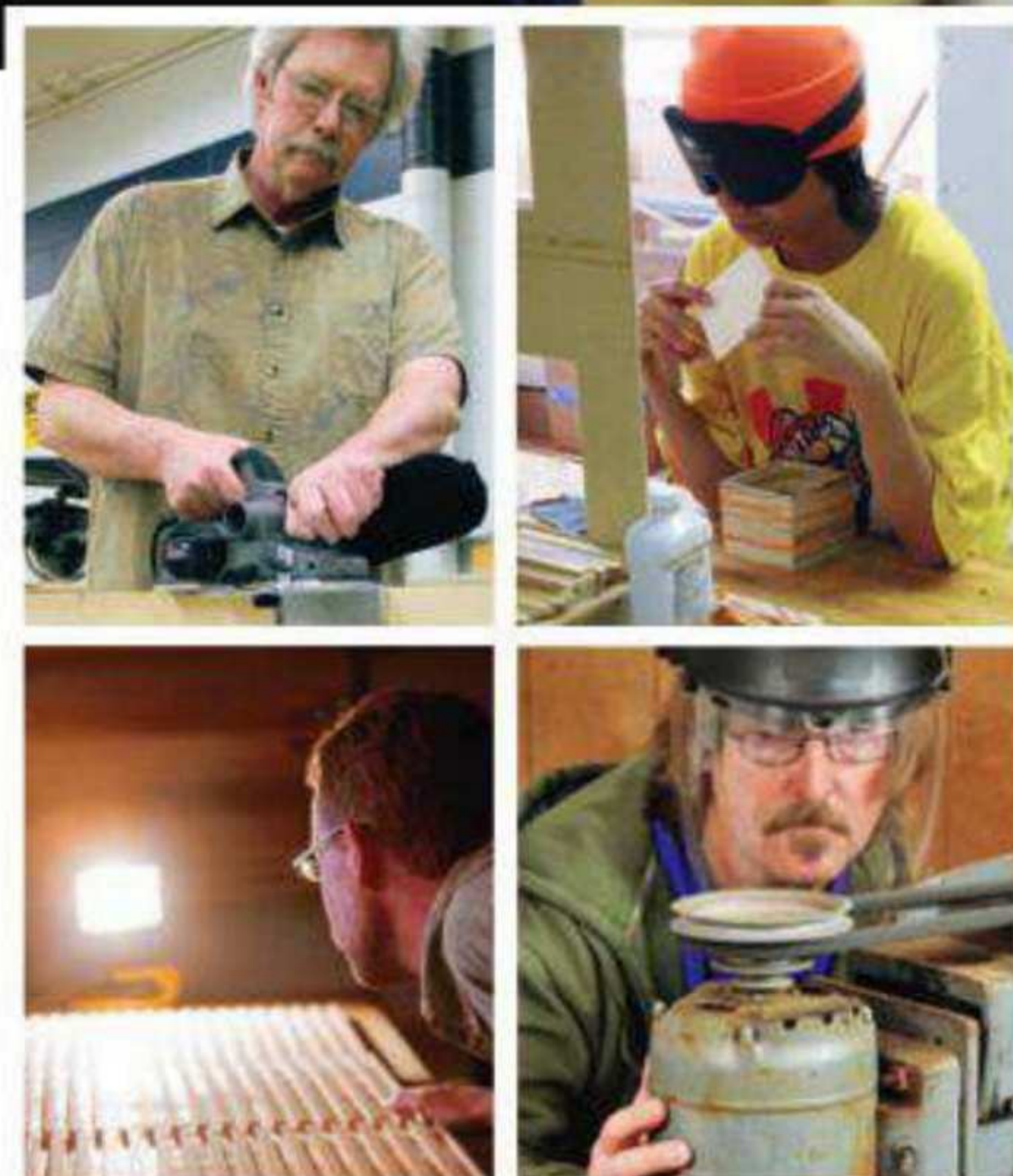
By Simon Watts

A table that's perfect for any occasion, featuring easy assembly and a flexible design.

44 Westport Chair

By Rob Johnstone

A classic design (it inspired the Adirondack chair) and thermo-treated wood create a great place for outdoor relaxation.



Departments

6 Editor's Note and Letters

12 Questions & Answers

14 Stumpers

16 Tricks of the Trade

20 What's In Store

22 Shop Talk

50 Shop Test

62 Tool Review

68 Skill Builder

70 Finishing Thoughts



CELEBRATING 90 YEARS OF THE GOLD STANDARD

2011 is a historic year for all of us at Powermatic.

While almost everything has changed since we built our first planer in 1921, one thing we'll never change is the quality craftsmanship that goes into everything we make. The same care that you put into your projects goes into constructing each one of our tools. If you already own Powermatic equipment, you know what we're talking about, and we thank you for your support over the years.

Join in our 90th Anniversary Celebration Event today. Visit powermatic.com to find a dealer near you.



www.powermatic.com

The Gold Standard Since 1921™



Letters

Build Twice, Finish Once

SAVE LOTS OF TIME AND FRUSTRATION BY BUILDING TWICE ...



Recently, the *Journal* conducted a survey that yielded a surprising detail: a paltry 2% of woodworkers who create their own designs build full-sized mock-ups as part of their design process. Why was I surprised? Because when it comes to making a new design, there is no more important step than that of building a full-sized mock-up. (According to whom? Well, Ian Kirby, me and most full-time furniture makers, just to name a few.)



Our full-sized mock-up of the entertainment center featured on page 32 of this issue.

Mock-ups answer all sorts of critical questions: Are the proportions right for the setting? What is the most practical joinery? Is there a proper balance between form and space? Will the hardware work as you imagined it? — the list goes on. It's a process we make use of regularly, as you can see here (left) with our mocked-up sliding entertainment center.

— Rob Johnstone

plus or minus sign. Thus, $1\frac{49}{128}$ would be $1\frac{3}{8} + 1$ and $2\frac{87}{128}$ would be $2\frac{1}{6} - 1$ (not $2\frac{5}{8} + 7$). This would allow me to use increments I am used to, while permitting me to be as accurate as I choose.

I like the range of articles you put in your magazine. Keep it up.

Philip Marcuse
Birmingham, Michigan

Frazzled by Fractions

"It's only wood for gosh sakes," made an impression on me as my work as a theater carpenter involves only being close — because the set will be painted black and the nearest viewer will be 20 feet away! In my personal woodworking, though, I like to be as accurate as I can manage. That's why your article on "Digital Accessories" (*April*) awakened me to digital possibilities.

As useful as digital fractional measuring may be, though, there is one suggestion I would like to offer to the manufacturers. Whenever I use my digital fractional caliper, it seems I always land on some number of 128ths. Even if I add or subtract 1, I usually get 64ths or 32nds. This is much too hard for my aging brain to convert, and my training says, "Why bother?"

It seems to me that a useful digital readout would show the nearest 16th (or 8th or quarter or half) in the largest numerals and the number of 128ths in superscript with a

Precision? Precisely

Dennis Tyler of Kendall, New York, wrote in [*Letters, April*] complaining about the level of precision in plans. He made the comment, "Who the heck measures anything in woodworking to the hundredth of an inch?" Well, Mr. Tyler, I do, and so do thousands of other luthiers. Thousandths of an inch can make the difference between good and poor intonation on a guitar, or between a poor or good fit between the binding and the guitar, or even the angle of the neck set in relation to the body. So I, for one, welcome precision. Not everyone wants to "guesstimate."

Billy Pratt
Piedmont, Oklahoma

Often, I have felt as Dennis Tyler in his letter, "Too Particular by Half." However, I have had to rethink my position. My first reaction to his statements was, "I agree." But then I thought about my own demands of my choirs throughout the (36) years of public school music teaching.

Letters continues on page 8 ...



Readers offer their feedback on digital devices.



FREE Blade

Go to www.bethepro.com and sign up today!

Enter code: OISWJ811

Offer expires August 31, 2011



Power and Versatility within Reach

NEW! The Bosch oscillating multi-tool system gives you the versatility and power to tackle any job with ease—cut, sand, scrape and grind. The Multi-X™ MX25E features 2.5 amps for heavy-duty jobs and the OIS™ 12-pin interface that ensures a secure connection for high-torque applications. Bosch multi-tool accessories offer best-in-class speed, performance and durability. Visit boschtools.com/MX25E for more information.



BOSCH

Invented for life

Available at local distributors and home centers.



OIS is a trademark of Robert Bosch Tool Corporation. The Home Depot is a registered trademark of Home Depot, Inc.

(Circle No. 2 on PRODUCT INFORMATION form)

Letters continued



Many times I have walked around my room inspecting choir members' mouths to see if their tongues were truly "in the floor of their mouths" so that a perfect sounding "Ah" would be produced. Were the eyebrows lifted to make the tone brighter? Forty people can be singing, with 39 of them perfectly in tune on every note. But the one person singing out of tune gets the audience's attention. To them, the choir was out of tune. You get the picture!

Then, having recently been through the ordeal of a four-way bypass surgery, would I have really been happy to know that the surgeon had only guessed at the length of artery that he removed from my leg to supply the bypass material near my heart? No!

I've concluded that a "master" of whatever the medium finds themselves being as exact as they can be to make the finished product as perfect as is possible.

The musician working with sounds, the doctor dealing with human tissue, the woodworker using wood, as "artists" of their professions, try to make the outcome of their work a true work of art and, as such, want it to be absolutely perfect. Who can really disagree with that?

Roy D. Ford
Tipp City, Ohio

Does It Cross the Road?

I was looking at A. J. Hamler's article ("Cutting Edge Technology," April) and noticed in the photo that he had a rubber chicken hanging on a cabinet in the background.

Years ago, I received training as a ropes instructor as part of a teamwork project at my day job, and we used a rubber chicken as part of an exercise (long story). One day I threatened my team with a rubber chicken beating if they didn't perk up, and the beatings would continue until morale improved. My reputation thereafter was set, and over the coming years I've received rubber chickens of all types and sizes from my old team members.

So, I'm wondering, what does Mr. Hamler do with his rubber chicken?

Phil Gilstrap
Lexington, Oklahoma

A.J. Hamler Responds: I've had a rubber chicken so long that I don't even remember how I got the first one, Phil. I'm sure it has something to do with my refusal to face adulthood, which would also explain why I named the three poplars I planted in my backyard Larry, Curly and Moe, and why the plate on my car says "BEAM UP."

Letters continues on page 10 ...

ROCKLER PRESS

THE VOICE OF THE WOODWORKING COMMUNITY

AUGUST 2011

Volume 35, Number 4

ROB JOHNSTONE *Editor in Chief*
JOANNA WERCH TAKES *Senior Editor*
CHRIS MARSHALL *Field Editor*
JEFF JACOBSON *Senior Art Director*
JOE FAHEY *Associate Art Director*
MATTHEW BECKER *Internet Production Coordinator*
LARRY N. STOIAKEN *Publisher*
MARY TZIMOKAS *Circulation Director*
KELLY ROSAEN *Circulation Manager*
LAURA WHITE *Circulation Assistant*

Founder and CEO

ANN ROCKLER JACKSON

Editorial Advisors

NORTON ROCKLER JOHN KELLIHER

Advertising Sales

DANA SEVERSON *Advertising Director*
dseverson@woodworkersjournal.com
(763) 478-8306 Fax (763) 478-8396

ALYSSA TAUER *Advertising Operations*
atauer@woodworkersjournal.com
(763) 478-8366 Fax (763) 478-8396

Member



Audit Bureau of Circulations

Editorial Inquiries

ROB JOHNSTONE
rjohnstone@woodworkersjournal.com
JOANNA WERCH TAKES
jtakes@woodworkersjournal.com
CHRIS MARSHALL
cmarshall@woodworkersjournal.com

Subscription Inquiries

(800) 765-4119 or
www.woodworkersjournal.com
Write Woodworker's Journal, P.O. Box 6211,
Harlan, IA 51593-1711

email: WWJcustserv@cdsfulfillment.com. Include mailing label for renewals and address changes. For gift subscriptions, include your name and address and your gift recipient's.

Book Sales and Back Issues

Call: (800) 279-4441
www.woodworkersjournal.com

Woodworker's Journal (ISSN: 0199-1892), is published in February, April, June, August, October and December by Rockler Press Inc., 4365 Willow Dr., Medina, MN 55340. Periodical postage paid at Medina, Minnesota and additional mailing offices. Postmaster: Send all address changes to Woodworker's Journal, P.O. Box 6211 Harlan, IA 51593-1711. Subscription Rates: One-year, \$19.95 (U.S.); \$25.95 U.S. funds (Canada and other countries). Single copy price, \$5.99. Reproduction without permission prohibited. Publications Mail Agreement Number 0861065. Canadian Publication Agreement #40009401.

©2011 Rockler Press Inc. Printed in USA.



ROCKLER®

WOODWORKING AND HARDWARE

Create with Confidence™

TAKE **15% OFF** YOUR ORDER!*



Dust Right Vortex™ (40530) \$69.99

* Offer expires September 4, 2011. Excludes sale items, power tools, Leigh jigs, Porter-Cable dovetail jigs, Shark CNC, Saw Stop, Steel Router Cabinets, Festool, and Rockler Gift Cards. Not valid with any other coupon, offer or previous purchase. Offer not valid at Rockler independent resellers.

Clean your shop, not your filter

Our new Dust Right Vortex™ collects dust before entering your shop vacuum preventing your vacuum's filter from clogging. This allows your vacuum to continue to operate at full efficiency maintaining the maximum suction. The translucent 10 gallon bucket is easy to see when full, simple to empty and the five casters make the Vortex virtually tip proof. Get the most out of your vacuum with the Vortex—another Rockler® innovation to help you *Create with Confidence*.

Order your Dust Right Vortex™ (40530) today for just \$69.99.

Call 1-800-279-4441, go to www.rockler.com or dial 1-877-Rockler to find a store near you!

Simply place your order at Rockler.com and enter promotion code V1449 at check out, or call 1-877-ROCKLER



For a store near you or free catalog visit

Rockler.com

1-877-ROCKLER

Letters continued



WOODWORKER'S JOURNAL

Woodworker's Journal makes some pretty cool videos (if we do say so ourselves), and they now have their own page on our website. Click on the "videos" tab at woodworkersjournal.com to watch tools and techniques in action.



woodworking.com



woodworkersjournal.com/eZine



woodworkersjournal.com/QuikLinks



woodworkersjournal.com/Store



facebook.com/WoodworkersJournal



twitter.com/WoodworkersJrnl



woodworkersjournal.com/WJBlog

Fine Concept

I have subscribed at one time or another to every woodworking magazine in the U.S. I currently have a subscription to five different ones, including *Woodworker's Journal*. Every time I think of culling my subscriptions (usually when the stack next to my bed is getting too tall), I decide to keep getting yours. The primary reason is that, in addition to the nuts-and-bolts, how-to articles, you also have a regular diet of conceptually interesting articles, such as the articles on local sawmills by Jeff Day and on spatial design by Ian Kirby in your *April 2011* issue. It is these kinds of articles that keep me renewing my subscription to your magazine. Please keep them coming.

Josh Gressel
El Cerrito, California

A Fleet Takes Flight

The attached photos are of the Toy Airplane from page 42 of the *December 2010* issue of *Woodworker's Journal*. These were made at Santa's Helpers in Erie, Pennsylvania. I made 35 of them for distribution to children in the area at Christmas. Last Christmas, Santa's Helpers distributed 3,200 toys (at no charge) to area children. We have approximately 35 members that build wooden toys.

Tom Cook
Fairview, Pennsylvania



This toy idea really took flight with one of our readers.



Extending Finish Life

I want to thank you for providing some honest and unprejudiced views on finishes' shelf life. I find that when I use a finish, I add a few tablespoons full of whatever their "liquid" [solvent] base is — e.g., polyurethane oil-based varnish gets paint thinner — before I close the container. The emptier the container, the greater the number of tablespoons. So, for example, if the varnish quart is only half full, I might add three tbsp. of solvent. I've learned by trial and error how much "works." As it evaporates, it seems to saturate the empty can with the solvent and slows the rate of evaporation, keeping the finish from skinning over.



For latex paints, I use water from a cooled kettle so as to minimize mold or rust.

Gerhard Sommerfeld,
Winnipeg, Canada

Tools and Memories

Attached is a picture of some old carpentry tools that belonged to my grandfather. He was 96 when he passed away in 1976. I have had these since his passing, along with his carpentry box. When I was young, I couldn't wait to go into his shop and watch him work. He taught me a lot about woodworking. I am now 75 and still enjoy getting out in my shop. I had forgotten about these until I was cleaning out my shop. I didn't want them to just rust away, hence the shadowbox (cherry) to display them in my den. Hopefully they will be appreciated this way. It's a shame, but there are young people out there that would not have any idea what any of these would be used for or how to use them. I thought this may be of some interest to you and your readers, especially some of the "old-timers."

Don McCrea
Hampton, Virginia

WOOD ENGRAVING AND CUTTING

WITH AN EPILOG LASER SYSTEM



Laser Engraving and Cutting Systems from Epilog Laser

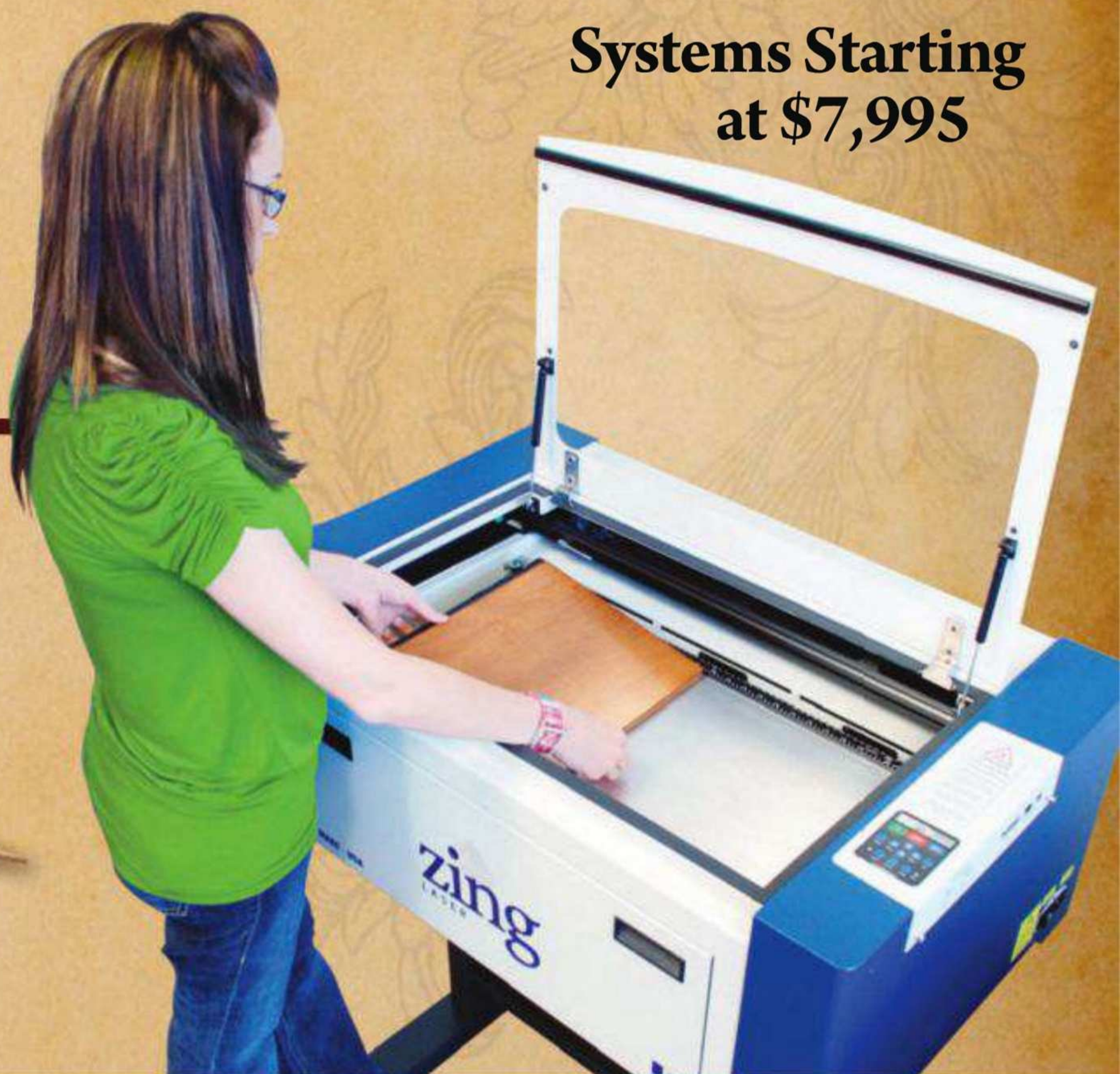
An Epilog Laser system makes it easy for woodworkers and wood shops to customize any wood product with graphics, text, logos and much more. From creating and personalizing 3D models, to engraving photos, to cutting and creating intricate inlays, our laser systems create the products you see here and more!

Your vision, coupled with Epilog's powerful equipment will allow you to bring your creative visions to life. From creating custom keepsake plaques to rapid customization of your existing product line, Epilog systems allow you to:

- Provide new services to your customers.
- Expand your current product offerings.
- Create new business opportunities.

(Circle No. 9 on PRODUCT INFORMATION form)

**Systems Starting
at \$7,995**



For more information contact us today at 888-437-4564
sales@epiloglaser.com • epiloglaser.com/wwj.htm

MADE IN USA

Questions & Answers

Wood: Dust, Dimensions and Acidity

THIS ISSUE'S EXPERTS

Rob Johnstone is the editor in chief of *Woodworker's Journal*.

Barry Schwaiger is the woodworking products internal manager at Powermatic and JET Tools.

Michael Dresdner is a nationally known finishing expert and author of *The New Wood Finishing Book*.

Contact us

by writing to "Q&A,"

Woodworker's Journal,

4365 Willow Drive,

Medina, MN 55340,

by faxing us at (763) 478-8396

or by emailing us at:

QandA@woodworkersjournal.com

Please include your home

address, phone number and

email address (if you have one)

with your question.

Q How do you clean your dust collector bag? I have tried blowing it with high pressure air, have turned it inside out and used the shop vac, and beat it with a long screwdriver handle. The shop vac seems to do the best job. I do this outside since my dust collector is in a covered area outside.

Ken E. Smith
Chico, California

A When a dust collector filter bag is brand-new, its efficiency actually increases as it traps some amount of fine dust in the filter media. In the industry, we call this a "healthy cake." Washing or vacuuming out a filter bag removes the healthy cake and retrogrades it back to a stage of cleanliness before it was the best filter it could be. In my shop, here's how I clean my filter bags: I leave them on the machine, shake them vigorously (while wearing a particulate mask) and then empty the bottom collection bag as usual. I don't feel that there's a positive benefit, from a filtration standpoint, of cleaning the bag any more thoroughly than that.

— Barry Schwaiger

Q Is there some magic formula for calculating the wood requirements of a project? Such as a 5/4 x 8" x 8' board has how many board feet? I usually guess (badly) and I either overbuy or go back for more!

Ron Turanski
Portland, Oregon

There's no magic to calculating board feet, unless, of course, you're among the math-challenged. Follow our expert's formula for success.



Above: Vigorously shaking out a dust collector bag might, our expert warns, eliminate its "healthy cake." It's best to gently empty and shake the bag into a trash bag (right) and call it a day.



A Thankfully, the formula is not magic, it's just math. Think of a board foot (BF) of lumber as 1" thick, 12" wide and 12" long (which is essentially 144 square inches of 1"-thick lumber). So a 1"-thick board, 6" wide and 36" long would be 1.5 or 1½ BF of stock. Formula: $\{(1" \times 6" \times 36") / 144 = 1.5 \text{ BF}\}$.

Rough lumber (hardwood) is sold in multiples of 1/4" thicknesses. So 4/4 lumber (read as four-quarter lumber) is around 1" thick. With any rough lumber thickness, subtract 1/4" to determine the surfaced thickness of the stock. For example, 4/4 lumber will plane cleanly to 3/4"; 5/4 lumber to 1" thick. Note: 3/4" surfaced lumber is considered 1" when calculating BF because it is derived from 4/4 roughsawn lumber.

The thickness of the lumber is the key factor in figuring

board feet. The 1" (thickness) dimension is the baseline from which everything else is figured. For example, if you are using 1/2"-thick lumber, multiply the width by .5. In your example, using 5/4 stock, the equation would be: $\{(1.25" \times 8" \times 96") / 144 = 6.66 \text{ BF}\}$.

Another rule of thumb is that, once you have figured out how many board feet of lumber you need for a project, you will need to add another 20-30% for waste. For a good article on this topic, check out http://woodworking.com/www/Article/Calculating_Board_Feet_7473.aspx at our www.woodworking.com site.

— Rob Johnstone

Q Several years ago, my aunts gave me my grandfather's 1948 casket flag, pre-statehood of Alaska and Hawaii. I've wanted to build a display box for the flag since then; however, I understand that certain woods and finishes are acidic and may not be archive friendly. Do you know which wood and finish would be safest to use to make an archival display

box for this flag? Also, I'd like to place glass in the front so that the exposed portion of the flag doesn't fade. Do you have any suggestions about what would be best to use for this type of project?

Katherine McCombs
Baton Rouge, Louisiana

A There are certainly strategies to avoid acid in both wood and finish. Tannin plus moisture forms tannic acid, so choose a low tannin wood like maple, birch, aspen or holly, and avoid high tannin woods like oak, walnut, mahogany and

Continues on page 14 ...



The decision to use walnut in our Memorial Flag Case plan (available online at woodworkersjournal.com) was not the best when wood species acidity is taken into account.



Winner!

For simply sending in his question on determining lumber quantities, Ron Turanski of Portland, Oregon, wins an **Osborne Miter Gage** by Excalibur (from General International). Each issue we toss new questions into a hat and draw a winner.

A router table that thinks it's a shaper



ProMaxRT Complete
Stock No. 40-300

What do you get when you put the industry's biggest, flattest, most durable top on a rock-solid base with unrivaled storage space?

The ultimate router station

- Over 5 square feet of cast-iron work surface
- Award winning fence
- Dust collection above and below the table.
- Clever storage including pull-out router bit trays

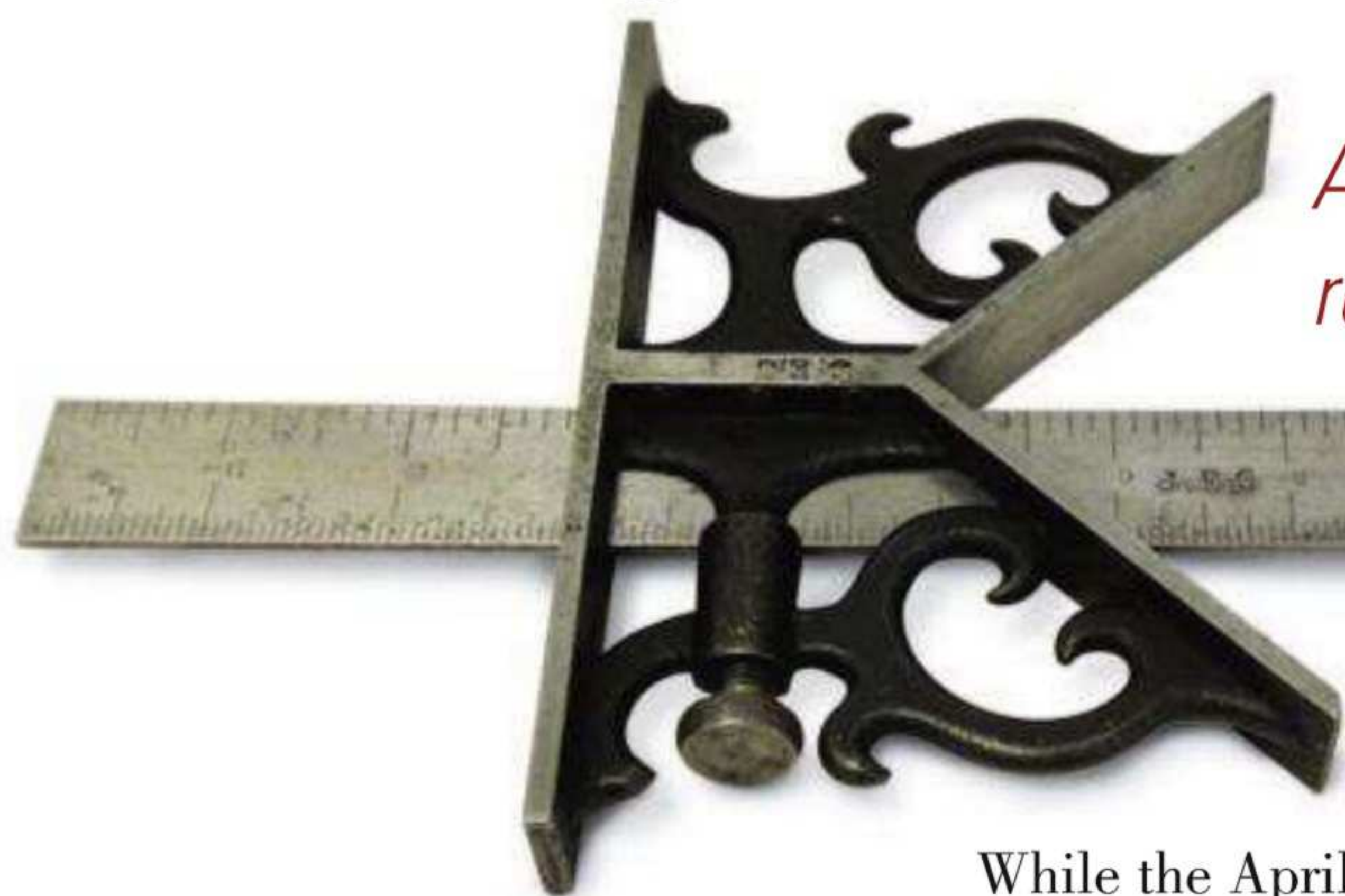
Learn more at benchdog.com



(Circle No. 30 on PRODUCT INFORMATION form)

Stumpers

Finding Your Center



A combination of readers solves a mystery tool.



While the April 2011 mystery tool “looks like something I would throw at a family member for disturbing me in my shop,” says **William Parkins II** of Toledo, Ohio ... well, that’s not what it’s for.

Instead, as **Bob DeNardo** of East Moriches, New York, identified it, “It’s a combination square with the centering head cast into it as one piece.” **James Sanderson** of Erie, Pennsylvania, explained: “It functioned the same way as a combination center rule, to find the center of a square or round object.”

Edward Hastings of Olympia, Washington, noted that, “It can be used standing up, like pictured, or on its side, lying on the support.” A key clue? “The blade part of the square is missing in the photo,” as noted by **David Wilder** of Dennysville, Maine. The “blade part,” says **Gary Grundy** of Lakeville, Minnesota, is also known as a “metal rule [that is] slid into a slot and secured by tightening a knob.”

Bill Lundy of Westfield, Wisconsin, explained, “It can be used as a square [or] a depth gauge, or it can find

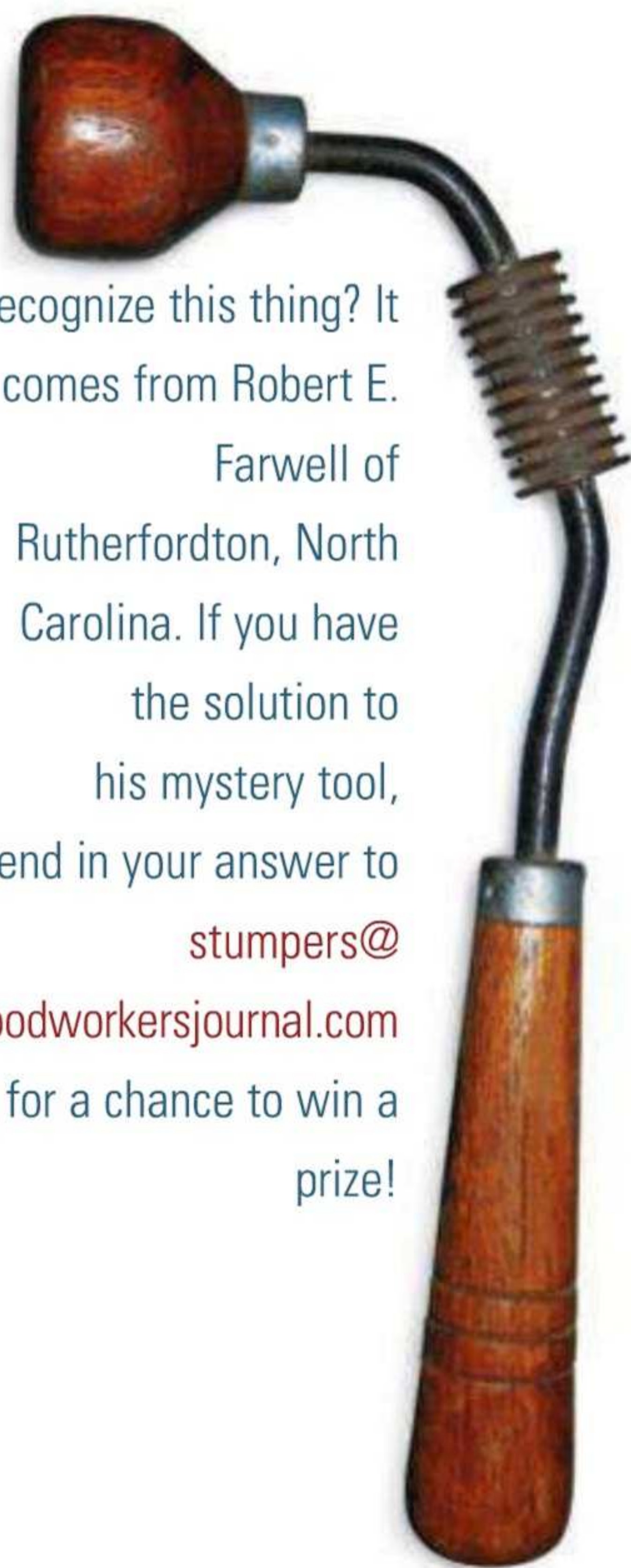
centers on a round object by placing the round face against the flat face of the scale as it protrudes from the slot. Where the edge of the scale crosses the round face, that is the exact diameter line; rotate the round face 90 degrees and the new line intersects the first diameter line at dead center.”

Bill Needham of Morris, Illinois, said it was used in layout work and machining in the metalworking industry, where “it can also be used to find the center of a piece of square bar stock and to scribe a 45 degree line from any corner.”

Stumpers readers mentioned several manufacturers of this type of tool, including Brown and Sharp of Providence, Rhode Island; Starrett Co. of Athol, Massachusetts, and the Standard Tool Company of the same locale. **Carl C. Smitley** of Zanesville, Ohio, who voted for the manufacturer listed last, said they called the tool a Chapin’s Patent Combination Square and that “There are two ‘heads’ and an offset groove rule that make up the square/tool.” Carl said it was the second head that was shown as the mystery tool.

—Joanna Werch Takes

What’s This?



Recognize this thing? It comes from Robert E. Farwell of Rutherfordton, North Carolina. If you have the solution to his mystery tool, send in your answer to stumpers@woodworkersjournal.com for a chance to win a prize!

Winner! Joann Brennan of Federal Way, Washington, wins a **PORTER-CABLE Oscillating Multi-Tool (Model PC250MTK).**

We toss all the *Stumpers* letters into a hat to select a winner.



Questions & Answers

continued



If you’re making a box for precious archival material, there are important strategies to follow when it comes to species, finish and glass selection.

cedar. To further isolate any tannin, seal the inside of the wood frame, the portion facing the flag, as well as the outside. Let the finish fully cure for four to six weeks before sealing the flag in the case.

Finishes that use acid as a curing agent include conversion varnish, catalyzed lacquer and pre-cat lacquers, so I’d avoid them. Instead, choose water-based or oil-based polyurethane, or lacquer. Shellac is OK, but I avoid shellac on anything that is adjacent to glass because ammonia-based glass cleaners can soften and damage shellac.

Finally, choose a UV blocking glass, since the UV portion of light is most responsible for cloth’s fading and degradation. The right glass can block up to 99 percent of UV rays without any color alteration. Thus the flag will be protected, but you’ll still see its colors clearly and without distortion. You can buy UV blocking glass from your local picture framing suppliers, or from online vendors.

— Michael Dresdner

CNC ROUTING

FROM ONLY \$2,599⁹⁹



**CNC Shark
Routing System**

\$2599⁹⁹

39200

Priced thousands less than most CNC machines, the new CNC Shark™ and CNC Shark Pro™ give home shops unprecedented access to precision-automated routing. Tools like these will revolutionize your work, bringing pro-level results to every project.



**CNC Shark Pro
Routing System**

\$3399⁹⁹

36900

CNC Shark Pro PLUS

\$3799⁹⁹

39500



ROCKLER®
WOODWORKING AND HARDWARE

Create with Confidence™

For a store near you or free catalog visit
Rockler.com 1-877-ROCKLER

(Circle No. 23 on PRODUCT INFORMATION form)

Tricks of the Trade

Simple Jigs Offer Setup Precision



Use soda bottles to store finish, squeezing out air as you use it to prevent skinning.

Safety First

To demonstrate techniques and show details, *Woodworker's Journal* sometimes removes necessary guards from power tools. We do not advocate this practice and urge readers to strictly follow tool manufacturers' instructions and safety precautions.

Give Finish the Squeeze

There are all sorts of ways to prevent varnish from skinning over or hardening in the can between uses. Here's the tried-and-true technique I've been using for two decades: I pour my quart containers of finish into two clean, half-liter plastic soda bottles and cap them tightly. When the bottles are nearly full, it's easy to squeeze the air out, but as the bottles empty I flatten them in a vise to expel the air. I've never had a bottle break, even when clamping down hard. It's cheap and effective.

E.S. "Pinky" Martin
Montrose, Alabama

Hardened Caulk Cleans Clogged Abrasives

Here's a good substitute for those rubber blocks you can buy to clean off sanding belts and discs. Just let a tube of silicone caulk cure hard. Peel the cardboard back, and use it like the store-bought alternatives to refresh your abrasives.

William L. French
Pineville, Missouri

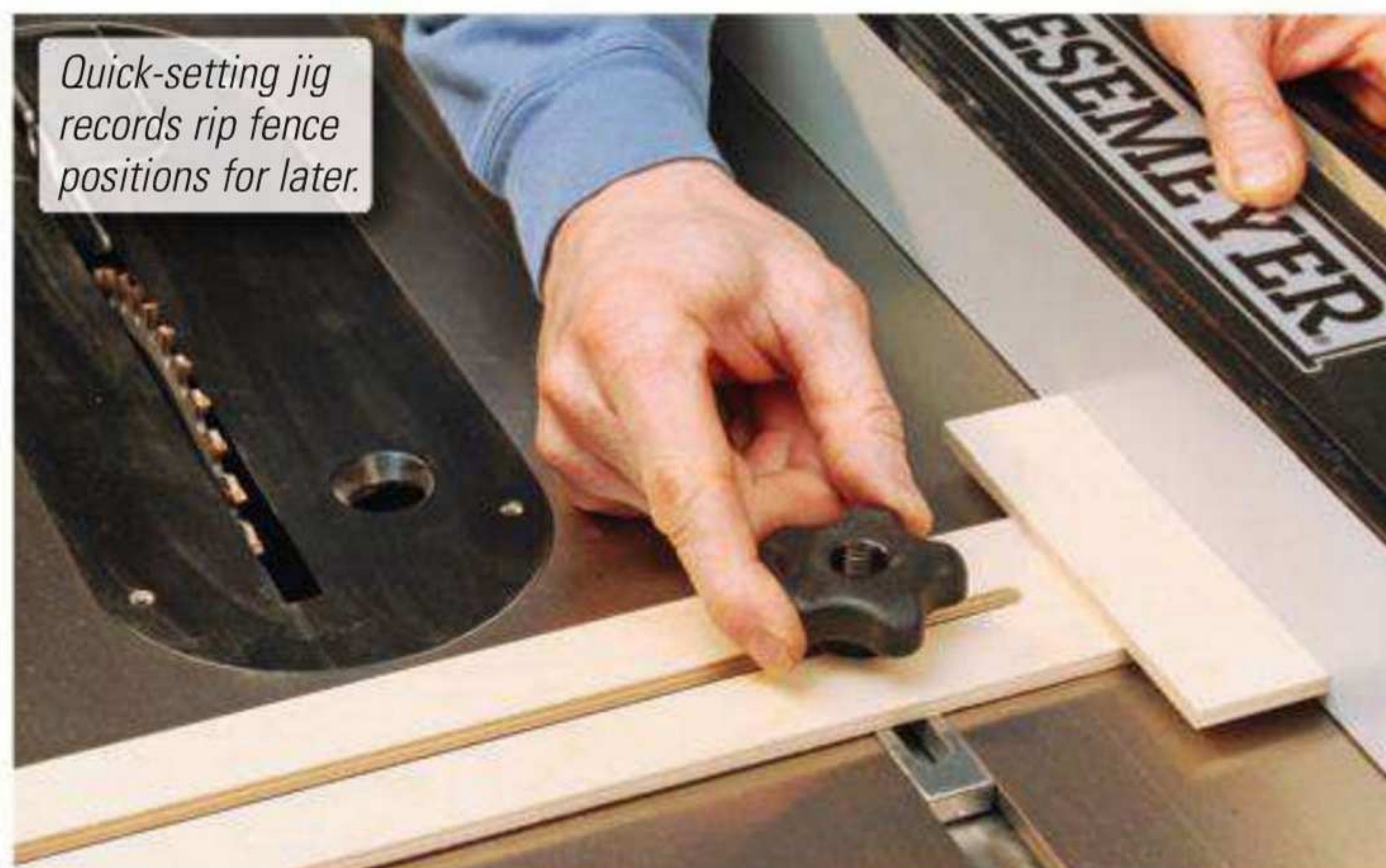
Instant Recall for Rip Fence Settings

Sometimes when building a project, I'll want to reset my table saw's rip fence exactly to an earlier setting. Here's a simple jig that helps me do it

without measuring. I routed a 5/16"-wide slot in a long, narrow piece of quarter-inch plywood and mounted it to the metal bar and knob of one of my featherboards. I glued a second plywood crosspiece to the end. To use the jig, I slide the registration end over against the rip fence setting I want to record and tighten the nut just enough to lock the jig's position. Now I can lift the jig off the saw and set it aside. My "story stick" jig is ready to set back in the miter slot and relocate the fence when I need it.

Cliff Furman
Englewood, Florida

Tricks continues on page 18 ...



Quick-setting jig records rip fence positions for later.

PICK OF THE TRICKS



Keeping Power Cord Plugs Off the Floor is a Snap

Most of my shop machines aren't located near electrical outlets, so extension cords are a necessity. I used to keep the power cord draped over the top of the tool when not plugged in, but often it would fall to the floor. Sooner or later, I'd end up stepping on the plug and bending the prongs. No more. Now I clip

one of those inexpensive (under \$2) keyring carabiners to a convenient place on the tool, and I capture the plug inside it. The carabiner's spring-loaded gate makes it easy to store or remove the power cord, and those delicate prongs are never underfoot.

Ed Klodnicki
Durham, North Carolina

ALL THE PARTS YOUR CAR WILL EVER NEED

Price Comparison

1972 Plymouth Satellite Idler Arm

Parts Store	Part Brand	Price
RockAuto	Moog	\$36.99
Advance	Moog	\$53.99
Autozone	Duralast	\$53.99
NAPA	NAPA	\$53.99
O'Reilly	Moog	\$55.99

(as of 4/20/2011) RockAuto price is regular price, NOT a special sale price created for this comparison.

✓ Huge Selection
✓ Everyday Low Prices

✓ Fast Shipping
✓ Easy to use Website



ROCKAUTO.COM

ALL THE PARTS YOUR CAR WILL EVER NEED

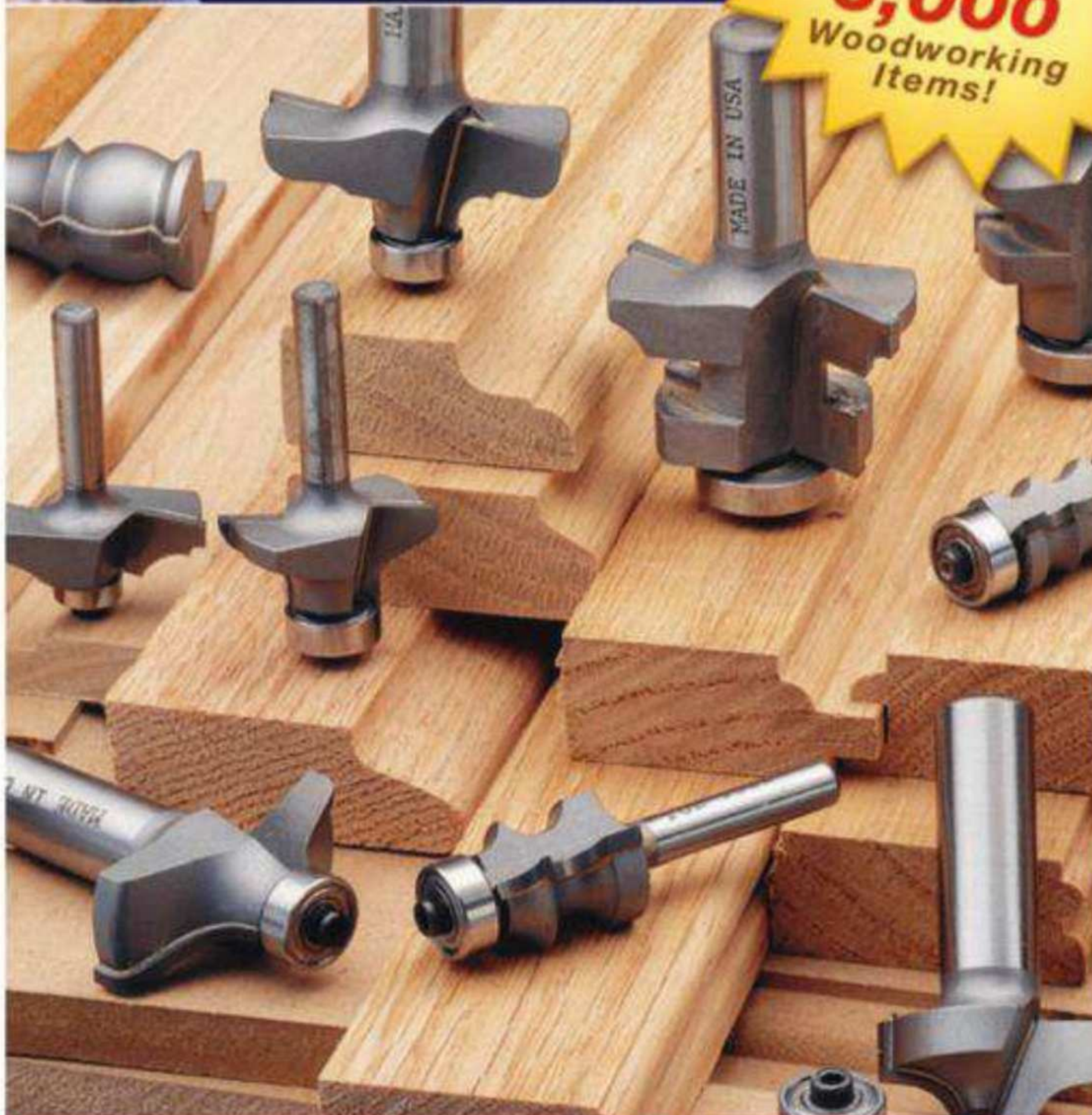
GO TO WWW.ROCKAUTO.COM ROCKAUTO, LLC (EST. 1999)

(Circle No. 28 on PRODUCT INFORMATION form)



EAGLE
AMERICA
The World's Router Bit & Woodworking Source!

OVER **2,000**
Router Bits!
OVER **6,000**
Woodworking
Items!

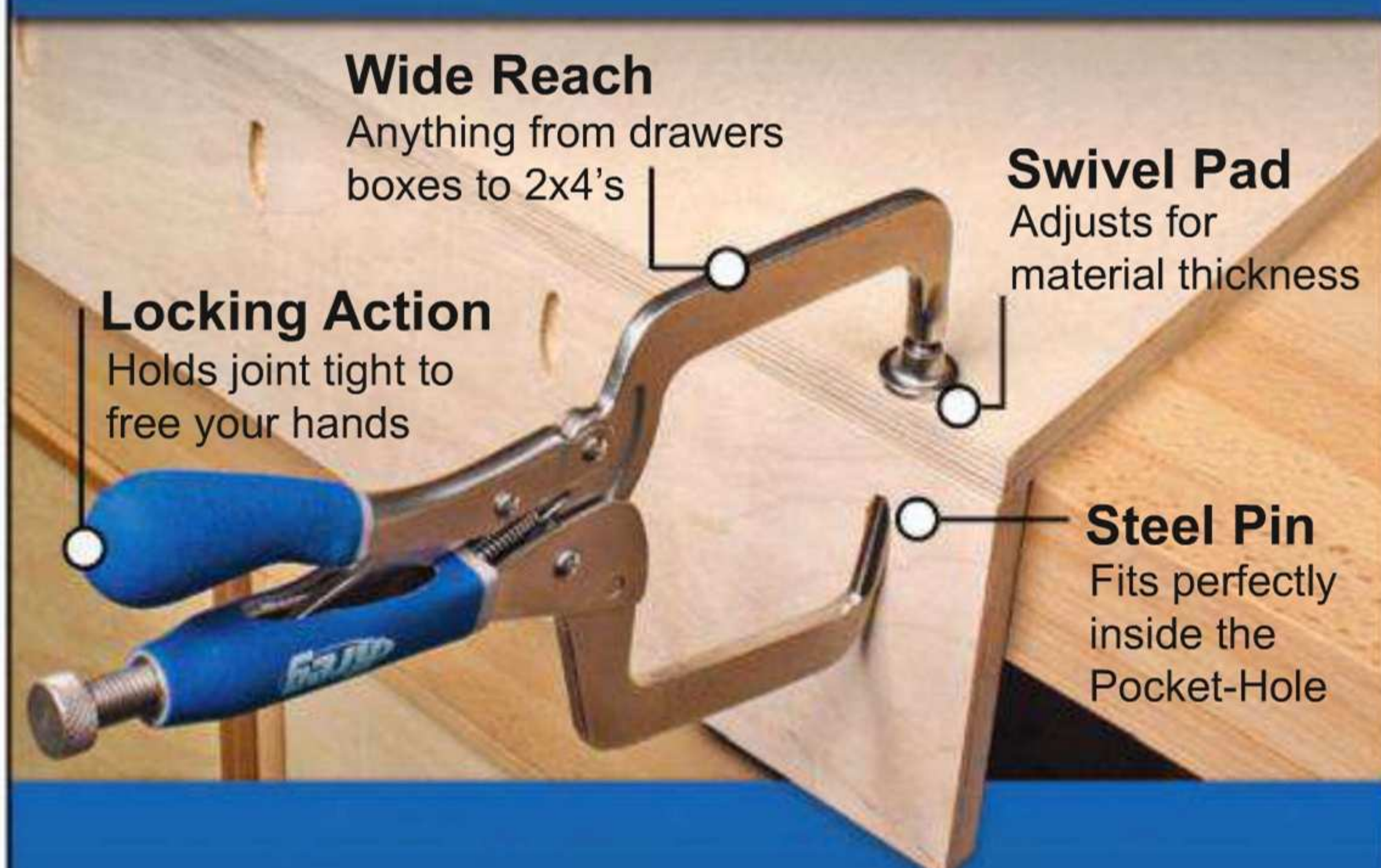


FREE Shipping On your order of \$75. Use offer code WJ1107. Prior orders excluded. Ends 9/30/2011.

1-800-872-2511 • www.EagleAmerica.com/WJ1107

(Circle No. 6 on PRODUCT INFORMATION form)

Right Angle Clamp



Take the challenge out of 90° joints

Attaching a face-frame to a cabinet carcass, assembling drawers, shelving and other situations where you need to join workpieces at 90 degree angles is a snap with the Right Angle Clamp.

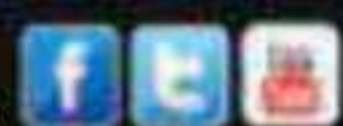
Watch the Video



to Learn More

www.kregtool.com/rac

Follow us



(Circle No. 19 on PRODUCT INFORMATION form)

NEW PLANERS
FEATURED THE "PATENTED"
HELICAL ACCU-HEAD CUTTERHEAD


\$2499.99
40280H -
20" Industrial
Helical Planer



\$249.99
40100 -
13" Straight
Knife Planer

5 YEAR WARRANTY COVERAGE

2 YEAR WARRANTY COVERAGE

STEEL CITY

BY WOODWORKERS | FOR WOODWORKERS

Variety Accuracy Longest Warranty Unsurpassed Performance Excellent & Smooth Finishing



Join Us! From July 20th - 23rd, 2011
Booth: 4823
AWFS in Las Vegas Convention Center
Visit: SteelCityToolWorks.com for details!

(Circle No. 34 on PRODUCT INFORMATION form)

Refinish Your Future.



Own your own business.

Let your passion for furniture lead you into a new business with a Furniture Medic franchise. We're a complete on-site repair and restoration-refinishing business servicing homes and companies as well as handling moving and insurance claims. We offer extensive training and support with a low initial investment and manageable overhead. Financing is available to qualified candidates and franchises are offered nationwide. Call today to brush up on the details.

 **FURNITURE MEDIC**
"the prescription for damaged furniture"

www.furnituremedicfranchise.com **1-800-RUN YOURS**

(Circle No. 12 on PRODUCT INFORMATION form)



Turn logs into lumber.

8 models to choose from

Wood-Mizer 800.553.0182
SawBoards.com

dream to the MAX

(Circle No. 36 on PRODUCT INFORMATION form)

WJ woodworkersjournal.com
eZiNE

The *Woodworker's Journal* eZine is the Internet's most popular woodworking magazine — bar none. If you are not a subscriber to the eZine, sign up for your **FREE** subscription now!

Sign up at woodworkersjournal.com



Tricks of the Trade

continued

Precision Height Gauge

A dial caliper takes precise inside and outside measurements, but the depth probe on the end can also help you set exact blade and bit heights. The key is to lock the caliper vertically in a jig like I made here. The base is 4" square, and the upright is 3½" x 5" with a 5/8" x 2½" notch cut into one edge. I cut a 5/8"-deep kerf into the edge above the notch with 1/8"-kerf saw blade; this slot fits a standard caliper perfectly. I stepped to the band saw to cut a centered slit across the top of the upright, 2" deep. By threading a bolt and wingnut across this thin kerf in the upright, the bolt applies just enough pressure to hold the caliper in place. To set bit or



blade height, I lower the probe to the table and zero out the gauge, then raise it to the cutter height I want. Now crank up the cutter until it touches the probe. It's a handy jig to have around.

Serge Duclos
Delson, Quebec



Old School Trick: Start Your Tape at Ten

For accurate measurements with my tape, I use an old shop trick and start at the 10" mark instead of skipping the first inch. That way, the

numbers read 1 to 9 and I don't have to remember to account for the missing inch.

Allan Hawley
Wappapello, Missouri

Winner!

In addition to our standard payment (below) Ed Klodnicki of Durham, North Carolina, will also receive a Lamello Vario Box 440 Piece Set of Biscuits and Joining Elements from Colonial Saw for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an email: tricks@woodworkersjournal.com



THE BRAD NAILER YOU'VE BEEN WAITING FOR



1850GB
GREEN BUDDY™

THE NEW GREX 2" 18 GAUGE BRAD NAILER

Brilliant Ergonomics
Bulletproof Construction
Unrivalled Power
Precision Control



FIND YOUR DEALER

888-447-3926

905-838-4887

www.grexusa.com

(Circle No. 15 on PRODUCT INFORMATION form)

For the Toughest Jobs on Planet Earth®

With its incredible versatility and strength, Gorilla Glue is the ultimate solution for all your adhesive needs. Bonds wood, stone, metal, ceramic, foam, glass and much more!

FOR THE TOUGHEST JOBS ON PLANET EARTH®



1-800-966-3458 Made in USA



© 2011 Gorilla Glue Company

(Circle No. 14 on PRODUCT INFORMATION form)

Enjoy the Benefits of HVLP with a FUJI!

- ▶ Pattern Control Knob
- ▶ Non-Bleed Sprayguns
- ▶ High-Efficiency Aircap
- ▶ Powerful & Compact
- ▶ Standard or 'Quiet' Turbines
- ▶ Industrial-rated



Visit www.fujispray.com or call 800-650-0930

(Circle No. 11 on PRODUCT INFORMATION form)



With over 30 years of experience in producing lumber dryers you can count on EIP's dependability and simplicity.



Mention this ad to receive
10% OFF your total purchase
OR FREE Shipping

We offer four models ranging from
800 BF to 10,000 BF

Ebac Industrial Products Inc

700 Thimble Shoals Blvd, Suite 109, Newport News, VA 23606-2575
Tel 757 873 6800 Fax 757 873 3632

Toll Free 1-800-433-9011 www.ebacusa.com

(Circle No. 8 on PRODUCT INFORMATION form)

What's In Store

Some Next-step Tools

Contact Information

Argyle Cabinetry
561-281-9976

I-Mark Tools
802-253-9600

Laguna Tools
800-234-1976

Rockler
800-279-4441

SKIL Tools
877-754-5999

Starborn Industries
800-596-7747

The I-Mark® Self-Marking Tape Measure is a 16-foot tape measure with a 3/4" blade and a pre-installed marking cartridge that eliminates the need for a pencil or additional marking tool. Measure, and press the case to mark. The tape measure is priced at \$24.95; the company also sells replacement ink cartridges for \$4.95.



I-Mark Self-Marking Tape Measure



Laguna Tools has added a new, taller 8" Resaw Fence to its products. Designed for precise, demanding resawing applications, the new fence measures 8" tall by 31½" long and weighs 12 pounds. It's made from aluminum and will fit any Laguna band saw and most other popular brands. The 8" Resaw Fence sells for \$155 and is available through Rockler.

Starborn Industries
SMART-BIT



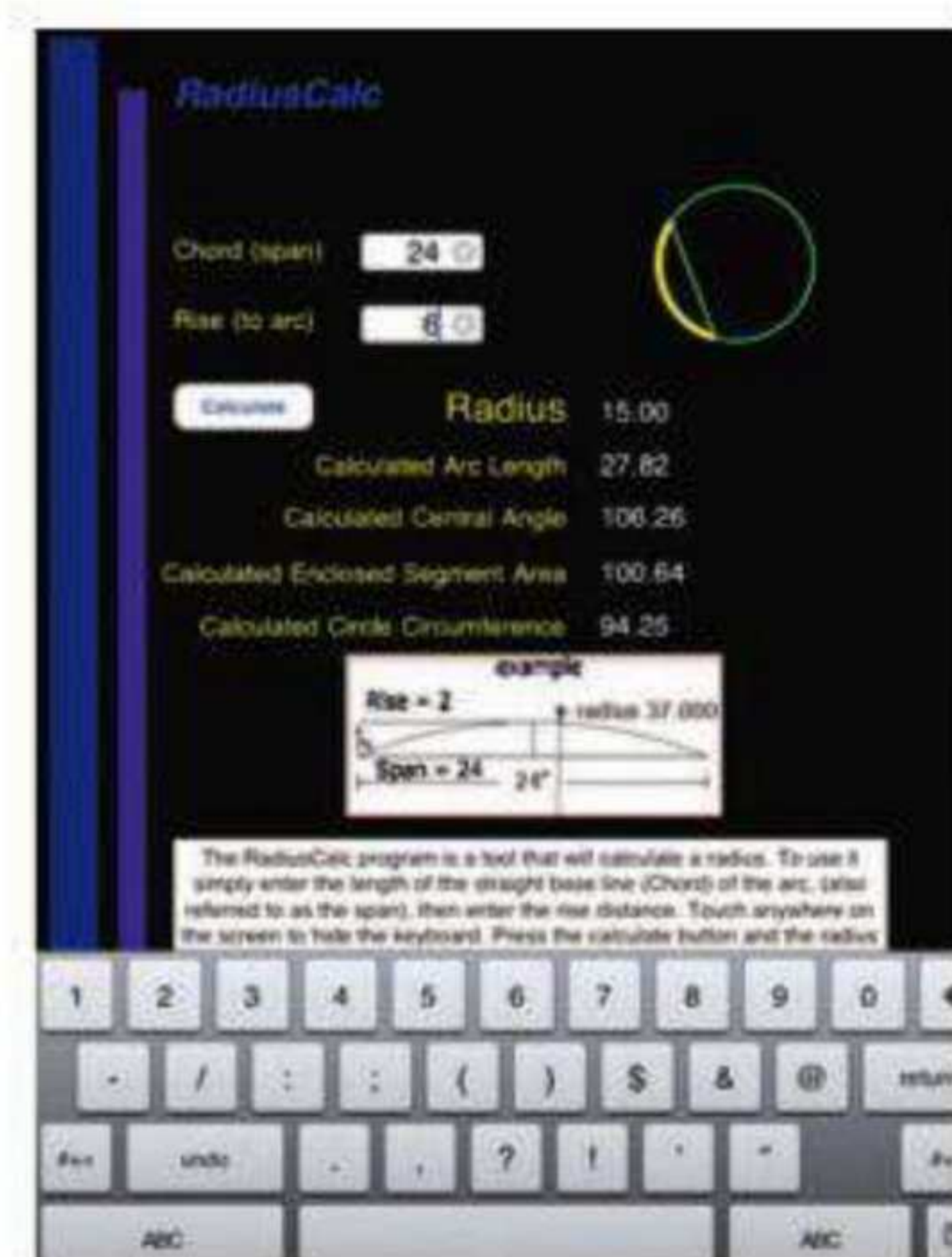
SMART-BIT® from Starborn Industries is a pre-drilling and countersink tool with a countersink portion proportionate to the head of each corresponding screw size. It matches the head diameter, head angle and countersink depth of the hole and fit. A stop collar that spins free of the bit and a rubber O-ring ensure the tool won't leave marks. It drills a 1½"-deep hole and is available in five sizes. The SMART-BIT is packaged with two replacement drill bits and a hex Allen wrench. Pricing varies by screw size, starting at \$14.99 for a #7 trim-head SMART-BIT.



Laguna Tools
8" Resaw Fence

Developed by Florida woodworker Norman Lucia for his own use, the **Argyle Cabinetry AngleCalc** and **RadiusCalc** software applications for iPhone, iPod and iPad devices are designed for easy calculation of angles and radii used in woodworking and do-it-yourself projects. RadiusCalc will calculate circle circumference and arc segment length and area, while AngleCalc measures and calculates angles and miterers of any degree. A miter box field shows the accurate setting for your calculated angle, with warnings about miter box angles greater than 45 degrees and recalculation for use with a 45 degree fixture fence. ArgyleCalc offers the combined features of the AngleCalc and RadiusCalc apps, as well as the ability to input CAD information and make calculations for fluted columns and moldings. The AngleCalc and RadiusCalc apps are each priced at \$2.99; ArgyleCalc is \$7.99.

Argyle Cabinetry Angle Calc, Radius Calc, ArgyleCalc apps



Argyle Cabinetry Angle Calc, Radius Calc, ArgyleCalc apps

The rubber is off the road — and into the shop — with **Rockler's** new 100% **Recycled Bench Mat**. Made from recycled rubber tires, the 24" x 60" mat protects workbench tops, tools and projects from shop-made scratches, dings and dents. You can cut the 3mm-thick



Rockler 100%
Recycled Bench Mat

mat to size, move it around to different shop areas, and roll it up for storage — or adhere it permanently to a bench.

“We feel we’ve made an environmentally conscious selection our customers will appreciate,” said Dan Wenning, a Rockler product development specialist. The 100% Recycled Bench Mat is priced at \$39.99.

SKIL has a new line of routers — the 1817, 1827 and 1830 — which the company is touting as offering “professional features at an affordable, DIY price.” All three routers in the line feature SoftStart™ Technology, micro-fine adjustment for precise depth measurements and an LED SiteLight™ for improved visibility. They also have soft-



grip handles, a dual-position On/Off switch and half-inch collet capacity with a quarter-inch collet adapter. *The Model 1817* is a 1¾hp fixed-base router, priced at \$69.99; the *1827* is a 2hp plunge base router with variable speed, depth rod and adjustable tur-

ret for repeatable plunging applications. It's priced at \$89.99. The *Model 1830* is a 2¼hp combo kit with both fixed and plunge bases, variable speed, depth rod and adjustable turret. The 1830 is priced at \$109.99.



SKIL's 1817, 1827 and 1830 routers



NOTE: See Quik-Link at woodworkersjournal.com for web links to all of these products.



SprayStation Earlex®
The modern way to paint

**If you can make it,
you can spray it!**

Spray Stations provide maximum control and minimal overspray for a great finish every time.



It's easy with an Earlex.
Available at your local woodworking store.
www.earlex.com

(Circle No. 7 on PRODUCT INFORMATION form)

Shop Talk

Trusting All Your Shop Senses



Woodworkers Move Beyond Sight

George Wurtzel Shares A Lifetime of Shop Tricks

Trouble telling the difference between birch and maple? A hint from shop teacher George Wurtzel: "They smell different."

That's one of the things George has learned over 50 years as a blind woodworker. He's now teaching students of all ages at BLIND, Inc., a Minneapolis training center.

"Having a teacher who's blind helps a lot," says Kayla Weathers of Trenton, Georgia. George added, "If you have somebody normal, they may not believe 100 percent in their heart of hearts that you can be successful at doing it."

George, on the other hand, wants his students to be

comfortable "doing something that in their wildest dreams they never thought they'd be doing."

His class is required of all students at BLIND, Inc., and they all do woodworking in complete blindness. People who have some vision wear sleep shades to create total occlusion. The reasoning, George explained, is that most people's vision problems will become worse; if they've received training in total blindness, they won't have to relearn everything later.

George starts every student out with hand tools to learn how tools work and how to position their bodies when

Students like Kayla Weathers (green shirt), Xai Lor (orange hat) and Kimberly Kiser (background, above right photo) create a box in George Wurtzel's class, then get a feel for their own projects.

using them. "With a hand miter saw, you have to keep your body square to get it to work right. So when you go over to the power miter saw, you already know that."

After completion of the first class project, a cedar box George has designed to be deliberately confusing — several parts are the same size but must fit together in a certain pattern — each student chooses an individual project.

Kimberly Kiser of Kaukana, Wisconsin, is building an occasional table with a



www.woodworkersjournal.com
MORE ON THE WEB

To watch a video of George Wurtzel's specialty measuring tool in use, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.



butterfly-shaped top. She'll shape the legs with a router. "So much of that is touch and listen," George said. "It if starts to climb grain, you'll hear a bad noise, and you know you've got to slow down."

The only "specialty" tool George and his students use is a click rule measuring device. A nut marked on one side



slides along a threaded rod equipped with a spring-loaded ball bearing that drops into the side of the threads, making clicking noises at every 1/16 of an inch and locking into place at the desired measurement.

"The guy wearing trifocals who can't see well enough to set the saw at 3/32" doesn't know this tool exists," George

said. "He can come here and learn."

After the course, Kayla said, "I'll know I can do something that a lot of people think blind people can't do."

For more information about BLIND, Inc. call 800-597-9558 or visit blindinc.org.

— Joanna Werch Takes

Shop Talk continues on page 24 ...



This click rule measuring device is the only specialty tool used by these blind woodworkers.

"White oak has a buttery smell, nothing like the 15 kinds of red oak it gets graded into. To compare pine and birch: when you put your hand on it, a piece of pine instantly feels warm. Birch takes a while to warm up."

— George Wurtzel



Veritas® Precision Squares

To order these squares, call or visit us online. Request a copy of our free 284-page woodworking tools catalog or browse it online.

1-800-683-8170
www.leevalley.com

An ideal size for cabinetmaking, this square has the accuracy of an engineer's square (0.001" per inch of length). All four edges are ground, and both faces are graduated on the inside and outside edges. The Imperial square is graduated in 32nds on the 3" leg and in 16ths on the 6" leg, while the metric version is graduated in half millimetres on the 8cm leg and in millimetres on the 15cm leg. Useful not only for general layout and checking whether surfaces are flat, but also for machine set-up. Made from chrome-plated high-carbon steel, with etched and black-filled markings for ease of reading. The relieved interior corner ensures that the square seats well, even over saw whiskers. This thin, compact square fits easily into an apron slot or pocket so it's there when you need it. Made in USA.

05N35.01 Precision Square, Imperial **\$24.50**

05N35.03 Precision Square, Metric **\$24.50** Shipping and N.Y. sales tax extra.

Lee Valley & veritas®

(Circle No. 20 on PRODUCT INFORMATION form)

Shop Talk continued

"Shellac's recorded use
goes back some three
thousand years, and
the water-soluble
dye that comes out
of the first washing
of raw shellac was
long prized for the
bright scarlet color
it gave to silk, leather
and wool."

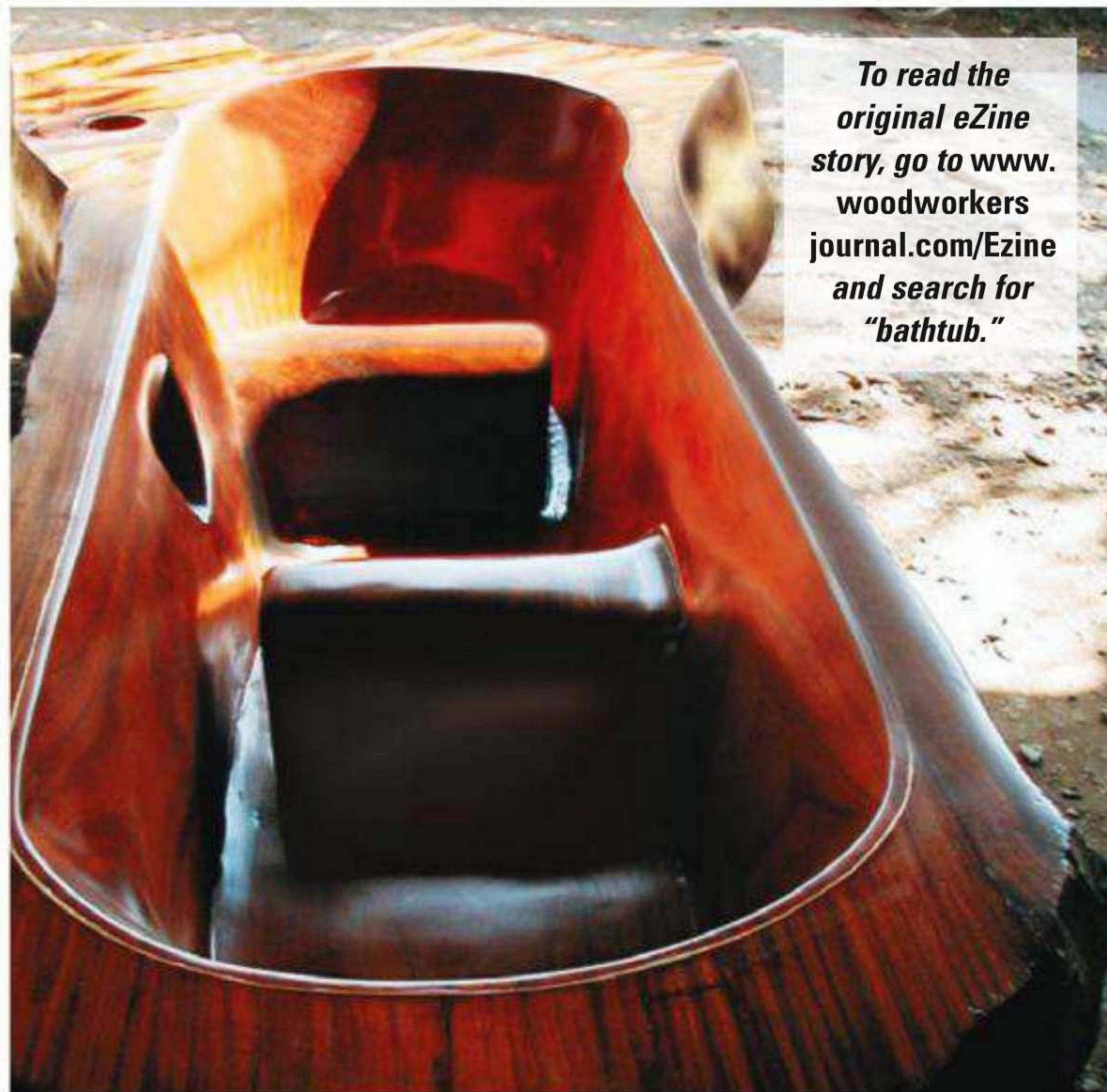
Michael Dresdner

Tree Trunk Tub A Cedar "Canoe"

A while back, *Woodworker's Journal* reader Alok Mital sent in a question to our *Woodworker's Journal eZine* about finish options for a wooden bathtub he was building. We definitely wanted to see pictures of the completed project, and Alok kindly obliged.

The 10' x 42" tub for two was created from a cedar tree trunk to Alok's design, with the humps put in at the customer's request. "Feels like a chaise lounge, looks like a bark canoe," as Alok described it.

It took 30 days to dig out the trunk, at one inch per day by a trainee carpenter using chisel and hammer. Alok then sanded and finished it with clear epoxy,



To read the original eZine story, go to www.woodworkersjournal.com/Ezine and search for "bathtub."

as recommended in the eZine, for its quality of drying to a hard state that will resist water. He also inlaid a thin copper strip around the tub.

Alok, who is an IBM mainframe computer engineer by profession, does his woodworking in his garage in

Dehradun, India, a city in the foothills of the Himalayas. He describes it as his "old age hobby," as opposed to his childhood hobby of model airplanes, and says, "I work for the love of woodworking."

A Lack of Shellac?

Dry weather in southeast Asia the past couple of years has caused a shortage in seedlac, the raw material for the creation of shellac, but woodworkers needn't worry. Tim O'Reilly, senior brand manager of wood care at Rustoleum Corporation, whose Zinsser division is the sole supplier of shellac products in the U.S., says the company keeps enough supply on hand to deal with fluctuations in the crop.

While declining to provide specifics on how much is kept on hand, Tim noted that, since seedlac is a natural crop influenced by weather, the company expects fluctuations. And, although the price of the raw material was up over 500 percent in mid-April 2011 from the same time last year, Zinsser was also



Bug Doots: Tiny laccifer lacca swarm on trees in their larval stage. Encrusted branches are then harvested, the earliest stage of shellac.



not recouping that price increase from consumers. "We know it will come down as soon as we get a good crop," Tim said.

In general, seedlac is not a plantation-grown crop, although Tim said China's burgeoning furniture industry has led them to cultivate the trees which attract the beetles and can survive being encrusted in the secretions.

Zinsser's supply comes from India as a spring crop and from Thailand as a fall crop. Due to the time required for freight and other factors, the current shortage in raw material actually reflects weather patterns from 2009, Tim said. "It has to do with the migration pattern of the beetle. If it's really dry, they don't do what they need to do to produce secretions on the tree," he said.

Those secretions then become the various shellac products, including the patented de-waxed versions offered by Zinsser. "An awful lot of shellac goes into the primer product Zinsser BIN used by professional contractors," who might buy thousands of gallons a year, Tim said. For them, and for the woodworkers who buy a quart at a time, "We want to let them know what's going on with the supply of the product."

—Joanna Werch Takes

The bulk of shellac in the U.S. is used for coating medicine to make pills easier to swallow and as a confectioner's glaze to make fruit and candy — like Junior Mints® and Raisinetes® — shiny. Below are several types of shellac flakes derived from the same source.



Raw
wood

Super blonde

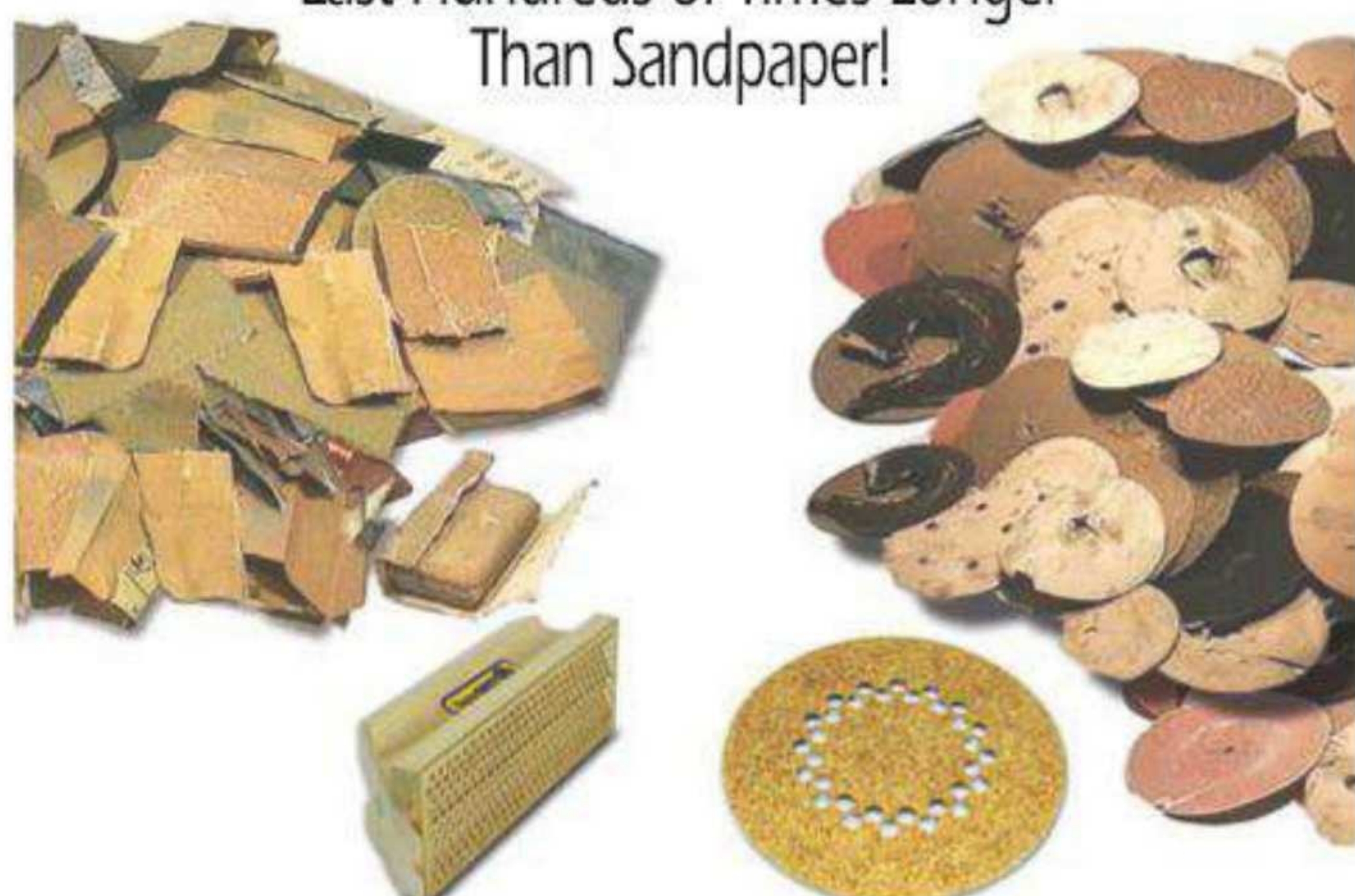
Blonde

Orange

Garnet

TIRED OF CHANGING WORN SANDPAPER & DISCS?

DuraGrit Carbide Blocks and Discs
Last Hundreds of Times Longer
Than Sandpaper!



TruSander™

90° Carbide Sanding Block
Wood Handle with Dust Trap
60 & 120 grit

DuraDisc™

5" Carbide Sanding Disc
5 & 8 Hole Compatible - Loop Back
46, 60, 80 & 120 grit

"I've been using the same DuraGrit block and disc since 1998"
John D. (Tradesman, Toronto)

Check Out These & Other Great Carbide Tools at:

www.duragrit.com/wj



Carbide Tools That Really Work. And Work. And Work!

(Circle No. 5 on PRODUCT INFORMATION form)

Meet the Buddy

The most versatile tool in your shop

Whether you're a weekend wood-worker or ready to turn your craftsmanship into a business, with your PC and the

ShopBot Buddy you can:

- Cut wood, vinyl, aluminum, foam, plastic - *just about anything*
- Get professional-grade speed, power and accuracy at a fraction of the cost of a big-iron machine
- Use just 16 sq. feet of shop space



Check out our website, then call our friendly customer service team. We listen to your needs and can help you find the right tool to match your passion!

Get Inspired!
Find Projects,
Forums, & Advice
at
shopbottools.com

ShopBot®

888-680-4466 • shopbottools.com

Making high-performance CNC
fabrication tools affordable since 1996.

(Circle No. 33 on PRODUCT INFORMATION form)

WJ woodworkersjournal.com

eZiNE

FREE
plans in
every
issue!

Don't miss out ...
... it's **FREE!**

The *Woodworker's Journal eZine* is the Internet's most popular woodworking magazine — bar none. New, fresh content — always delivered with a sense of humor and respect for the craft. If you are not a subscriber to the eZine, sign up for your **FREE** subscription now!



Sign up at woodworkersjournal.com

UNIQUE SOLUTIONS



Fix Dust
Collection
Problems

Free Design
Assistance for All
Custom Made Dust
Bags & Sleeves!

AMERICAN FABRIC FILTER CO.

www.americanfabricfilter.com 800-367-3591

Get Into Wood!

Sawing Lumber Made Easy.

Easily turn your logs into
lumber with the all NEW
HP-26 Hobby Pro Sawmill.
Prices start at only \$3,995.00!

Call or email for your **FREE** Catalog!

1-800-473-4804

WWW.COOKSSAW.COM

(Circle No. 4 on PRODUCT INFORMATION form)



MOLDERS

7 YEAR WARRANTY



Model 154
Molder

Model 206
Molder

Model 209
Molder

AWFS
Booth
#4414

www.williamsnhussey.com

Toll Free 800.258.1380

70 Powers Street
Milford, NH 03055



OUR COMMITMENT IS TO EXCELLENCE

(Circle No. 40 on PRODUCT INFORMATION form)

Mark Sfirri: A Life

By Jeff Day

Mark Sfirri pushes turning to its limits with his multi-axis approach. For most of his career, he says, "I've been doing creative turning looking at things different ways."

Off-Center



There is something large spinning on Mark Sfirri's lathe — something large and spinning and wobbly. The kind of large and spinning and wobbly that gets his work into the Smithsonian's Renwick Gallery, into The Yale University Art Gallery, and into New York's Museum of Art and Design.

The kind of large and spinning and wobbly that you get from a multi-axis turning — turning a piece first on one set of centers, and then on a second set.

"I don't particularly like round things," Sfirri says. "I don't like symmetrical things. I do appreciate work that is exquisitely executed or nicely dovetailed, but that's not the way I see things. For most of my career I've been doing creative turning looking at things different ways."

There's the *Walking Table*, an end table standing as if its legs were mid-stride. There's the elegant, six-foot tall *Glancing Figure*, with its arched back and the head looking off to the side. And the aptly named *Rejects from a Bat Factory*, one bat with its handle tied in knots, another with a chunk missing, as if it were knocked out by a steaming fastball.

If you can do that, why would you turn round things?

Sfirri says there are two types of multi-axis, or off-center, turnings. In one, each section is round, like the broken rolling pin of *Homeland Security*: It's a cylinder turned on one set of centers with a neighboring cylinder turned on a second set of centers. Each section is



To view a video of Mark Sfirri demonstrating multi-axis turning techniques, go to woodworkersjournal.com and click on the "More on the Web" tab shown above.



turned only once. He can sometimes lay out the work in advance by drawing it full scale, cutting it up, and pasting it back together. (See him lay it out at woodworkersjournal.com/videos)

In the second type of multi-axis work, there are no cylinders. Every inch of the turning is turned twice, first on one set of centers, and then on a second set. The result is football-shaped in cross-section, each surface having been turned on a different set of centers. The ends of the football point in slightly different directions as you move along the turning, creating a wandering line.

"The reason that those lines appear — that's one of the key points of why I do this, that line of detail — is the way the two sides come together." He demonstrates, standing at the lathe. A gentle cove on the end, rolling into a soft bead, followed



Sfirri sketches out his work in advance. What he can't sketch out on paper, he sketches in three dimensions on the lathe.

by another gentle cove on the other end. "Just sort of an organic line waving along," he says. He resets the centers, and turns the exact opposite: A bead, cove, and then a bead. It's geometry combined with magic: You can see a ghostlike image of the first surface as he turns the second. The two surfaces combine to form what he describes, somewhat technically, as a "squiggle" form. "The whole piece," he says "kind of drifts along to create that shape."

There was a time, he says, when he thought he would run out of ideas. But he is a creative designer and an innovative woodworker — an early frame-and-panel piece has large raised panels that were turned on the lathe, cut into rectangles, and then cove cut to fit into the frame. He has boundless curiosity and apparently eternal youth, despite his graying temples.

A story: Years ago, his son shamed him into turning a baseball bat. ("Dad. You have the wood and you have a lathe") As he was turning the bat, Sfirri suddenly saw it as the sophisticated tool that it is: "A knob keeps your hand from flying off the end. The narrow handle lightens the load and improves the grip. And the head, of course, is hefty, designed to do what a bat does: Every square inch is an evolved design."

And he wondered, "what if I just interjected some isolated shapes, treating the bat as a blank canvas?" *Rejects from the Bat Factory* grew out of it, and kept growing: A two-handled bat. A bat with the ball stuck in it. A bat swung so hard that all the bulk has gone to the top.

Sfirri imagines pieces like Homeland Security (below) by cutting a drawing apart, shifting the pieces, and taping them back together.



Samples from Rejects from the Bat Factory hang near Sfirri's table saw. Samples help him lay out centers of pieces he wants to recreate.

Rejects was the first of his pieces to be added to the permanent collection at the Renwick.

Consider the bright yellow *Fromage Whiz* (above, left). On a teaching trip to France, Sfirri was fascinated by the shapes of the containers at the corner grocery. The labels were incomprehensible, but he learned that the French take their fromage — their cheese — very seriously. Few French, he says, have ever tasted cheddar, because importing it from England is difficult, if not illegal. Parmesan is unheard of for the same reason, and although there is a French equivalent, Sfirri found it somewhat lacking. On a return trip to France, he packed a spray can of Cheez Whiz® because — well, because he is Sfirri. The adults were offended, though one connoisseur admitted privately that the stuff was pretty good. The kids loved it. When a young boy pulled Sfirri aside asking to buy a can, Sfirri knew he had to



The profile of one shape appears on the lathe after Sfirri resets the centers to turn a second shape.



After laying out a shape on paper, Sfirri roughs out the blank on the band saw.



commemorate the event. Voilà — *Fromage Whiz* — with its jumpy looking container and proud French name. *Printemps Poulet* — Spring Chicken — came later, followed eventually by the more Anglo *Logger Lager*, and *Ten Pin Ale*.

Sfirri's designs evolve out of the abstract, as well as out of his experiences. *Glancing Figures* started out as the handle of a baseball bat, to which Sfirri added the squiggle. "I stretched part of it out, and pinched part of it together to make it look even more organic. And I wondered, what it would look like if I did that squiggle on one side, and just a gentle curve on the other?" It looked like a handle when he drew it out in his sketchbook, but when he turned it, it looked like a figure. For the next year, he turned figures, working at first to make them more proportional and then, unable to leave well enough alone, he says, he manipulated the centers first to make the figure look as if it were twisting, and then as if it were twisting and looking over its shoulder. It is the second of his pieces to be added to the Renwick collection.

Sfirri lives in a 291-year old Bucks County stone farmhouse that he and his wife, Lucy, restored, saving it from the previous owner's red, white and blue decorative scheme. When built, the house was one room wide and one room long, and heated by a huge walk-in fireplace. The front door and back door are directly opposite each other, so that, Sfirri says, a horse could haul firewood in one door and walk out the other. Sfirri's collection of turned objects is on display in the addition they built. The kitchen, which Sfirri designed and rebuilt, is in an addition that was there when they bought the house.

The shop is down a gentle walk to the end of the driveway. The building is about as wide as a four-car garage, and twice as deep. It was a dog kennel when they bought the house, and there was an



By turning everything on one set of centers and then on a second or even third set of centers, Sfirri can create everything from the subtle Glancing Figure (left) to the boldly angled legs of Walking Table (right).



initial problem with fleas. It's home now to his band saw, table saw, jointer, planer, and his Oneway lathe with its 14-foot bed. He keeps his chisels in a lacewood cabinet behind where he works. "Like all turners, I have a hundred chisels and use about three of them," he says.

There are also shelves full of turning blocks and countless samples of his work. Some are there to help him lay out a second edition of a piece. Some are doodles. "I try to do as much design work as I can on the lathe," he says. "What I'm going to do is three-dimensional. Why not just do it three-dimensionally?"

Sfirri learned woodworking at the Rhode Island School of Design, where he earned a master of fine arts. He had started as an architecture student, but architecture is conceptual, he says, while he was hands-on. One day he toured the studios of the school's art programs in search of another way to spend his life. "When I went into the woodshop," he says "it was just the smell of the place, the equipment, the wood floor. That was it," he says, "I found my calling."

Sfirri teaches woodworking now at Bucks County Community College in Newtown, Pennsylvania. The shop is huge, and well-equipped with new, commercial-grade equipment, thanks to a \$100,000 grant from the Windgate Foundation. Sfirri teaches woodturning on the shop's 11 lathes, of course, but he also teaches carving, furniture making, bending and veneering. He travels and teaches extensively, having lectured at Yale, the Philadelphia Art Museum, and craft schools across the country. He is also a leading authority on Wharton Esherick, the Chester County,

One idea often leads to another. The "squiggle form" Sfirri turns at the left appears as a bat handle in *Rejects from the Bat Factory* and reappears in *Glancing Figure* (above). Both are in the Renwick's permanent collection.

Pennsylvania woodworker whose work was among the first to combine modern art with sculpture to create functional furniture. (See more about Esherick at www.whartonesherickmuseum.org/)

Sfirri's writing and teaching earned him the 2010 James Renwick Alliance Distinguished Educator Award — only the second ever awarded to a woodworker.

In much of his work, Sfirri looks at the mundane, and literally pushes it off-center to make a statement. *Homeland Security* is satire. *Rejects from the Bat Factory* is about how we sometimes value mistakes — mistakes like the 1955 double-die penny, for which, as a kid with a coin collection, he once scoured his pocket change. "Make a hammer and the head flies off, people get angry. Make a mistake on a penny, and it's worth thousands." (\$6,613, in fact, at a recent auction.)

He says that even though his pieces may look completely different, they all come from the same core. "One idea influences the next idea, then builds on that idea to do the next thing. Some are humorous, like the bats, but it's not like

I'm laughing all the way through it or anything. It's my work, my serious work. I'm thinking about how I need to do this, and what I need to create that. I'm engineering the geometry.

"The glancing figures are an attempt at elegance and beauty, much more organic — almost Art Nouveau with the sweeping lines. To define this figure with two lines, it's a very different mindset. To me it's more tonal. There isn't that blank canvas that's on the bat. I'm creating a blank form." Yet both the bat and the figures sprang from the squiggle, and the sweeping lines are as much geometry as a bend in the bat.

"I'll start one thing, and it's a stopping-off point for the next. I never want to settle back and say 'OK. That's it.' It's all a progression," Sfirri says, "and I want to keep playing around."

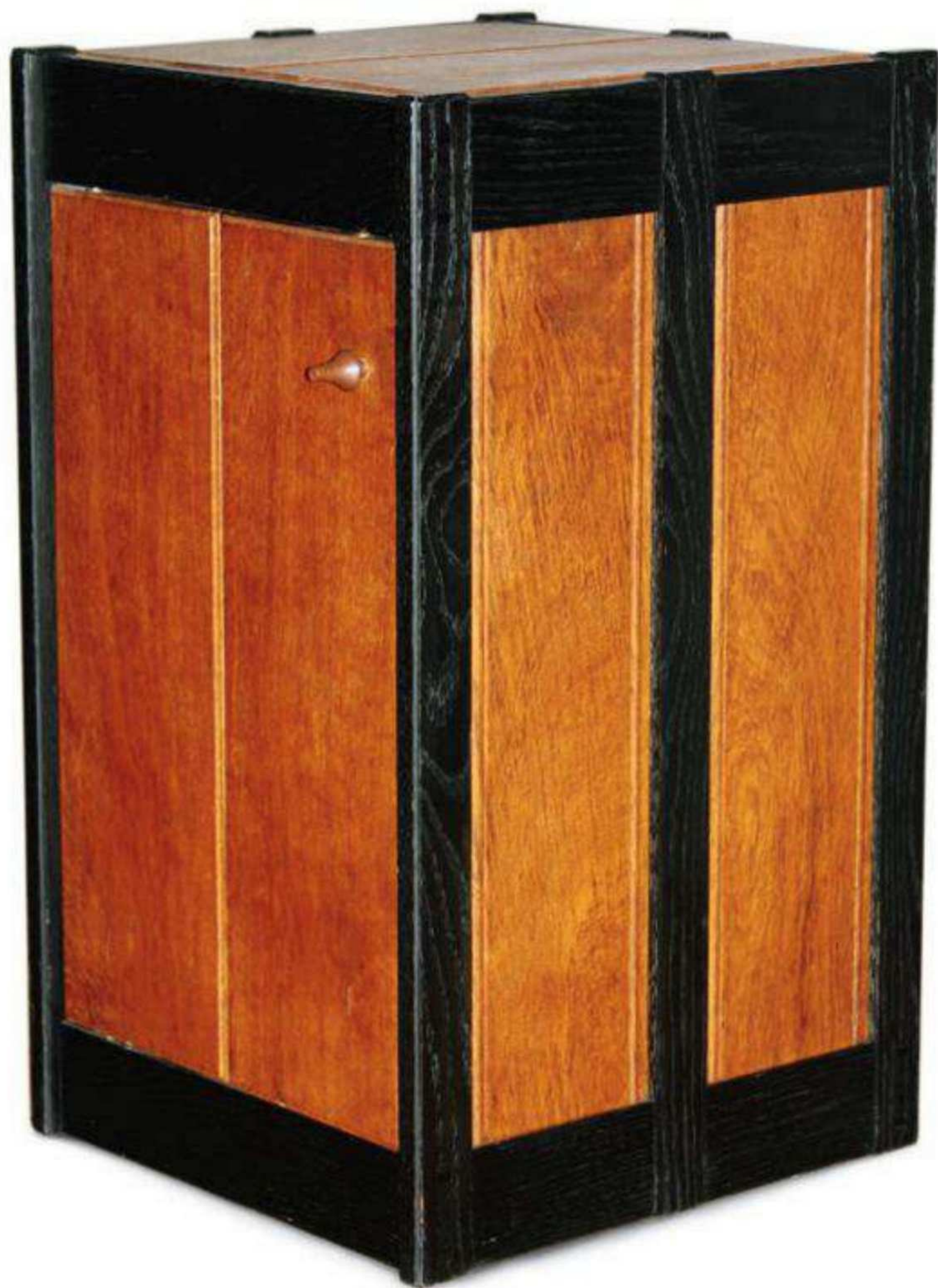
As a much younger man, Jeff Day studied woodworking with Sfirri at Bucks County Community College. He admits to being one of Mark's worst students. He is a regular contributor to the Journal.



Casework: The Cuboid Conundrum

By Ian Kirby

Cuboid furniture, commonly known as casework, presents a specific visual challenge. With chairs and tables, the look revolves around form and space. With a cuboid piece, there's little or no space as part of the mix — it is all form.



The frame and panel structures of this piece are emphasized by the ebonized frame which holds the brown oak panels. From a distance, the front differentiates itself from the sides and back in that it isn't divided by a muntin. The door and the flip-up top have an internal frame. Each is made of two panels held together by splines in their end grain edges. The spines are glued in place at the ends to allow shrinkage and expansion towards the center of the door or top. The result is a slim line down the center of each panel. The gap between the two pieces of wood has a loose spline. The sides and the back are each made of frames and panels. However, they are slightly unconventional in that the stiles and the muntins are the same length and project slightly above the short rails that join them. The panels on the sides and back are flat top to bottom. The edges of the panels are molded with a reed whose highlights and shadows emphasize their verticality.

The first article of this series focused on the primary tenet of good furniture design — proportion. The next two had something to say about the wood parts and that area between them — the form and space. Tables and chairs, stick furniture as we called them, were the main subjects.

It's time now to turn to the other major furniture group, which the furniture industry refers to as "casegoods." You might call it storage furniture. It includes objects with shelves and drawers and cupboards with doors.

To preface my remarks on designing storage furniture, it's important to recognize that we are not designing doors or drawers: they have already been "designed." What we are doing goes back to the beginning, which is getting the proportions and details of the various parts of the case into a visual order.

In designer language, this furniture form is often referred to as cuboid, a real-enough word meaning "resembling a cube in shape." A cube as a working drawing is a series of squares. A cuboid as a working drawing is a mixture of rectangles and squares.

The conundrum, from a design point of view, is the division of this visually solid block into its practical parts: doors and drawers. In the case of stick furniture, the division revolves around form and space. With a cuboid piece, there is no space as part of the mix ... it's all form.

Pattern Value

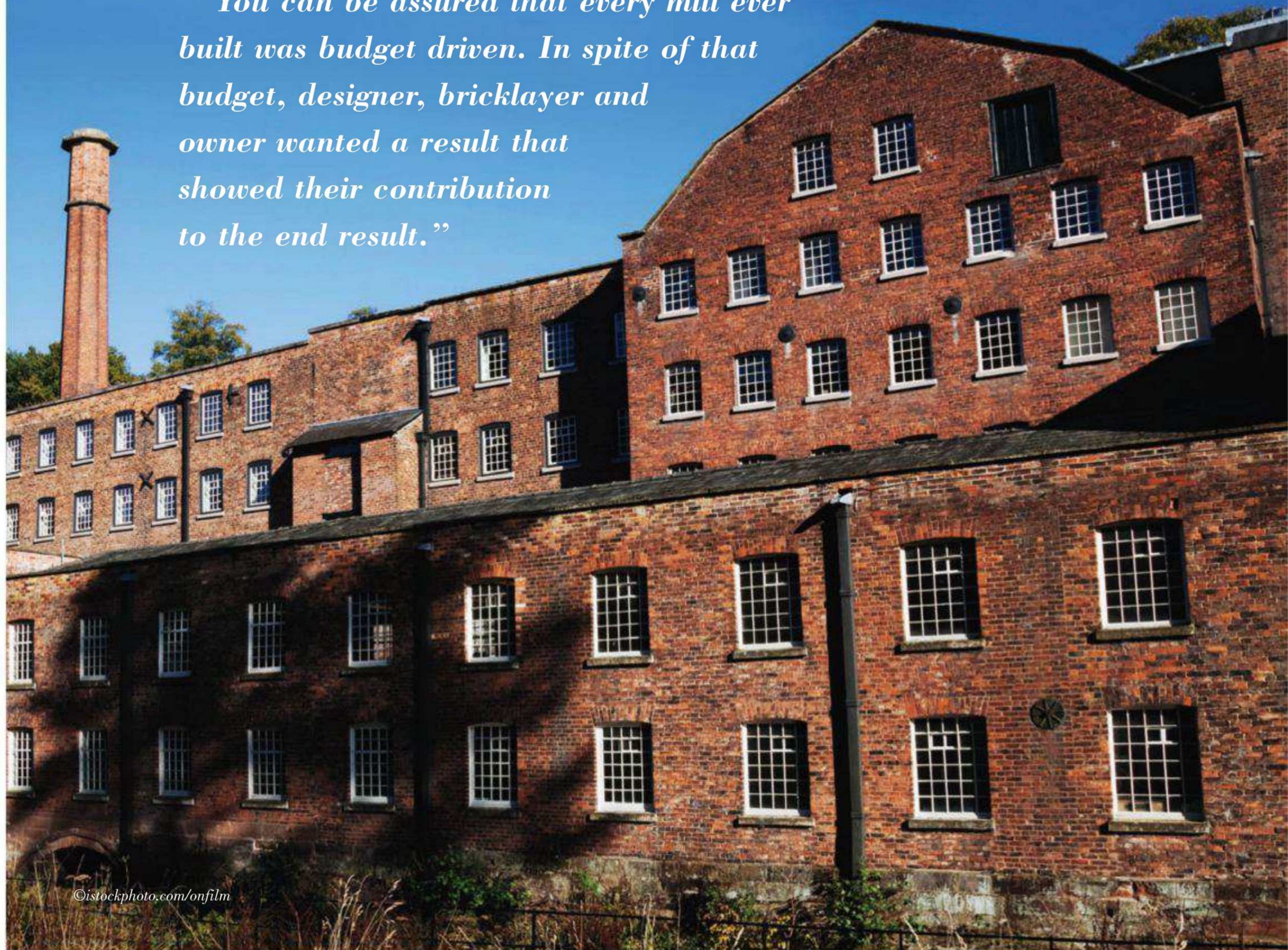
The front face of a cabinet is divided into doors and drawers and will present the most complex "break-up" of the rectangle. We refer to the "break-up" as its pattern, and the whole as "pattern value." The patterns of the sides and of the top are affected by the structure of the piece. For example, if the sides are made as a frame and panel structure, they will have a different pattern value than if they are made of flat pieces of solid wood with through joints showing.

Over the last half century or so, stick furniture hasn't changed much. Tables and chairs are about the same height as they ever were and do the same job. Not so with casegoods. Chests of drawers nearly six feet tall and better than three feet wide were common. Wardrobes were so big that you could easily step into them. Now we have closets and dressing rooms built into the house to do their job. Those oversized earlier pieces were often adorned with architectural detail: for example, a cornice so large that it looked like a crown molding. As well, there were pillars and pilasters, along with carved details that were often gilded. The days of building those oversized pieces are past.

Architectural Form and Casework

Solid wood and sound construction techniques tend to provide an orderly layout of the parts of the piece. Modern dimensionally stable materials such as veneered MDF bring wider composition and detail opportunities. The design goal is to bring wit and imagination into that order. To better exemplify the point, I'm going to go down a path which may, at first blush, seem odd, but bear with me. I want to draw an analogy between commercial

“You can be assured that every mill ever built was budget driven. In spite of that budget, designer, bricklayer and owner wanted a result that showed their contribution to the end result.”



©istockphoto.com/onfilm

buildings built before 1920 and casegoods design. Think of brick and stone buildings four or more stories high. In those days, designers and builders were working, as are woodworkers, with traditional materials and techniques. What you see is the result of the designers' effort to combine proportion, pattern, color and texture into an oversized cuboid.

Even in the plainest of buildings — say, the mills found in the manufacturing towns of New England — the proportion and placement of brick panels to windows speaks to a carefully studied assembly. Once you get close enough to observe the detail in the brickwork, even on such an elemental structure as this, there is evidence of creative flair by both designer and builder. As you look at such buildings you may well think, “We couldn't afford or find the skill to do that sort of detailing on today's buildings.” However, you can be assured that every mill ever built was budget driven. In spite of that budget, designer, bricklayer and owner wanted a result that showed their contribution to the end result, whatever their role in its making.

Commercial buildings in towns and cities show an endless variation in the juxtaposition of windows and structure. Doubtless, the form will not translate directly into a piece of furniture, but a 10-story building, after all, is a structure with distinct vertical and horizontal lines, as is the furniture form under discussion. There is enough of a connection that you can learn much by diligent observation of architectural forms, which will have a realistic payoff with regards to your understanding and

manipulation of pattern in your casegoods furniture. Put another way, I'm suggesting that you will develop an awareness of pattern by looking at buildings which, after all, are oversized repetitive cuboids. The thing to look for and to realize is that, hidden in what appears to be a complex structure, is a skeleton of simplicity. As furniture designers and makers, it is the utilization of that simplicity in the composition of our casegoods that we are aiming for.

Of course, all casework is not a block sitting on the floor. Much of it comes elevated, so that space is involved in the composition.

Fourth In a Series: Ian

Kirby, whose technical and professional background provide the perfect qualifications to teach woodworking design, has authored three previous articles in this series.



In this piece, the legs and the grain of the wood serve to emphasize its verticality. The white details ground it and illustrate its proportions.

Slide-out Media Center

By Frank Grant

Today's high-tech TV components have wires — lots of wires! This attractive design helps you to finally get a handle on them.



We've all been through it ... upside down, behind the TV, trying to make sense out of an impossible matrix of wires, coaxial cables, power strips and so forth, the flat-screen TV precariously balancing on the cabinet, rocking dangerously to and fro as you plug and replug wires in the hopes of getting both sound and picture from your new system. It seemed like a problem that we would all just have to bear — like crabgrass and taxes. Then editor Rob Johnstone had this idea of making a cabinet that would pull out on enormous slides, bearing the weight of the TV and all the electronic components, making it

much easier to get behind the gear and hook up the cable to the DVD or Blu-ray with surround sound and the Game Boy to the — well, you get the idea.

Designing a substantial piece of furniture with moving parts capable of bearing around 500-lb. loads without tipping over and landing on an innocent party became the goal. Designer Jeff Jacobson and publisher Larry Stoiaken noodled through

several ideas, after which Jeff came through with CAD drawings. That's when I got busy and put together a full-size mock-up in MDF — always a good idea when working through a new design. In this case we especially needed to try out the moving parts and determine how best to anchor the cabinet to the wall or floor. (Actually a good idea with any large or tippy cabinet with a 60" TV, even if it



does not have a slide-out section!) At the end of the process, we settled on the configuration you see above, where the entire top glided out with the center console, creating a large, stable surface that presented an unbroken visual line at the top of the cabinet. The center console needed to be large enough to contain most, if not all, sizes of electronic media components, and obviously strong enough

to handle the weight of everything. We chose two Accuride glides rated for 500 pounds for the sides of the console and two Accuride 250-pound glides beneath it. These provide around 1,500 pounds of load-bearing strength, allowing us to support not just the TV monitor and components but perhaps even a safe and a boat motor ... just in case!

With the cabinet securely screwed to the wall (this is a "must-do" safety consideration) and the center section fully extended, editor Rob Johnstone got to test out the design ... he declared it a success.

Media Center Hard-to-Find Hardware

The following supplies are available from Woodworker's Journal.

Heavy-duty Drawer Slides (1 pr.) #31416\$109.99 pr.
Accuride Drawer Slides (5 pr. req.) #32482\$18.99 pr.
Drawer Pulls (4 req.) #23331\$15.29 ea.
Heavy-duty Levelers (2 packs req.) #81239\$22.49 pk.
Hex Wrench for Levelers (1) #81253\$1.69 ea.
Oval Grommet (1) #22899\$5.99 ea.
DVD & Audio Cassette Holders (4) #30510\$4.99 pk.
Black 1/4" Pin Support (1) #22781\$4.19 pk.

To purchase products online, visit www.woodworkersjournal.com and click on the "WWJ Store" tab. Or, to order by phone, call 800-610-0883 and mention code WJ1142.

Splines cut into the plinth's solid wood mitered corners help align the joints and add strength in the bargain.

The key to this whole design is access, so we decided not to put a back on any of the casework to help move that goal forward. We also chose a large, double-barrel grommet to fit through the top behind the TV, for cable and wire access. Once we figured all that out, and picked out the drawer glides, pulls and adjustable feet, material selection was a piece of cake!

Kicking It Off

Developing a cutting list was easy, too: we simply took measurements from our mock-up, another benefit of a prototype approach to woodworking design.

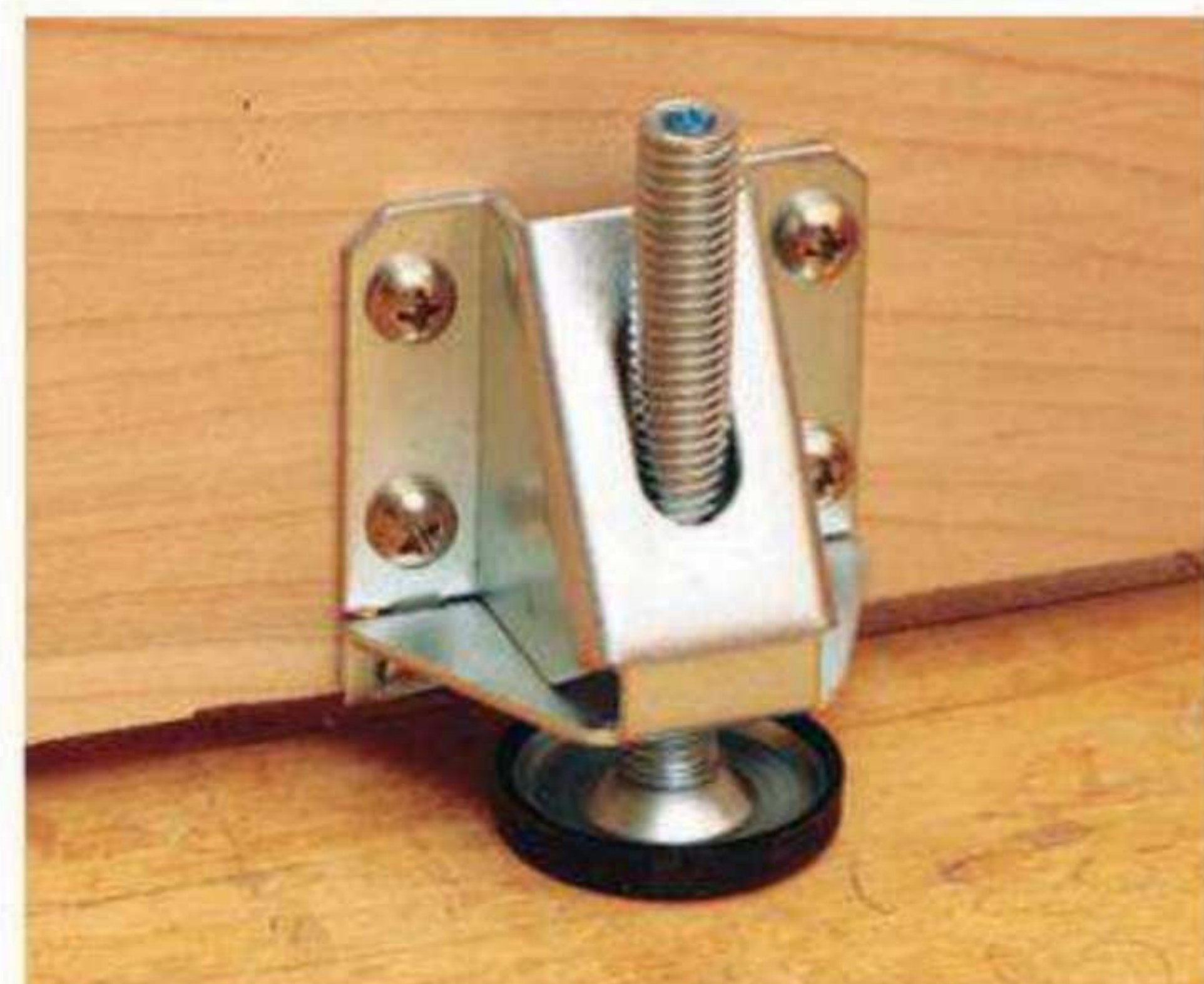
There are several major parts to this project. The plinth, or base, holds everything off the ground. The two side drawer cabinets share a common base panel that covers the plinth and becomes an attaching point for the bottom glides on the center console. The center console is attached to a sub-top that's flush with the

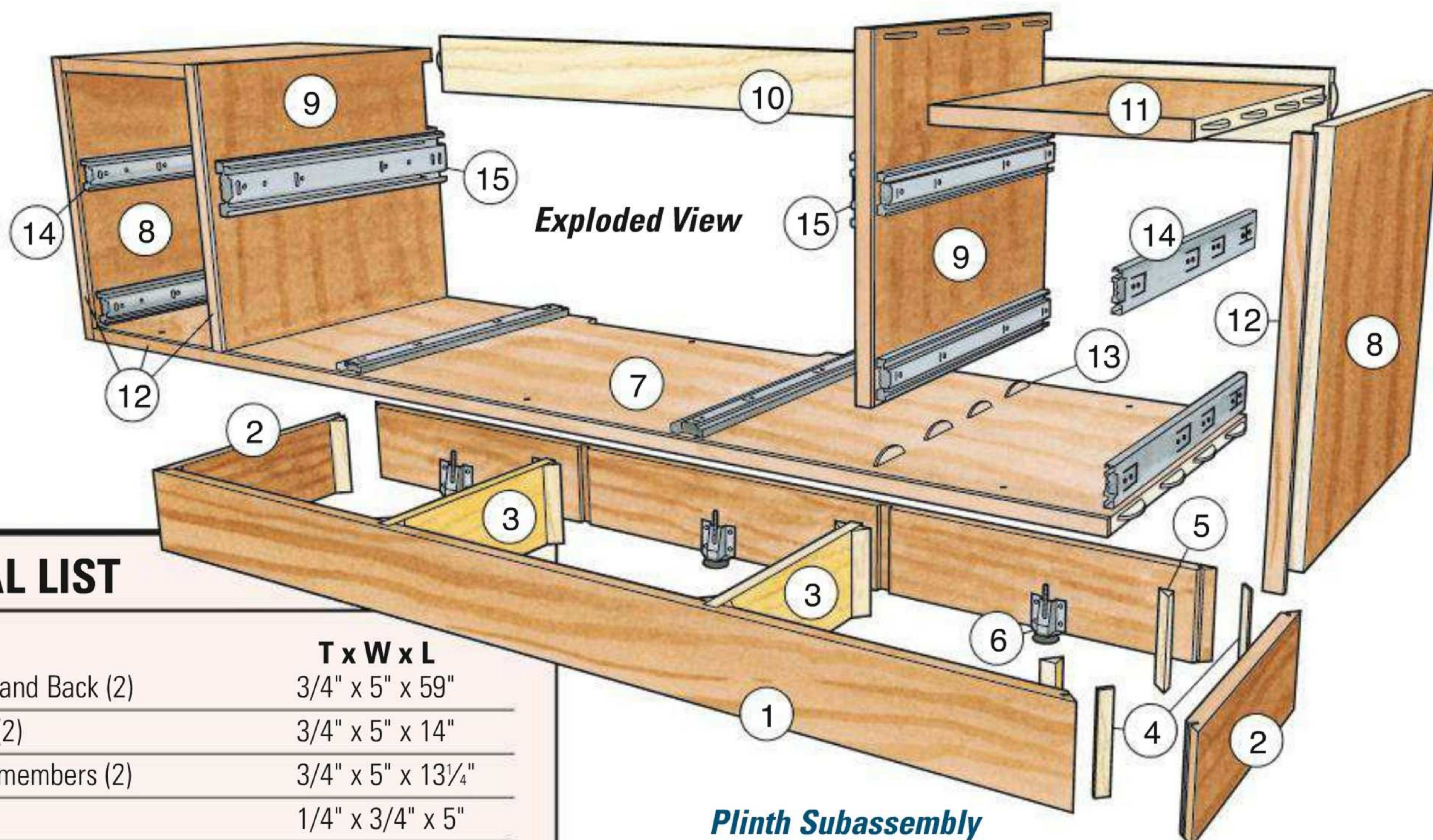
casework beneath it, and this in turn is attached to the solid cherry top which overhangs the casework by 2½" at the ends and 5/8" at the front.

I started with the easy stuff. I built the plinth using solid cherry for the front and sides for durability on these high traffic parts and cherry veneered plywood for the back and middle parts. You can find all the dimensions for these pieces in the *Material List* on the facing page. I decided to spline the mitered front corners and plowed dadoes for the crossmembers, then used a fun little trick called glue blocks to reinforce all the corners. As woodworkers through the ages can attest, glue blocks deliver amazing strength with just a small amount of effort and material. I glued and clamped the plinth together and then allowed the glue to cure.

Once everything was set, I mounted six heavy-duty lifting levelers to the front and back — it is important to have the

The plinth (or base) is the first subassembly. It needs to support a lot of weight and be leveled when it is set up. Corner blocks (top photo at right) add strength to the framework, and heavy-duty levelers (bottom photo at right) make quick work of the initial setup.



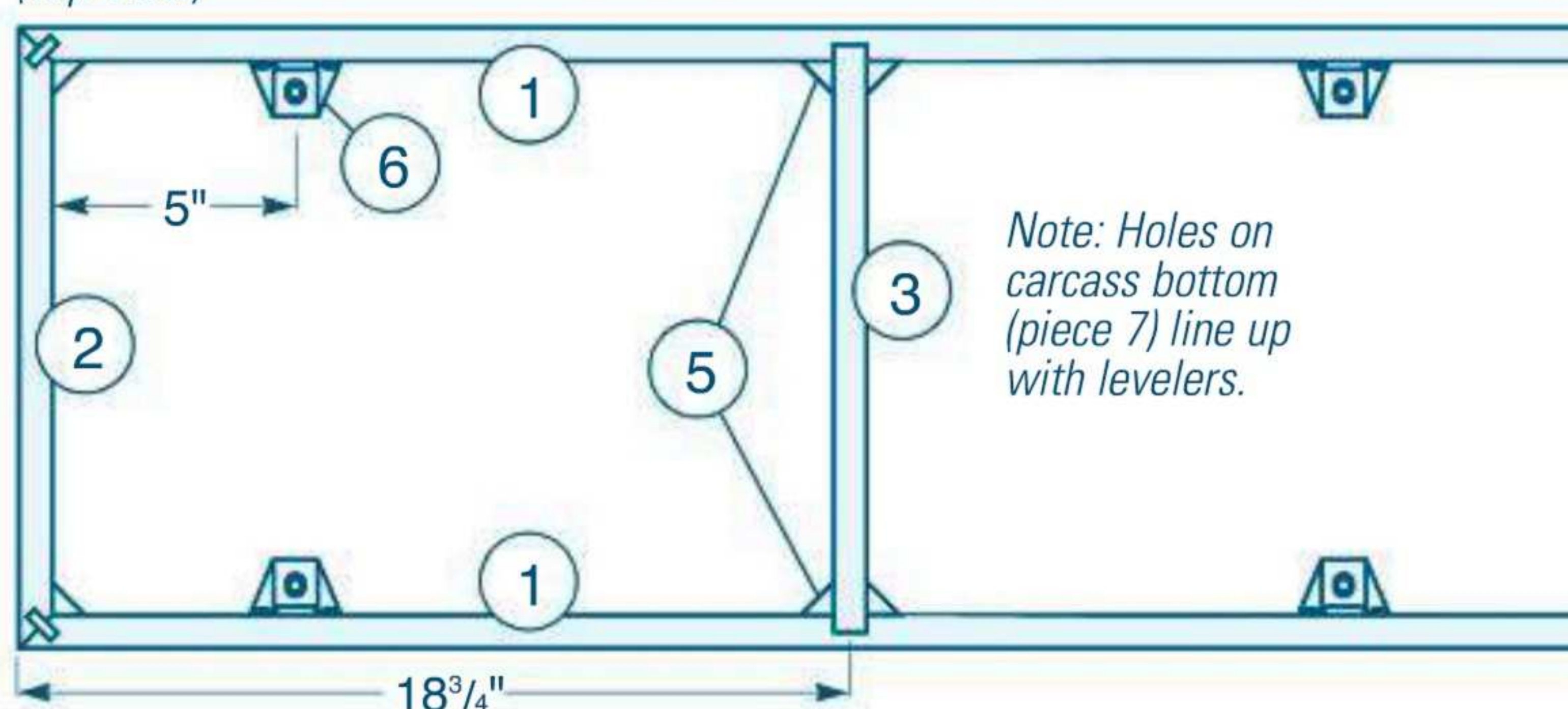


MATERIAL LIST

	T x W x L
1 Plinth Front and Back (2)	3/4" x 5" x 59"
2 Plinth Ends (2)	3/4" x 5" x 14"
3 Plinth Crossmembers (2)	3/4" x 5" x 13 1/4"
4 Splines (4)	1/4" x 3/4" x 5"
5 Corner Glue Blocks (12)	3/4" x 3/4" x 5"
6 Heavy-duty Lifting Levelers (6)	Adjustable
7 Carcass Bottom (1)	3/4" x 16 3/8" x 62 1/2"
8 Carcass Ends (2)	3/4" x 16 3/8" x 16 1/8"
9 Carcass Vertical Dividers (2)	3/4" x 16 3/8" x 15 3/8"
10 Carcass Rear Stringer (1)	3/4" x 4" x 62 1/2"
11 Carcass Drawer-Box Tops (2)	3/4" x 16 3/8" x 10 1/2"
12 Carcass Front Trim (1)	1/4" x 1" x 167"
13 Carcass Biscuits (32)	Size #20
14 Drawer Slides (5 pr)	16" Accuride
15 Heavy-duty Drawer Slides (1 pr)	16" Accuride

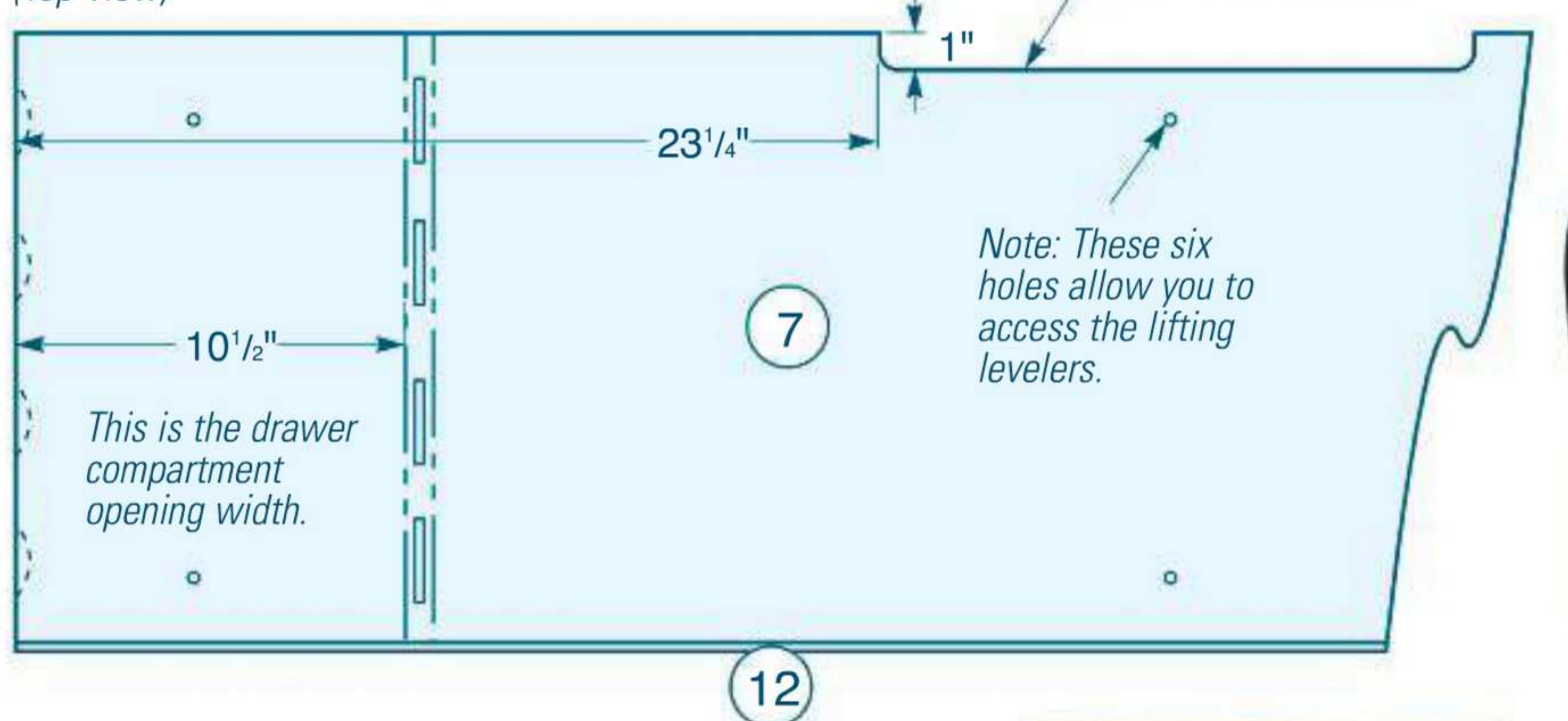
Plinth Subassembly

(Top View)



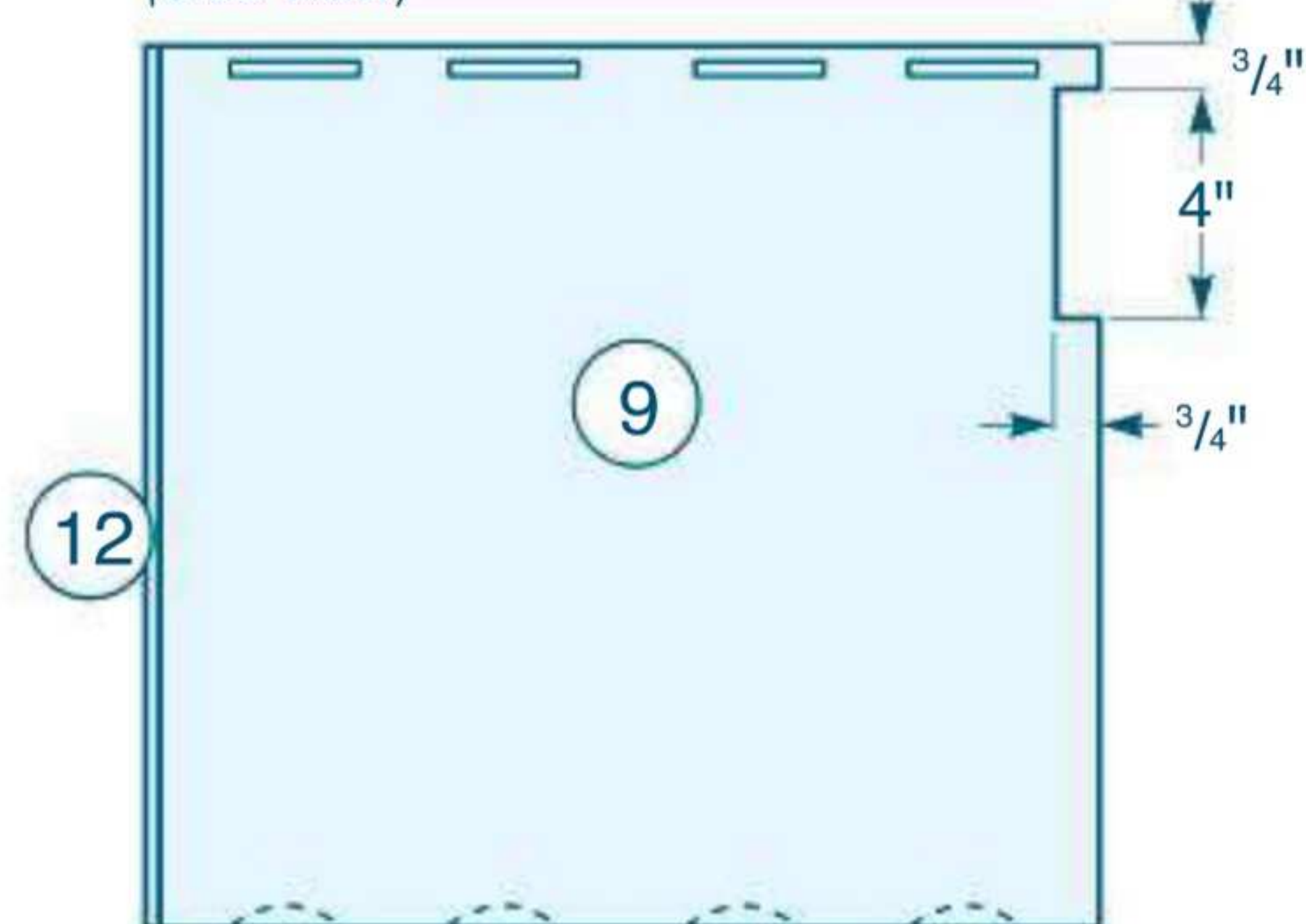
Carcass Bottom

(Top View)



Carcass Vertical Dividers

(Side View)



Cherry edging (see inset) is used on the plywood components of this piece. The author used a long gluing caul to ensure that clamping pressure is spread evenly along the full length of the carcass bottom.





A notch on the back of the carcass bottom allows an array of wiring access to the center console and out past the cabinet.

“If you don’t attach it to the wall, the whole cabinet will tip over and your expensive equipment will end up in a landfill somewhere.”

ability to level a big piece of casework like this — without using old carpenter’s shims in your living room!

Before I went any further with the casework, I decided to glue up the top. It is a bit out of sequence, but I could come back to it as I waited for other clamped and glued subassemblies to cure. The top is a simple, butt-glued panel. After I jointed and planed the stock, I examined the grain patterns and composed the pieces. I glued the top together and then set it aside for future attention, once I had built everything else.

Cabinet Parts

The plywood components for the drawer cabinets were next on the agenda. I put a sharp saw blade paired with a zero-clearance insert in the table saw and started ripping and crosscutting pieces — again, look to the *Material List* for their sizes. All the panels’ exposed edges got banding of 1/4" solid cherry before final sizing and spline cutting. The joinery for all these carcass parts was butt joints and biscuits. Take your time to lay out the

biscuit locations carefully, and you will save yourself a lot of misery.

In addition to the biscuit locations, there is a long notch cut out on the back edge of the carcass bottom. The notch is there to allow power cords and other sorts of wiring access to the center sliding console. Look to the *Elevation Drawing* for the location of the notch. I used a Forstner bit at either end of the notch and then cut the rest of it away with a jigsaw, as shown at left.

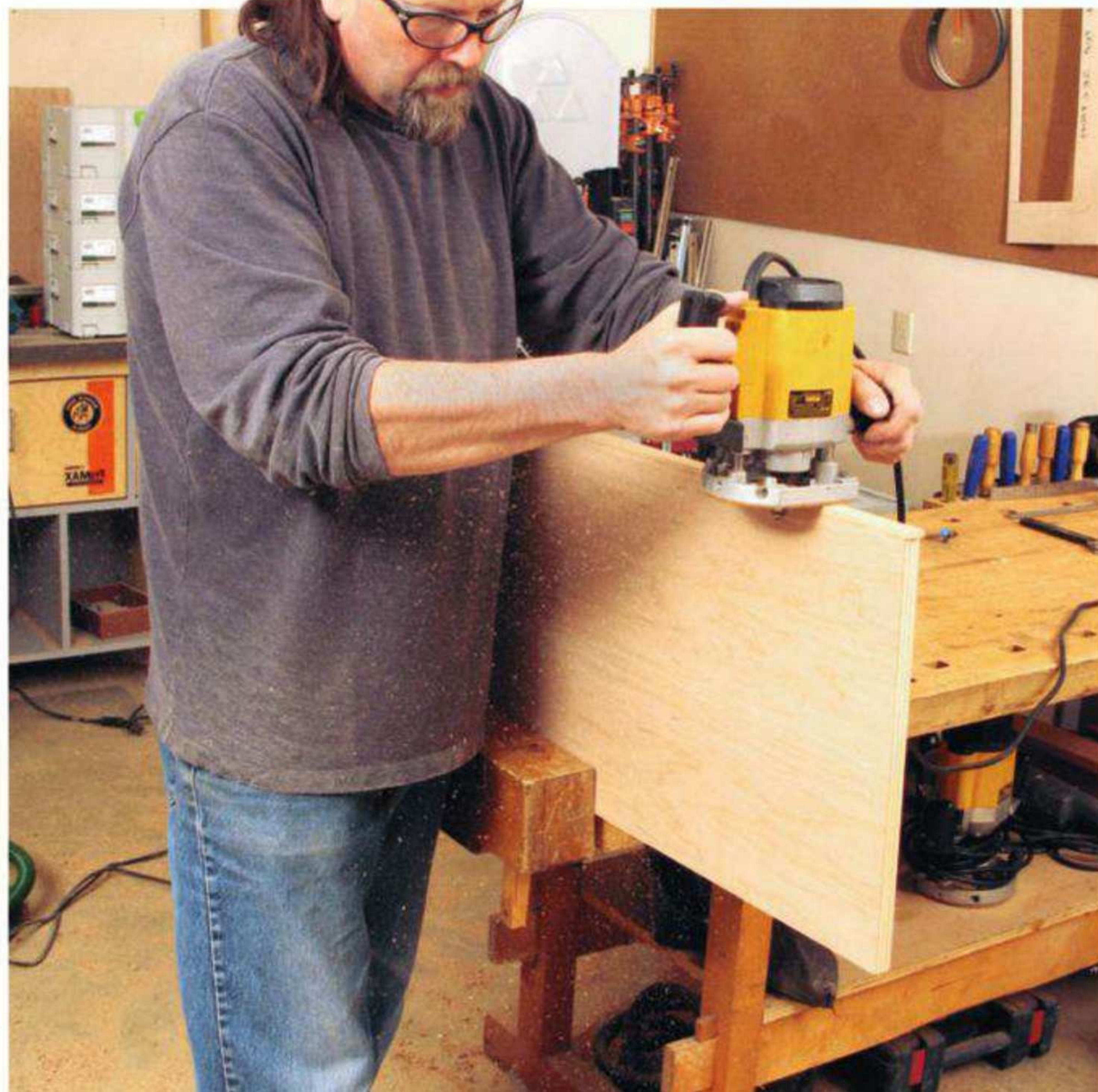
One of the most important pieces on this cabinet is the carcass rear stringer that runs the whole length of this subassembly. It sits in notches on the vertical dividers and is biscuited into each carcass end. This stringer is the means by which you attach this cabinet to the wall, which you must do to safely operate the sliding console. If you don’t attach it to the wall, the whole cabinet will tip over and your expensive equipment will end up in a landfill somewhere.

With all the machining done for the carcass, I performed a final test fit. Everything was jake, so I took the time to sand all the pieces before final assembly. I clamped the subassembly together and set it aside while I went on to build the center console. (Do you see a pattern here?) Although it could go without saying, I am not going to risk it: make every effort to be certain you have clamped up the carcass square and true. Remember, you can’t reverse a glue-up step.

The Electrified Slide

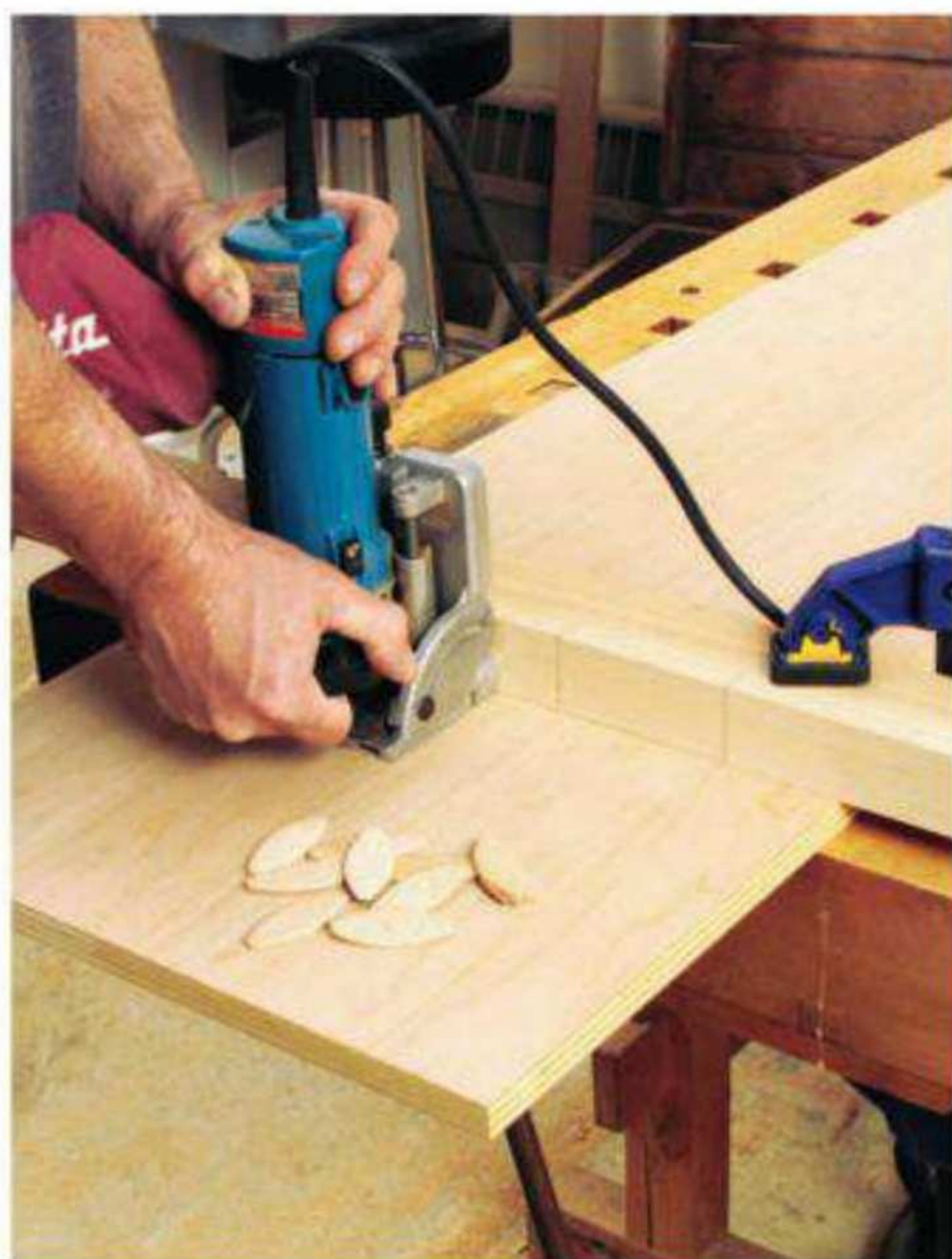
The sliding center console is the heart of this project’s design. Even so, it is pretty much bread-and-butter casework construction, just as you did with the

The author used a flush-cutting bit to trim the solid cherry lipping.



SAFETY NOTICE!

This cabinet must be attached to the wall and the TV must be secured to the top of the cabinet. Use the locking pin to avoid accidental roll-out.



The author methodically lays out his biscuit locations, marking them on a straightedge. The straightedge is then used to transfer the biscuit locations to the joining pieces. While hand-cut dovetails might be stronger, biscuit joinery is entirely sufficient for this casework project.

carcass. Once again, the cherry veneered plywood pieces have solid cherry lipping on their exposed edges. The exception for that is the face frame area. The center console needed to allow for the thickness of the heavy-duty slides (they are so robustly made that they are 3/4" thick compared to the standard slide thickness of 1/2"!), so Jeff designed a face frame to fit into the center of the case to hide that unsightly hardware. It sits in the same plane as the drawer faces, which overlay the casework behind them. He also added a center vertical divider for additional strength, allowing us to eliminate any fixed shelving and giving you even more options in loading up the electronic stuff into your "ultimate" media cabinet.

I biscuit-joined, sanded and assembled the console in the same manner as the carcass, with the additional step of drilling shelf-pin holes. See the *Drawings* for the locations of the holes. Like the other plywood pieces, the shelving is simply edge-banded and sanded smooth. The limited size of these shelves means they won't sag over time; otherwise I'd have suggested solid wood shelving.

As I mentioned before, the glue stage step is irreversible, so the dry-fit pre-assembly step cannot be done too carefully. Take your time, apply the clamps as you would if you were using glue, and then test for square. When everything fits perfectly, go ahead and do the glue-up.

After a very careful test fit, the author glues and clamps the carcass together. It is important that the cabinet is square and true.

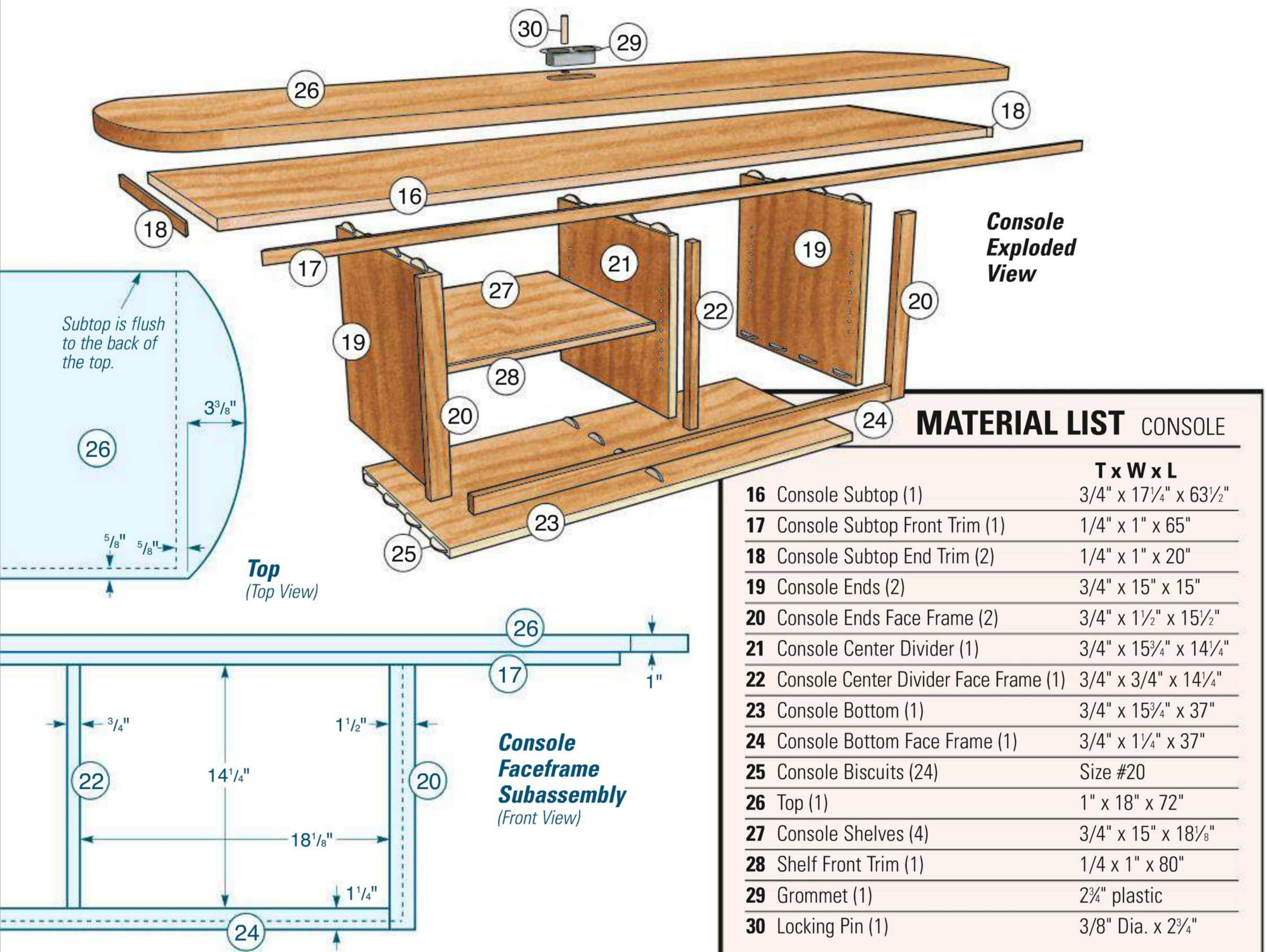
When the glue has cured, set this sub-assembly aside, too. (You will be getting a pretty big pile of "set asides" by now!)

At this point, I went back to work on the carcass subassembly, building and fitting the drawers using the Accuride drawer slides. In this instance, the drawer construction was simple: 1/2" Baltic plywood rabbeted at the corners. I glued the joints and drove trim nails into the corners. The bottoms were 1/4" Baltic plywood panels

captured fully within a dadoed housing. Look to the *Drawings* for the details of these simple drawers. One detail you will notice is that the sides of the drawers are shallow, which allows for easy finger access when grabbing your favorite movie or game cartridge.

The drawer faces are made from solid cherry lumber and are attached with screws driven from the inside of the drawer boxes. Getting these faces to line up with each





other and the face frame of the center console proved to be the most challenging woodworking task of the entire project, in my opinion. I'm great at making hand-cut dovetailed and hand-planed fitted drawers — it's the easy stuff I sometimes struggle with. Be patient and as accurate as you

can. Fortunately, with a 1/8" reveal you have some room for trimming and fitting. I was grateful for that reveal, I can tell you.

Demanding Drawer Slides

I installed all the of the slide hardware basically by the numbers, meaning I use

the manufacturer's specs and make my measurements precise. The drawer slides on the drawers (as opposed to the console) fully disengage, and I was able to mount each slide part to its mating surface on the drawer and cabinet sides. I simply measured, taking into account all offsets, then precisely marked and screwed them in place. For the aluminum drawer handles, I made a template out of scrap 1/4" birch plywood, clamped it to the drawer face with a backer block and drilled straight through for the mounting screws. Easy breezy ...

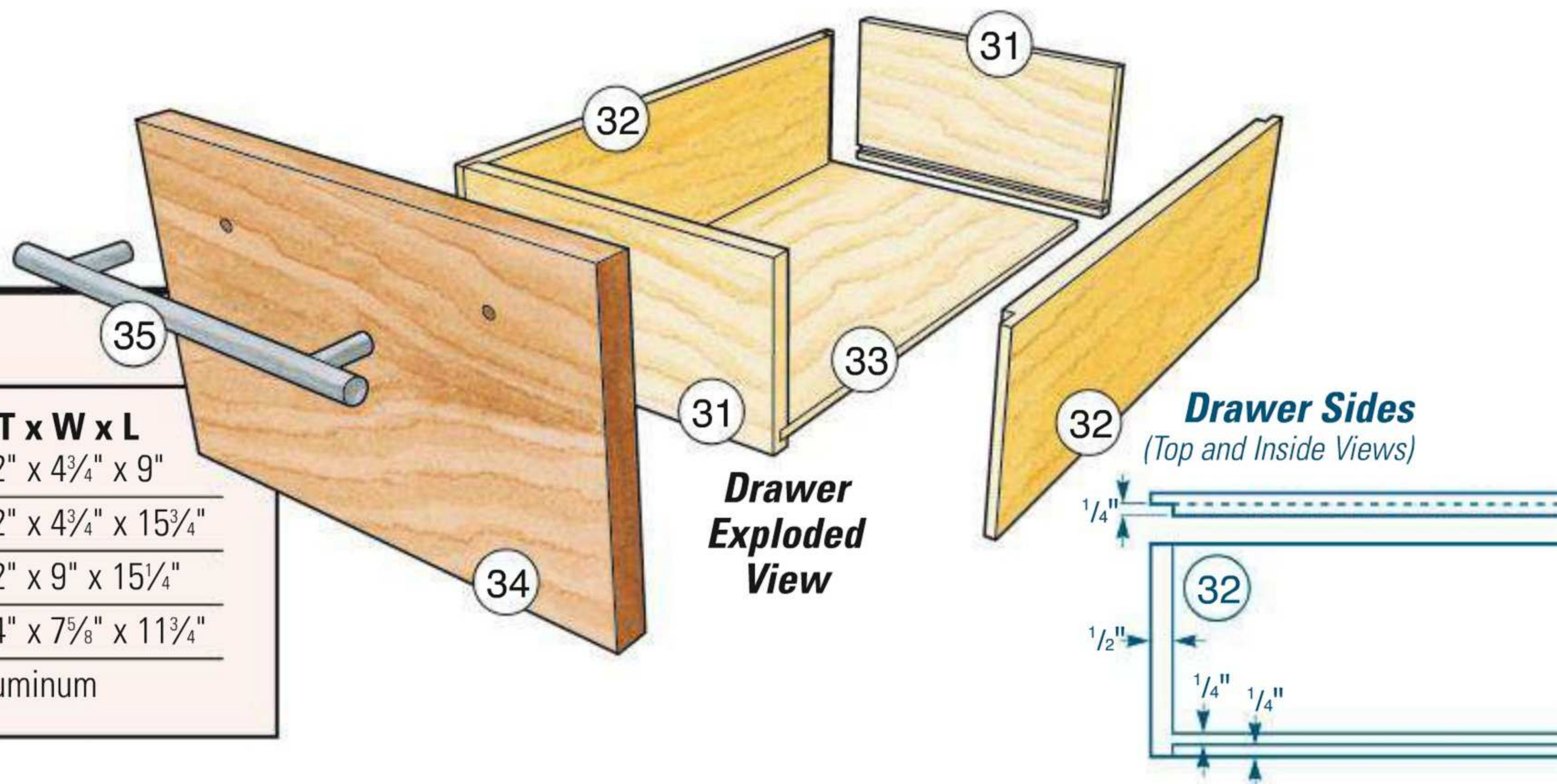
That was the drawers ... the center console, however, has the Accuride super heavy-duty slides that do not come apart into two pieces, which made things a bit more complicated. After noodling over the challenge, I started out by setting the bottom slides (which are detachable) to the carcass bottom and the adjoining bottom of the center console — again, doing it

Connecting the console to its heavy-duty drawer slides turned out to be a more complicated process than the author had at first anticipated.



MATERIAL LIST DRAWERS

	T x W x L
31 Drawer Fronts and Backs (8)	1/2" x 4 3/4" x 9"
32 Drawer Sides (8)	1/2" x 4 3/4" x 15 3/4"
33 Drawer Bottoms (4)	1/2" x 9" x 15 3/4"
34 Drawer Faces (4)	3/4" x 7 5/8" x 11 3/4"
35 Drawer Pulls (4)	Aluminum

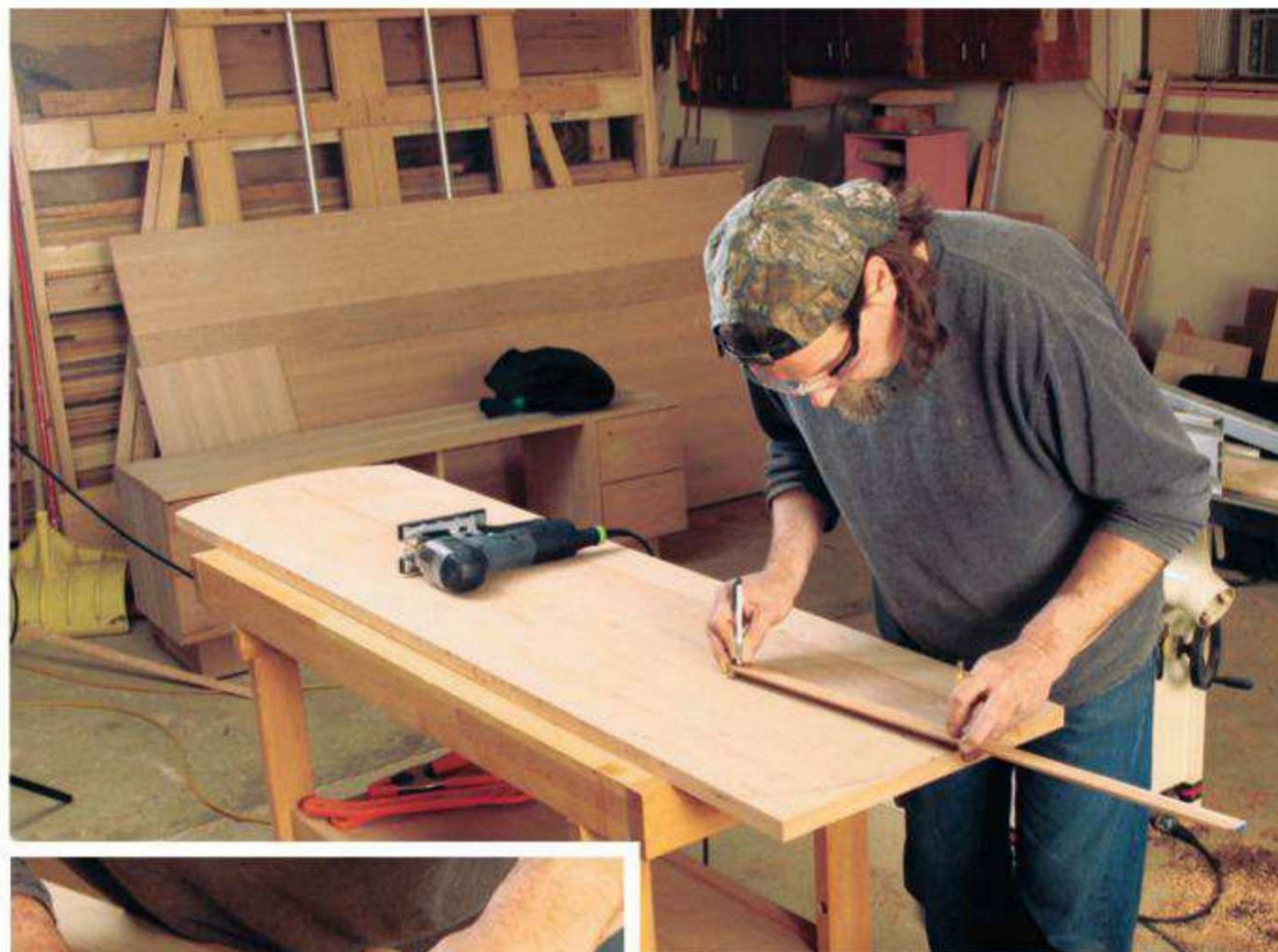


by the numbers to manufacturer's specs: all of the required offsets, etc., which are basically built into the casework. I attached the big glides to the vertical dividers of the carcass and then blocked and shimmed up the center console to connect with the carcass at just the right spot. I connected the smaller glides, pushed the center in a little ways and checked my marks against the screw holes on the slides (wow, good job!) and fastened it down. Then it was time to test it out: I can't begin to tell you how nice it worked, better than the drawers. I even impressed myself on this little step of the job; it was far easier than I anticipated.

Driving It Home

It was now time to start thinking about finishing this project off. Remember the top that has been waiting patiently on the sidelines? There was some work left to do on it. I first hand planed it with a #07 beater plane of Rob's, then started at about 80-grit with a Festool 6" random-orbital (sorry, purists ... you'll notice the drawers are pinned also). I cut and shaped the top (see the photos at right) before the final sanding, then gave it a coat of Watco® before setting it aside again to start getting the casework prepped and ready for finishing. I needed to work on the reveals some more, getting all the lines looking straight. I eased all the edges along with a final clean-up scuff sanding using 220-grit paper before tacking and rubbing in a coat of Watco. A penetrating oil finish on cherry brings out the grain like no other treatment, in my opinion. Even if you are going to apply a durable topcoat like polyurethane, I would still recommend taking the time to apply a coat of oil before the poly.

After an overnight dry, I mated the top to the sub-top of the center console, simply screwed in place but with elongated



The glued-up top was the last piece to be completed. The curved radii were drawn with a trammel and cut out with a handheld jigsaw.

holes at the front and middle to allow for movement of the cherry top.

Next I drilled holes for the grommet hardware through the top and the subtop. I confess to a bit of anxiety; I was using a really big bit on a really nice top! After the holes were drilled, I used a jigsaw to connect the holes for the grommet. Following that, I drilled the 3/8" hole for the locking pin. This dowel keeps young children from "accidentally" pulling the console forward unsupervised.

I then gave it all a light rubdown with #0000 steel wool, tacked the surfaces clean and applied another coat of Watco Danish oil.

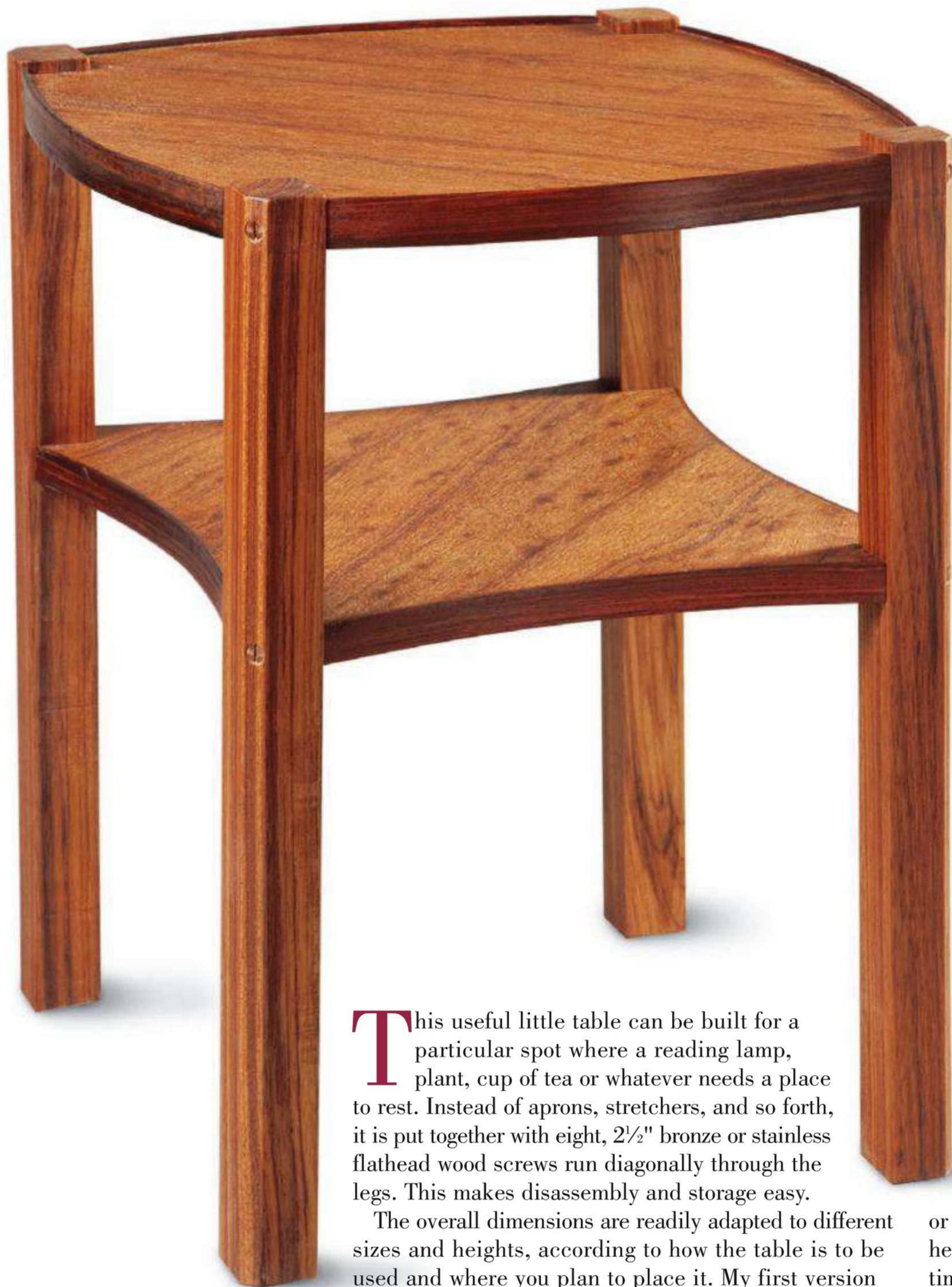
This was a very fun, very cool project to work on. I don't think it's a groundbreaking achievement in the world of fine woodworking, but it sure offered up a number of challenging elements to bang my head against, some beautiful wood to use and cool moving parts! Imagine the ease with which you'll reconnect your Xbox or new amplifier, Blu-ray or an "old style" DVD player to your system, with no chiropractor bills for your efforts or shorted-out components!

Frank Grant is a professional woodworker from Minneapolis, Minnesota, and is a regular contributor to the Journal.

Occasional Table

By Simon Watts

Our author's boat-building roots stay just below the surface during the construction of this attractive and sturdy little table.



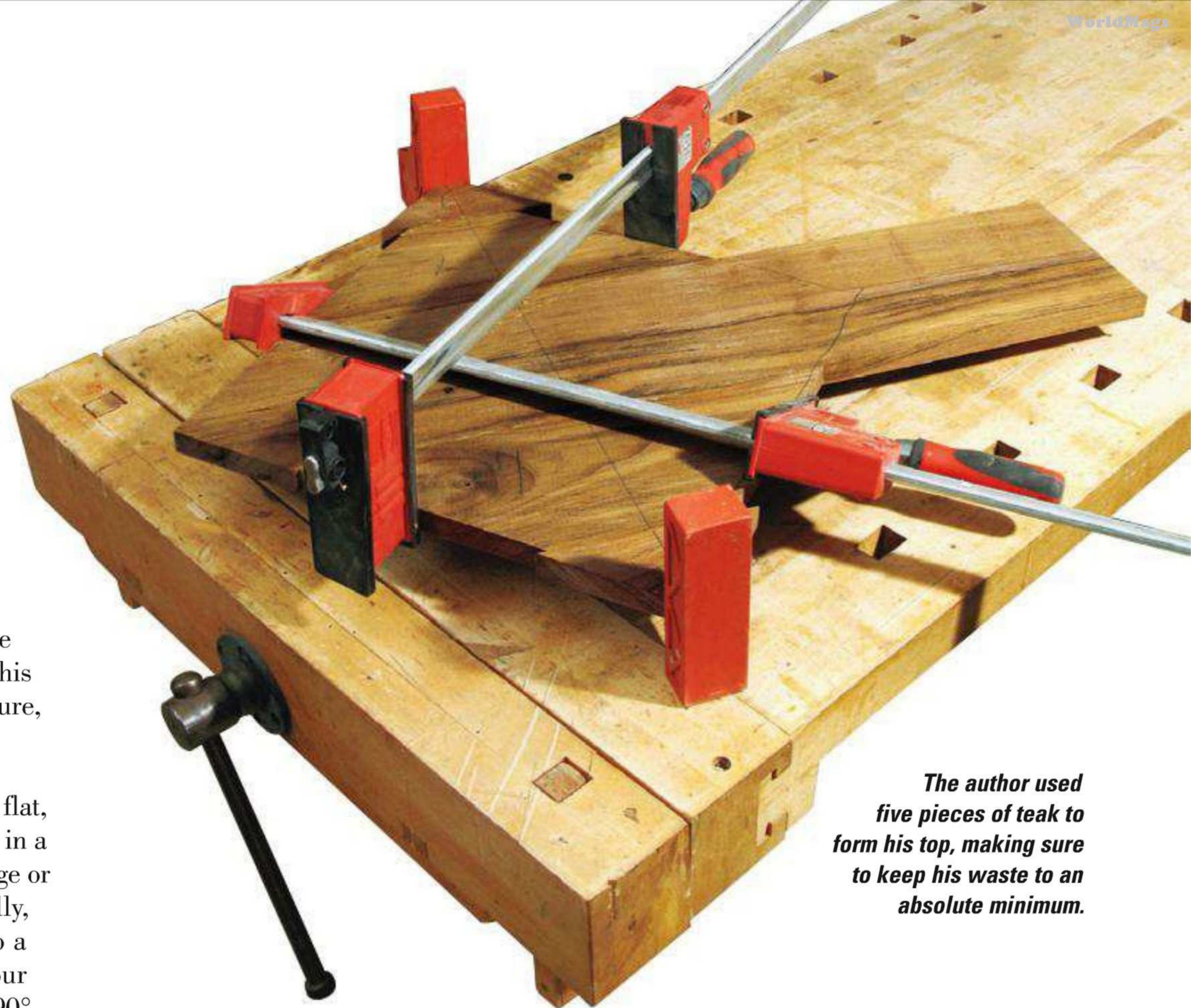
The author kept the edging around the top proud of the top, a tip-off to his boat-building background. Screws, instead of glue, allow the table to be disassembled with ease.

This useful little table can be built for a particular spot where a reading lamp, plant, cup of tea or whatever needs a place to rest. Instead of aprons, stretchers, and so forth, it is put together with eight, 2½" bronze or stainless flathead wood screws run diagonally through the legs. This makes disassembly and storage easy.

The overall dimensions are readily adapted to different sizes and heights, according to how the table is to be used and where you plan to place it. My first version was for the end of a couch, to support a reading lamp with a shelf below to accommodate magazines. It had not the hint of a curve anywhere in sight — probably an overreaction to having spent the last half-dozen years building boats and dealing with complex, winding surfaces. I liked the table well enough, but soon reverted

to old habits and made a second version with curved sides, convex for the top and concave for the shelf below. This is not only more elegant but also gives a little more room on the top surface.

Placing the legs at the outside corners with no overhang makes this table very stable. The overall height depends on how you plan to use it — beside a chair, couch, bed or otherwise. I'd be wary of making the height more than about one and a half times the width. A 16" x 16" table, for example, should not be more than 23 to 24 inches high. The placement of the lower shelf depends on what you plan to keep on it — magazines, nighttime reading, or whatever. For stability, the heavier the item, the lower the shelf should be



The author used five pieces of teak to form his top, making sure to keep his waste to an absolute minimum.

placed, but you'll find that somewhere within the middle third looks right. This shelf is an essential part of the structure, so don't be tempted to omit it to save time and material.

To keep such unsupported surfaces flat, you need to select well-seasoned wood in a species not prone to excessive shrinkage or warping. The grain lines run diagonally, from corner to corner, not parallel to a side, so they intersect each of the four edges at an angle closer to 45° than 90°. This minimizes seasonal movement, reducing the risk of glue failure and the edging strips parting company with the top. Note that the grain direction of the top is at right angles to that in the lower shelf, providing a pleasing asymmetry.

The rosewood edging has two functions: it both covers the end grain and defines the horizontal planes. The edge is raised a fraction above the top surface to act as a stop (sailors call them "fiddles") to prevent things sliding off. This may seem an unnecessary detail, but for those of us living in earthquake country, it makes sense. I used the profile shown to avoid making a 90° corner where dust and dirt are sure to collect.

Selecting Your Table Species

I used teak for my table, but you could also use any close-grained wood such as cherry, walnut or maple, or a harder variety of softwood such as Douglas fir, preferably vertical grain or close to it. Avoid using wide, flatsawn boards because they are more likely to warp. If that is all you have, cut the boards into 5- or 6-inch widths and glue them up with alternating grain patterns.

Constructing the Top, Shelf

The first step is to make accurate patterns in thin plywood of the top and lower shelf, including the cutouts for each leg. Because the upper and lower shelves are different shapes, you need to make a pattern for



When gluing the strips to the concave shelf, the author reused his cutoffs as cauls to ensure that the joints received equal pressure along their full length. The strips are allowed to run long and then trimmed after the glue has dried. Given that the strips stand slightly proud of the top faces of the tabletop and shelf, choose a glue that can easily be removed once it cures.

each one. Make sure the square cutouts for the four legs match exactly in both patterns — otherwise the table will be hard to assemble and the legs may be skewed out of line.

Since I was using 11-inch-wide boards and wanted the grain to run diagonally, I cut four triangular pieces and one rectangular piece and planed them to the finished thickness of 13/16". I then hand-planed the long edges (I have no jointer in my island workshop) and glued them to a center board to make a square.

You can make a plywood jig or clamp them diagonally as shown in the top photo, this page, so you can apply enough pressure to get a good glue joint.

After gluing them up, I finished smoothing the boards with a cabinet scraper and a random-orbit sander.

The next step is to cut the two pieces to exact squares (the top is larger than the shelf because it is convex; the lower, concave). Draw a diagonal line, corner to corner, then pencil in the square and trace the patterns. The square shapes will

“Keep in mind that the structural integrity of this table is dependent on the fit of these eight joints. Ill-bred people have been known to put their feet up on low tables — or even sit on them.”

make the leg cutouts easier to register for sawing, next. Use a knife, rather than a pencil, to accurately scribe the leg cuts.

It is much quicker and more accurate to cut the notches for the legs on a table saw before band sawing the curves. With a sharp crosscut blade installed, set the rip fence and use it as an index so the notches will be identically sized. You will need to change this setup for the shelf. Keep in mind that the structural integrity of this table is dependent on the fit of these eight joints. Ill-bred people have been known to put their feet up on low tables — or even sit on them.

Detailing the Top and Shelf

Cut the curves for the top and shelf (pieces 1 and 2) on a band saw, then smooth the sawn edges so they are ready for gluing. A disc sander is a quick way to clean up the convex curves, but for the concave edges, a spokeshave and contoured sanding block is your best bet. Be sure to keep the offcuts; they will come in handy as clamping pads when gluing on the edging strips.

When using an expensive, exotic wood such as rosewood, ebony, or teak for edge strips (pieces 3), I plane one edge of a wide board smooth, clean it up with sandpaper, then cut the strip free on the table saw using a thin-kerf, carbide-tipped blade. A lightly set featherboard helps

to keep the work against the fence. Plane the sawn edge of the original stock again and make another rip cut to produce another strip. Repeat until you have sufficient edging.

Glue the edging strips to the tabletop and shelf blanks and let them run past an inch or so at each end. It's an easy matter to trim them flush on a disc sander when fitting the legs at a later stage. Before applying glue, have a dry run by clamping up a pair of strips, smooth face out, using the appropriate offcuts as backing blocks (see

photo, page 41). Raising the edge around the top surface, as shown in the top inset photo, page 40, is a nice detail but adds more work. You may want to make the strips flush with the top surfaces instead.

When the glue has cured, trim the edging roughly to length and glue the second pair of strips on in the same way. Do exactly the same with the lower shelf, letting the strips run by the leg cutouts to be trimmed later.

There is some unavoidable squeeze-out, so if you are using raised edging, pick a glue that's easily removed.

Making the Legs

Since the legs (pieces 4) have no taper, they can be sawn out on the table saw directly and then planed to their finished size. Saw one corner to 45° as shown on the *Drawing* and clean it up with a hand plane. If you have a disc sander, this is a good time to finish-sand the top and bottom of each leg.

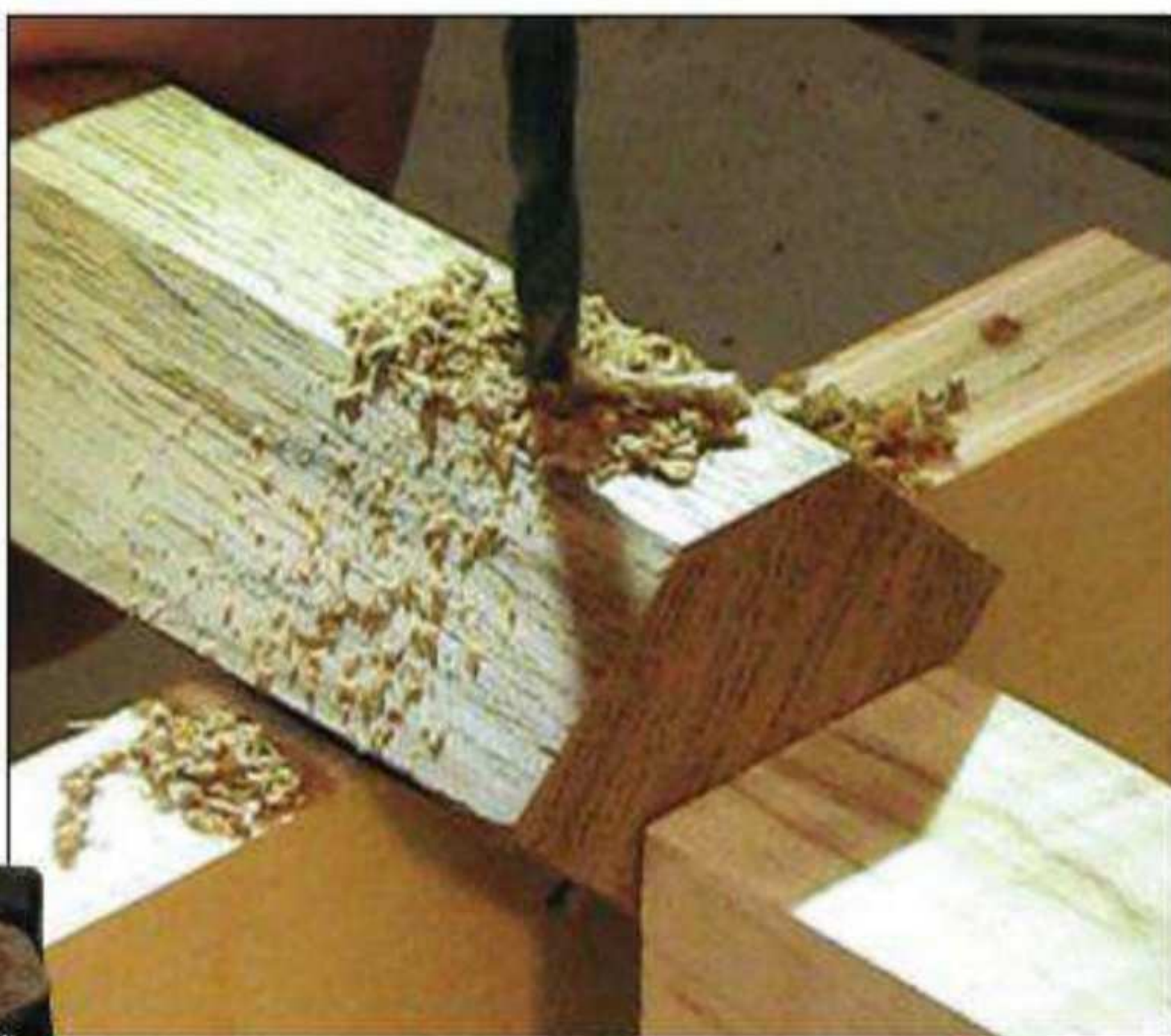
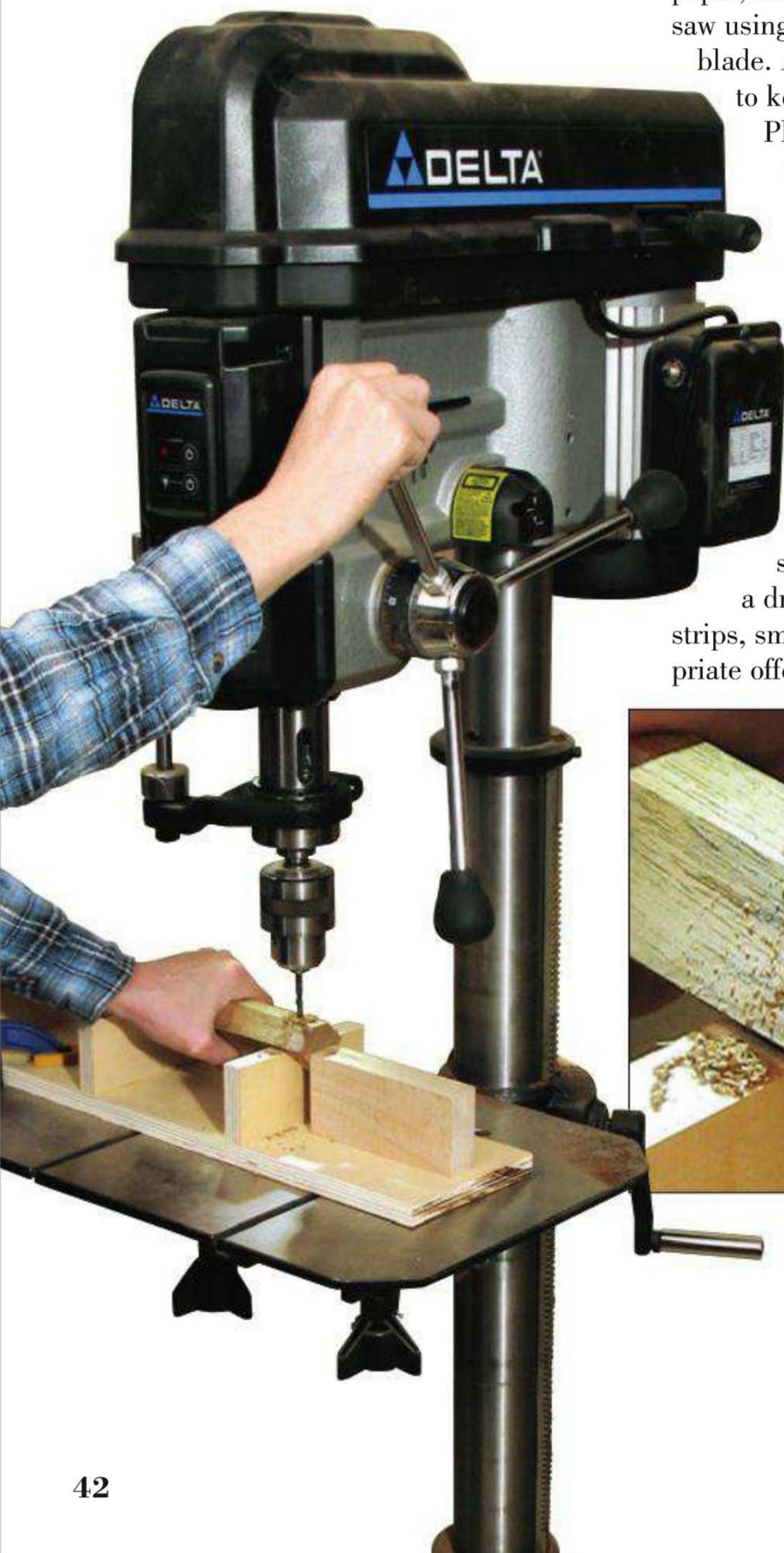
Drilling for Screws

You can attach the legs using 2½" brass or stainless-steel wood screws (pieces 5) or threaded inserts and bronze machine screws. Running wood screws into end grain can be a bit risky, so the machine screw option could be a very good idea, even though it's considerably more work. You'll need inserts with a #10-20 thread, preferably stainless steel, because the brass ones tend to strip and then there is no getting them in or out.

Whichever type of fastening you choose, you'll need to make yourself the simple cradle jig shown in the photo at left. Clamp it to the drill press table so the bit is exactly centered on the "V" cutout. Mark the location of the tabletop and shelf screw holes in one leg, then set stops so each leg will be identical. Drill holes for the screws and then, with the leg still cradled, bore a countersink for the screw heads in each of the legs.

Fastening the Legs

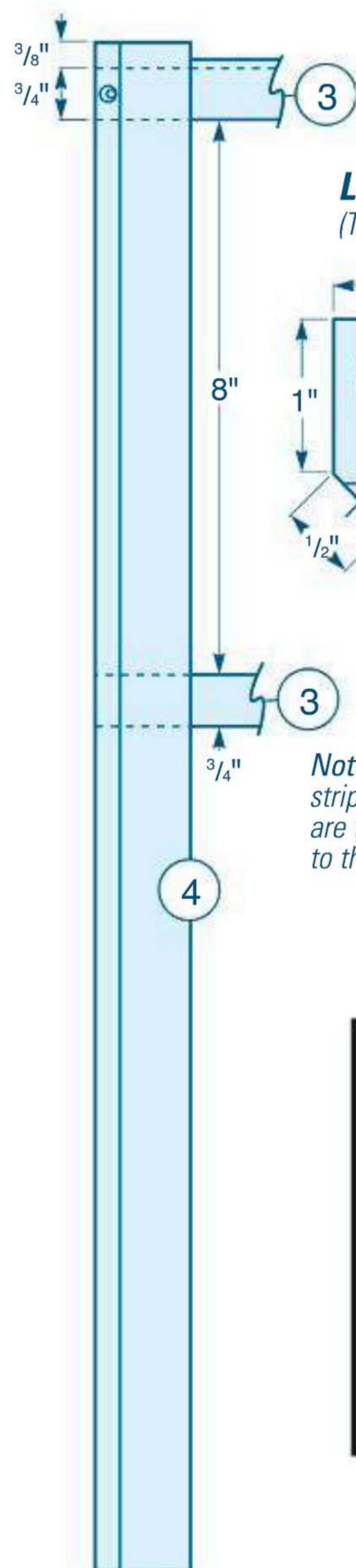
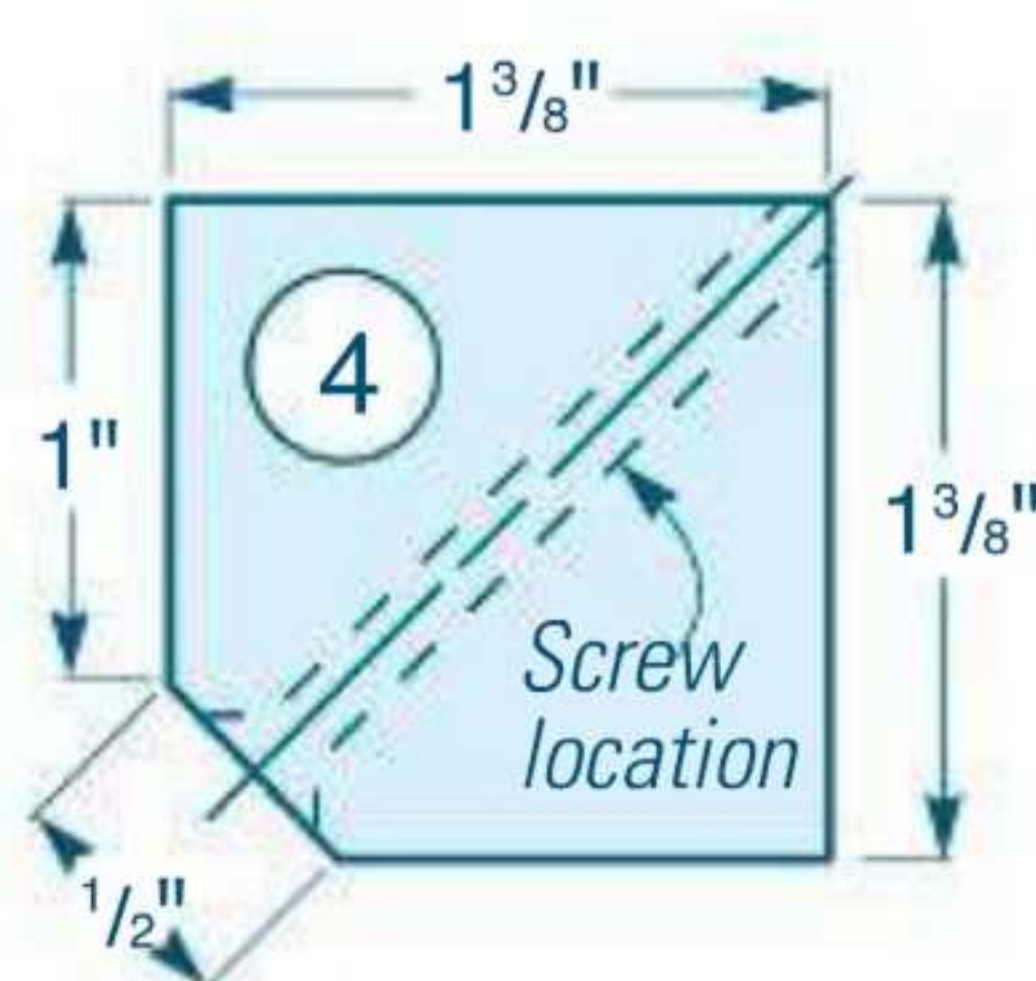
First, make a 3/8" gauge block to ensure uniformity and then lay a leg across the top of the bench. Clamp the tabletop vertically in the vise. Position both parts so the leg projects the thickness of the gauge block



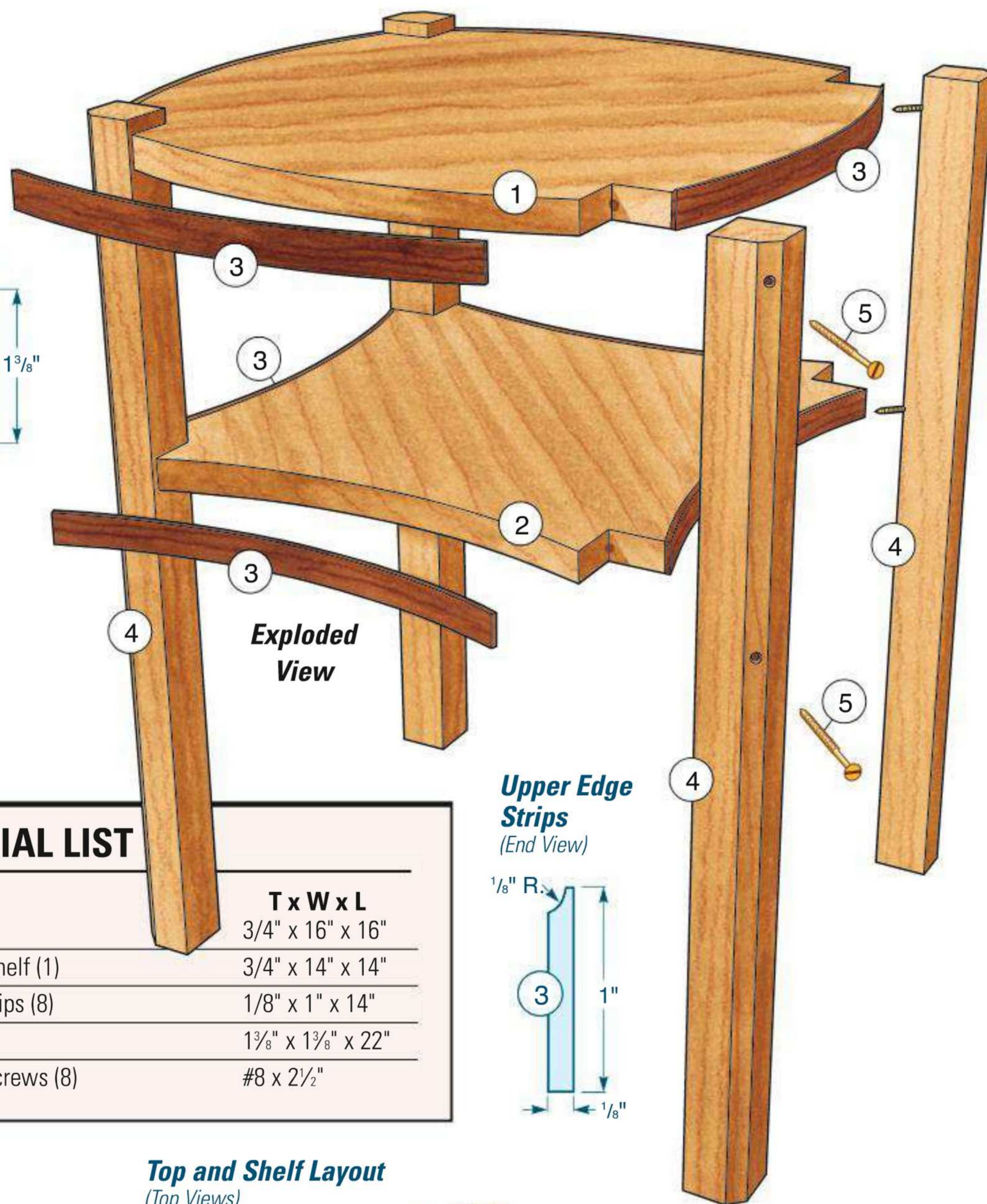
A shop-made cradle jig with a registration stop will help to ensure that the screws and countersinks are perfectly positioned and drilled.

Shelf Locations

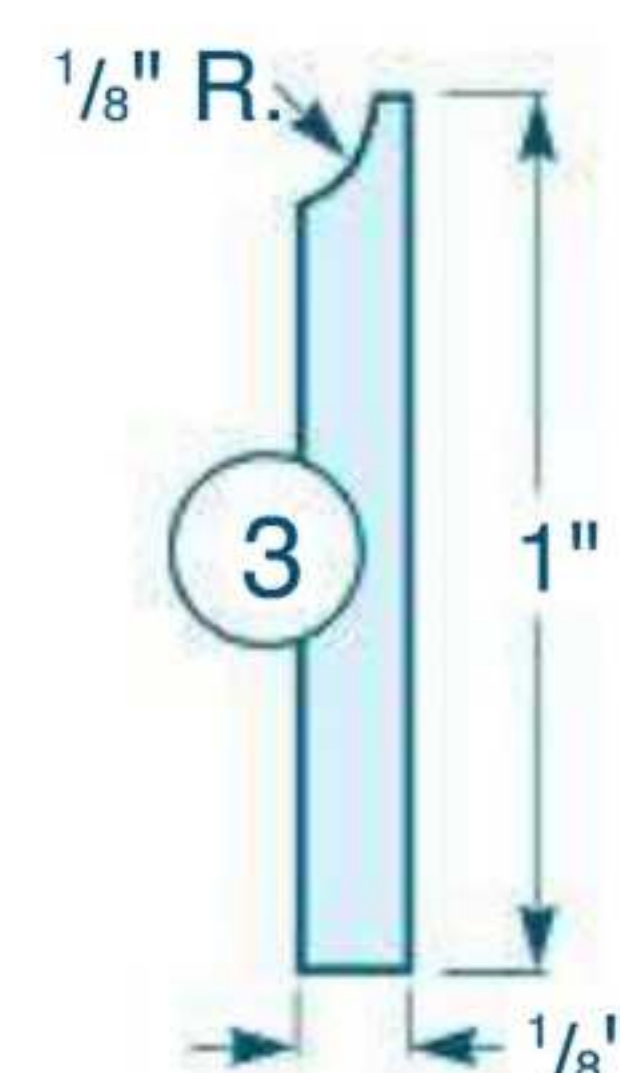
(Side View)

**Leg**
(Top View)

Note: The edge strips (pieces 3) are trimmed flush to the shelf.

**MATERIAL LIST**

	T x W x L
1 Top (1)	3/4" x 16" x 16"
2 Lower Shelf (1)	3/4" x 14" x 14"
3 Edge Strips (8)	1/8" x 1" x 14"
4 Legs (4)	1 3/8" x 1 3/8" x 22"
5 Wood Screws (8)	#8 x 2 1/2"

Upper Edge Strips
(End View)

and clamp the leg down to the benchtop. Drill a pilot hole into the tabletop for the size of screw you are using. If using a threaded insert, remove the leg and drill a shallow hole of appropriate diameter and screw the insert in place. Replace the leg, install the screw and rotate the top, repeating the procedure with the other legs.

To fasten the shelf, place the table upside down on the bench and cut four strips to support the shelf at the correct height. Wrap a few loops of sturdy string around the legs, insert a short stick and wind the stick end over end to tighten the string until the shelf is securely locked in place. (This ancient device is known as a Spanish windlass.) Drill pilot holes as you did before, and drive the attachment screws. Or, remove the shelf and install the threaded inserts if you're using them instead of wood screws.

The final step for threaded inserts is to lay the table sideways on the floor, one

leg resting horizontally on a piece of carpet, and drive the machine screws home. I use a brace and screwdriver bit for the final tightening because it gives more control. With a bit of luck (and practice) one can usually stop before the screw shears off or the threaded insert pulls out.

Finishing

Before applying finish, I gave the top surface a final hand sanding in the direction of the grain. I used Watco® oil penetrating

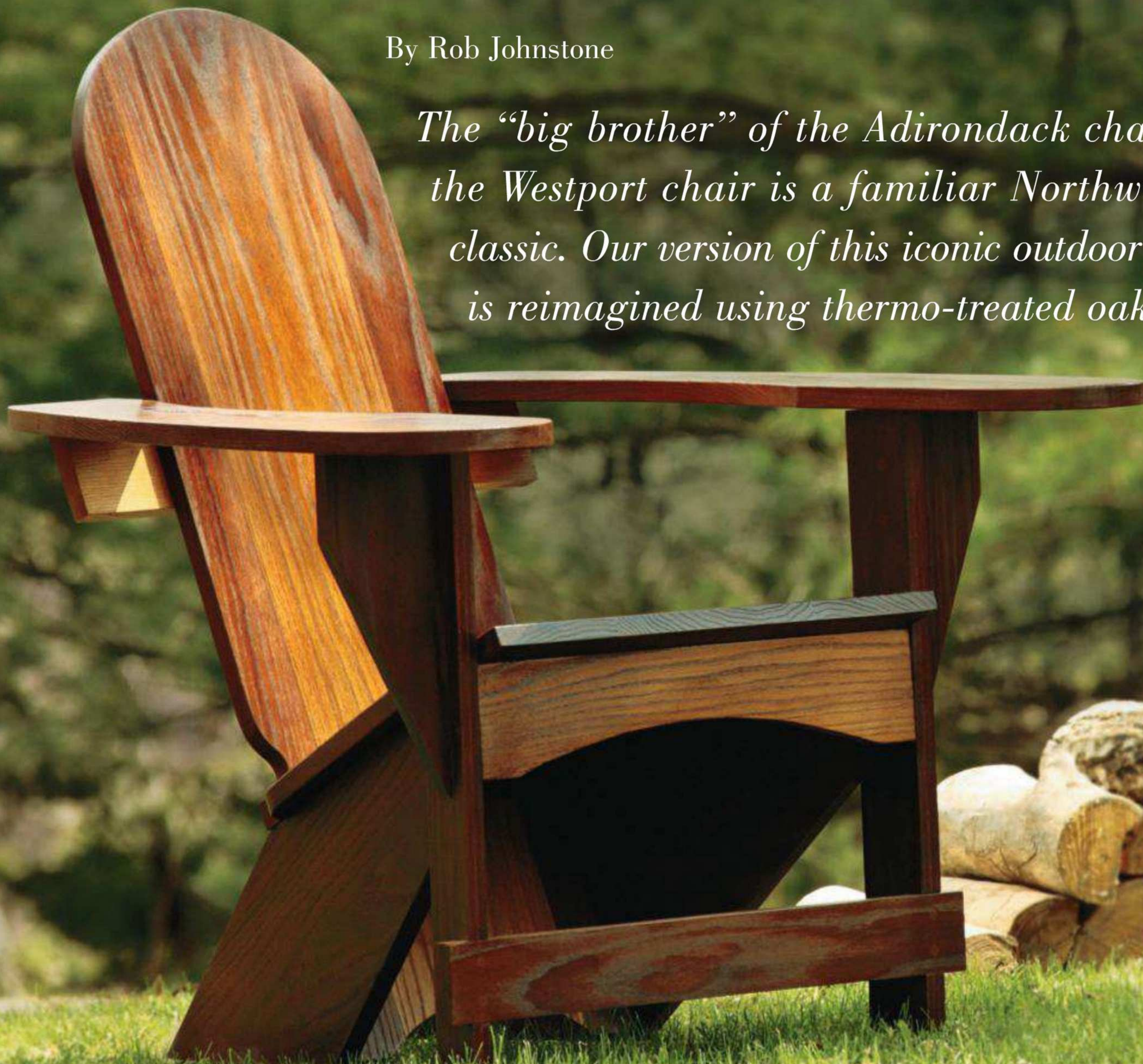
sealer, which must be wiped off with a cotton rag while wet. A day or two later, I applied a second coat, wiping it off as before. It's a durable finish, proof against most spills, and it's easily renewed as necessary. The final step is a thorough waxing and polishing.

Simon Watts is a boatbuilder, teacher and writer. He lives in San Francisco during the winter months and on an island home in Nova Scotia during summers.

Westport Chair

By Rob Johnstone

The “big brother” of the Adirondack chair, the Westport chair is a familiar Northwoods classic. Our version of this iconic outdoor chair is reimagined using thermo-treated oak.



Back in 1902, when Thomas Lee first developed his chair design, it is unlikely that he had any idea his effort would become an uberpopular American classic, but the attractive lines and comfortable and practical features of the chair have sustained it as an outdoor favorite for over 100 years.

Here in the 21st century, I found the “Westy” design impossible to improve upon, with the possible exception of the material from which to build it. Mr. Lee made use of wide white pine boards common in upstate New York in his era. But I was curious about the woodworking properties of thermo-treated lumber — which is purported to be exceptionally rot-resistant. Don’t confuse this lumber

with chemically treated stock: it remains natural wood. See the short article on page 48 for more about the high points of this high-temperature lumber.

Repeatability and Accuracy

Have you noticed how outdoor furniture tends to travel in groups? (Flocks, herds, coveys ... I am unsure what to call the aggregations.) That’s because we like to sit outside communally with family and friends. For that reason, when I decided to build our version of the Westport chair, I chose to make 1/2"-thick MDF templates for all of the shaped parts. Now I can easily build two, three or even an entire flock of chairs. But even if you choose to build a single Westy, I recommend working

from templates. They allow you to fair the curves and refine your radii without ruining expensive stock. In addition to the part dimensions in the *Material List* you’ll find on page 47, we’ve provided drawings that will help you lay out the templates for the chair. While I always advise folks to be precise in their woodworking efforts, don’t fret overmuch regarding the shapes of the curved pieces. The most important thing to achieve is a graceful, pleasing shape to the arms and other shaped parts. As you can see in the top photo at right, I laid out the template shapes by using the old trick of a flexed thin strip of wood to define my curves. For other radii, I used a handheld compass.

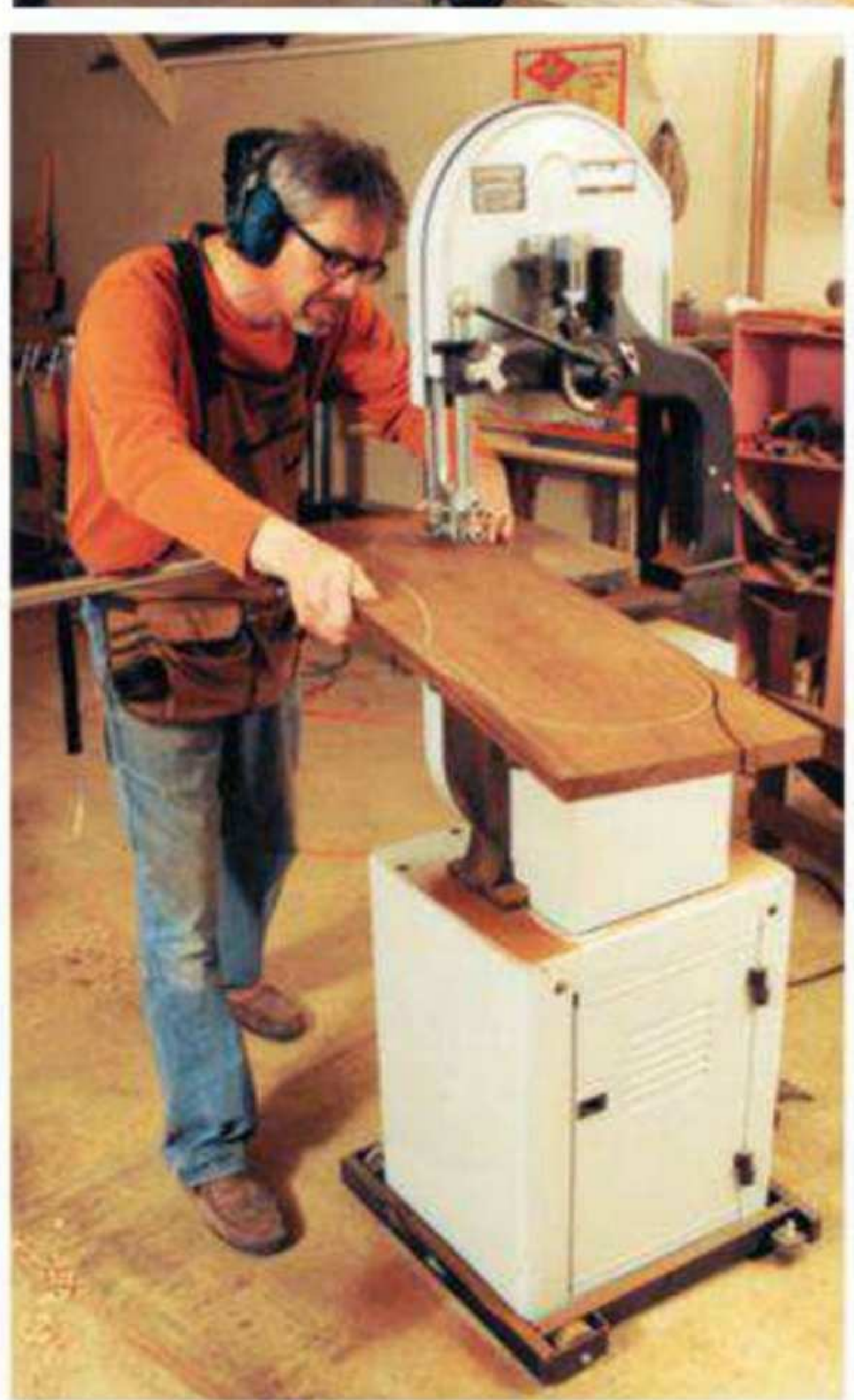
Templates, a Pattern for Success



As I noted earlier, I built our chair from thermo-treated red oak, but this time-tested design will work well with cedar, cypress or any other type of wood that holds up well in outdoor use. Similarly, use a good quality waterproof glue — I chose Titebond® III — for any butt-joined lamination that you will need, such as for the back and the seat.

Building from the Bottom Up

Regardless of which material you make the chair from, the legs and arm supports (pieces 1 to 3) have straight lines that are easily made on a table saw. The front legs have a 12° bevel on their forward edges, and notches with the same interior angle (see the *Drawings*). I made each notch by



Creating templates for the chair's shaped parts, like the arm template (top photo), helps you to make multiple accurate copies of the pieces. The dark thermo-treated oak necessitated a white marking pencil — regular pencil lines were nearly invisible.

After tracing the pieces' shapes onto the surfaced stock using a template (2nd photo from top), the author cuts out the shape on a band saw (photo at left), staying just outside the line. Then, using a pattern routing bit, he refines the piece to final shape (below).





The chair's back and the seat (above) were both laminated using a waterproof glue. The thermo-treated oak requires longer clamp time.



To form the trapezoidal shape of the rear legs, the author used a table saw sled. He lined up the cuts and then screwed a moveable fence to the sled. The shape was first traced onto the workpiece from a template.

“I chose to make 1/2"-thick MDF templates for all of the shaped parts — that way I could easily build two, three or even an entire flock of chairs.”

holding the beveled edge of the leg flat on the table saw top and raising the saw blade to 15/16", then nibbling the notch clean. This technique forms the proper angle in each notch. To make the rear legs, I traced their shape onto the stock using a template, and then cut the shape out using a sled on the table saw, as shown in the photo below. Note the grain direction indicated on the Template Diagram (next page).

To get the 12° angle on the leg's front ends, I raised the blade on the table saw, held the end square to the blade and slid the saw's miter gauge up to the leg, adjusting it to the angle of the leg. Then I cranked the saw blade over to 12° and cut the angle onto the rear leg as shown in the *Elevation Drawings*. Repeat the process for the other rear leg.

Now go ahead and cut out the stretchers (pieces 4 and 5). The lower stretcher is simply sticked up; the curved stretcher has a curve cut into its bottom edge. It also has an angled top edge and ends. All these details are found in the *Drawings*.

Drilling: 1, 2, 3

Once you have completed those machining steps, you can start drilling counterbored holes for your first dry assembly. An important note for those who choose to use this treated lumber: I found it more brittle than non-treated wood, so for that reason I procured a really good quality countersink bit set which came with plug cutters. It cost a goodly sum, but it worked so well that, to me, the cost was worth it. Another thing I did was to use three drill/drivers as I worked: one with the countersink bit to make the counterbore and the clearance hole, the next with the properly sized drill bit for the pilot hole and the third with a Robertson (square-drive) bit. I know that having three cordless drill/drivers might seem a bit overboard, but I have to say it was a sweet deal. The screws I used in this project were stainless steel #7, 1 5/8" with square-drive trim heads.

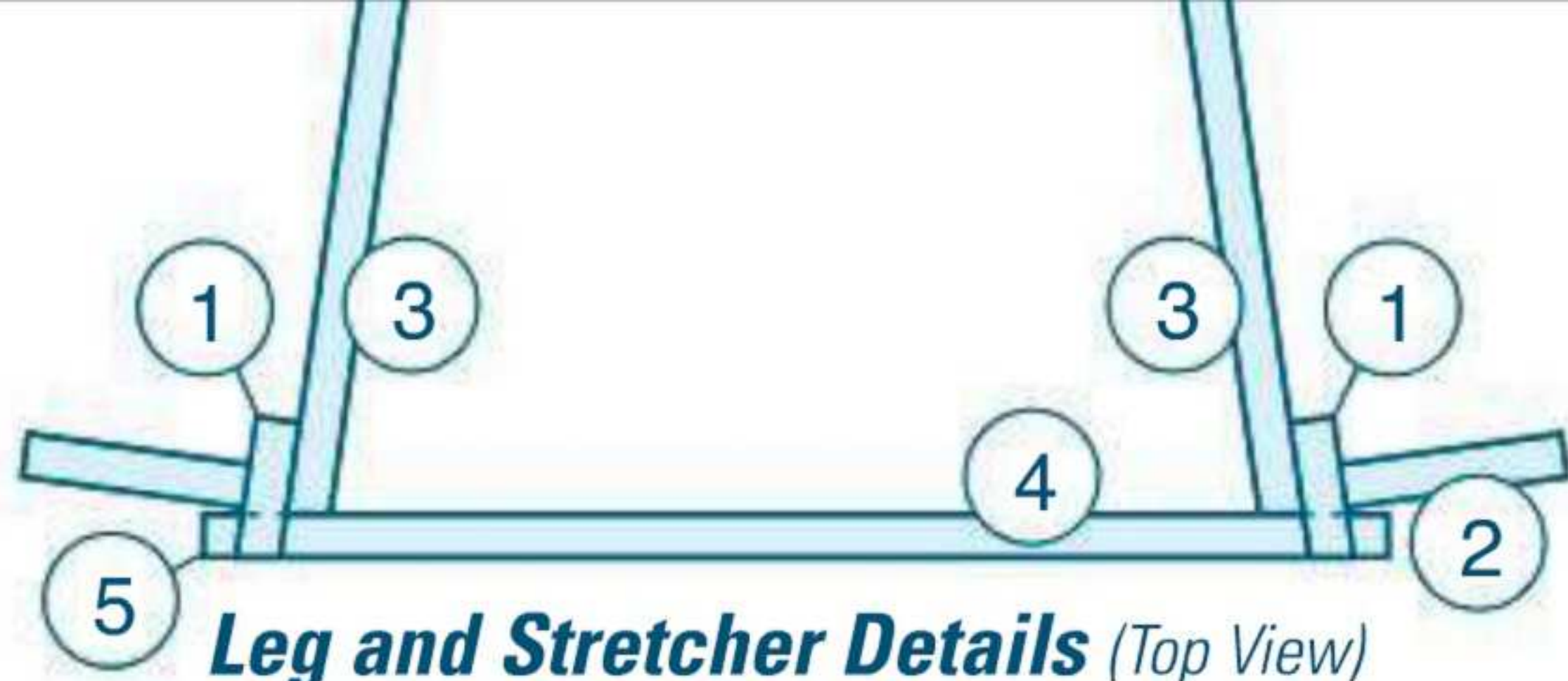
For each front leg assembly, counterbore and drill your pilot holes, then attach the arm support to the front legs using screws alone — no glue just yet. In the same way, secure the lower stretcher to the front legs in the notches that you nibbled earlier (no glue). The distance between the front legs is 20 3/4". With that done, stand up the subassembly on a flat surface like a workbench or table saw table and grab one of the rear legs. Clamp the rear leg in position, holding it back 7/8" from the forward edge of the front leg. Counterbore, drill and secure the rear leg to the front leg, then repeat the process for the other rear leg. Now you can test fit the curved stretcher to see if its angles line up properly. When it fits well, secure it as you have with the other parts (see the *Exploded View* for suggested screw locations). With the leg subassembly done, set it aside and move on to the next set of parts.

Making the Back, Seat and Arms

You are on the home stretch now, with just a few remaining parts to make (pieces 6 through 9). Because they are pretty wide, your back and seat will almost certainly need to be glued up. I composed the back panel from a lighter center plank with darker boards on either side. The seat was glued up from boards that were essentially the same color.

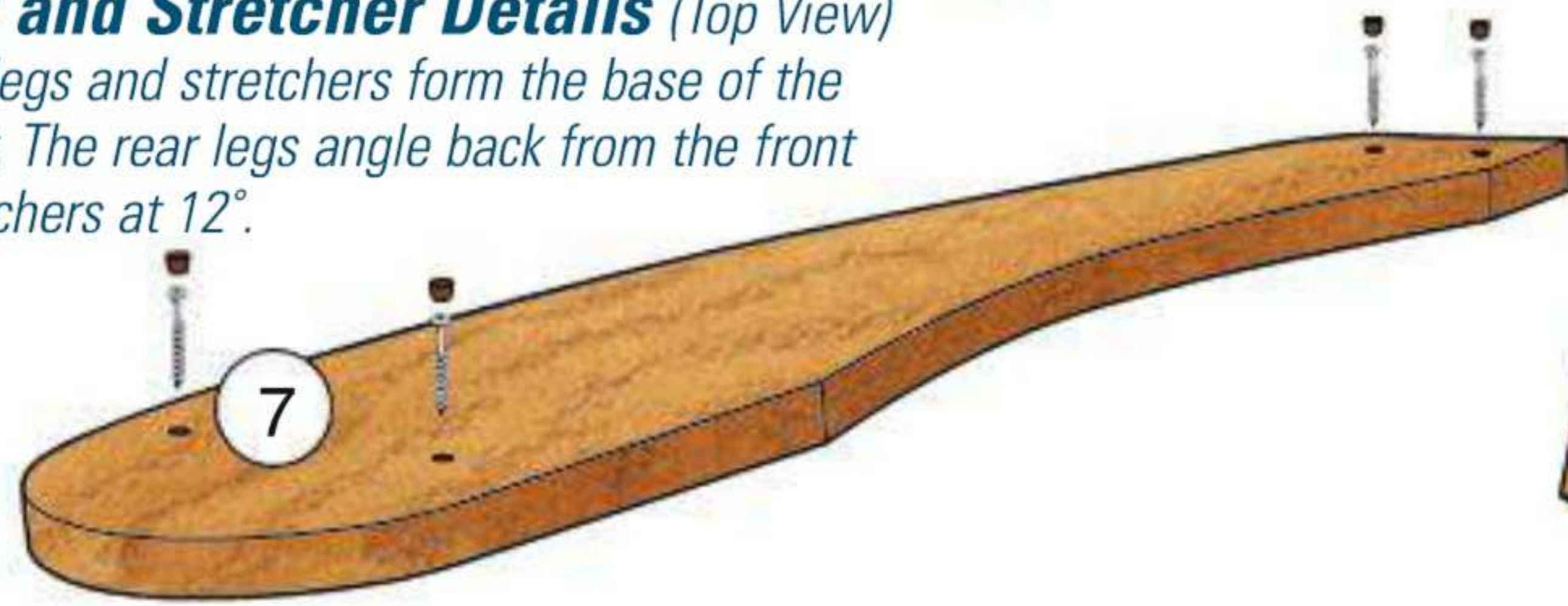
Starting with the back, I traced its shape onto the stock with a white pencil. Stepping to the band saw, I cut out the shape, staying just outside of the line. Then, with the help of a 12° ramp and a handheld jigsaw, I cut the compound angle onto the bottom of the blank (see the photos, page 48). Now I was ready to attach the template to the back blank with double-sided tape, and to use a pattern routing bit and a handheld router to complete the shape of the back. I followed the same steps to make the arms.

Securing the back to the leg subassembly would be more easily done with a helper to hold it in place — I substituted

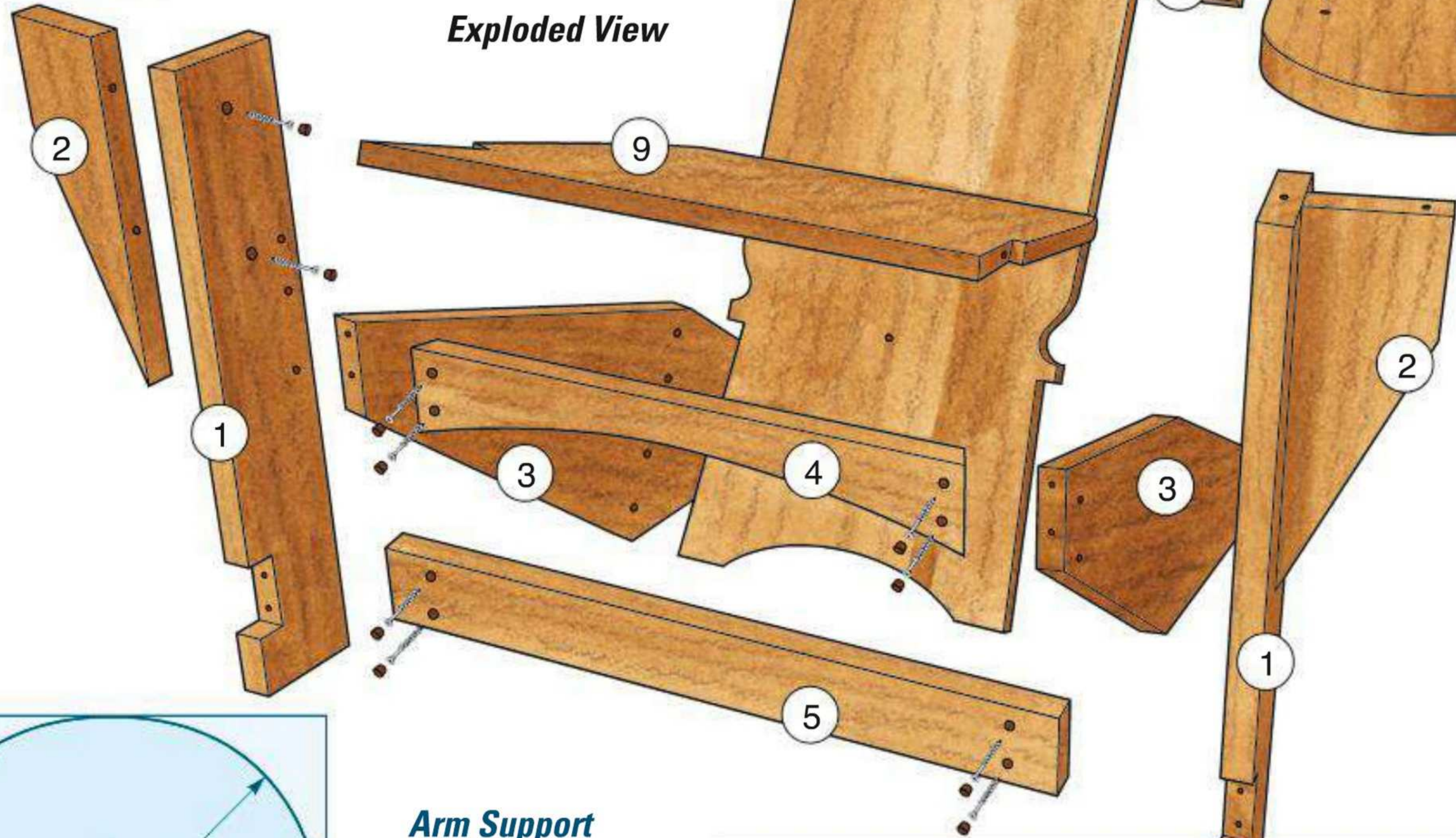


Leg and Stretcher Details (Top View)

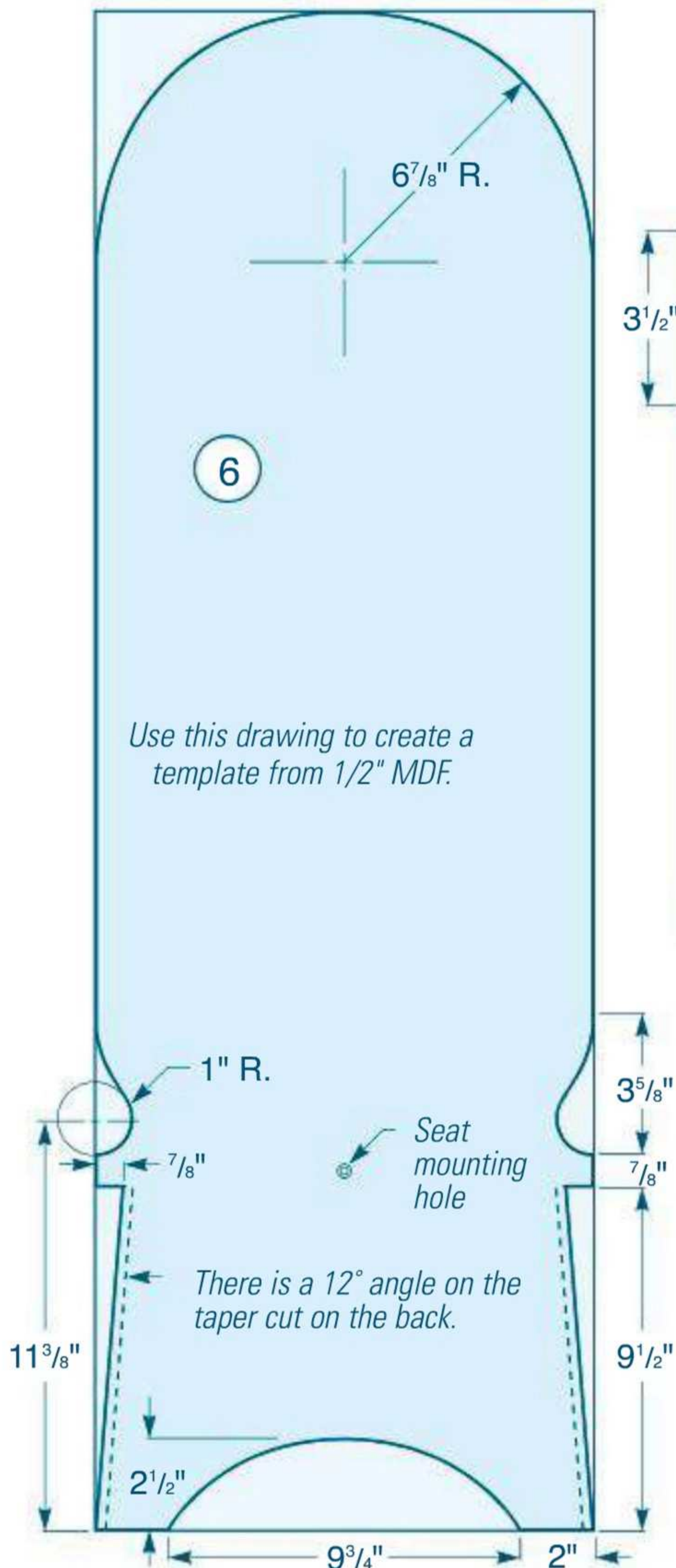
The legs and stretchers form the base of the chair. The rear legs angle back from the front stretchers at 12°.



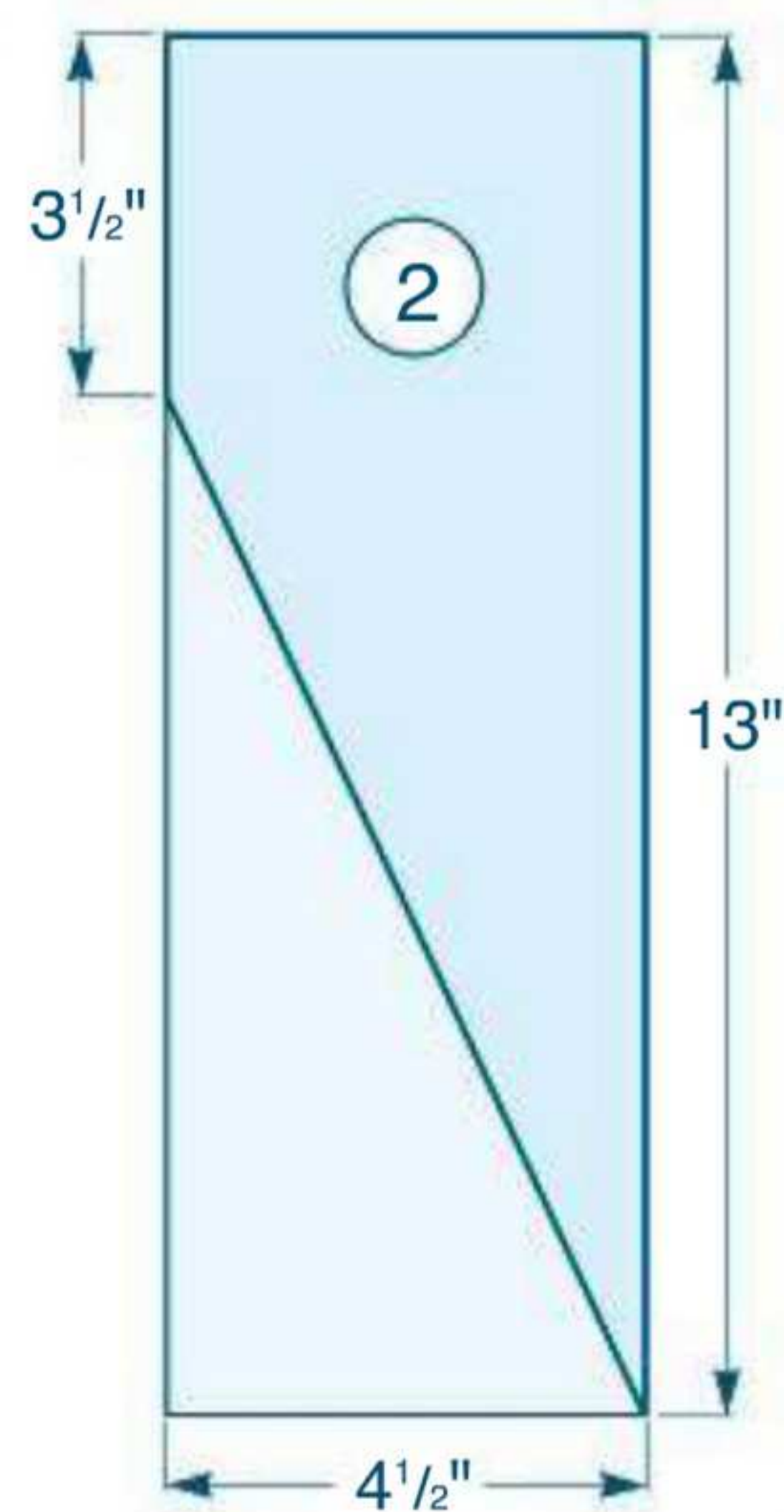
Exploded View



Back (Front View)



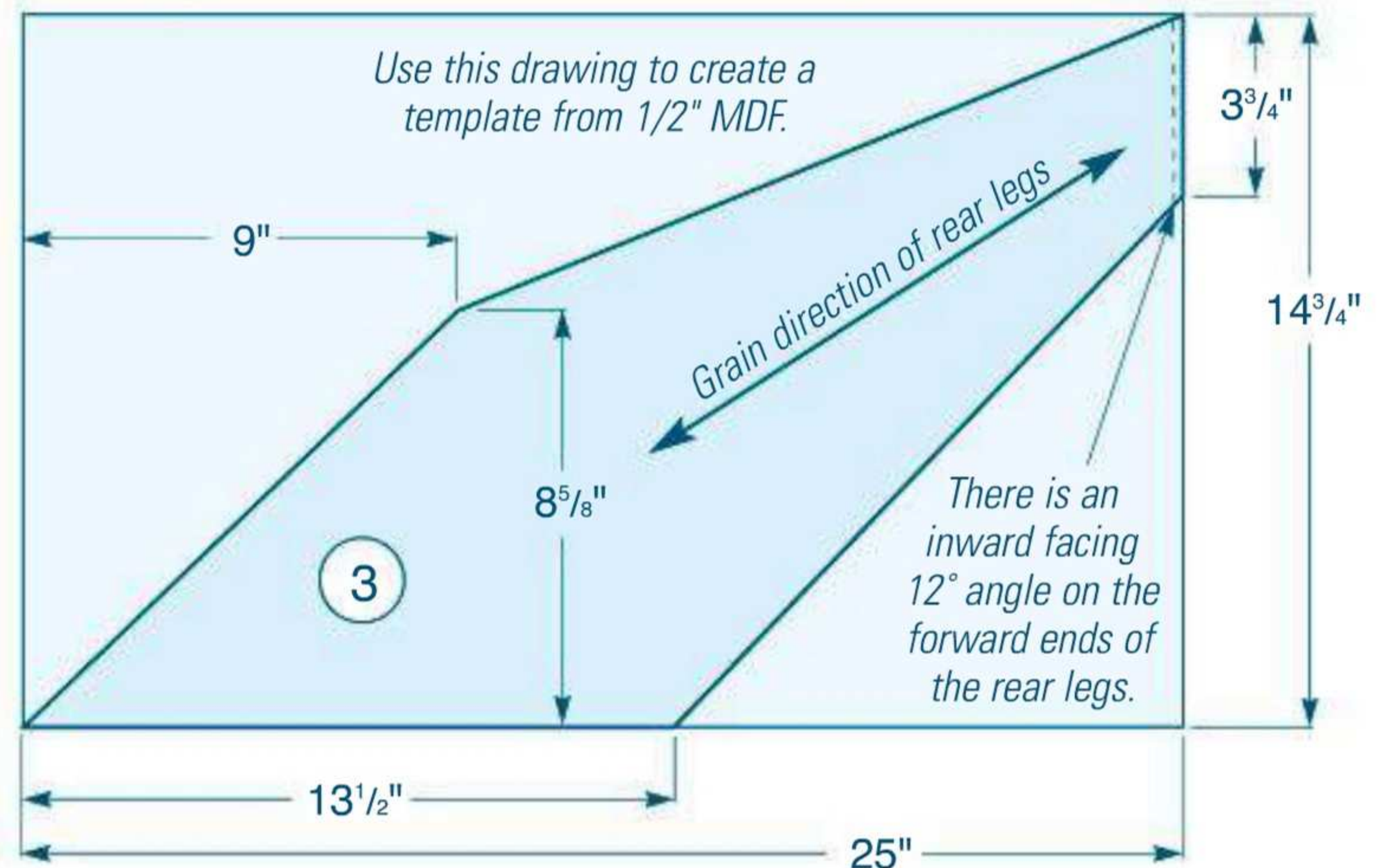
Arm Support (Front View)



MATERIAL LIST

	T x W x L
1 Front Legs (2)	7/8" x 3" x 24"
2 Arm Supports (2)	7/8" x 4 1/2" x 12 7/8"
3 Rear Legs (2)	7/8" x 14 3/4" x 25"
4 Curved Stretcher (1)	7/8" x 4 1/8" x 20 3/4"
5 Lower Stretcher (1)	7/8" x 3" x 24 1/2"
6 Back (1)	7/8" x 13 3/4" x 42"
7 Arms (2)	7/8" x 8 3/8" x 33 1/4"
8 Rear Back Support (1)	7/8" x 3 3/4" x 21 3/4"
9 Seat (1)	7/8" x 21 3/4" x 18 3/4"

Rear Leg (Front View)





The symmetrical taper at the bottom of the back also has a 12° angle across its thickness. A ramp cut to the proper angle was clamped in place and used to form both angles in a single cut.



“Securing the back to the leg subassembly is more easily done with a helper to hold it in place — I substituted clamps and muttered threats instead.”

clamps and muttered threats instead. When you have the back properly positioned, use the three-step drill-and-screw process described earlier to temporarily mount it in place.

There are a whole lot of angles going on in this chair, and I found that despite my best efforts, I was a degree off here and there as I assembled it. For that reason, I located the rear back support by using a level placed on top of the front leg stretching to the back — I marked a line on each edge of the back and mounted the support. Here, I just countersunk the holes for the back support (not covering them with plugs).

The next step was to make and fit the seat. As you will see from the *Drawings*, the seat has rounded back corners and notches in the front corners. Those notches have angled rear aspects (across the thickness of the seat) to accept the front legs. I cut those notches with a hand saw. The back edge of the seat is angled to abut cleanly with the back. When you've fitted the seat in place nicely, counter-bore and secure it with screws.

Completing the Last Details

By now you should be an expert at the bore, drill and screw sequence, so attaching the arms to the chair should go quickly ... again, all of this assembly so far has been without gluing anything in place permanently. The reason is that you are going to

There are a lot of angles on this chair. Note that angles formed on the legs and stretchers create the distinctive geometry of the chair base.



Thermo-treated Hardwood — Machining Tips from the Author

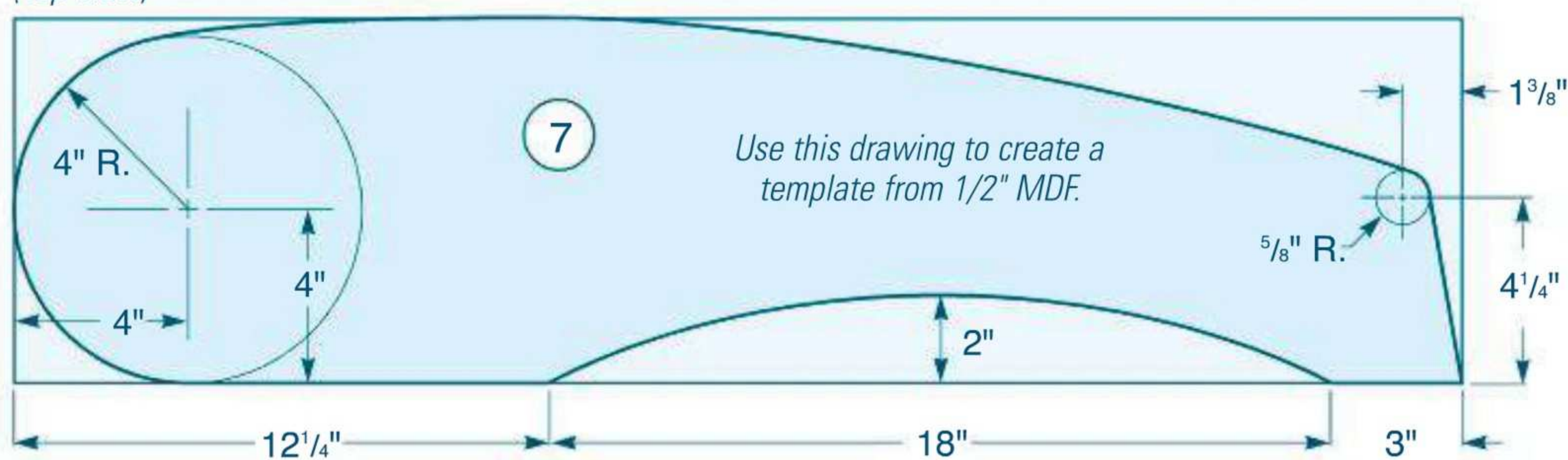
About 15 years ago, forest product folks in Finland developed a high-temperature processing treatment for softwoods with the goal of increasing its durability. They succeeded quite well. By heating the wood from 415° to 450°F. in anoxic (oxygen-free to avoid combustion!) conditions, the sugars and other organic components of the wood break down, with the result that bacteria and mold do not grow on the fibers well at all. In other words, in exterior uses, rotting does not occur for an exceptionally long time — and, properly sealed and

cared for, never. After the softwood process was successful, they expanded it to hardwoods.

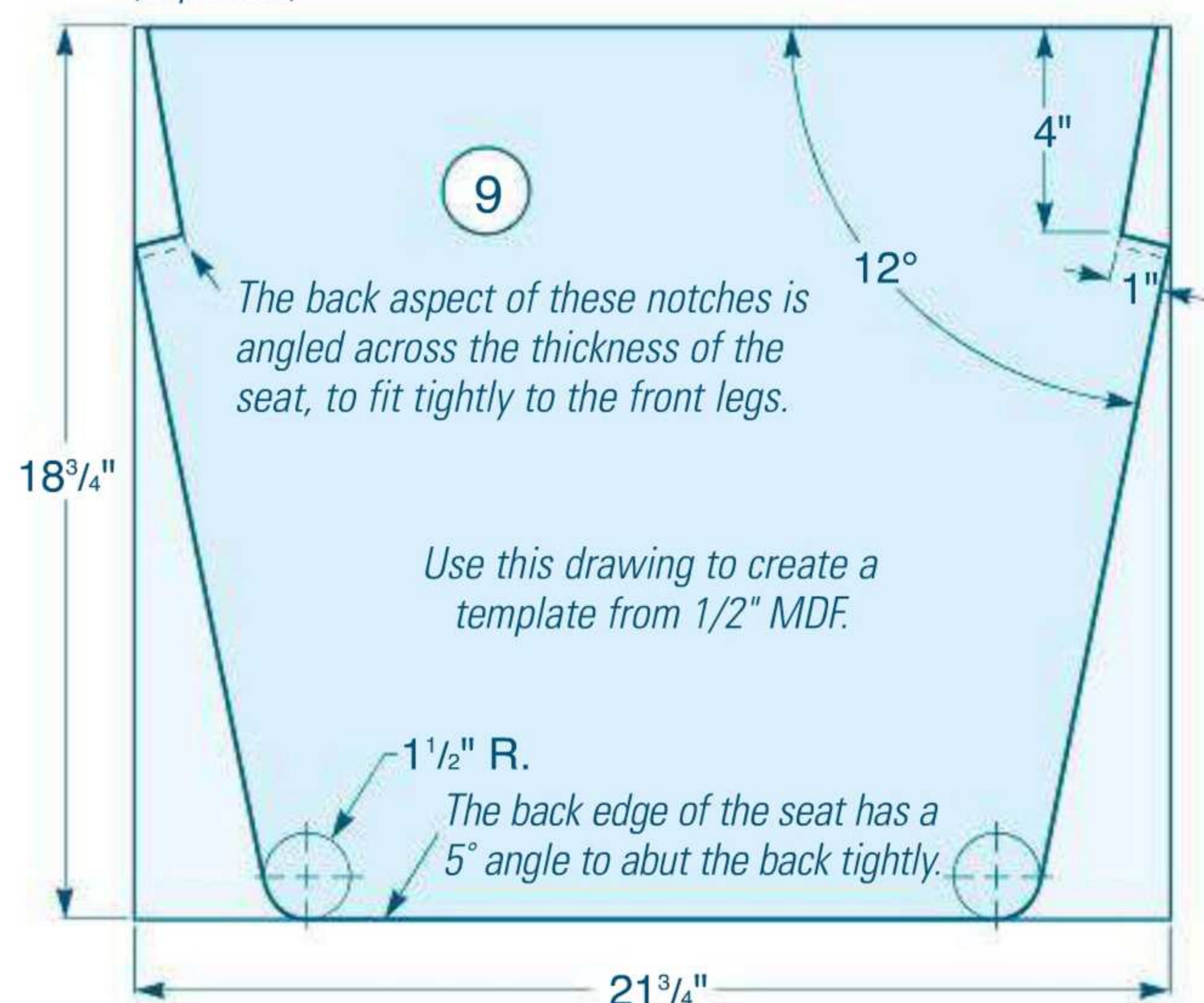
Working with this heat-treated wood required a bit of adjustment. It is more brittle and the fibers on the edges break off easily ... into your hands as splinters, for example. It also needs to stay in clamps longer to achieve a rock-solid bond. Because the treatment leaves it more dense as well as brittle, drilling properly sized clearance and pilot holes for screw fasteners is a must. And use sharp tools!

Arm

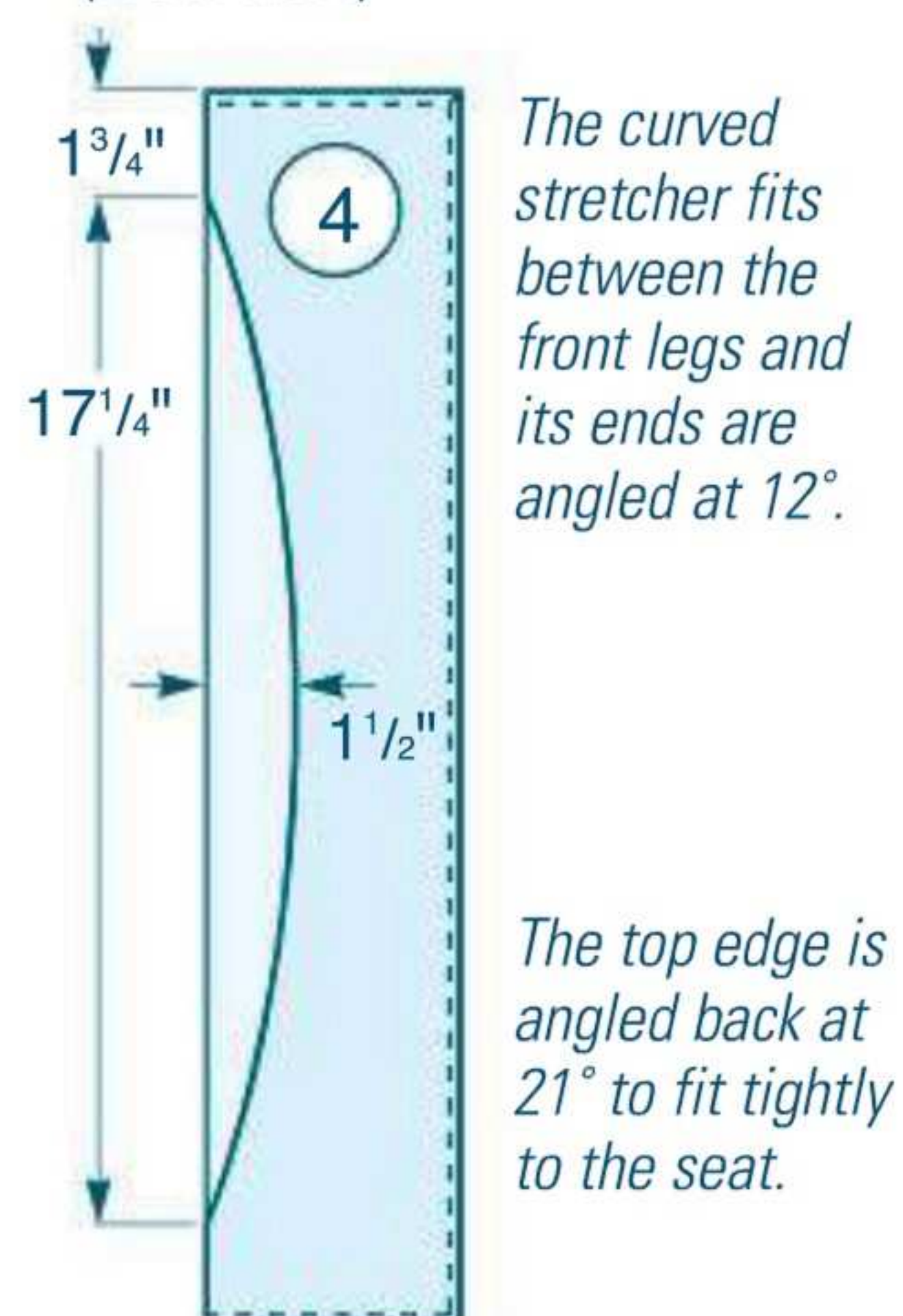
(Top View)

**Seat**

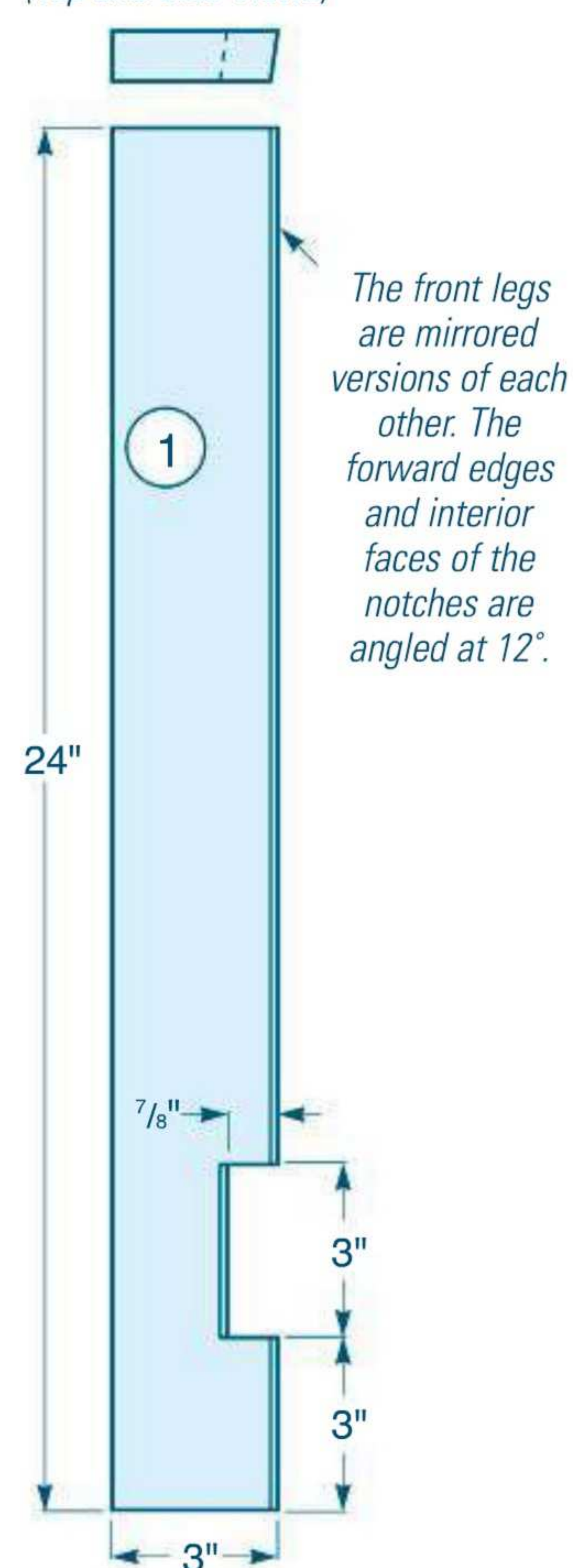
(Top View)

**Curved Stretcher**

(Front View)

**Front Leg**

(Top and Side Views)



take the whole chair apart now and sand it smooth. I also recommend a 1/8" roundover bit on the edges of the arms, seat (except at the notches) and the back (except where it meets the rear legs). On the rest of the chair, I broke the edges with sandpaper, sanding up to 150-grit.

Reassembling the chair went smoothly. I applied glue to the legs subassembly (including where it joins the back), but nowhere else. I took care to drive the screws securely home and then put the chair aside. At the drill press, I made a bunch of plugs and then used the band saw to "resaw" them from the blank.

I glued them in place with Titebond III and let the glue cure. A sharp chisel and disk sander made quick work of flattening



To match the color of the specially treated red oak, the author used a plug cutter to fabricate plugs from project scraps to cover the screws.

the plugs, and the chair was done, except for the applying the finish.

After packing the feet with epoxy (see Finishing Thoughts on page 70), I applied three coats of General Finishes 450 exterior varnish — it has UV protectors that will help keep the color of the wood from shifting in the sunlight.

In the end, I was so pleased with the chair. It is a piece of American history, and it was fun to build and comfortable to sit in. That's a win, win, win in my book for sure.

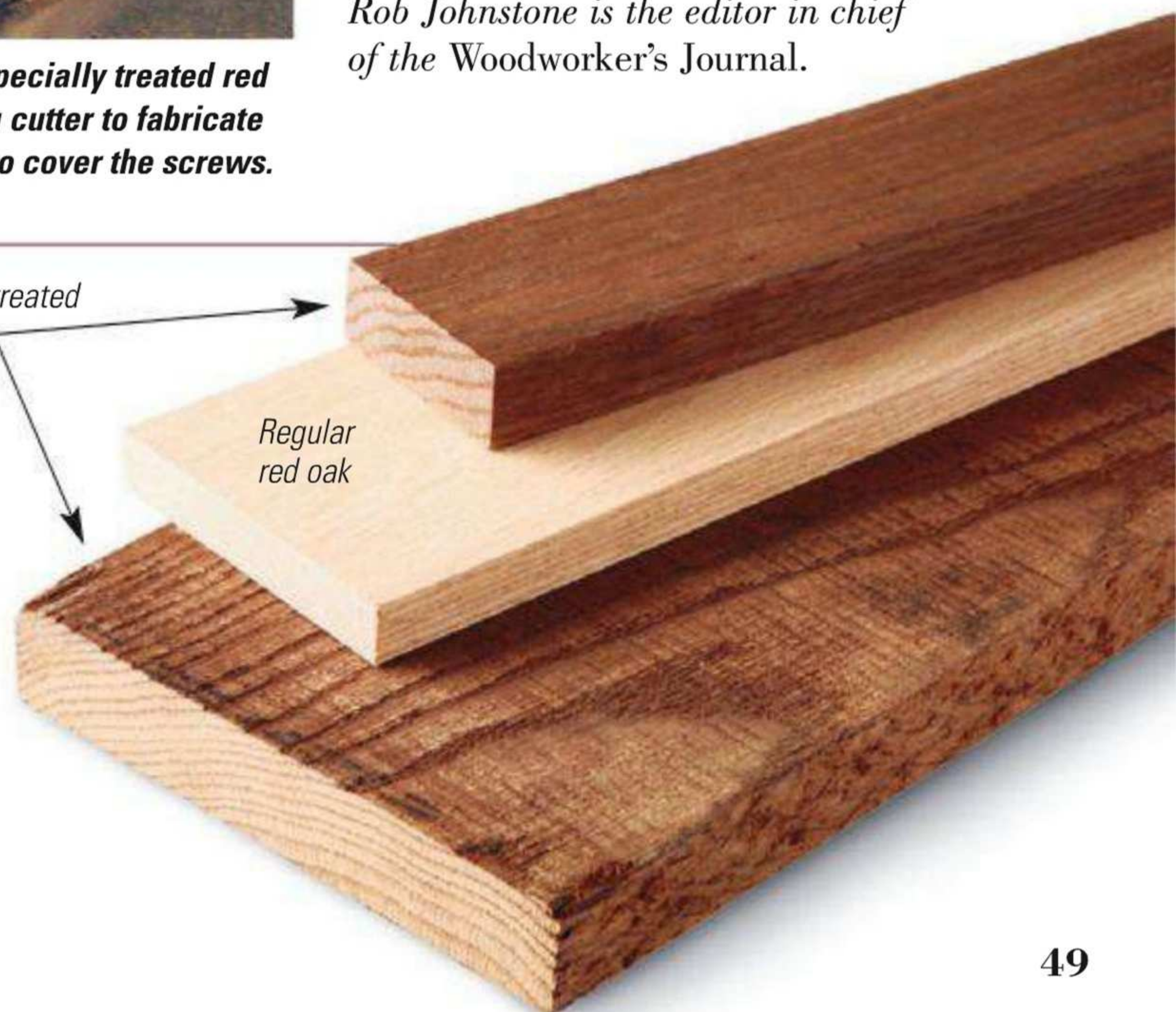
Rob Johnstone is the editor in chief of the Woodworker's Journal.

But those details aside, the impressive thing about this product is that it remains simply wood. No chemical treatments to leach into the environment and no special tools are required. It is darker than non-treated wood of the same species, as you can see in the photo at right. Cost? It is only a dollar or so per board foot more expensive than its non-treated counterpart. If you would like to try it on this project, it's available from rockler.com.

— Rob Johnstone

Thermo-treated red oak

Regular red oak



Shop Test

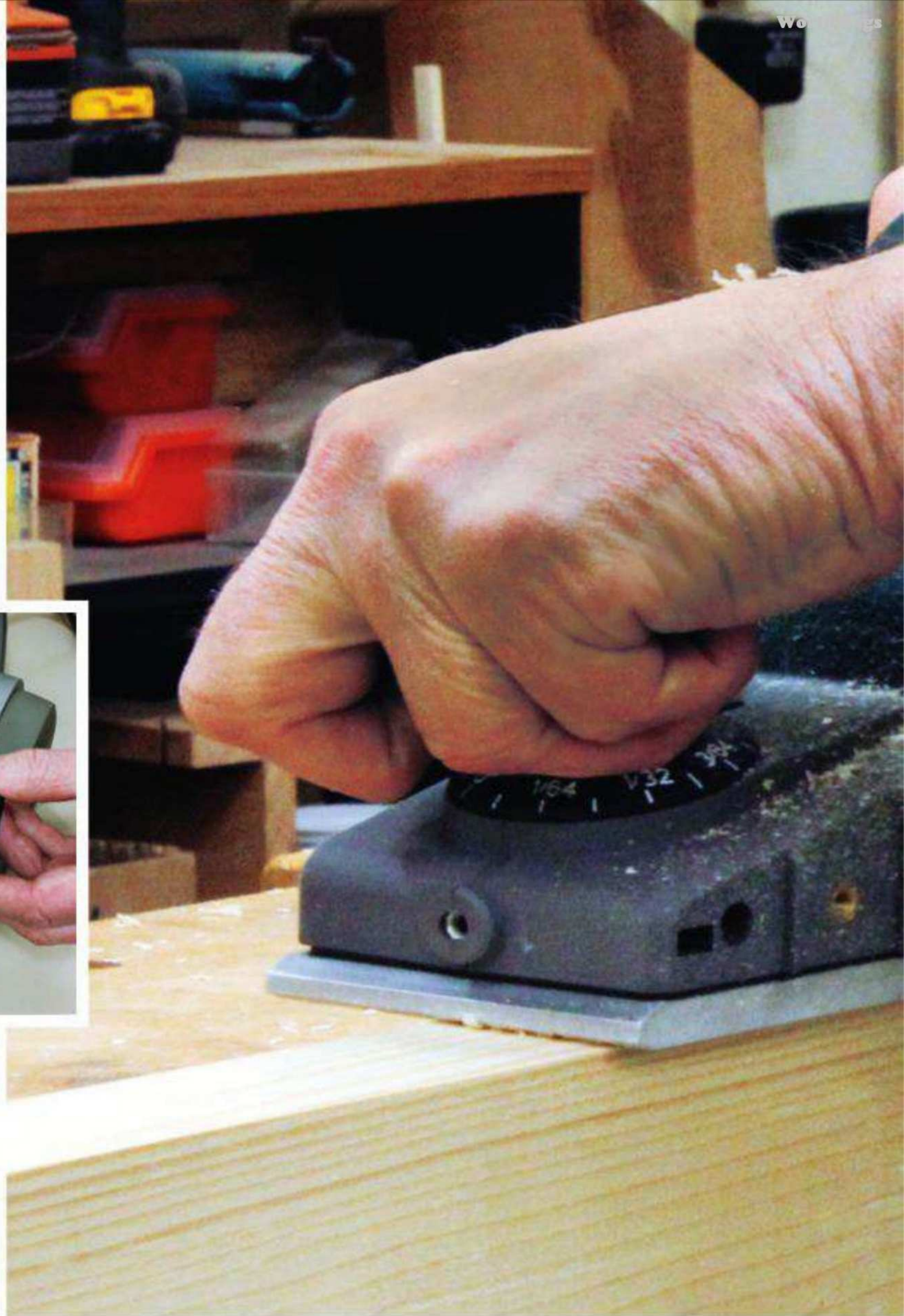
Power Planers

By A.J. Hamler

Emulating the features of both planer and jointer, today's power planers allow you to bring the workshop to the work.



"Selectable chip direction" is a great option to look for on a new power planer. A simple thumb switch reorients chip direction on Porter-Cable's new unit (left), while twisting the well-marked dust port a half turn changes direction on Rockwell's offering.



Quik-Link takes you directly to the web page on which these products appear! No navigation necessary ... just go to www.woodworkersjournal.com and click on the Quik-Link icon shown above.

The worlds of woodworking and construction are similar but don't always overlap. Tools used for one aren't always suitable for the other.

But when it comes to performing woodworking tasks away from the confines of the shop — deck building, patio furniture, garage and roof work, or repairing/replacing doors just about anywhere — who's expected to get that done in your house? You, the woodworker, of course. With that in mind, a wise woodworker should always consider extending equipment from the shop out into the greater world. Few tools are better equipped for that task than power planers.

While they may have limited usefulness inside a well-equipped shop, they do

have the extraordinary ability to take a number of woodworking chores out of a shop's confines and do them very well on-site. This can be a real boon in keeping you from running back and forth from wherever you're working to the shop every time you need to use a shop-based piece of equipment.

What Are These Things?

They plane stuff, so they must be planers, right? Well, yeah, but when you take a look at the business portion of a planer, you can easily see that they're designed exactly like another shop tool: the jointer. Outside of terminology, the only real difference is the orientation and the fact that these are handheld; otherwise, they work the same.

Power planers use a spinning cutterhead nearly identical to that on your jointer, with the blade positioned to cut in the direction opposite that of the workpiece feed. On a jointer, the stock is fed in and the cutterhead cuts toward you; with a planer, you feed the tool into the stock and the cutterhead cuts away from you.

The depth-of-cut is also determined on a power planer the same way. On a jointer, the infeed table is raised or lowered to adjust the cut while the outfeed table is fixed. The corresponding portion on a planer, called the front or adjustable shoe, is raised or lowered to control cutting depth while the rear shoe is fixed. As with a jointer, how much stock you remove per cut is a balancing



act based on characteristics and size of the workpiece, and it is determined the same way. The quality of the cut is controlled just like on a jointer, as well. Slower, shallower cuts give a smoother appearance than fast, deep cuts.

Adjusting the depth-of-cut on a power planer is accomplished in different ways, but each does the same thing: raises or lowers the front shoe. The first is a large twist knob at the front of the tool that doubles as a handle, and you'll see this method most often. Some planers, like the Ryobi cordless shown on page 54, have a separate front handle, with smaller depth dial. Festool has opted for a beefy twist handle that sets the depth.

And, comparing a planer to a jointer one more time, all

can be used with a fence (don't buy a planer that doesn't come with one). A fence is essential for keeping your cut at 90 degrees, as on a door edge or for milling stock. For beveled cuts, some manufacturers provide fences that can be angled to a specific setting.

Cutterheads and capacity vary considerably, although the most common cutting width among power planers is 3 1/4". Cutterheads can feature one or two HSS or carbide blades, either single- or double-edged. Some, like the Festool, use a single spiral blade. Along with capacity, you'll find that power, weight and pricing are all over the board. Some inexpensive units run at about 4 amps, while huskier machines go to 7 amps and higher. Most fall in the 5- to



6-amp range, with machines in that group tipping the scales from about 6 to 8 pounds. As with most tools, upping the power further results in a corresponding bump in both weight and price.

Speaking of prices, expect to pay \$70 to \$80 for models on the low power end and \$90 to \$160 for beefier models, with some more powerful and feature-rich machines going for more.

Shop Test continues on page 52 ...

All the manufacturers include a chamfering notch on their front shoe, but the style varies. DeWALT's offering (left) has a single extra-large notch, for example, while Makita's new unit offers three of varying sizes.

Shop Test continued

In 1828, William Woodworth received a patent for a machine with a rotary cutterhead with rolls to hold lumber to a bed against the force of the knives. The wood was fed by a rack and pinion system. In 1834, Thomas E. Daniels received a patent for a traverse planing machine, or reciprocating planer, in which the carriage moved back and forth like the bed of the metal planer used in machine shops.

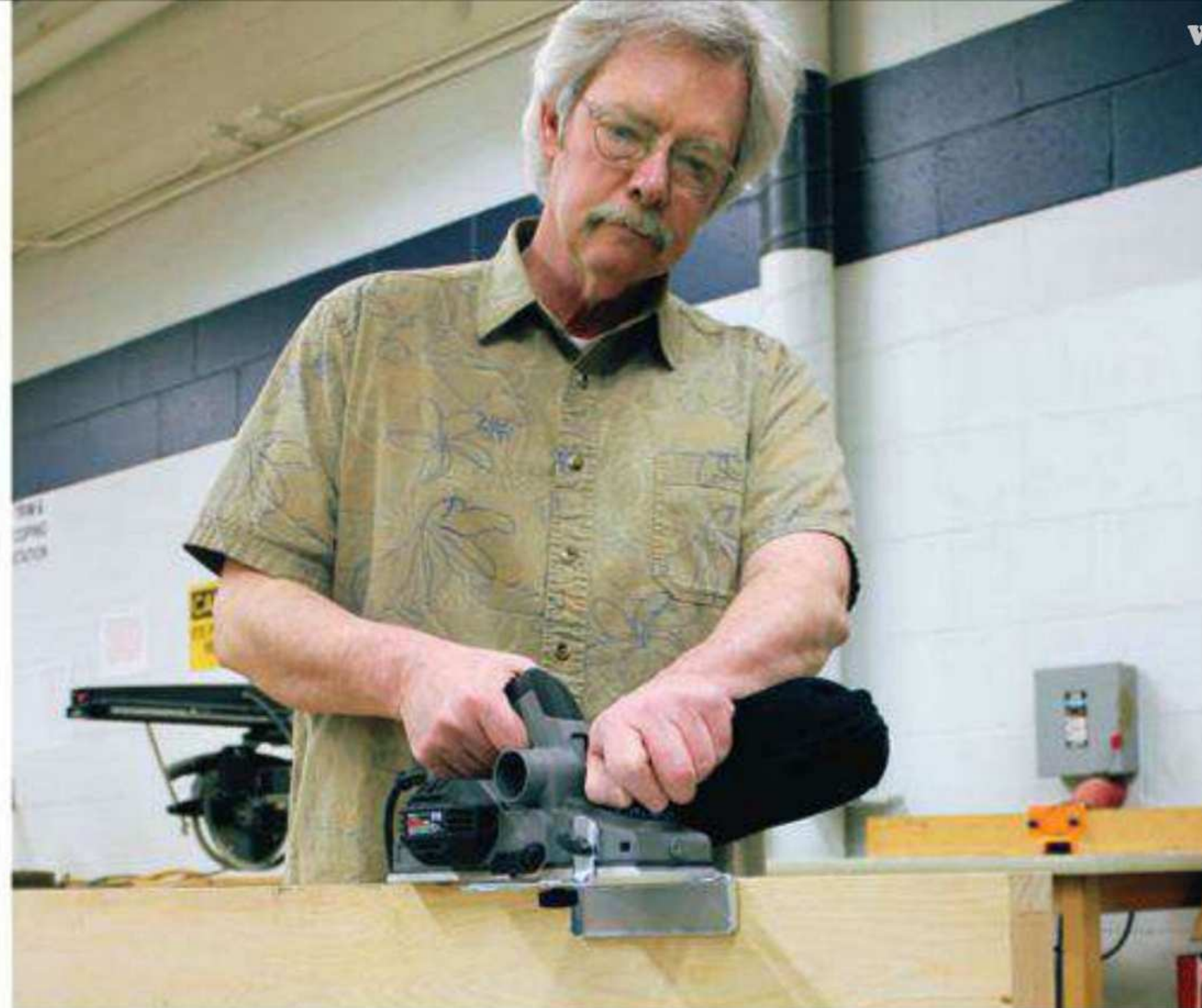
— *The Planer Truth*
by Dana Martin Batory

Put a Planer to Work

If you're already familiar with a jointer, you have a good handle on how to work a power planer. The difference is orientation — essentially, it's like using a jointer upside down.

First, adjust the depth of cut to suit the job at hand. For hogging off lots of material, set it on the deep side; for good-looking finish cuts and minor trimming (such as fitting a door), dial the depth back.

Start the cut by resting the tip of the front shoe on the workpiece with the machine angled slightly up at the rear. Turn the machine on and, when it comes up to full speed, lower the planer so the front shoe is flat on the workpiece and move it forward in one smooth motion. Slide the planer through the cut with a light, uniform pressure on both front and back of the tool, and don't lift up until the cutterhead has cleared the workpiece. If the workpiece is short, you can do all this without moving. However, for longer workpieces like doors, it's best to "walk" the planer through the cut.



Using a power planer is like using a jointer, only upside down. Bring the unit to full speed prior to contact and don't lift up until the cutterhead has cleared the workpiece. For longer cuts like this door, plan on "walking" the planer through the cut. A fence helps guarantee a perfect 90° cut.

So, just what kind of work can you do with these tools? In a nutshell, just about anything you'd do with a nonpowered hand plane, but adding power extends their usefulness tremendously.

I've mentioned doors a couple of times, and working with doors is one of their most common tasks. Used with a fence, a planer will give you a perfect 90-degree edge; if the door requires a slight bevel for a perfect fit, you can do that freehand or with an adjustable fence. Likewise, fitting door cases can be problematic if the jamb extends beyond thinner walls.

A power planer can easily level those jambs in a snap.

For decks and other outdoor projects, you won't find a faster way to chamfer deck, railing and post edges than with a power planer. Virtually all have a V-shaped chamfering notch on the front shoe — something you won't see on a hand plane — and some have multiple notches in varying sizes. This notch guides the planer straight when milling stock corners.

If you've ever installed a ceiling, flooring or drywall, you've undoubtedly

Shop Test continues on page 54 ...

Yes . . . Sometimes Size Matters



Most power planers make a 3/4" cut, but there are some larger ones out there. And in that department, Makita takes the forefront in their current seven-machine lineup with 4 3/8" and 6 3/4" planers (models 1912B

and 1806B, respectively). But for truly massive jobs — like planing wide panels or extra-large structural beams — nothing compares to the Makita

KP312 (right). Weighing in at 40 lbs., with 15 amps and a cutting width of 12 1/4", you won't find one larger. And at 33' long, even the power cord is extreme. Add a set of wheels, and you could almost drive it to the jobsite.





Create with Confidence™

TAKE **15% OFF** YOUR ORDER!*

Rockler HPL
Table (26221) \$199.99

Accessories and stands
all sold separately

Bench Dog®
Portable (20253)
\$249.99

Bench Dog®
Baltic Birch
Cabinet
(28331)
\$379.99

Rockler Steel Router Cabinet (41427) \$429.99 with Cast Iron Top (28856) \$599.99

* Offer expires September 4, 2011. Excludes sale items, power tools, Leigh jigs, Porter-Cable dovetail jigs, Shark CNC, Saw Stop, Steel Router Cabinets, Festool, and Rockler Gift Cards. Not valid with any other coupon, offer or previous purchase. Offer not valid at Rockler independent resellers.

Do it better with the right router setup

From our affordable high-pressure laminate top to the cast-iron table that will make your neighbor jealous, Rockler has the router table to raise your work to another level.

Check out our brand new Steel Router Cabinet. Made of heavy-duty galvanized steel with integrated above-and-below-the-bit dust collection, it not only looks like a shaper, but performs like one when combined with the Cast-Iron table. Find out just how great your work can be with the right router setup.

Rockler Router Tables – more innovations to help you *Create with Confidence.*

Simply place your order at Rockler.com and enter promotion code V1447 at check out, or call 1-877-ROCKLER



For a store near you or free catalog visit

Rockler.com

1-877-ROCKLER

(Circle No. 29 on PRODUCT INFORMATION form)

Shop Test continued



Some manufacturers, like Festool, offer accessories that will convert a power planer into a small jointer.

encountered the occasional stud or joist that simply isn't in the same plane as those next to it. Trying to get drywall hung with a warped stud jutting out-of-plane with the others is tedious. But, using a good straightedge, you can determine which studs (or joists) need a bit of shaving. A few passes with a power planer and frequent checking with your straightedge can give you a flat surface for installation in no time at all.

Because planers are really upside-down jointers, it should

come as no surprise they can handle a few of the same tasks, such as rabbeting. Planer fences are designed so they can be set anywhere over the shoe, just as a jointer fence can go anywhere over the tables. (A curved cutout keeps blades from making contact.) To cut a rabbet, just slide and lock the fence in place to the desired rabbet width,

then plane along the workpiece edge until you reach the depth you want.

Ever taper workpieces on a jointer by making a series of ever-longer cuts? You can do that with a power planer, too. Make a short pass over the end of a workpiece, then a longer second pass, a third pass that's longer still, and so on. The last cut runs the length of the workpiece to make a single smooth cut, resulting in a fast-and-easy taper. If you've ever tried to hang a door in an existing

frame that's not square, you'll quickly come to appreciate a planer's tapering ability.

Finally, it should come as no surprise that a tool based almost exactly on a jointer can also joint boards. To this end, several manufacturers offer adapters to simplify this task. Most are bench-mounted bases that support the planer securely in an inverted position.

What to Look For

When shopping for a power planer, the most obvious factors are power and price. For most indoor woodworkers who need a power planer only occasionally, a 5- or 6-amp machine is a good target. If you have plans to construct a large deck, garage or home addition, consider a heavier machine. Likewise, a smaller unit like the Ryobi cordless (with its 2" cut and a weight of only 5 lbs.) might be your best bet for light work.

Your preferences and the tasks to which you'll set a

Depth differences: The DeWALT D26677's depth-adjust knob (left) doubles as the front handle, a common sight on most power planers. The Ryobi P610 cordless planer (middle) uses a small depth dial and a separate handle. The Festool HL850E's adjustment (right) is a twist-style handle.



Cutterhead Comparison

planer should dictate other factors, but here's a good list to consider:

- **Blades:** Always opt for carbide blades when available, as they last a lot longer than HSS, especially for extensive heavy-duty use. And, of course, machines that sport double-edged blades give twice the use.

- **Chip direction:** Some machines give you no choice, and shoot chips one direction only. For the most versatility, pick a machine that allows you to select left or right chip direction (which determines either dust bag or hose location) according to the job. If you

don't plan to use a bag or dust hose, a model with a chip chute that can be angled away from you is a good pick.

- **Accessories:** All planers come with a basic selection of necessary tools for blade changing and a guide/fence, but examine those fences

carefully before buying. The larger and longer the fence is, the more control it gives; conversely, a too-short fence is worthless. Multiple cutterheads, angled guides, dust control add-ons,

Shop Test continues on page 56 ...



The cutterhead on a power planer is virtually identical to that on a jointer. At left is the cutterhead on the Makita KP0810; above, the cutterhead on my 6" Delta jointer.

The most expensive product you will ever buy is the one that doesn't work.



Choose products that work right the first time. Choose Old Masters. Their easy to use stains and clear finishes ensure a picture perfect finish every time.

For more information or to find a store near you, visit www.myoldmasters.com or call 800-747-3436

(Circle No. 24 on PRODUCT INFORMATION form)

Shop Test continued



To keep the cutterhead and blade from contacting a surface when not in use, all newer planers include a spring-loaded kickstand that raises the back of the planer, as on this Ryobi P610.

rabbeting and jointing adapters are all plusses, even if optional.

- **Depth scale:** The easier to read at a glance, the better. Note that Festool planers have a metric depth scale, which may require some on-the-fly calculating.

- **Tool storage:** When I'm king of the world, I'll decree that all necessary adjustment tools must be stored right on the machine itself. Till that day comes, though, few manufacturers offer on-board storage. Planers that have it are far more convenient.

- **Cord length:** A too-short cord will constantly tangle and snag, so the longer the cord, the better. Currently, Makita and Festool are the

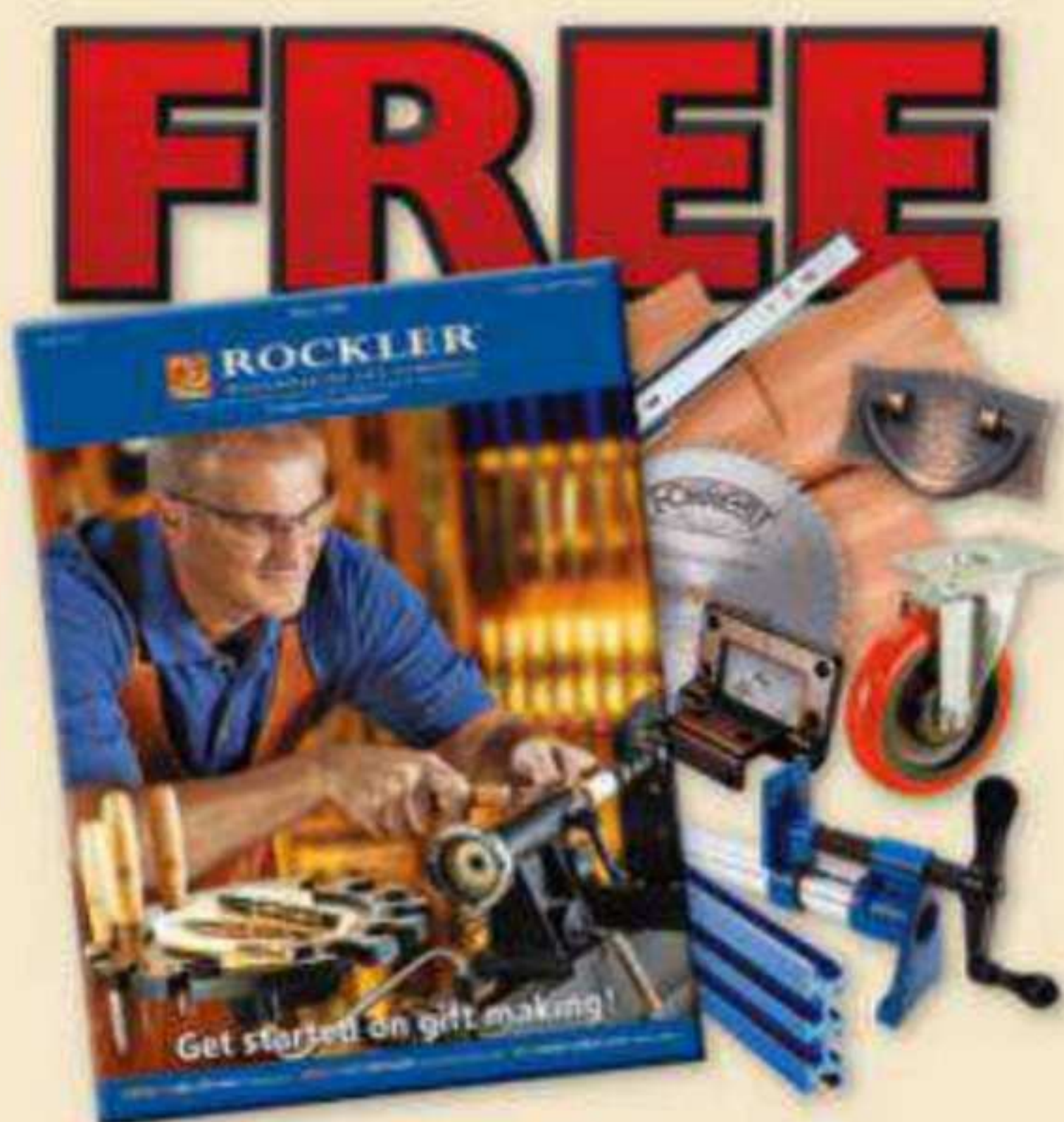
leaders here with cords that should be an example to the others.

Safety and Maintenance

Power planers are deceptive. They're compact, not that loud, and don't feel like they want to leap screaming out of your hands while using them like, say, a router can. In fact, some are as easy to handle as a power drill. However, remember that they have a cutter running at a very high speed that is always exposed. That cutter should be foremost in your mind at all times.

Always allow the cutter to come up to speed before cutting, and always engage

Shop Test continues on page 58 ...



The most complete catalog for woodworkers

- Featuring over 10,000 items
- Innovative jigs and tools
- High quality hardware
- Rare hardwood
- Unique Moldings

Get your **FREE** catalog today!
Call 1-800-403-9736 (code 310)
or go to www.rockler.com/go/V1440



(Circle No. 31 on PRODUCT INFORMATION form)

Moisture Meters

without pins with pins

Avoid
Shrinking
Warping
Cracking
Cupping
Delamination

Buy quality, accuracy and reliability
Backed by professional customer service.
Protected by a two year warranty.

new Web-site: www.moistureproblems.info

lignomat.com 800-227-2105
Lignomat USA, 14345 NE Morris Ct, Portland OR 97230

(Circle No. 21 on PRODUCT INFORMATION form)

WOOD ENGRAVING AND CUTTING WITH AN EPILOG LASER SYSTEM

Starting at \$7,995

An Epilog Laser system makes it easy to customize any wood product with graphics, text, logos and much more.

For more information call us at 888-437-4564.

MADE IN USA
sales@epiloglaser.com
epiloglaser.com/wwj.htm

(Circle No. 10 on PRODUCT INFORMATION form)

Woodworkersjournal.com

triton **New 1.33hp Router**

- Patented through the table bit height winder
- Channeled dust port for superior collection
- Automatic collet lock for 1 wrench changes
- Easy spring removal for table use
- Built-in safety lock out switch
- Patented micro-adjust knob
- Easy access brushes



EDITORS' CHOICE
TAUNTON'S 2009 TOOL GUIDE

You Tube

www.htcproductsinc.com

(Circle No. 17 on PRODUCT INFORMATION form)

FEED YOUR CREATIVITY!

With Our Comprehensive Inventory of Game Call & Pen Turning Supplies

EASY ONLINE ORDERING
hutproducts.com
1-800-547-5461

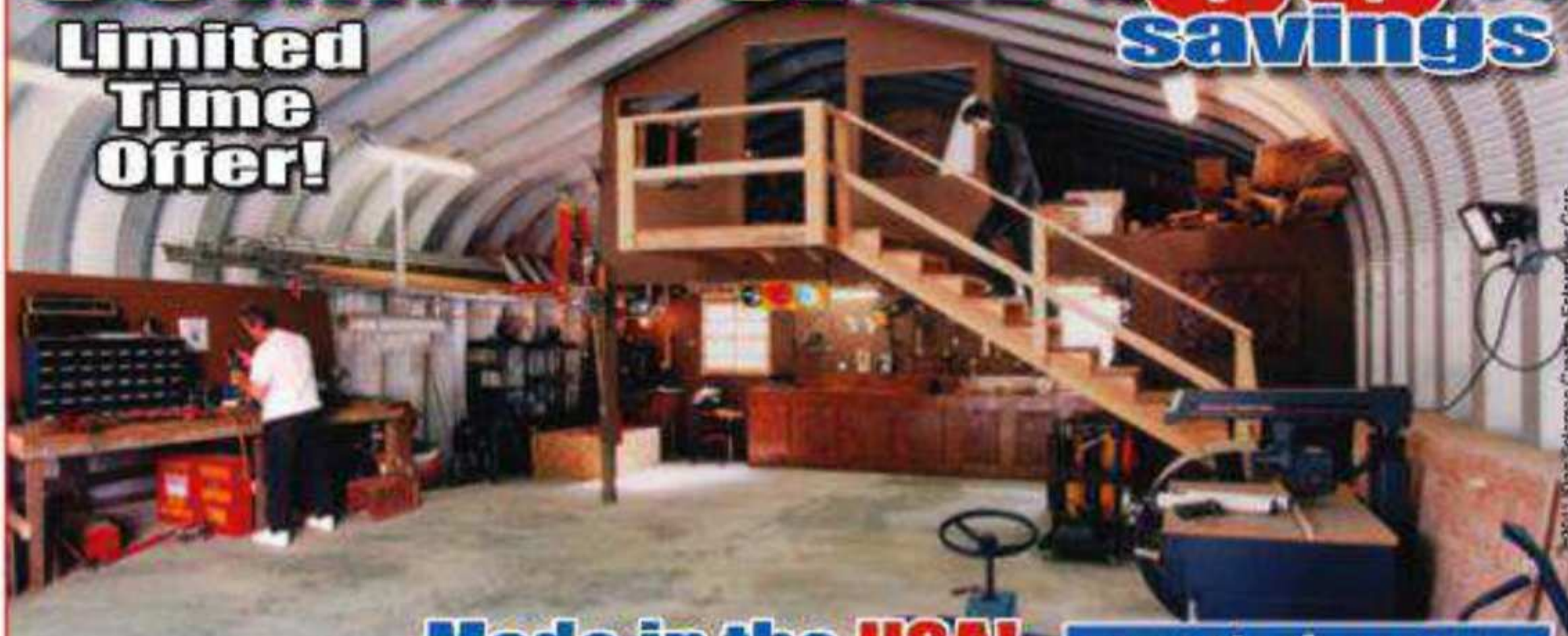
Turn to Quality

HUT
Products



(Circle No. 18 on PRODUCT INFORMATION form)

SUMMER SALE **up to 50% savings**
Limited Time Offer!



Made in the USA! www.steelspan.com
800-891-6733 ext 019

AMERICAN STEEL SPAN

(Circle No. 1 on PRODUCT INFORMATION form)

We Make Sawing Fun.
FREE! Husqvarna Chainsaw **Call for details!**
Easy to Use & Affordable!



Call or email for your FREE Catalog!

COOK'S SAW MFG.
1-800-473-4804
WWW.COOKSSAW.COM

(Circle No. 3 on PRODUCT INFORMATION form)

OSBORNE
Wood Products, Inc.

**Completely Custom
Made to order Table Apron Kits.**



**YOUR NEW SOURCE FOR
TABLE SLIDES**

866.963.5601
www.woodencomponents.com



(Circle No. 25 on PRODUCT INFORMATION form)

Shop Test continued



Some high-end planers, like the Festool HL850E, offer quick-change optional heads for specific types of “molding” cuts.

the workpiece smoothly with both hands on the machine; never use a power planer one-handed. Although a planer’s built-in kickstand keeps the cutterhead off the worksurface when not in use, it’s best to let it power down completely before setting it down.

Avoid over-reaching; if the workpiece is long, walk the planer along the cut. Keep your work area free of obstacles, and be especially



Being able to store necessary tools on the planer itself, as on the Rockwell RK5259K, is a handy feature to look for.

mindful of where the cord is at all times.

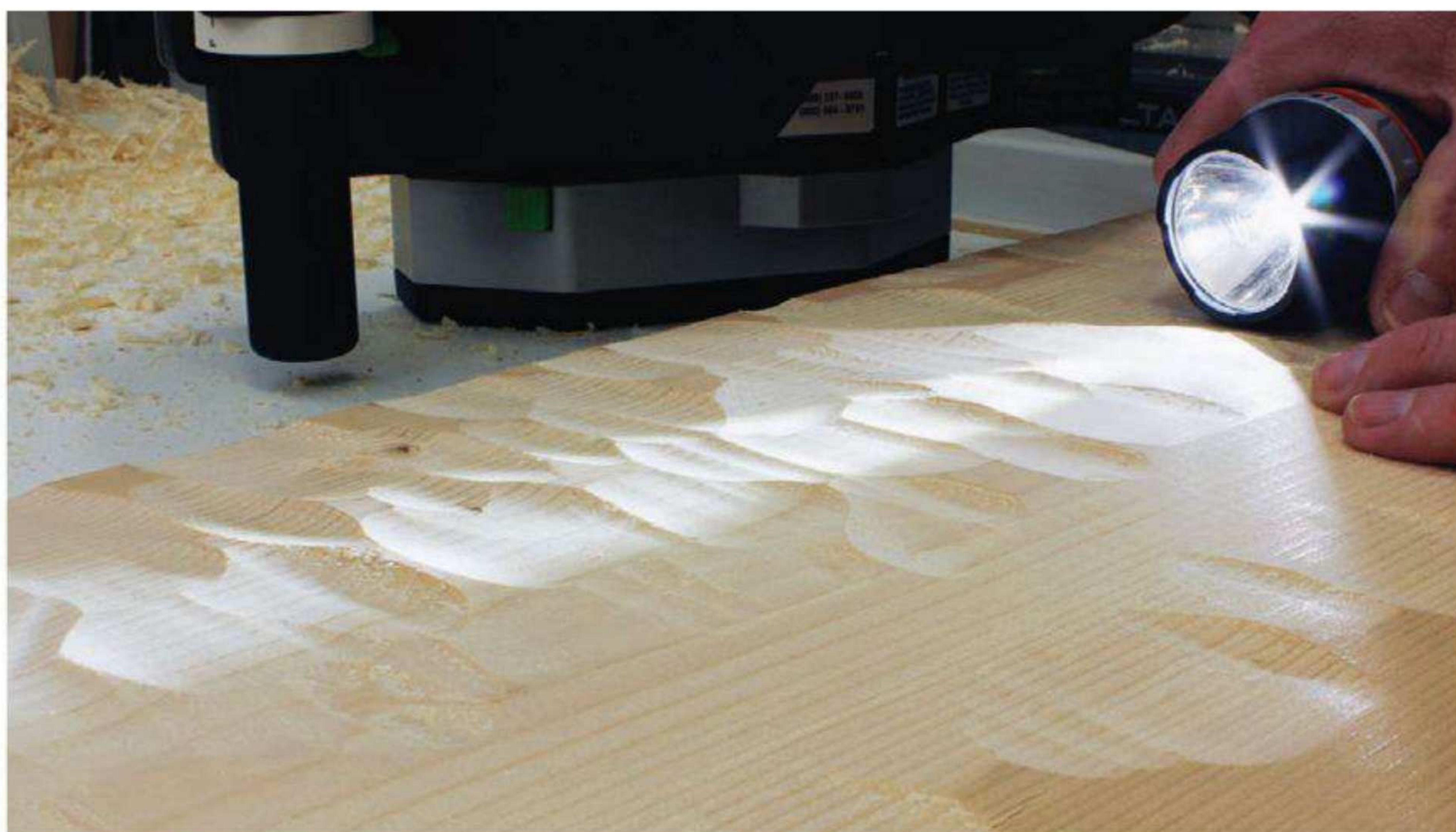
Watch those chips! It’s always best to attach the machine’s collector bag or a dust-collector hose during use. If you don’t, always pay attention to where the chips will go. You can easily spew a surprisingly large wave of chips flying five to eight feet away when planing — especially when doing deeper cuts. When using an attached bag, empty it often. Those bags fill surprisingly fast, and chips can back up into the cutterhead. If chips start flying out of the bottom of the machine as you’re planing,

you’ve got either a full bag or a chip blockage in the machine. Either way, stop and fix it.

Finally, keep those blades sharp. Dull blades slow you down, give inferior cuts and overtax the tool. Check them often. Sharp blades produce large, well-formed chips and shavings, so if you notice increased amounts of fine dust — or the planer bogging down, of course — it’s time to change or sharpen those blades.

A.J. Hamler is a woodworking author and former editor of Woodshop News.

You can even add texture! With an optional undulating head installed in the Festool HL850E, you can create a rustic rough-hewn look in lumber for beams and other architectural members.



Woodworking.com



Now a part of the Woodworker's Journal award-winning family of websites!

LEARN:

The most complete woodworking instruction site on the web. Learn as you never have before!

COMMUNITY:

Share tricks and techniques with fellow woodworkers. Visit the forum and check out our blogs and gallery photos (post your most recent work!).

PRODUCTS:

Thousands of products ... from Adirondack chair plans to zebrawood. Plus, books, magazines and new CDs!

"woodworking for everyone"™

Visit now and get (FREE)

1. A downloadable bookshelf plan.
2. Our award-winning eZine ... the most popular woodworking newsletter on the web ... now enjoyed by almost a quarter of a million woodworkers!
3. Regular updates and breaking news from woodworking.com!

www.woodworking.com/FreePlan



Why are traditional
RTA and
Cam & Dowel
Connectors shaking
in their drill holes?



**Introducing
Lamello
Clamex® P**
Detachable, Eccentric
Connectors for
Aesthetic KD Assemblies

Slides into place by hand.
No screws. No tools.



**Zeta
Lamello Biscuit Joiner**

CNC results from a
hand-held tool
with oscillating cutter action!



1-800-A-LAMELLO
lamello@csaw.com

COLONIAL SAW
MACHINERY SALES AND SERVICE

(Circle No. 38 on PRODUCT INFORMATION form)

HARDWOOD SHOWCASE

Shopping for hardwoods has never been so easy!

The Best Lumber



- ✓ Expert knowledge
- ✓ Project galleries
- ✓ 100 woods
- ✓ 100% satisfaction

Get an *amazing* online shopping experience at:

www.101woods.com

VISA MasterCard American Express PayPal 800-423-2450

(Circle No. 37)

Badger Hardwoods of Wisconsin, Ltd.

(800) 252 - 2373

17 Species of Hardwood Lumber and Plywood

Free Catalog – No Minimum Orders

www.badgerwood.com

(Circle No. 41)

YOUR NEW SOURCE FOR TABLE SLIDES

Table Slides
Equalizer Slides

866.963.5601
www.woodencomponents.com

(Circle No. 26)

To place your ad in

HARDWOOD SHOWCASE

Contact
Dana Severson

763-478-8306

Pssst! NEED WOOD?

woodfinder®

Over 400 Suppliers
35 Ways to Search

www.woodfinder.com

SERVING WOODWORKERS AND INDUSTRY SINCE 1999

Super Selection

Over 160 wood species available in a variety of sizes to inspire any woodworker!

Rockler.com | **1-877-ROCKLER**

(Circle No. 32)

Classic Project Plans...

ONLY
\$1.00 EACH!
(Downloadable only)



Download NOW at: www.woodworkersjournal.com/classics

Woodworking Tools & Supplies Index



August 2011

To receive information about the products or services featured in the advertisements in this issue, fill in the attached postcard, circling the appropriate number(s). Please allow 4 to 6 weeks for delivery.

For product information in the blink of an eye, visit our website to link to any of our advertisers' sites: www.woodworkersjournal.com/adinfo

ADVERTISER	Reader Service No.	Page No.	Web Address	ADVERTISER	Reader Service No.	Page No.	Web Address
American Fabric Filter Co.		25	americanfabricfilter.com	Grizzly Industrial, Inc.	16	2, 3	www.grizzly.com
American Steel Span	1	57	www.steelspan.com	HTC Products	17	57	www.htcproductsinc.com
Arrow Fastener Co., LLC	42	71	www.arrowfastener.com	Hut Products	18	57	www.hutproducts.com
Badger Hardwoods of WI, Ltd.	41	60	www.badgerwood.com	Kreg Tool Company	19	17	www.kregtool.com/rac
Bench Dog Tools	30	13	www.benchdog.com	Lee Valley Tools, Ltd.	20	23	www.leevalley.com
Bosch Tools	2	7	www.boschtools.com	Lignomat	21	56	www.moistureproblems.info
CNC Shark	23	15	www.rockler.com	Loctite	22		www.loctiteproducts.com
Colonial Saw	38	59	www.csaw.com	Old Masters	24	55	www.myoldmasters.com
Cook's Saw MFG, L.L.C.	4, 3	25, 57	www.cookssaw.com	Osborne Wood Products	25, 26	57, 60	woodencomponents.com
Country Home Products		69	www.drpower.com	Powermatic	27	5	www.powermatic.com
Dura-GRIT	5	25	www.duragrit.com/wj	RockAuto, LLC	28	17	www.rockauto.com
Eagle America	6	17	eagleamerica.com/wj1107	Rockler Woodworking and Hardware	39, 29 31, 32	9, 53 56, 60	www.rockler.com
Earlex, Inc.	7	21	www.earlex.com	ShopBot Tools	33	25	www.shopbottools.com
Ebac Lumber Dryers	8	19	www.ebacusa.com	Steel City Tool Works	34	17	www.steelcitytoolworks.com
Epilog Laser	9, 10	11, 56	epiloglaser.com/wwj.htm	Wagner Electronics	35	65	www.wagnermeters.com
Fuji Spray Equipment	11	19	www.fujispray.com	Williams & Hussey Machine Co.	40	25	www.williamsnhussey.com
Furniture Medic	12	18	furnituremedicfranchise.com	Woodfinder		60	www.woodfinder.com
General Tools & Instruments	13	72	www.generaltools.com/wwj	Wood-Mizer	36	18	www.sawboards.com
Gorilla Glue	14	19	www.gorillatough.com	Woodworkers Source	37	60	www.101woods.com
Grex Power Tools	15	19	www.grexusa.com	Woodworking.com		59	woodworking.com/freeplan

**WIN
A FREE
TOOL!**

We give away a free tool in every issue of Woodworker's Journal! Just circle the reader service numbers of the companies you're interested in and answer the survey questions on the card at left. Send it in for your chance to win ... we even pay the postage!

Tool Review

Stacked Dado Blades

By Chris Marshall

There are many dado blade makers claiming that they have “premium quality” offerings. Our author headed to his shop with eight of the top contenders to put their claims to the test.



Do you want to realize the full joint-making potential of your table saw? Then buy a quality stacked dado blade. When it comes to joinery, only a router can surpass a table saw and dado blade for versatility. With a dado blade, you can mill a variety of rabbets, dados and grooves, tenons, both parts of a tongue-and-groove joint, spline slots, box joints and a slew of different lap joints — all from this one multi-piece blade accessory.

While I was collecting these premium 8" models for testing, I recalled my first dado blade from 20-some years ago. It consisted of a pair of wobbling blades on an adjustable hub — a regrettable performer. I could rarely dial it in to get a proper flat-bottomed dado, and the top “show” edges of the cuts were often ragged messes. That all changed when I upgraded to a quality stacked set. By swapping chipper blades of varying thicknesses, I could easily achieve any cutting width I wanted. The bottoms were dead flat — just what you’re after when machining interlocking joinery — and the top edges were very tidy. It was an astonishing and instant improvement.

These days, premium dado blades abound, and hearty competition between blade makers means you can get professional results from many different sources. This test group consists of the best of the best, so I wasn’t surprised to see some stellar results ... but picking an overall winner was perplexing. More on that later. Here’s how the test went and what I thought after the chips flew.

Making Tracks, Earning Stripes

We woodworkers want to buy only one dado blade that cuts it all well — from composite sheet materials to both softwood and hardwood, so I made test cuts on all three material types: black melamine particleboard to evaluate edge chipping, oak veneer plywood and cedar to inspect for splintering, and some hard maple. I cut as many 5/8"-wide, 3/8"-deep dados into 2 x 2 ft. sheets as I could fit on the melamine and across the veneer of oak ply. Next, I made 25 cross-grain cuts on 1 x 8 cedar; all of these cuts were made on a 3hp cabinet saw with workpieces resting in a crosscut



Tool Review continued



Amana 658060 Prestige

Street price: \$199.95
 Chippers: 6 (1/16", four 1/8", 3/32")
 Maximum cutting width: 29/32"
 Outer blades: 24-tooth
 Chipper style: Four-wing
 Carbide: C4; Hook angle: -10°

sled. Then I stacked the full load of chippers onto each blade to adjust for maximum width and cut three grooves in hard maple. It was a good way to evaluate bottom and side-wall smoothness with all parts in place. After making my test cuts, I used a low raking light (see photo, below right) to inspect the test pieces closely. I tabulated my inspections of the results in a chart that you can see as a "More on the Web" entry for this issue.

Amana Prestige

Amana's 24-tooth dado provides solid features: it comes with six chippers, including a 3/32" size that makes it easier to adjust for cutting undersized 15/32" or 23/32" plywoods. Color-coded shims allow for even more cutting width micro-adjustment. Negative 10° hook angles on the blade teeth (the teeth tip back 10° from an imaginary line extending from the center of the arbor hole out to the tooth faces) allow it to cut less aggressively than positive hook blades, which purportedly extends carbide life and leaves cleaner cuts. Amana also provides a sturdy plastic carry case — a must for dado blades, because most of us store them more often than our standard saw blades.



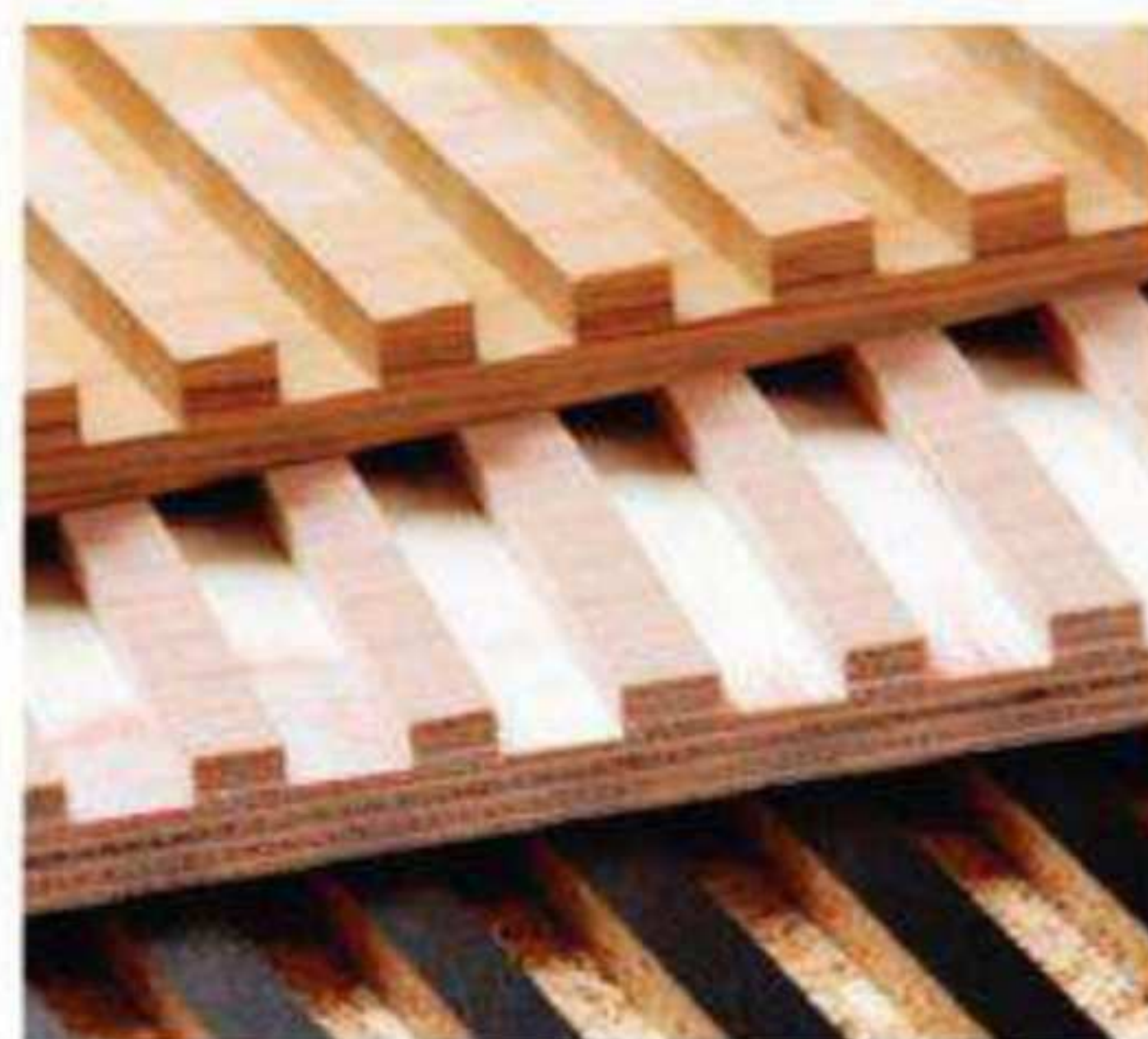
Bosch PRO824

Street price: \$240-\$247
 Chippers: 4 (1/16", two 1/8", 1/4")
 Maximum cutting width: 13/16"
 Outer blades: 24-tooth
 Chipper style: Two-wing
 Carbide: C3; Hook angle: +15°

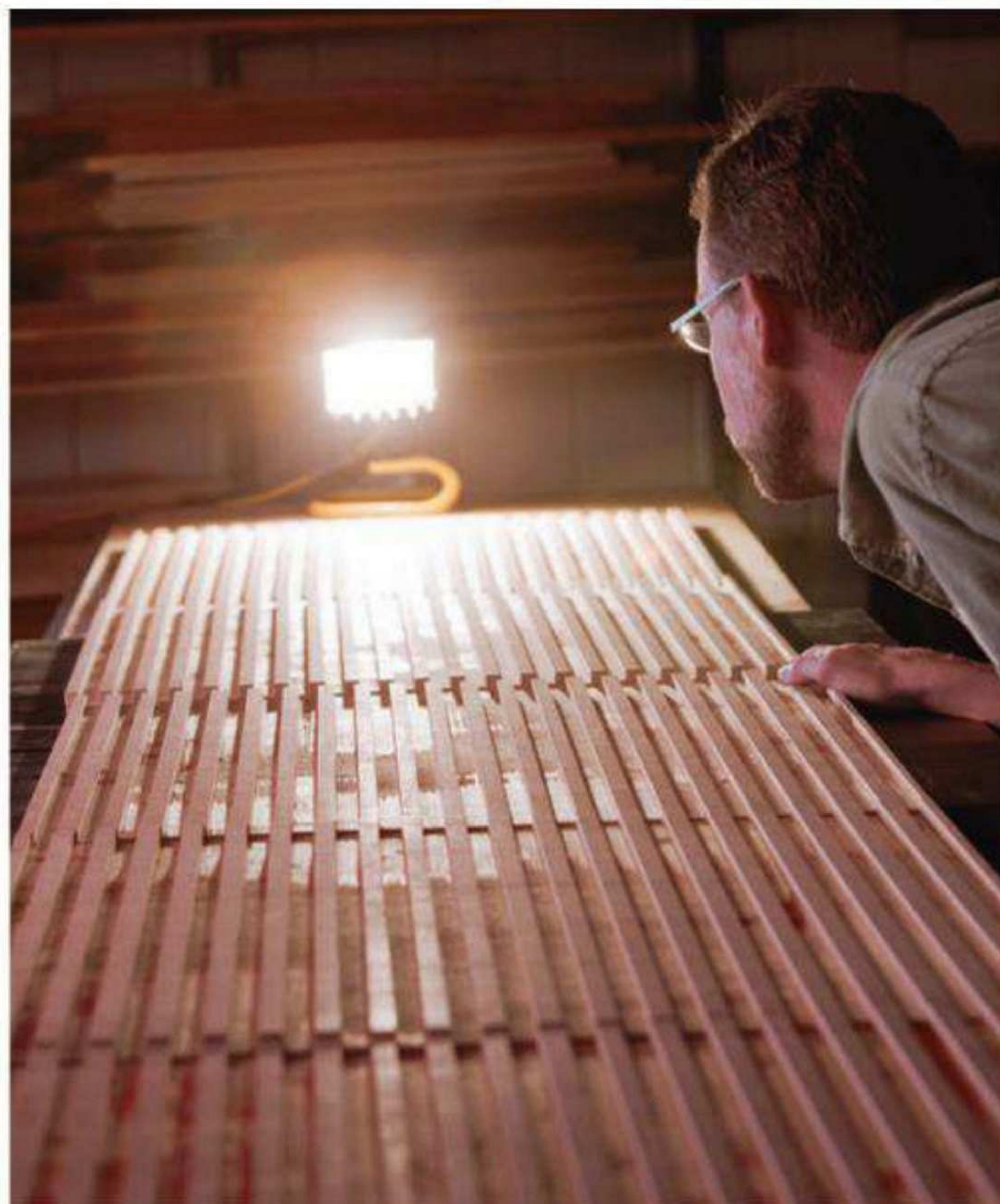
In testing, this blade sliced across delicate oak veneer with no splintering, and it did nearly as well on cedar. There were only a few chipouts on melamine, and I could find just a hint of blade tracks in the bottoms of wide maple dados. Anti-kickback humps behind the teeth also make it less likely to invite kickback, because they limit each tooth's "bite" and prevent overfeeding. Here's a fine blade for a competitive price.

Bosch PRO824

With 15 degrees of positive hook, I wasn't expecting this Bosch blade to cut as cleanly as it did. It left a fair amount of splintering on oak ply, but the results were still above average for me, and it handled melamine quite well, too. Cross-grain cedar cuts were nearly perfect and entirely on par with other negative hook blades. The thickest chipper blade left noticeable score marks in the bottoms of the



Clean-edged, flat-bottomed dados were the standard to meet here, in various chip- and splinter-prone materials. A low raking light (below) highlighted any defects in the test cuts.





CMT 230.524.08

Street price: \$210

Chippers: 6 (1/16", four 1/8", 3/32")

Maximum cutting width: 29/32"

Outer blades: 24-tooth

Chipper style: Four-wing

Carbide: C4; Hook angle: -5°

maple dadoes, but the sidewalls and top edges of these cuts were still clean. The two-wing chippers that come with this blade do have to cut more material per revolution per tooth than chipper blades with more teeth, but the carbide is really thick. That should allow for several resharpenings when they finally dull. Still, despite a good showing in testing, this blade seems overpriced — it's at least \$40 more than the "sweet spot" of \$199 among this test group.

CMT 230.524.08

For \$210, CMT outfits your saw with a lot of steel — look at the size of those big four-tooth chippers! Anti-kickback humps should make this a safer blade to use, and with a

3/32" chipper, it's ready to go after today's thinner sheet goods. I also appreciated the sturdy hard-plastic case with star knobs to hold blade parts on either side. This "heavy hitter's" strengths were in melamine and oak ply, where it delivered almost flawless cuts; it left more splinters in soft cedar and some blade tracks in maple. Still, there's no question that it deserves positive marks as a premium blade choice for general use.

Everlast DS840

Everlast incorporates 16 more teeth on the outer blades than others here, and their -5° hook angle cut almost perfectly through composites and cedar. The two-wing chippers did



Everlast DS840

Street price: \$274

Chippers: 4 (1/16", two 1/8", 1/4")

Maximum cutting width: 13/16"

Outer blades: 40-tooth

Chipper style: Two-wing

Carbide: C3; Hook angle: -5°



Booth
1962



WAGNER MOISTURE METERS

FEATURING ADVANCED *IntelliSense™ Technology*

Measuring moisture **IN** the wood, not **ON** the wood

- ❖ More accurate* & over 10 times faster than pin-type meters
- ❖ Quick & easy deep measurements without the damage
- ❖ Proudly manufactured and supported in the USA

Providing fast and accurate moisture measurements, Wagner's **CLEARLY ADVANCED** moisture meters have been the preferred choice of professionals for over 25 years.

www.wagnermeters.com 1-800-505-1281



*Accuracy proven by multiple independent university studies.

(Circle No. 35 on PRODUCT INFORMATION form)

Tool Review continued



Forrest Dado King

Street price: \$299

Chippers: 6 (1/16", four 1/8", 3/32")

Maximum cutting width: 29/32"

Outer blades: 24-tooth

Chipper style: Four-wing

Carbide: C4; Hook angle: -10°

leave more noticeable score lines in maple than other blades, so it lost some ground for me there — but the results were still cleaner than Bosch in this regard. A 3/32" chipper and shim set would make this blade a more competitive buy for its price.

Forrest Dado King

If you follow blade articles, you already know that Forrest has ranked high or even dominated most categories for years. It's a reputation for quality and performance the company has earned by developing superior products. And, in this dado test, the Dado King definitely didn't underwhelm. Crosscuts in cedar were surgically sharp; melamine and oak ply were nearly so. It whisked maple so cleanly on the bottoms, you'd think they were made from a single ultra-wide blade. Wow.

You get a 3/32" chipper here along with a full selection of other sizes, a seemingly indestructible case and magnetic shims. But, at this time when budgets are tight, the venerable Dado King hits the price ceiling for this group of blades at \$299. Distributors may offer it for less, but the rationale to buy it over one of the other top-flight dadoses selling for \$100 less seems tougher to justify.

Freud SD508

Time for a confession: I've been using a Freud SD508 for about eight years, and it's never needed sharpening. It



Anti-kickback humps behind the blade teeth (as seen on the grey edged blade above), help prevent kickbacks. Some blades have them, others don't.



Chipper wing counts (right) vary from two to six teeth per blade. Regardless of style, all chipper blades come in a range of thicknesses (below) to adapt to various cutting widths.



still cuts clean dadoses with flat bottoms consistently, so I had high expectations for this new set with its flashy chrome outer blades. And true to form, it did itself proud in testing. I gave it perfect scores for clean cuts in both maple and cedar; I had to search hard to find any evidence of chipping in melamine or splinters in oak ply; there were scant few.

Freud provides the undersized chipper, anti-kickback provisions behind each tooth and a decent case

with plastic spacers to pad the blade parts. A street price just shy of two hundred bucks puts it right in the hunt group for median pricing. You won't be disappointed with this blade. That's my time-tested verdict — and something we cannot often attest to in these sorts of "point-in-time" tool reviews.

Infinity Dadonator

Speaking of impressive dado blades, seven years ago when I last tested stacked sets, Infinity didn't even offer dado



Freud SD508

Street price: \$199.99

Chippers: 6 (1/16", four 1/8", 3/32")

Maximum cutting width: 29/32"

Outer blades: 24-tooth

Chipper style: Four-wing

Carbide: H01S; Hook angle: -12°

blades. Even so, click on the company's website and you'll see the accolades this blade has earned in under a decade. I can concur with those votes of confidence, based on my testing. The Dadonator's six-wing chippers (more chipper teeth than any other blade here) made easy work of cross-grain cuts in cedar. In spite of all of those teeth, it earned a perfect score for cutting smoothness in maple. Melamine and oak ply were sliced cleanly, too, with just a tiny chip or splinter here or there over about 100 lineal feet of cuts.

I like Infinity's thoughtful labeling of those chippers: each is laser etched with its thickness — very helpful. An undersized chipper and a set of color-coded shims round out the package. A sub-\$200 pricetag should add this blade to your short list when you're ready to buy. Only one gripe: it would be nice if it came with the wooden case Infinity sells separately for \$20. This would be icing on the cake.

Ridge Carbide North Woods Dado-Master

If you haven't heard of Ridge Carbide, it's a company worth adding to your bookmark list when shopping for cutters, based on how this dado blade performed. The outer blades are 24-tooth with a negative hook, and you get six four-wing chippers, including the 3/32" size. There are no anti-kickback humps behind these teeth. When I stacked it up, the Dado-Master whipped through melamine particleboard with the same finesse as its competition. A few tiny chipouts were all I could find. It didn't do quite that well when cutting across oak veneer plywood or splintery cedar, but don't misunderstand me — the splinters amounted to tiny whiskers along the edges that could be cleaned away with sanding. Still, some other blades left a cleaner shave on these materials.

Ridge Carbide provides a set of brass shims with this blade, and their thicknesses are

marked to help you fine-tune your cuts. You'll also get the same open-sided case that comes with the Forrest blade. Big wingnuts on both sides make it easy to lock the blade parts securely for storage.

But the most noteworthy aspect of this blade — aside from respectable performance in cutting tests — is that it sells for about \$80 less than the mid-pack-priced blades, which makes it a strong value. While it didn't quite deliver the same cutting quality as that sub-group, this blade would deserve a "Best Value" award if we offered it. A very apt stacked set for the money.

Who Makes Top Cut?

Typically when I conclude a round of testing, a tool stands out in my mind almost immediately as pick of the litter. It outperforms the others, sells for a fair dollar and is rich with features. This time, three blades left this strong impression: Amana, Freud and Infinity. In cutting tests they ran a neck-in-neck race, and they're priced the same. We don't award multiple "Best Bet" awards, but all three of these blades deserve that prize. There are so many consistencies between this trio, it would be unfair to pick just one as the overall winner.

Chris Marshall is Woodworker's Journal's Field Editor.



Infinity Dadonator

Street price: \$199.90
Chippers: 6 (1/16", four 1/8", 3/32")
Maximum cutting width: 29/32"
Outer blades: 24-tooth
Chipper style: Six-wing
Carbide: C4; Hook angle: -5°



Ridge Carbide

Dado-Master

Street price: \$119.95
Chippers: 6 (1/16", four 1/8", 3/32")
Maximum cutting width: 29/32"
Outer blades: 24-tooth
Chipper style: Four-wing
Carbide: C4; Hook angle: -5°

DADO BLADE SOURCES

Amana: 800-445-0077; www.amanatool.com

Bosch: 877-267-2499; www.boschtools.com

CMT: 888-268-2487; www.cmtusa.com

Everlast: 800-387-5278; www.everlastsaw.com

Forrest: 800-733-7111; www.forrestblades.com

Freud: 800-334-4107; www.freudtools.com

Infinity: 877-872-2487; www.infinitytools.com

Ridge Carbide: 800-443-0992; www.ridgecarbide.com

Skill Builder

Drill Press Maintenance

By Sandor Nagyszalanczy

It is easy to ignore these steady-Eddie workhorses of the shop, but a little attention will improve their performance and longevity.

Power Tool Tune-ups: 2011 Schedule

Table Saw
February

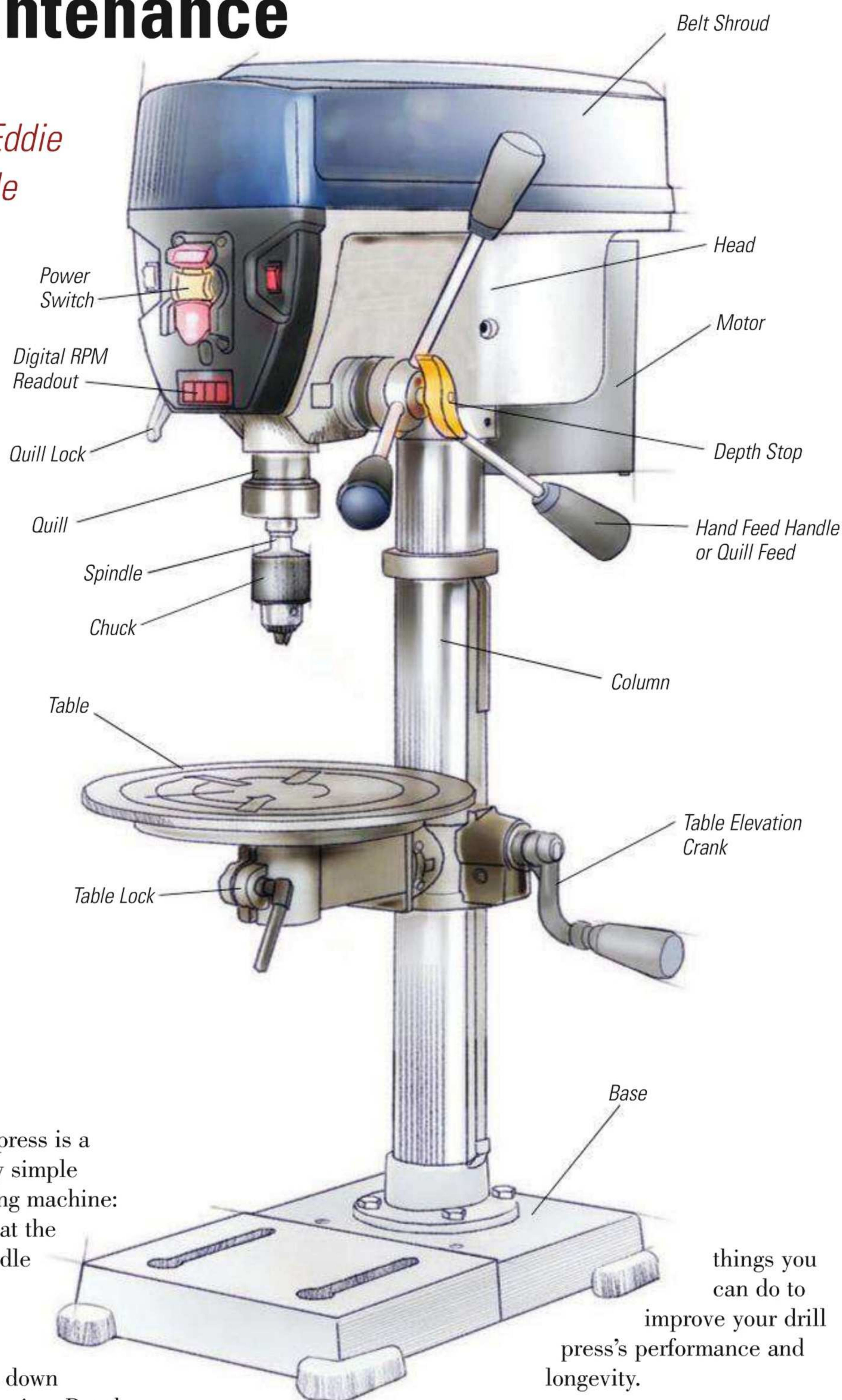
Band Saw
April

Jointer
June

Drill Press
August

Planer
October

Dust Collection
December



A drill press is a pretty simple looking machine: just a chuck at the end of a spindle that holds a drill bit, and allows it to move up and down while it's spinning. But there are a number of things that can get out of kilter that compromise drilling performance and accuracy. These include issues with the machine's pulleys and drive belt, spindle and chuck and the table and column. Fortunately, it doesn't take a lot of time or effort to do a few basic maintenance tasks that

things you can do to improve your drill press's performance and longevity.

Clean and Slippery

If the outside of your drill press's steel and iron parts are rusty or dirty, clean them off using either a rust remover such as Naval Jelly for heavier rust deposits, or a cleaning solvent/degreaser for lighter grime. Use a plastic abrasive pad or steel wool to scrub the surfaces. Wipe all

help keep your drill press running smoothly. Unless otherwise specified, all the procedures described in this article should be performed with the drill press unplugged from electrical power.

We'll start out by cleaning and lubricating the tool, but as stated, there are many

www.woodworkersjournal.com MORE ON THE WEB

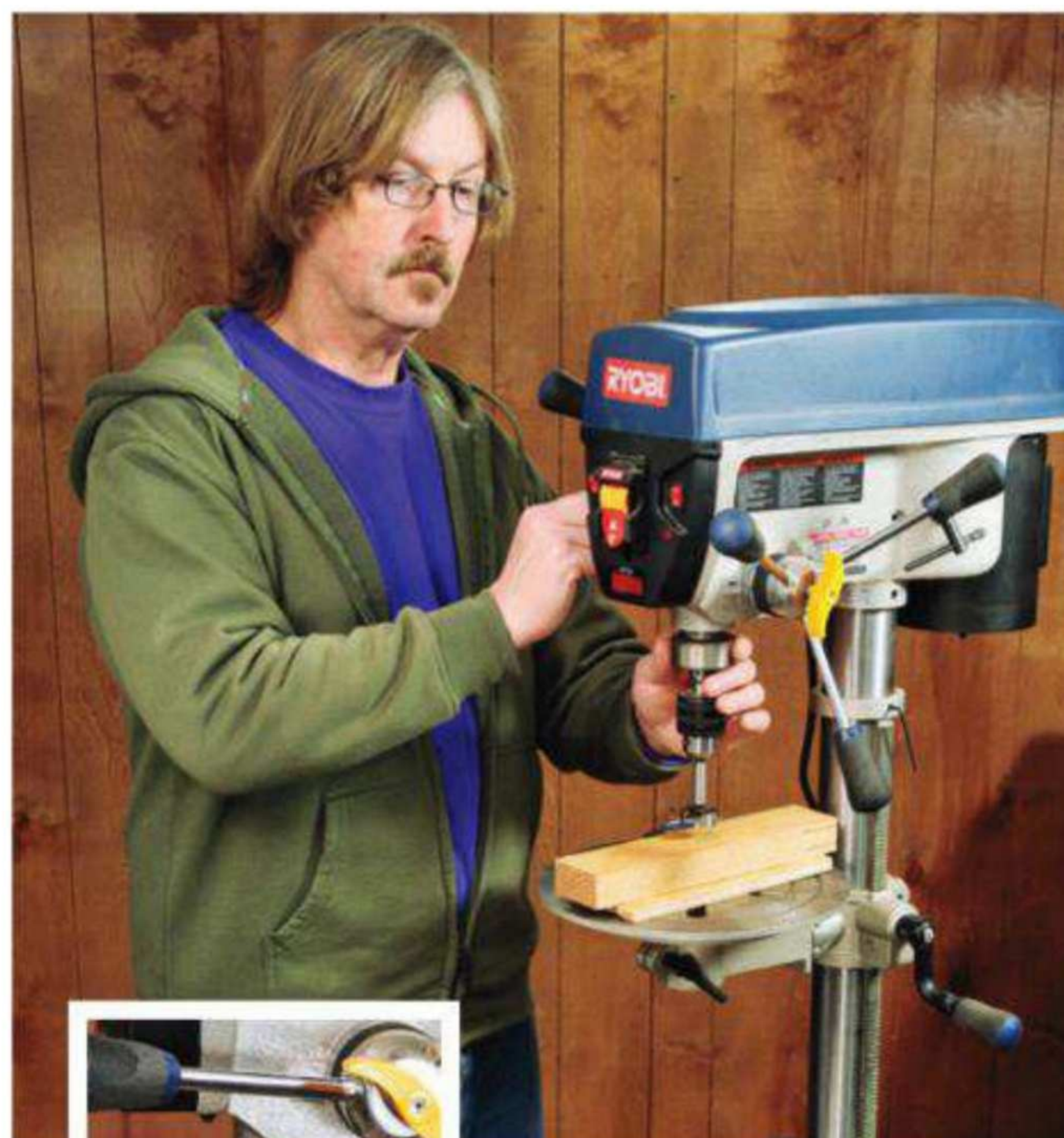
For a more extensive article and video on using and maintaining your drill press, visit woodworkersjournal.com and click on the "More on the Web" tab shown above. Or send a large SASE to Woodworker's Journal, Skill Builder 22, 4365 Willow Drive, Medina, MN 55340.

parts dry with a clean rag. To keep the column, table, chuck and other bare metal surfaces from corroding, coat them with a protective spray, such as Bullfrog Rust Blocker. It's also a great idea to vacuum out any sawdust from the machine's motor and electrical switch boxes.

To keep the chuck's jaws operating smoothly — essential to proper bit centering — apply a little drying lubricant, such as Boeshield T-9®, inside of the chuck: First, however, turn the chuck's shell until the jaws are fully open and blow the inside clean with a burst of compressed air (wear

goggles to keep flying dust out of your eyes). Spray or squirt some lubricant up inside and tighten and loosen the jaws a few times while the excess lube drips out. Wipe off any residue with a clean rag.

Along with the previous articles in the Skill Builder series, the entire drill press article (including details on how to deal with and prevent vibration and belt wear, checking and adjusting for runout and a host of other items) and a supporting video discussing these various tasks can be found at woodworkersjournal.com.



A careful inspection, cleaning and lubrication is the first step to sprucing up the performance of your drill press.

For complete instructions, visit woodworkersjournal.com and click on the "More On the Web" button.



CLEAR OVERGROWN PROPERTY FAST!

Take control with a DR® FIELD and BRUSH MOWER.

CUT A 44"-WIDE PATH Attaches easily to your ATV or riding mower.

MOW WEEDS, BRUSH, even 2"-thick saplings — with up to 20 HP of V-Twin power!

REMOTE CONTROL lets you manage all blade, clutch, and engine functions from your towing vehicle!

OUTRIGGER™ TOW BAR cuts 100% outside the path of towing vehicle to mow along fences, under trees.

Powerful Self-Propelled Brush Mowers also available!



72232X © 2011



Call for a FREE DVD & Catalog!
TOLL FREE **1-888-212-2548**
www.DRfieldbrush.com

STUMP REMOVAL FAST & EASY!

ELIMINATE Landscape Eyesores with a DR® STUMP GRINDER!

- **EXPAND** lawn areas.
- **OPEN UP** fields & meadows.
- **BLAZE** new trails.
- **REMOVE** mowing hazards.

The DR® STUMP GRINDER uses carbide-tipped cutting teeth that take over 400 "bites" per second, to pulverize stumps into a pile of woodchips. Quickly and easily, you can grind any size tree stump below ground level. Gone forever!



72233X © 2011



Call for a FREE DVD & Catalog!
TOLL FREE **1-888-212-2548**
www.DRstumpgrinder.com

Finishing Thoughts

The Achilles' Heel of Outdoor Furniture Projects

By Michael Dresdner

No matter how carefully you choose the wood or the finish, the Achilles' heel of outdoor furniture is typically the bottom of the feet.

CONTACT US

with your "Finishing Thoughts" by writing to Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340, or by emailing us at:

finishing@woodworkersjournal.com

Please include your contact information with your thoughts or questions.

In most cases, when it comes to outdoor woodworking projects, the part that comes in contact with the ground is end grain. While water sheds off the rest of the piece, those end grain surfaces often sit in it, acting like a wick.

As you probably know, wood is made up of hollow cells that look like a bundle of straws when viewed on end. They will hungrily wick up water when furniture feet stand on wet ground. That can create excess swelling and can contribute to premature rot and cracking.

A good finish on the ends or the use of rot-resistant wood will help, but there's something more you can do, and it's fairly quick and simple. Before you apply the finish, plug up those end grain areas with exterior epoxy. The epoxy will soak up into the end grain, creating



Ouch!@#! The feet of this wooden sculpture were never protected from the elements.

plugs that stop up those straw-like ends, preventing water from wicking up. That, in turn, can extend the life of your table and chair legs.

It's obvious why this technique works on simple furniture with vertical legs, but I also use it on Adirondack chairs. In most designs, the bottom of the angled back legs are cut diagonally across the grain. Although they are a bit less prone to problems than full-on end grain, they can still soak up excess water, and it's a good precaution to seal them.

Epoxy is the Answer

Since epoxy is inert when cured, it is compatible under exterior finishes, so seal the ends before finishing. Turn the piece upside down before you apply the finish, and make sure the ends are clean. I like to sand the end grain with coarse 80-grit paper to make certain that I have a clean surface with clearly open end grain. Choose a slow-curing epoxy, one with a

12-hour cure rather than quick-set "five-minute" epoxy. You don't want it to set up before it has a chance to soak down into the pores.

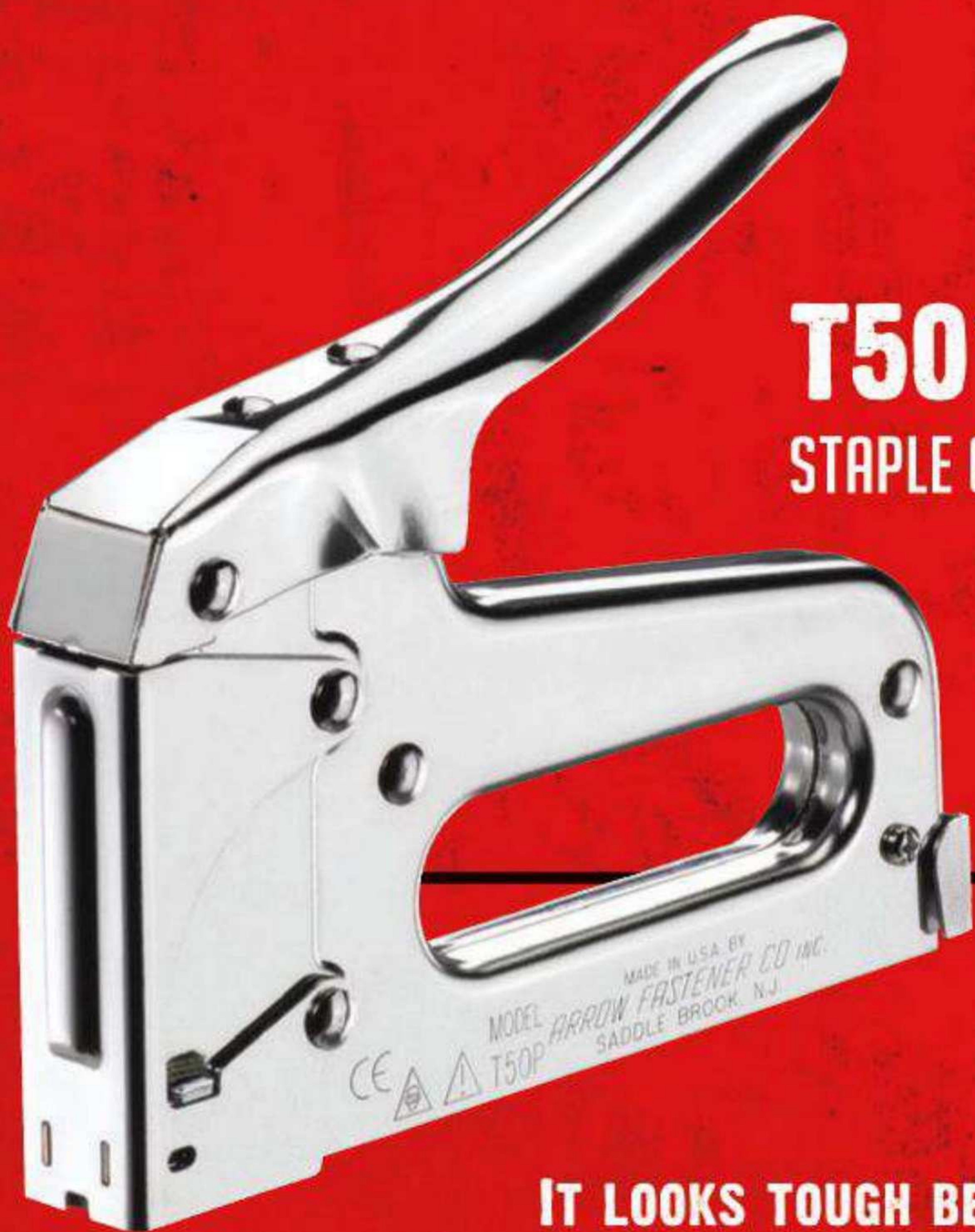
Mix a batch of epoxy and spread it across the end grain, pushing it into the pores with a popsicle stick or scrap wood stirring stick. The goal is to get it only on and in the end grain and not on the adjacent flat grain surfaces. Give it a minute or two to soak in, then squeegee off the excess so that the end grain is fully packed and just a very thin coat of epoxy skins the surface. Don't leave it on too thick or it can chip off. The idea is to impregnate, seal and case harden the end grain rather than apply a surface coating. Let it cure fully, usually overnight, then sand the sides of the legs prior to finishing in order to remove any wayward epoxy.

You'll find that this simple precaution can measurably extend the life of your outdoor projects.



Using an epoxy with a long open time allows the resin to "soak" into the wood fibers. Here the epoxy is being applied to the "Westport Chair" featured on page 44.

BUILT RIGHT, BUILD RIGHT.



T50®
STAPLE GUN

**TOOLS AS TOUGH
AS THEY LOOK**

IT LOOKS TOUGH BECAUSE IT IS; DESIGNED, TESTED AND PROVEN TOUGH. WE BUILD TOOLS THAT STAND UP TO YEARS ON THE JOBSITE BECAUSE THAT IS WHAT PROFESSIONALS DEMAND. FOR OVER 80 YEARS WE'VE BUILT TOOLS THE RIGHT WAY, SO YOU CAN BUILD IT RIGHT EVERYDAY.



Like us on Facebook.

www.facebook.com/ArrowFastener

www.arrow-red.com/woodworkers



MADE WITH PRIDE IN THE USA

©2011 Arrow Fastener Co., LLC

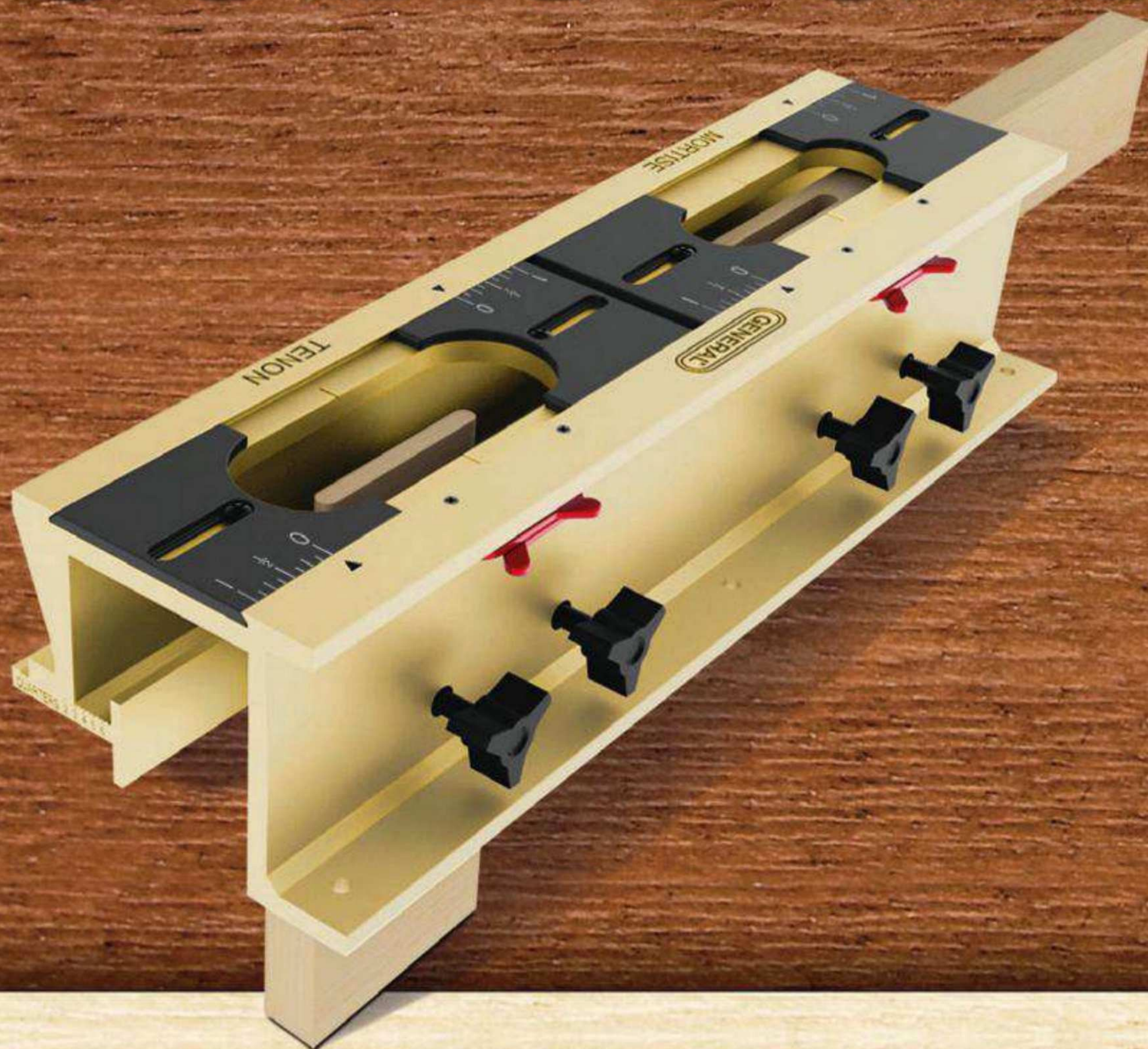
Arrow® and T50® are registered trademarks of Arrow Fastener Co., LLC



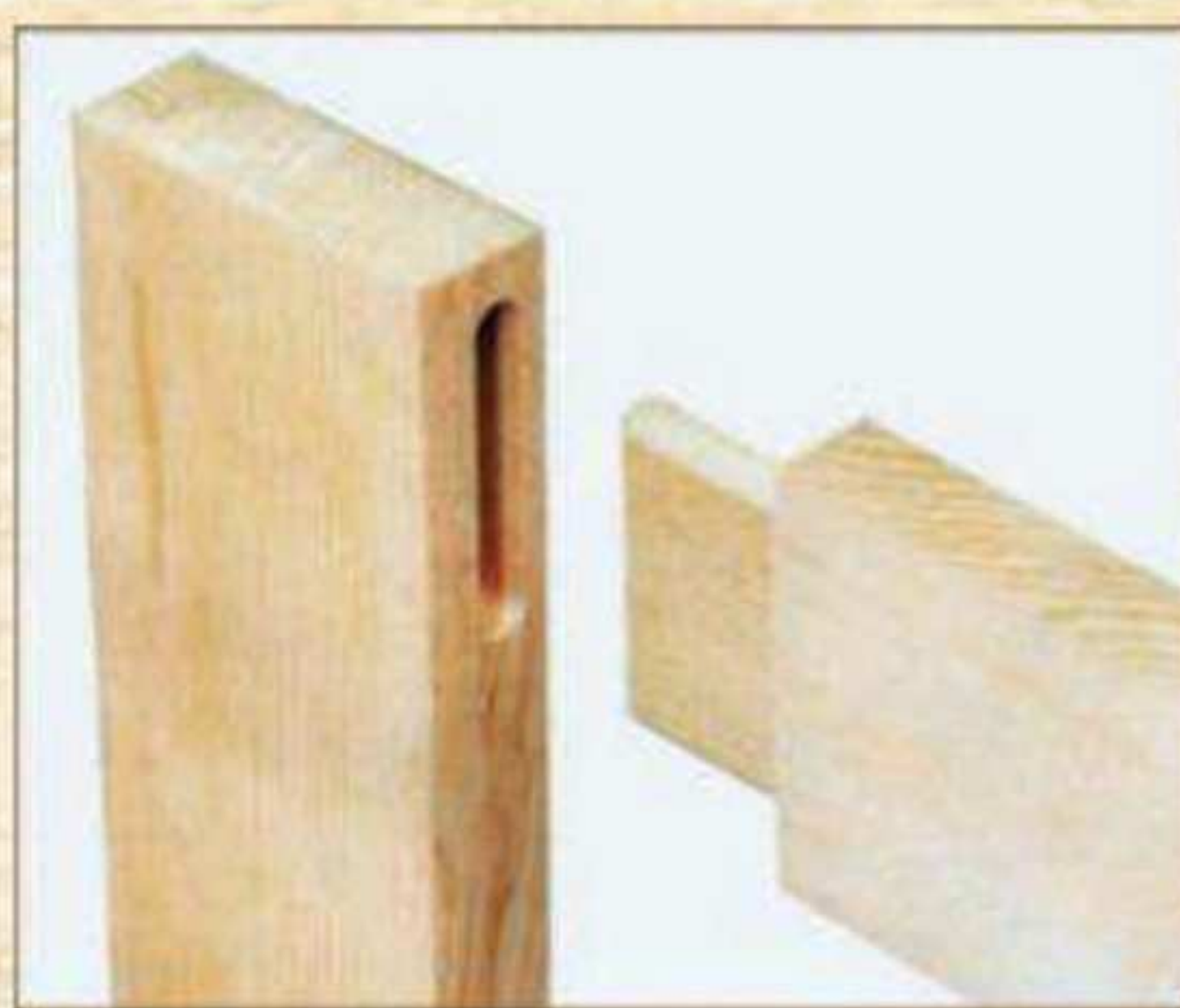
PROFESSIONAL FASTENING
- SINCE 1929 -

(Circle No. 42 on PRODUCT INFORMATION form)

Relieves Joint Pain



We feel your pain. Trying to make an accurate mortise and tenon joint without spending an arm and a leg on an expensive and elaborate jig setup can really give you a headache. But now General has developed the remedy. Our new E•Z Pro™ Mortise & Tenon Jig lets you cut a matching mortise and tenon with a single jig right out of the box! Just add a plunge router



and stir. You'll be making 1/4", 3/8" or 1/2" mortises & tenons in no time and feeling much better. And, you don't need a prescription — our new affordable jig is available over the counter. Ruggedly made from hardened, high-quality aluminum, General's M&T Jig is designed for years of reliable service and provides long-lasting relief. Works way better than aspirin!

For more information on General's new Mortise & Tenon Jig and the rest of our E•Z Pro™ line of innovative wood joining jigs, visit: generaltools.com/wwj

E•Z Pro™

It's your job — General Tools make it easier.

