NEW ASIAN PLANES – DO THEY MAKE THE CUT?

Tool Test:
Ashley Iles
Chisels

POPULAR Woodworking

Learn How. Discover Why. Build Better.

JUNE 2009 #176

EXCLUSIVE!

Roy Underhill's TOOL CHEST

Pump Up Your Skills With His Step-by-Step Plans

No-Nonsense ROUTER TABLE

Dirt-simple, Dirt-cheap Works Like a Champ

New, Fast & Easy Way to EBONIZE WOOD

5 SIMPLE STEPS to Better Drawer Layout

Classic HUNTBOARD With Modern Joints

popularwoodworking.com

fw media
US $5.99
06
0 74470 01355 6
Display until June 29, 2009

POPULAR Woodworking
Learn How. Discover Why. Build Better.

JUNE 2009

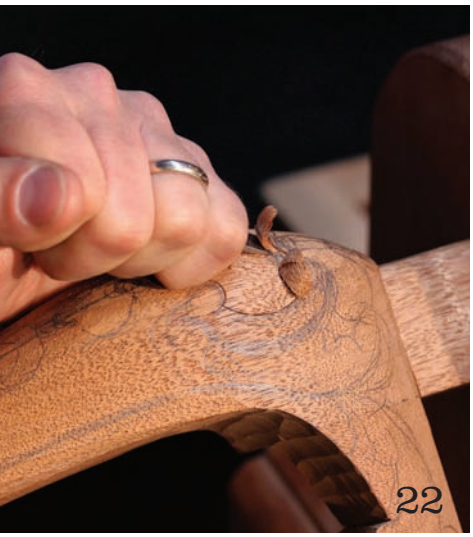
Features

51

Number 176, June 2009. *Popular Woodworking* (ISSN 0884-8823, USPS 752-250) is published 7 times a year in February, April, June, August, October, November and December by F+W Media, Inc. Editorial and advertising offices are located at 4700 E. Galbraith Road, Cincinnati, Ohio 45236; tel.: 513-531-2222. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (7 issues) is $19.96; outside of the U.S. add $7/year ▪ Canada Publications Mail Agreement No. 40025316. Canadian return address: 2835 Kew Drive, Windsor, ON N8T 3B7 ▪ Periodicals postage paid at Cincinnati, Ohio, and additional mailing offices. Postmaster: Send all address changes to *Popular Woodworking*, P.O. Box 420235, Palm Coast, FL 32142-0235 Canada GST Reg. # R122594716 ▪ Produced and printed in the U.S.A.

JUNE 2009

REGULARS



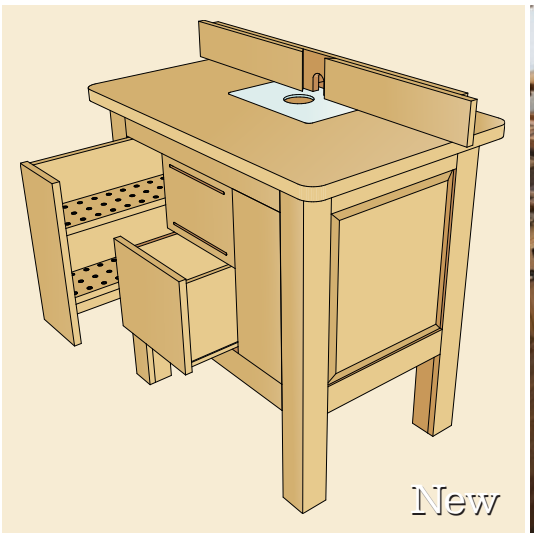
ON THE JUNE COVER

Roy Underhill shows you how to make a traditional joiner's tool chest with proper joinery and old-school tools. Page 32.

COVER PHOTO BY AL PARRISH

I Can Do That

JUNE 2009
ONLINE



Video Gallery

Smashing Handplanes

After testing the new planes from overseas (page 56), Editor Christopher Schwarz wanted to find out what they were made of. So he took a hammer to several tools, and we caught it all on video (warning – not for the faint of heart).

popularwoodworking.com/video

popularwoodworking.com

- Contact Customer Service
  popularwoodworking.com/magazines
- Free Project Plans
  popularwoodworking.com/projects
- Article Index
  popularwoodworking.com/articleindex
- Tool Reviews
  popularwoodworking.com/tools
- Editor Blogs
  popularwoodworking.com/blogs
- Writer's Guidelines
  popularwoodworking.com/writersguidelines
- Contact the Staff
  popularwoodworking.com/contactus

New This Month

We've just launched our new online store, Woodworker's BookShop. You get free shipping on any order of more than $25. Everyday discounts on the best woodworking books and videos. Deep discounts on select items. An additional 10 percent off all future orders after you spend $100. And more!

Popular Woodworking's Woodworker's BookShop

woodworkersbookshop.com

Dueling Router Tables

This issue's "Jig Journal" (page 74) features Senior Editor Robert W. Lang's efficient and easy-to-build router table – but if you need a table with storage, check out Popular Woodworking Books Editor Jim Stack's new-and-improved router table on our web site.

popularwoodworking.com/jun09

On the Blogs

A Visit to Roy Underhill's

Editor Christopher Schwarz traveled to Pittsboro, N.C., to visit with Roy Underhill and write about Roy's new Woodwright's School. Read a preview story about the school, and about Chris's failed attempt at foot power, on the *Woodworking Magazine* blog.

popularwoodworking.com/jun09

Contest

Enter and You Could Win a Jet 14" Band Saw

The JWB-12 DXPRO 14" cast iron band saw from Jet features a beefy, innovative frame that provides 12" of resaw capacity right out of the box – no riser block needed! This saw earned a 2008 Best New Tool Award from *Popular Woodworking* – and it could be yours just for answering a few questions! But hurry – the contest ends on May 31.

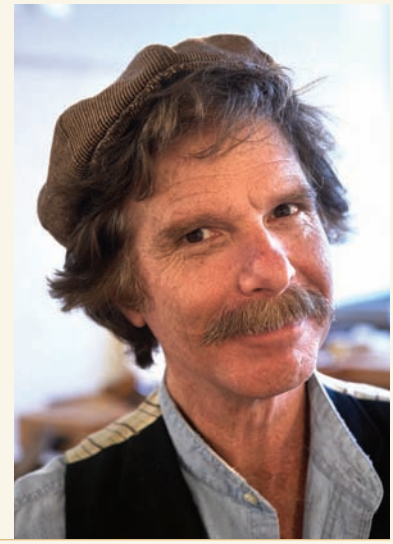
popularwoodworking.com/jet

And More!

Visit popularwoodworking.com/jun09 to find a complete list of all the online resources for this issue – including videos, additional drawings and photos.

Contributors

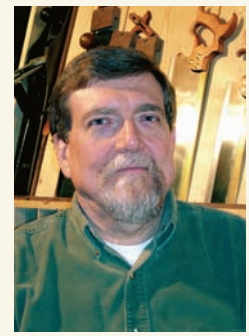
Roy Underhill Since 1979, Roy has explored every aspect of hand-tool woodworking as host of "The Woodwright's Shop" on PBS. In February, Roy opened The Woodwright's School in Pittsboro, N.C., where he and other instructors are teaching hand-tool skills in a restored storefront workshop that has a 1930s feel (and no power tools). While Roy honors the past with the tools and techniques he teaches, his real aim is furthering the future of hand craft. In addition to teaching woodworkers from all over the world, Roy is structuring his school's classes to attract budding young craftsmen from the area.



Brian Boggs A chairmaker for almost three decades, Brian was first inspired to try the craft when he read seminal books by woodworking legend James Krenov. Brian recently moved his shop from Berea, Ky., to Asheville, N.C., where he focuses mainly on post-and-rung chairs. In his first article for *Popular Woodworking*, Brian writes about the process he's developed for ebonizing wood (page 40).

Peter Follansbee began woodworking in 1978, starting with books on green woodworking and chairmaking. About two decades ago, Follansbee began investigating the methods of 17th-century joiners by studying surviving furniture, tool history and period artworks and written documents. He has been the joiner at Plimoth Plantation in Massachusetts since 1994. Peter's first article for *Popular Woodworking* (page 51) is on carving a 17th-century-style panel.

George Walker began woodworking more than 25 years ago and gravitated toward hand tools in the woodshop. By day, he's manager of a factory that manufactures bearings. George finds design inspiration from a deep love of nature and a reverence for our rich woodworking heritage. He recently completed a video with Lie-Nielsen Toolworks, "Unlocking the Secrets of Traditional Design," which provides a foundation in understanding proportion, line and form. His first story for us is on graduated drawer layout; it begins on page 60.



POPULAR WOODWORKING®
Learn How. Discover Why. Build Better.

JUNE 2009, VOL. 29, NO. 3
popularwoodworking.com
EDITORIAL OFFICES 513-531-2690

BY CHRISTOPHER SCHWARZ, EDITOR

The Freedom to Become Uncommon

For me, learning to design furniture has been a lot like learning to write.

For both disciplines, there are rules that you need to know, such as how to establish rhythm in an arrangement of drawers or in a declarative sentence. Or how to capture the eye and move it around a piece of furniture, or through a narrative.

And with both design and writing, you need to learn the rules so you know when to break them.

That's why I am pleased to tell you that our first Woodworking in America conference for 2009 will be about furniture design, construction and styles.

This isn't going to be an artsy affair with people discussing how furniture has a "performative value that can convey something ritualistic, ceremonial or narrative."

While that sort of discussion has its place, it's just not us.

Instead, our conference is going to be practical and hands-on. We're going to show you how to use Google SketchUp – one of the greatest free woodworking tools ever invented – to its fullest potential. We're going to teach you the vocabulary of the different furniture styles, such as Shaker, 18th century, Arts & Crafts and contemporary. We're going to teach you the rules of good design, such as how to graduate your drawer sizes. And we'll show you the rules for good joint design so you can make furniture that looks good and lasts.

And, with any luck, we're going to show you how these rules can be broken to produce great-looking projects.

The conference is going to be held Aug. 14-16 in St. Charles, Ill., which is outside Chicago and is easy to get to by car or plane. We'll be inviting many of the top furniture makers and toolmakers to participate, so we expect this conference to sell out as quickly as last year's, which filled up in just a few weeks.

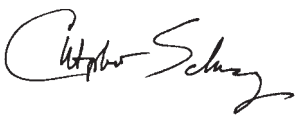
So be sure to visit woodworkinginamerica.com for details and registration information.

But don't think that we've given up on our hand-tool conference. After the strong success of our first conference in November 2008, we'll be holding a second Woodworking in America conference on hand tools and techniques, Oct, 2-4 in Valley Forge, Pa. Like our 2008 conference in Berea, Ky., this event will offer incredible seminars, lots of hands-on work with experts and a marketplace filled with the best hand tools – both old and new.

If you attended last year's conference, you'll find a lot of new names, new seminars and new toolmakers. It will definitely be worth attending again.

And if you missed out on our sold-out conference last year, I hope you can scurry over to woodworkinginamerica.com and reserve your place at the conference now.

We had a tremendous time putting on the conference last year and have been working hard to make our two 2009 shows even better (thanks to your input, I might add). So think about breaking one of the rules of woodworking (always working solo) and spend a weekend with us. **PW**



POPULAR WOODWORKING®
Learn How. Discover Why. Build Better.

Customer Service

How can I contact customer service with questions regarding my subscription, including a lost or damaged issue?
Visit popularwoodworking.com/customerservice. Or write to *Popular Woodworking*, P.O. Box 420235, Palm Coast, FL 32142-0235. Or, if you prefer the telephone, call 386-246-3369 and a customer service representative will be happy to help you.

When does my subscription expire?
The date of your subscription expiration appears on your magazine mailing label, above your name. The date indicates the last issue in your subscription.

Can I get back issues of* Popular Woodworking*?
Back issues are available while supplies last. Visit popularwoodworking.com/backissues. Or if you know the exact month and year of the issue you want, call our customer service department toll-free at 800-258-0929 to order.

What if I want more information about the projects and tools I read about in* Popular Woodworking*?
For all editorial questions, please write to Popular Woodworking Editorial, 4700 E. Galbraith Road, Cincinnati, OH 45236. Or e-mail popwood@fwmedia.com.

Does* Popular Woodworking *offer group discounts?
Group discounts are available by special arrangement with the publisher. For more details, send an e-mail to Debbie Paolello at debbie.paolello@fwmedia.com or call 513-531-2690 x11296.

Our Privacy Promise to You

We make portions of our customer list available to carefully screened companies that offer products and services we believe you may enjoy. If you do not want to receive offers and/or information, please let us know by contacting us at:

List Manager, F+W Media, Inc.
4700 E. Galbraith Road
Cincinnati, OH 45236

Safety Note

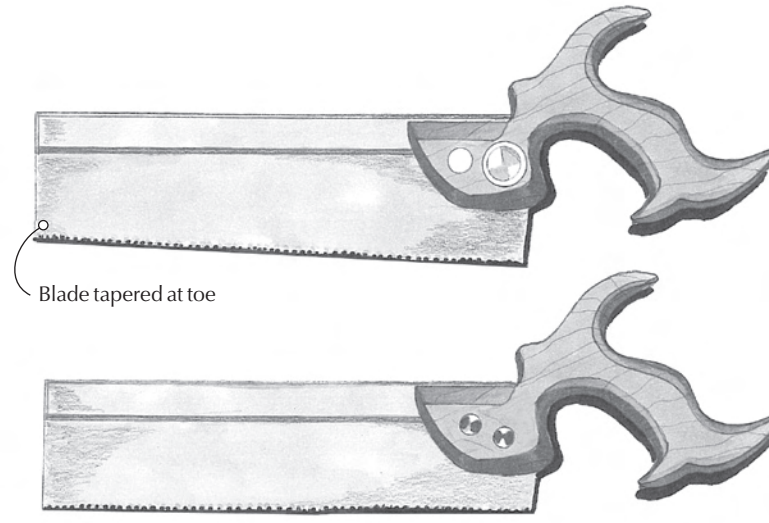
Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy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

Tapered Blades on Backsaws: What's the Benefit?

What is the benefit of having a tapered blade on a backsaw? I've got the bug to make a couple tenon saws. In terms of appearance, I like the look of the 18th-century tapered saws, but can you offer another reason? Does it offer ease of cut maybe by having less metal in the wood at the toe? Your answer will help me decide whether it is worth the extra machining step or not.

I confess, though, that I value good looks and will even add carving to the saw handles.

— Jim Paulson, St. Johnsville, New York



That taper from toe to heel (some people call it a "canted blade") seems to me to have some advantages.

1. I think it improves the overall balance of the tool by removing some weight from the toe.

2. I think it makes the sawcut feel a bit more aggressive. Every sawtooth is a bit lower than the one in front of it. This seems to improve the feeding characteristics of the tool.

3. Typically, you will hit your baseline on the side of the work that faces you first and you will be shy of the baseline on the backside. This is a good thing because you can only watch one face of the board at a time.

I don't consider the feature to be an absolute "must-have" detail, but it does make for a nicer saw.

— Christopher Schwarz, editor

SawStop Safety Question

I read your review of SawStop's contractor saw in the February 2009 issue (#174). I always think safety is a good thing, but I am not ready to believe the SawStop is as safe as everyone thinks. I have seen the hot dog demonstration in person, and I have seen the video where the inventor of the SawStop tests it on his own finger – without even a nick!

My concern is the speed at which the hot dog and finger were introduced to the blade – very slow. I understand that a large percentage of table saw cuts and amputations are the result of kickback pulling the wood and a hand into the blade. I also understand a board kicked back on a table saw can travel at speeds of more than 100 miles per hour. I would like to know how well the hot dog does when introduced at a high rate of speed to the blade – and even at the speed someone would be ripping a rip a piece of wood. Sorry to be a doubting Thomas, but I would like to see a more real-world demonstration of the effectiveness of the SawStop.

— Tom Collins, via e-mail

I've seen a number of demos of the SawStop that moved the hot dog into the blade at a high rate of speed. We had a false triggering of the cabinet saw we had in our shop, and the blade stops and disappears below the table in an incredibly short period of time. I believe that in real time it's a few thousandths of a second. That part of the device works as advertised, and it would turn a potential amputation into a few stitches at worst.

— Robert W. Lang, senior editor

Circular Saws for Southpaws

It's time to replace my vintage 1943 Milwaukee circular saw. It works fine and looks new, but it weighs a ton. I'd like to replace it with a good tool that does not weigh as much.

I was mystified to discover that nearly every sidewinder-style saw in the big box store is offered in two different models: One with the blade on the right side of the motor, the other with the blade on the left side.

Now, I want to guess that the difference is to accommodate right- and left-handed people. But I am not accustomed to manufacturers accommodating southpaws like me. So, I am wondering why there are two different sides for the blade placement. And, if it is for right- and left-handed folks, which saw is for which hand?

— Bill Wiese, Melbourne, Florida

CONTINUED ON PAGE 14

ILLUSTRATION BY HAYES SHANESY

CONTINUED FROM PAGE 12

Perhaps there are other reasons that manufacturers make these saws with the blade on the left- and right-hand side of the motor, however, this is how I see it.

With a so-called left-handed saw in the hands of a right-handed woodworker, you don't have to crane your head over the tool to see your cut line. It's right there in front of you. Perhaps as a left-hander owning a right-handed saw you never noticed this problem.

I've used a left-handed circular saw (I'm right-handed) and like it.

— Christopher Schwarz, editor

Can White Oak Branch Wood Be Used to Make Good Pegs?

I have a huge white oak tree in my back yard, probably 50' to 60' tall. I recently had to trim a lower branch off of it because it was partially broken off by a storm. The branch is about 6" to 8" around at the base and (of course) tapers to the end. Would it be possible to run small sections of the wood from the limb through a dowel plate to make pegs for drawboring, or is using wood from a limb just a no-no?

— Kipper Odom, Fayetteville, Georgia

In general, I'd stay away from branch wood. It usually has some nasty stresses in it. It dries crooked. It splits. It looks fuzzy and is impossible to finish.

That said, there is nothing lost by splitting off a chunk and running it through a dowel plate to see what happens. I'd be curious myself.

— Christopher Schwarz, editor

Just What the Doctor Ordered

I am excited that *Popular Woodworking* has taken the step to provide digital copies of many of its past issues, and all of its future issues. Digital copies are far easier to store and search. But this does bring up a small problem of what to do with the paper copy, once you are through reading it.

I recommend that you cut out or obscure the address on the cover and take it with you to your next doctor's appointment. This is better than recycling, it is reusing. Your gift of *Popular Woodworking* might just get someone else interested in the craft – and it beats the two-year-old magazines you usually find in the doctor's office.

— Rick Dubbs, Greenwood, Indiana

Enfield Shaker Cabinet

We've had great response to Bob Flexner's "Finishing Cherry" article from the April 2009 issue (#175). The most frequent question is: Where can I find plans for the cabinet shown in the opening photo? Editor Christopher Schwarz built that for *Woodworking Magazine* Spring 2006. Back issues are available at popularwoodworkingshop.com in both digital and print versions. Plus, there's a free SketchUp model at our Google 3D Warehouse (you can get there from popularwoodworking.com/sketchup).

— Megan Fitzpatrick, managing editor

Cleaning Synthetic Brushes

In "How to Brush a Finish" (December 2008, #173), Bob Flexner suggests a final rinse in lacquer thinner prior to washing a brush with soap and water. Considering that lacquer thinner is pretty potent stuff, and many of today's brushes are made with synthetic bristles, is there any danger of damage to nylon, polyesters and other synthetics from the thinner?

— Bill Rogers, via e-mail

There shouldn't be any problem rinsing a synthetic-bristle brush in lacquer thinner. First of all, you're just rinsing the brush, dipping it basically. There isn't enough time to do any damage.

With all the brushes I've used, there doesn't seem to be a problem even soaking the brush for a long time or brushing lacquer with the brush.

— Bob Flexner, contributing editor

Flattening Across the Grain

I'm in the middle of my workbench build right now and I elected to go with a vise that requires an end cap. What's the best way to do the initial flattening and periodic re-flattening with this kind of arrangement of cross grain? I have not yet built a table with breadboard ends so I have not encountered this.

— Shannon Rogers, Bel Air, Maryland

I've never had any problems because I don't consider my benchtop a furniture-grade surface. It has to be flat, but not picture-perfect. So first I flatten the benchtop with diagonal passes. The diagonal passes leave the same surface on both the benchtop and the end cap (it's all diagonal, after all).

Then I flatten the benchtop with passes that follow the grain of the benchtop. This results in the plane cutting at 90° to the grain in the end cap. This leaves a wooly surface that is free from tear-out.

Finally, I'll take a smoothing plane and clean up the end cap a tad. You don't do much work on the end cap, so it's OK if the end cap is a little lower than the benchtop. **PW**

— Christopher Schwarz, editor

Question? Comment?
We want to hear from you.

Popular Woodworking welcomes comments from readers about the magazine or woodworking in general, as well as questions on all areas of woodworking. We are more than happy to share our woodworking experience with you by answering your questions or adding some clarity to whatever aspect of the craft you are unsure about, and if you have a complaint, we want to address it whenever possible.

Though we receive a good deal of mail, we try to respond to all correspondence in a prompt manner. Published correspondence may be edited for length or style. All correspondence becomes the property of *Popular Woodworking*.

Send your questions and comments via e-mail to popwood@fwmedia.com, or by mail to:

Letters
Popular Woodworking
4700 E. Galbraith Road
Cincinnati, OH 45236

EDITED BY PAUL ANTHONY

THE WINNER:

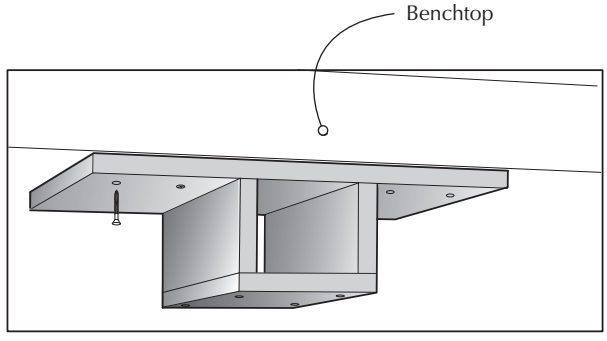
Bar Clamp Hold-down

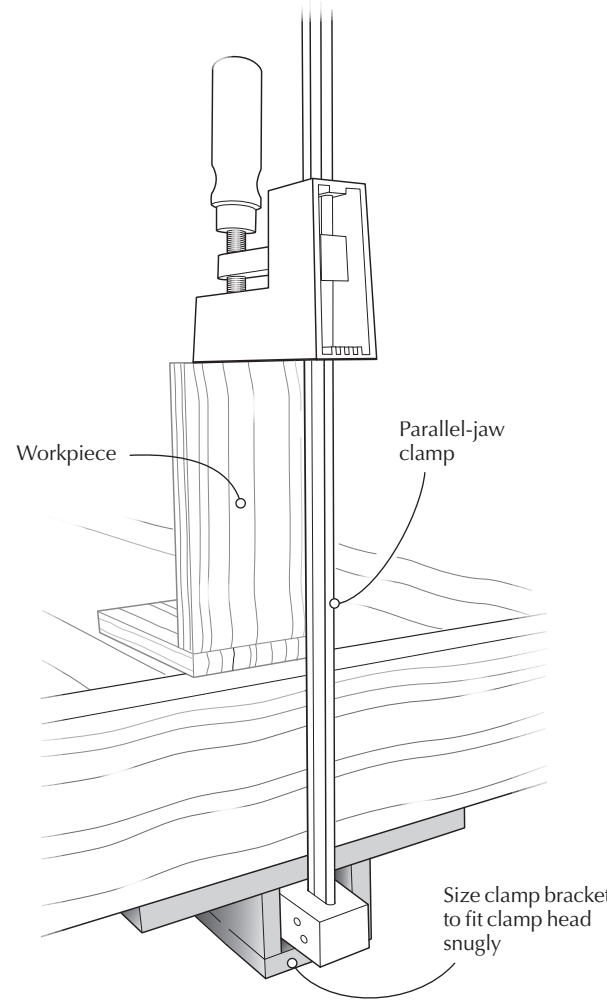
There are times when I need to hold small workpieces on end at the bench for drilling pocket-screw holes, clamping box sides together and other operations. I've always found the process awkward and wished that I had a third hand. As the next best thing, I designed a fixture to hold a parallel-jaw bar clamp at the end of my bench. It's basically a box that's built to hold a clamp head snugly without play, with the inverted body of the clamp extended above the benchtop. The box is attached to a panel that screws to the underside of the bench.

Now when I need to clamp a workpiece on end, I just slip the clamp's head into the bracket, raise the opposite jaw, slip the piece under it and clamp it down. No more fumbling. For wide boards, multiple brackets can be used. If you like, you can clamp the bracket to the bench rather than permanently screwing it in place.

— Gary Scoggins, Hayward, California

CONTINUED ON PAGE 18





Cash and prizes for your tricks and tips!

Each issue we publish useful woodworking tips from our readers. Next issue's winner receives a $250 gift certificate from Lee Valley Tools, good for any item in the catalog or on the web site (leevalley.com). (The tools pictured at right are for illustration only, and are not part of the prize.)

Runners-up each receive a check for $50 to $100. When submitting a trick (either by mail or e-mail) you must include your complete mailing address and a daytime phone number. If your trick is selected for publication, an editor will need to contact you. All entries become the property of *Popular Woodworking*. You can send your trick by e-mail to popwoodtricks@fwmedia.com, or mail it to Tricks of the Trade, *Popular Woodworking*, 4700 E. Galbraith Road, Cincinnati, OH 45236.

ILLUSTRATIONS BY MARY JANE FAVORITE

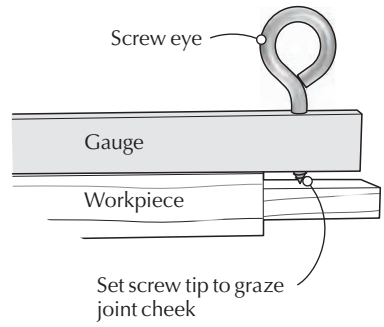
CONTINUED FROM PAGE 16

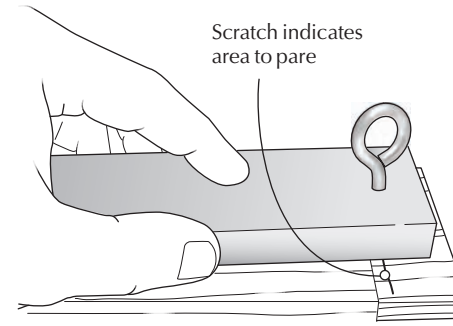
Accurate and Easy Joint-depth Gauge

A straight mortise-and-tenon joint requires each tenon cheek to be flat, of consistent thickness and parallel to the body of the workpiece. If a cheek is twisted or angled relative to the faces of the workpiece, the result can be a twisted assembly. The same goes for an end rabbet joint.

This simple tool can quickly check joint cheeks for twist or angles. It's nothing more than a straight piece of wood outfitted with a projecting screw eye. It works as sort of a combination depth gauge/scratch awl, with the point of the screw eye marking any high spots that need trimming.

To make the jig, use flat, stable, accurately thicknessed stock of about 3/4" x 2" x 9". Drill a snug pilot hole about 3/4" in from one end and install a sturdy screw eye with a sharp tip. (A standard screw will work, but it won't adjust as quickly.)





To use the jig, rest it on the workpiece face, adjust the screw so the point barely touches the joint's cheek surface, then slide the point along the surface. The tip of the screw will scratch any high spots that need paring. Pare and recheck as needed until the point consistently skims the cheek at the desired depth. This technique can be used to fine-tune hand-cut tenons as well as to validate the results of machine setups.

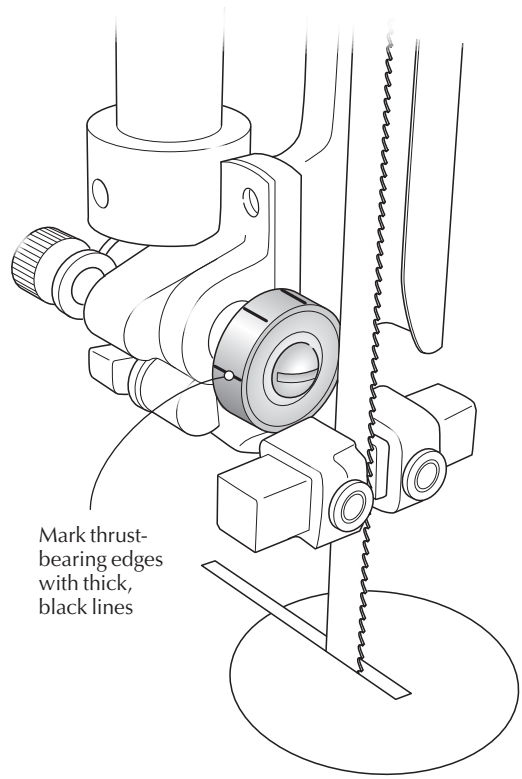
— Rob Porcaro, Medfield, Massachusetts

Easy Band Saw Bearing Adjustment

When adjusting the thrust bearings on a band saw, they should be set just a few thousandths of an inch behind the blade. The idea is that the blade shouldn't contact the bearing when the saw is freewheeling – only when a workpiece is pressed against it. And the blade should barely move backward before contacting the bearing. The traditional method of adjustment is to slip a dollar bill between the bearing and the rear of the blade, but I've always found this procedure awkward. Instead, I have developed my own approach, which I find to be much easier.

Using a thick marker, I draw a few lines on the edge of each bearing so I can clearly see when it's moving. While slowly rotating the band saw wheel by hand, I adjust the thrust bearing forward until contact with the blade causes it to spin, then I slowly back it off until it stops. The technique works great, and it's fast. Just make sure to double-check the setting after tightening each bearing's lock screw to ensure the screw hasn't shifted the bearing forward.

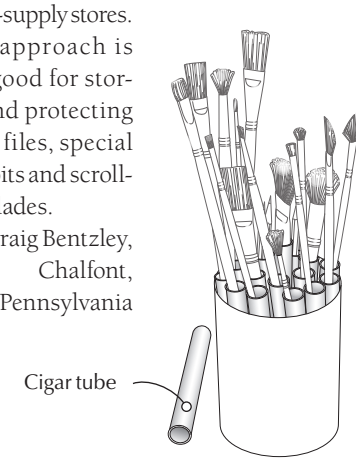
— Paul Anthony, PW contributor



Safe Brush and Small Tool Storage

I use a wide variety of artist's brushes for touch ups in my restoration business. In the past, storage of these was always a hassle because the delicate bristles can be easily damaged or deformed if the brushes are clumped together. When a cigar-smoking friend gave me a bag of plastic cigar tubes, I solved my problem by packing a bunch of the tubes in a coffee can. Now my brushes stand upright without touching one another, and they're readily available and easily identified. In lieu of cigar tubes, you could cut up appropriate lengths of 3/4" CPVC water pipe or 1/2" PVC electrical conduit, available at home-supply stores. This approach is also good for storing and protecting small files, special drill bits and scroll-saw blades.

— Craig Bentzley, Chalfont, Pennsylvania



CONTINUED ON PAGE 20

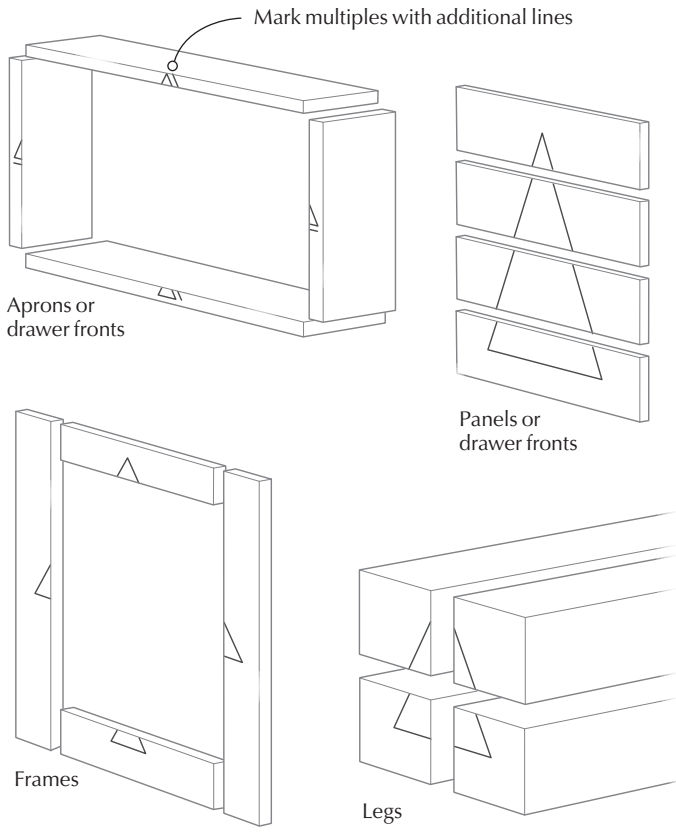
CONTINUED FROM PAGE 18

Triangle Marking System

Keeping project parts organized and in proper relation to one another while machining and assembling them can be a real challenge, especially if you're organizing the pieces for attractive grain composition. So how do you mark the parts for quick return to their home position? Once again, we can turn to the old-timers for the trick: the triangle marking system.

Once you have dressed your workpieces to thickness, width and length, orient them as desired and mark the faces with sections of triangles as shown. This quickly identifies the face, top, bottom, left and right sides of an assembly. Now when you grab a piece to cut a joint, for example, you know immediately which edge or face goes against the saw table or jig face. And during assembly, it's a snap to place the pieces in their proper orientation. When cutting a series of identical parts, such as for multiple drawers, simply add additional lines that extend across all the pieces.

— Art Mueller, Athens, Georgia

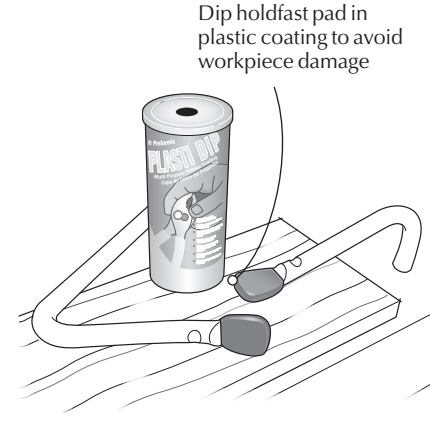


Prevent Holdfast Damage With Plastic

I use bench holdfasts because they're so convenient and provide such a tremendous amount of clamping force. However, in the process, they can mar workpieces, especially softwoods. The traditional solution is to place a protective wood block under the holdfast pad, but this can be a bit of a hassle, and it's one more maneuver involved in the clamping process.

Instead, I coat the pad of my holdfast with a plastic coating designed to protect handles on wrenches, pliers and other hand tools. Sold at hardware stores under names like "Plasti Dip," the coating provides the necessary cushion to prevent damage to clamped items. An additional benefit is that it adds a bit of friction to help prevent a workpiece from sliding. To apply the coating, simply dip the pad of the holdfast in the can and let it dry. I have found that two or three coats is enough to do the job.

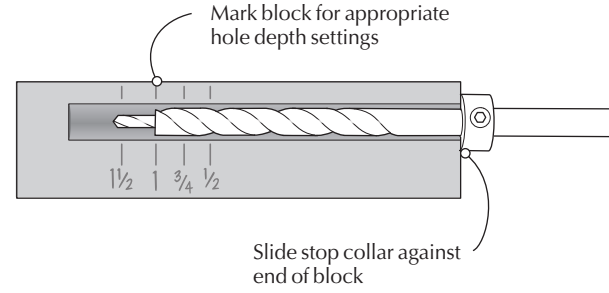
— Jeff Bradley, Rockville, Maryland



Pocket Hole Drill Bit Gauge

I love my pocket-hole jig but I can never seem to remember where to position the stop collar for different thicknesses of material. As a fix, I made this simple gauge that allows quick setup of the collar. The gauge is just a block of wood that I drilled out longitudinally, then sawed in half to create a cradle of sorts for the pocket hole drill bit. Referring to my users' manual, I marked the block to gauge the proper bit depth for various thicknesses of wood. Now all I have to do is rest the bit in the cradle, slip the stop collar against the end of the block, lock it in place and I'm ready to go. **PW**

— Mitch Palmer, Nashville, Tennessee



BY ADAM CHERUBINI

Low-relief Carving

Tips and tricks from a master.

I'm building a Philadelphia Chippendale chair and I've gotten to the stage where I must start carving. I've been hesitating because I'm not a confident carver. So I've been practicing and learning all I can from Philadelphia Museum of Art conservator Christopher Storb. Storb, who carved a Philadelphia-style ball-and-claw foot for the February 2009 issue (#174) is a true master carver.

As I see it, there are two distinct types of carving used on 18th-century furniture. The basic three-dimensional sculpture is one sort of carving. In my last article, I sawed out the back splat and shaped the back legs of the Chippendale chair I'm making. I carved areas too tight for my saw and used my gouges to round over the back of the crest rail. This sort of work, like shaping a cabriole leg, is sculptural work.

The other type of carving is called "low-relief" carving. This is shallow carving, often not deeper than 1/8". It is used to decorate surfaces. Chairmakers in the 18th century decorated flat and curved surfaces with shells, leaves, scrolls and other design elements. Specific elements used, and their locations, varied throughout the period.

Though I may not be good at it, I'm comfortable with basic sculptural carving. I find the ball-and-claw and basic cabriole leg carving formulaic. There are basic steps to follow, specific layout lines and specific tools to use. I asked Storb for some advice about how to approach the low-relief carving for my chair.

The answer I got didn't inspire me with confidence – I wasn't hearing the step-by-step instructions I had hoped for. My guess is that low-relief carving is also formulaic in nature. But I don't know those formulas. All woodworking is really just employing a set of techniques to solve a given problem.

Masterful work. *This is the work of master carver Christopher Storb. The C-scrolls and acanthus-leaf carving decorating the knee of this chair leg represent some of the most difficult and prized style of work done in the 18th century.*

PHOTOS BY THE AUTHOR

When a board is out of flat, we all know what to do. But what does one do when one encounters a C-scroll on a curved surface such as the knee of a cabriole leg?

I asked Storb to come back to my shop and show us how to do it. He did follow some basic steps. But they were fairly general in nature. I felt they were too general to be of much assistance on their own.

So instead of going step by step through the process as we did in the ball-and-claw article, I thought I'd try to illustrate some of the tips and tricks Storb used while he was working. These won't allow us all to finally carve like Storb, but they will provide some insight into the approaches and tricks he uses. Hopefully, we can try some of them when we encounter similar situations in our carving.

Basic Low-relief Carving Process

The basic process for executing low-relief carving consists of four steps: drawing, stabbing in the design, grounding and modeling. Each step requires skill, care and practice.

The drawing step seems simple enough. Get a pencil and draw the desired design on your workpiece. Well, not so fast. In 1762, cabinetmakers William Mayhew and John Ince wrote a book in many ways similar to, but less well-known than, Thomas Chippendale's famous "Director." Ince and Mayhew's book, entitled simply "Universal System of Household Furniture," includes what we now can see was a typical emphasis on drawing.

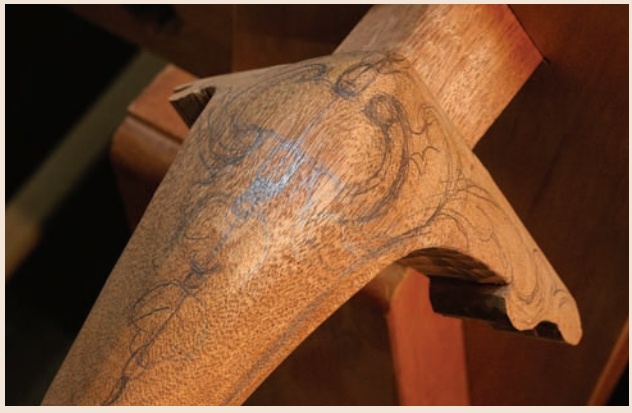
"… The principal Sweep or Centre Line is the Foundation and Basis of the whole Order of Ornament; that must be first drawn and made perfect (which can only be done by freedom of Hand) …."

I now believe that it is a truism that one cannot carve what one cannot draw. This drawing step is absolutely critical. The question is, on what media does it take place? I suspect paper is the answer, not wood.

The design is set in with gouges of the appropriate size and sweep or curvature. For long curves, a narrow gouge of the appropriate sweep can be used. Make a series of stab cuts, "walking" the gouge along, leaving a third of the tool's width in the previous cut. The result is a smooth arc. If the sweep is not exactly right, choose a narrow gouge and walk it around as before, but this time make the stab cuts end to end, "cheating" or approximating the desired curvature.

The stabbing-in step can be done with a

The Basics of Low-relief Carving



1 ***Draw the design.*** *The picture above should rightly be called step 1a, for this should not be the first time you have sketched this design. This is merely a crude representation of a design you have already sketched several times.*

2 ***The tool decides.*** *Ironically, the stabbing-in step changes the design to accommodate your tools.*

3 ***Prep work is key.*** *A good ground requires a good initial surface from which to work. This leg looked almost too nice to carve before Storb started with it.*

4 ***Sharp forebears.*** *There's just no chance 18th-century carvers didn't have tools every bit as sharp as ours. There's really no way to model this C-scroll without cutting against the grain. The only solution is to have nerves of steel and super-sharp tools.*

mallet or hand pressure. Just be sure not to try to makes the cuts too deep; 1/16" deep is more than enough for the first go around. Relieve the ground, then deepen the profile by an additional 1/16".

Grounding is done with a shallow gouge such as a #3. Removing material around your profile presents two challenges: cutting to the stab cuts without cutting past them (potentially lifting out your carving) and producing a uniformly smooth and seemingly consistent ground surface. A V-gouge or veiner can be used to chase around inside the stab cuts. The ground work can get wasted to these features without risking the finished profile. But this is a step good carvers seem to skip. I've found it to be helpful in some instances, however. Cross-grain veiner cuts, right through the middle of your waste area, can also help you maintain an even depth. Storb doesn't bother with this either.

Modeling seeks to create the illusion of three-dimensional elements, despite the very shallow nature of low-relief carving. The trick here appears to be to work very conservatively, just suggesting a rounded surface without fully delivering one. Storb left a tiny bit of flat on the profile of almost all of his carvings. He didn't round his designs all the way to the ground surface. Though the modeled surfaces appear to be continuous, the grain orientation required that these be comprised of multiple passes from different directions. Light cuts were required. Working against the grain was required in some areas.

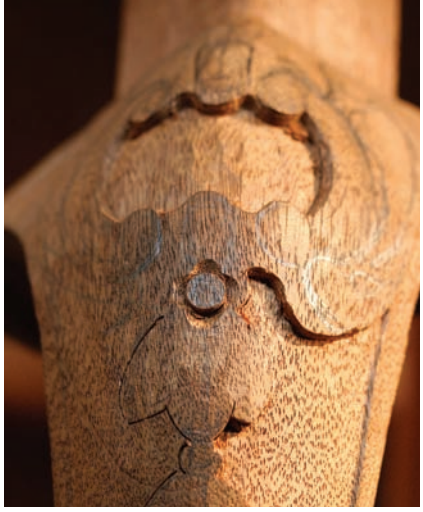
Control Depth with a Mallet, But Be Careful!

Storb sometimes uses a mallet to increase the consistency of his stab cuts. He maintains a relaxed upright posture. But the photo below belies a trick you need to know intimately. These cuts have to be perpendicular to the surface. If you lean away from the design, a portion of this cut may appear later in the ground surface. If you lean into the design, the edge of the carving will be undercut and will surely crumble or split. To make matters more complicated, single beveled chisels undercut toward the back side of the tool. Wood sees chisel edges as wedges and seeks to place the same amount of pressure on either side of the tool regardless of the direction it's driven. To get a straight cut, technically you have to tilt the chisel handle toward the back of the blade. If you try this, know that a component of the mallet force is pushing the blade sideways, potentially ruining your edge and stressing your carving (because your chisel handle is no longer in the line of action of the cut). Notice Storb doing that? No? Me either. His gouges are all double beveled. This allows him to use them upside down. I think I mentioned that in the ball-and-claw article. But it also allows him to hold his tools perpendicular to the surface he's working on. The result is nice square edges of his carvings. And he can use his mallet to make thin cuts along the grain without splitting. When you use a mallet, I think it's natural to worry about the pres-

Double-bevel approach. *Double-beveled gouges are Storb's secret for maintaining a perpendicular orientation to the workpiece surface.*

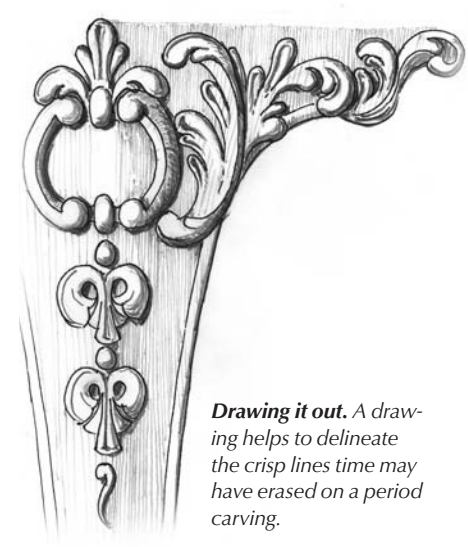
A light touch. *Stropped edges help Storb achieve a polished finished surface, but the real key is light cuts.*

Wiggle room. *Storb carefully walks the cut into his stab line, making sure to keep the corners crisp.*



From flower to bead. *Four flower-petal-like cuts are transformed into a bowl once the diagonals are cut off.*

The latest fashion. *Carvers in 18th-century America likely incorporated elements from the latest London fashions.*



Drawing it out. *A drawing helps to delineate the crisp lines time may have erased on a period carving.*

sure you are exerting down. But the tool is also exerting pressure sideways (from the wedge action) and you need to think about that too. A double-beveled tool helps.

Light Cuts with Heavy Pressure?

What do carving and turning have in common? More than I thought. Storb's tools leave beautiful polished surfaces behind. Smooth stropped edges help. But the secret to his success with surfaces appears to be the light cuts he makes. Taking a light cut with a carving gouge can be trickier than it appears. Storb begins each cut by riding the bevel just as a turner uses a skew. Pressing the tool down onto the work and rocking the bevel allows for a controlled cut. How much pressure? About the same as you would use sharpening the tool.

Wiggle Room

Don't try this move at home! Storb takes a coarse cut directly into his stab line. Even smooth, consistent pressure can result in catastrophic failure as changing wood grain makes the tool move in fits and starts. So Storb wiggles his tool side to side, walking the corners of his gouge toward his destination. "Watch the corners!" he warns. I've seen more than a few old gouges with thumbnail shaped edges. I wonder if this isn't the reason why.

Flowers, Beads: What's the Difference?

Storb approaches bead elements with four flower-petal like cuts. The circle is stabbed in first, then the cuts are wiggled in carefully using the same 5/16" #8 gouge that scribed the circle. The petals then become a bowl when the diagonals are sliced off. These cuts are made around the inside of the bowl, not into the center of the bead.

Low-relief Connoisseurship

The raised-edge member at the bottom of the leg in the picture above is a feature shown in Chippendale's "Director." In Chippendale's book, it runs down the length of the leg and flows gracefully into the scroll feet. By the time Chippendale wrote his book, ball-and-claw feet were out of fashion in London. The chair I'm copying, which incorporates very Chippendale-looking knee carving, includes this edge member, but the carver blended it into the cabriole halfway down the leg. My interpretation is that the person who carved the Philadelphia chair leg was a recent immigrant from England, conversant in the latest styles, but willing to adopt the latest fashions to Philadelphian conventions like the ball and claw.

You Can't Carve What You Can't Draw

The drawing shown above (one of many I made in anticipation of my own attempt at this design) fairly accurately reflects what I saw on the original chair. It features a central bracket of C-scrolls with some form of leaf at the top and a reel below. Beneath the reel is a couplet of beads over bellflowers. Beneath the couplet is some form of squiggle I don't recognize. Adjacent to the C-scroll, roughly mimicking its shape, are acanthus leaves that wind their way across the glued-on knee return. These aren't just swoops and curls. Each is individual and distinct from those around it. The best way to learn about these design elements is to see them in books or paintings and draw them. Generations of wear often obscure furniture carvings into easily dismissed frou frou swoops and curls. In their day, they would have been crisp and identifiable.

Conclusion

There are three types of fear: There is rational fear – the fear of table saws, motorcycles or the ocean. This sort of fear keeps us safe. There is irrational fear, which stops us from getting on airplanes to visit loved ones or visiting the circus (I've always been afraid of clowns). Then there's the ignorant lack of fear, when you should be afraid, but you're not. I'm not sure what this third type of fear is called, but it's the inaccurate sense that everything is going to be fine that allows us to eat in fast-food restaurants or mountain bike. Obviously, I was afflicted with this last sort when I began this project-turned-fiasco.

The carvings on the knees and back of this chair are among the most difficult ever attempted. Lesser carvers chose designs that radiated from the knee outward. Designs such as shells, in addition to being simpler overall, flow with the grain. This chair's knee carvings encircle the knee in ever-reversing grain. I chose to copy a chair that was made by a team of craftsmen at the top of their game, each of whom was handpicked in his youth to fulfill this ultimate destiny. This chair represents the pinnacle of woodcraft and the height of the Philadelphia Chippendale style. What was I thinking? The only upside is I'm not making it out of ebony. Bored? Done everything there is to do with wood? Come right this way. **PW**

Visit Adam's blog at artsandmysteries.com for more discussion of traditional woodworking techniques.

BY GLEN D. HUEY

Library Magazine Rack

Three tiers from two pieces of lumber equals one boatload of storage.

I might be going out on a limb, but I'm willing to bet that if you visit the library or special reading room (also known as the potty room) of most woodworkers, you'll find scads of magazines for occasional perusal. At one time in my bathroom I had a basket filled to the brim with periodicals. Some dated as far back as June 1991.

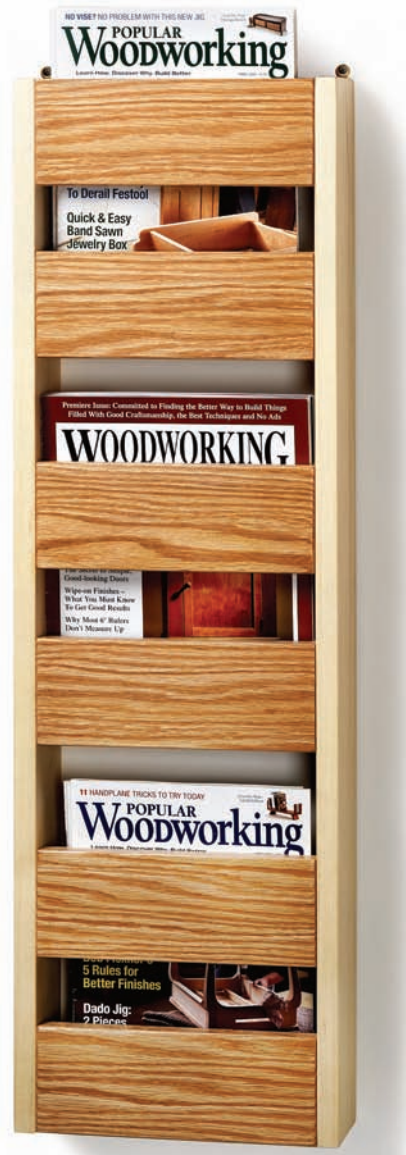
After my basket collapsed, I began to stack my collection in a corner on the bathroom floor. So when this project presented itself, I gladly stepped forward. A wall-hung magazine rack is just what I need.

A trip to the store to pick up materials is always the first step for "I Can Do That" projects and with only two pieces of stock, the material is not only easy to carry, it's also light on your wallet. One 6' piece is cut for the sides and one 10' piece provides all the face pieces, shelves and the hanger support. I opted to combine two wood species for a non-traditional design – aspen for the sides and red oak for everything else.

A Stop-block for Consistency

Begin by cutting the sides to length. I've seen many woodworkers stack two or more pieces together in preparation to cut parts identical in length. While you sometimes can get away with this shortcut, it's better to add a stop to your miter saw setup if you have an extended table – or accurately measure, mark and cut your material.

After crosscutting the sides, the remaining parts for the rack are all cut to the same length. For this operation, set up a stop-block. This is easily done on most miter saws even if there is no extended table, and it's worth the effort to do so. Seven of the 10 pieces are their finished size, but three pieces need additional work. Those pieces are the shelves and each needs to be ripped to fit.



In the round. *Slightly rounded edges soften the overall look of a linear design.*

To measure the width of the shelves, position a front piece face down and snug it against a rack side that's set on its edge. Set the body of a combination square flat on the rack's side with the ruler extending to just touch the front piece. Lock the square.

Next, use your combination square setup and a pencil to mark a cut line on each of the three shelf pieces. Hold the pencil at the end of the square and slide the unit along the shelves. Use a jigsaw to make these cuts and stay just to the waste side of each line. A block plane trims the shelves to their final width. A couple passes should be all that's needed.

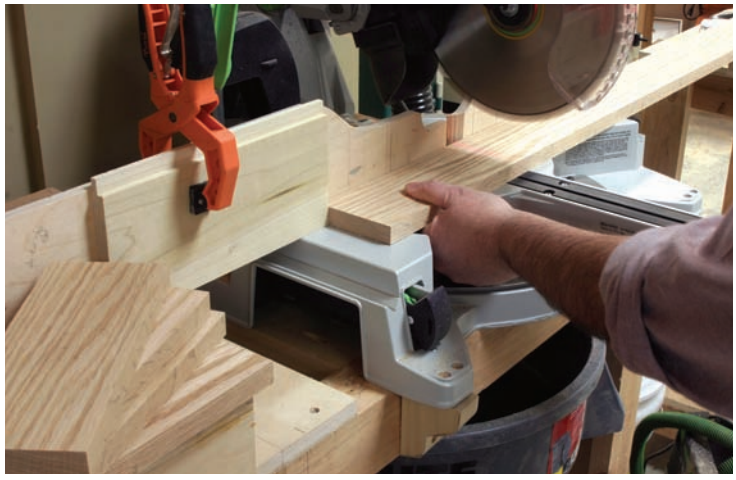
Although the pieces for the magazine rack are all at final sizes, additional shaping of the stock is required to soften the look. It's sometimes difficult to perfectly flush the face of the fronts with the front edge of the sides. Any variation is noticeable and would need to be sanded flush. To hide any slight variations, lightly round over the edges of the fronts and sides.

This is easily done with your block plane and sandpaper. Set your plane for a light cut and make several passes along the edges of the fronts. Begin on the end-grain edges. Cutting across end grain is a snap, but it's possible to blow out the long-grain edges as you work. By rounding the ends first, you remove any possible long grain tear-out as you plane the remaining edges. After your edges are rounded with a plane, finish the process with #150-grit sandpaper. A couple quick passes per edge is all it takes.

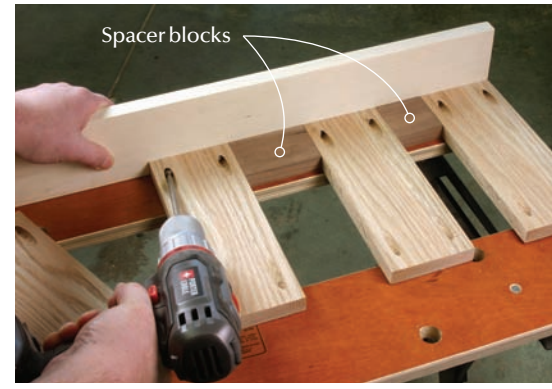
How to Connect

All horizontal pieces of the magazine rack are joined to the sides with pocket screws. Create four pocket-screw holes in the back face of each front piece and the hanger support (two per side); choose your ugliest piece for the support. If you wish to reduce the pocket-screw work, drill only two holes in the front pieces that connect to the shelves. While this saves six holes, I didn't find the additional holes that much of a burden.

LEAD PHOTO BY AL PARRISH; ILLUSTRATION BY ROBERT W. LANG



Consistent lengths. *A stop-block and your miter saw work in unison to provide pieces that are equal in length – no matter the number of parts needed.*



Appropriate spacing. *Lay out the locations with pencil marks – these have to be sanded out prior to adding any finish – or you can use spacer blocks to locate the front positions.*

The shelves need only three pocket-screw holes drilled, one for a screw into each side and a third – centered in the shelf – to affix the shelf to the adjacent front. Finish-sand all the parts before moving forward.

With the pocket holes drilled and parts sanded, you're ready to begin assembly. It's important to stand the side piece on its edge on a flat work surface, and to position the front piece face down with its end tight to the rack's side. Attach the front pieces to one side at this time. Begin at the top. Drive the screws while keeping the front flush with the end and front edge of the side.

Block Out the Locations

Each front piece is spaced either 2 1/4" or 3 1/2" from the piece attached directly above it. Cut a spacer block for each size. Set the narrow block just below the intersection of the front piece and side, then slide the next front piece into position. Drive screws to secure the front piece. Position the wider spacer block below that front piece to locate the third front. This pattern is repeated along the entire height of the magazine rack.

After the fronts are connected to one side, add the second side to the assembly, then drive the screws to secure those connections. The width of the unit makes this part of the build rather tight, but a standard pocket-screw driver in your drill does the job.

Now that the fronts are in place and attached, slip the shelves into position. Drive the center three to lock the shelf to the corresponding front, then drive the remaining two screws.

Add the hanger support with the pocket-screw holes facing the back of the rack – the hanger support acts as a spacer to keep the upper part of the sides aligned. Sand again as needed and you're ready to apply a finish.

I used shellac and wax as my finish. Purchase a spray can of shellac and the task becomes toolless. After a couple coats of shellac, sand the entire piece with #320-grit sandpaper and apply a coat of paste wax.

Add brass hangers to the back – make sure you find at least one stud in the wall for needed support – then have a friend hold your rack in place as you complete the installation. Store your most treasured *Popular Woodworking* issues, then enjoy your solitude. **PW**

Glen is a senior editor of this magazine, the author of several woodworking books and the host of several woodworking DVDs. Contact him at 531-513-2690 x11293 or glen.huey@fwmedia.com.

Library Magazine Rack

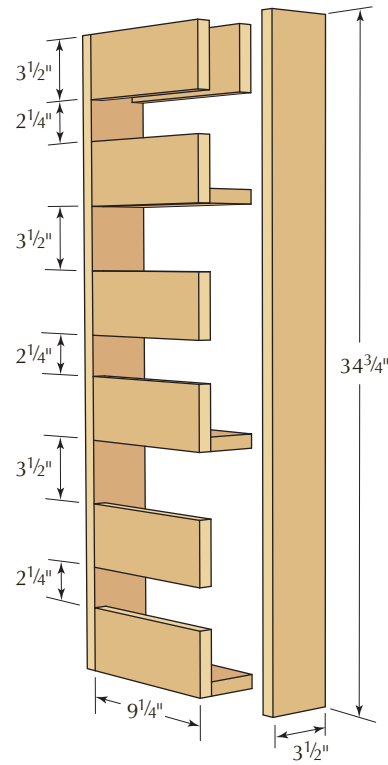
	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑	2	Sides	3/4	3 1/2	34 3/4	Aspen
❑	6	Fronts	3/4	3 1/2	9 1/4	Red oak
❑	3	Shelves	3/4	2 3/4	9 1/4	Red oak
❑	1	Hanger support	3/4	3 1/2	9 1/4	Red oak

Supplies

Woodcraft
1-800-225-1153 or woodcraft.com

2 ■ wall hangers, 2" x 9/16"
#27K02, pkg. of 10, $3.99

Price correct at time of publication.



EXPLODED VIEW

About This Column

Our "I Can Do That" column features projects that can be completed by any woodworker with a modest (but decent) kit of tools in less than two days of shop time, and using raw materials that are available at any home center. We offer a free online manual in PDF format that explains all the tools and shows you how to perform the basic operations in a step-by-step format. You'll learn to rip with a jigsaw, crosscut with a miter saw and drill straight with the help of our manual.

Visit ICanDoThatExtras.com to download the free manual.

BY THE POPULAR WOODWORKING STAFF

Grizzly's 'Ultimate Band Saw'

This do-it-all band saw has all the power and finesse you'll need.

Grizzly calls its model G0636X the 17" Ultimate Band Saw. With "ultimate" defined as last, final or definitive, I would agree. This could be the last band saw you ever buy.

This saw, with a steel-reinforced frame, arrives sporting a 1"-wide x 0.025"-thick blade with six teeth per inch. It is set up as a machine for resawing lumber. If that is your sole purpose for this tool, so be it. But there's no reason not to make this band saw your everyday saw as well. Slip a different blade over the wheels and go for it.

A 5-horsepower, single-phase, 220-volt motor powers this machine. There's enough drive to run up to a 1 3/8"-wide blade to slice paper-thin veneer, yet this saw has the finesse to cut tight curves in band-sawn boxes using a blade as narrow as 1/8". At 160" in length, however, finding a replacement blade at a local store is not easily done.

Blade changeover is simple due to easily adjusted blade tension and ball bearing blade guides. Side-to-side movement is controlled with two twin sets of eccentric bearings at both the upper and lower guide assemblies. There's also a single bearing per assembly for backward pressure. All guide assemblies are adjusted with a single wrench.

The upper assembly is easy to reach, but the lower assembly is a bit more difficult to access due to its location behind the lower door and near a dust collection port – one of two 4" dust ports on the machine. That port location reduces the amount of dust that collects on the bearings.

A couple slick features on this saw are the table tilt mechanism and a fence system that consists of a cast iron fence with a two-position aluminum resaw fence added. To tilt the table you slide a lock lever to loosen it, then turn a handwheel that controls a micro-adjustable rack-and-pinion setup. It's smooth and easy to control. When you stop turning, the table stays at whatever angle it's set. (Forget holding the table with one hand while you tighten the lock knobs with the other.) Slide the lever back to tighten the table and you're good to go. The table angles from 45° to the right, or pull the stop bolt to gain 5° to the left.

On most band saws the fence is wasted metal due to problems with aligning the fence for blade drift. It's not simple to position the blade to run exactly at the crown of the rubber-tired wheels. Most times the blade is slightly skewed to one side of dead center and if you set your fence square to the table and try to rip veneer or make straight cuts, the result is less than satisfactory.

On this saw, after you get the blade to track close to center, you can set your fence to match the blade's drift angle. Find the drift angle, then loosen the three cap screws that hold the bar that joins the fence rail to the saw, then align the fence with that angle.

Additional features on this machine are beefy cast iron trunnions and wheels – you would expect nothing less – and a foot-activated pedal that is a stop switch and blade brake. A quick-release blade-tension lever, a 16 1/2" cutting height and a 16" throat capacity also add to the saw's appeal.

But, if you currently work with a 14" band saw, it's an adjustment to get used to the 35 1/2" table height. Also, it pains me to purchase an electric plug and, in this case, a length of 12/3 cord before I can power-up my machine – but that's standard operating procedure for Grizzly.

— Glen D. Huey

17" 'Ultimate Band Saw'

Grizzly Industrial ▪ 800-523-4777
or grizzly.com

Street price ▪ $2,150

For more information, go to pwfreeinfo.com.

Two fine features. *The table tilt mechanism is easy to adjust, and the foot-activated pedal is both a stop switch and blade brake.*

PHOTOS BY AL PARRISH

Woodpeckers PRL-V2 Precision Router Lift

Routers perform a lot of work in the shop, but handheld routers are only part of the story. You can perform even more operations if you table-mount your router – but that setup is not beneficial if you have to remove the tool for bit changes, and height adjustments are not always easily made. A good router lift is the answer.

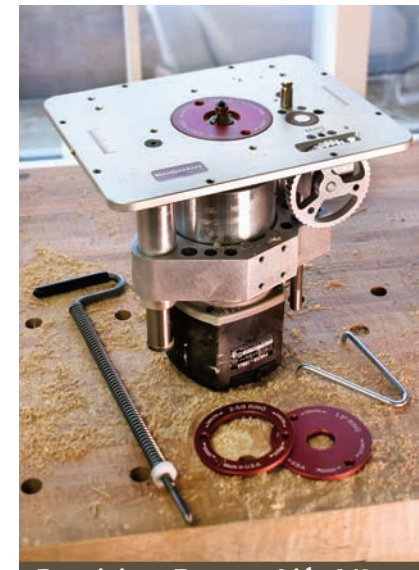
Woodpeckers' PRL-V2 (Precision Router Lift-V2) is a United States-made lift (designed for a Porter-Cable 7518 router, but adaptable to several router motors) that's built with the end-user in mind. There are two small adjustable side plungers that provide a perfect fit to the table opening, even if your routing abilities are suspect.

Also, there's a spring-assisted lift wrench – it's really more like a handle – that makes quick adjustments with ease. Slide the wrench into the lift, twist your wrist and watch the router and lift surface like a toy submarine in the bathtub. No other lift is as fast to bring the collet fully above the table for router-bit changes.

Use the wrench to make coarse height adjustments, then use the tooless micro-adjust wheel to fine-tune the setup. That's right – a wheel. The PRL-V2 is the first major router lift to employ a wheel to make fine adjustments. With the glass-filled nylon gears housed in an enclosed compartment away from dust, thumb pressure is all it takes to lift or lower the router bit. Tighten a set-screw and the wheel locks tight, but doing so is not necessary unless your router has excessive vibration problems.

A scale used in conjunction with the wheel for precise routing is marked with .002"-increment measurements, or one complete revolution equals 1/16". This is especially helpful if you need to tweak the bit to make accurate height modifications.

Included with the PRL-V2 is the lift, lift wrench, Allen wrench, brass starting pin, three twist-lock rings and a spanner. And if you need to close in a little tighter to your router bits, Woodpeckers has a set of eight twist-lock rings to fit the PRL-V2. Made from anodized aluminum the rings cost $85; in phenolic the rings will set you back $60.



Precision Router Lift-V2

Woodpeckers ▪ 800-752-0725 or woodpeck.com

Street price ▪ $300

For more information, go to pwfreeinfo.com.

With this router lift, you'll look forward to router operations and get tons more use from your router.

— GH

Ashley Iles Mk2 Bevel-edge Chisels

My first great set of chisels was made by Ashley Iles, a small manufacturer with deep roots in the toolmaking history of Sheffield, England. The steel was easy to sharpen and held its edge tenaciously. My only complaints were that the chisels were top-heavy and the bevels on the long edges were a bit bucky.

During the last 10 years, Ashley Iles has been refining its line of bench chisels, and its newest line is outstanding.

The Mk2 bevel-edge chisels are made using oil-hardened high-carbon steel, which is easy to sharpen and ideal for lower sharpening angles, such as 20° and 25°. The steel is quite hard at 61 on the Rockwell "C" scale, but not too hard. As a result the tools can take quite a beating.

The set of chisels I examined were accurately ground – the bevels on the long edges were razor thin. So these tools are ideal for sneaking into acute corners.

Speaking of grinding, the tools were fairly easy to set up. The unbeveled faces of the tools were quick to polish – they weren't as quick as a Lie-Nielsen chisel, but nothing is, in my experience.

The bubinga handles are nice. They're not too big in your palm or top-heavy when chopping out dovetails.

One of the other great features of the Mk2 chisels is that they are available in a full range of sizes, from 1/8" all the way up to 2". I think every hand-tool woodworker can benefit from a wide chisel sharpened at a low angle for paring. And these are the nicest new ones I've ever seen.

The Mk2s are reasonably priced for an English tool of this quality that will last several lifetimes. A basic set of four is $111.

— Christopher Schwarz

Ashley Iles Mk2 Chisels

Tools for Working Wood ▪ 800-426-4613 or toolsforworkingwood.com

Street price ▪ $23.95 to $56.95 each

For more information, go to pwfreeinfo.com.

Craftsman Oscillating-spindle Sander

If you have sculpted cuts to smooth, cabriole legs to shape or if you need to thickness-sand small pieces, you need an oscillating-spindle sander – and Craftsman's #21500 oscillating-spindle sander has a few features that place it near the front of the class.

First, this machine is quiet. It's so quiet that you can't hear the 1/4-horsepower motor over the sound of your shop vacuum and it's noticeably quieter than your battery-powered drill.

At 1/4 hp, this sander ranks near the bottom for power when compared to other benchtop models. However, when put through everyday shop operations, the outcome equals that of the other sanders.

The direct-drive motor spins one of six 4 1/2"-tall sanding sleeves. Five rubber drums with corresponding diameters are included. Sleeve diameters range from the 1/2"-spindle diameter up to 3".

The 1" spindle stroke on the Craftsman is a category leader. And the Craftsman sander has 30 oscillating strokes per minute – half the number of most other benchtop sanders. That slower stroke makes it easier to handle stock while sanding and provides a smoother cut, but that cut is not as aggressive as you sand to your layout lines.

Another nice feature on this sander is its 18"-round cast iron tabletop. There is plenty of surface area to accurately balance a workpiece during sanding and I found, because there are no 90° corners to contend with, you will not catch your workpiece on any corners as you work. That reduces the chance for sanding divots into your project.

Additionally, dust collection is through a 2" port and the on/off switch is lockable. At 58 pounds, the machine is easy to lift onto your bench. Extra sleeves are sold in packs of three with three different grits.

With a median price point, I think the Craftsman #21500 would be a great shop addition to handle any usual sanding tasks thrown at it.

— GH

Oscillating-spindle Sander

Craftsman ▪ 800-549-4505 or craftsman.com
Replacement sleeves ▪ $5 to $13
Street price ▪ $249
For more information, go to pwfreeinfo.com.

Dust Deputy a Pet-peeve Exterminator

Central dust collection is nice for big machines but there are some operations where a shop vacuum connected to a sander, router or miter saw makes more sense. We have both in our shop, but our small vacuums have always been a mixed blessing.

Yes, we collect the dust and debris directly at the source, but we never know that the collection bag on the vacuum is full until it is too full. When it stops working we know it's time to change the bag. In a busy shop the bags fill quickly, and it takes some diligence and expense to keep spare bags on hand.

Enter the Dust Deputy from Oneida, riding in to rescue us from the desperados of debris. This small cyclone, molded from an anti-static plastic, sits atop a five-gallon bucket and catches most of the junk before it can get to the vacuum. The end result is that the filters on the vacuum stay clean, the bags take forever to fill, and we can easily see when the bucket is getting full.

Oneida offers just the cyclone, or a complete kit that includes buckets, hardware and hose. We tested the complete kit with a plastic cyclone, and assembly took only a few minutes. There is also an industrial version available with a welded steel cyclone and 10-gallon collection barrel.

We hooked it up to our miter saw and are quite pleased with it. Almost everything that gets sucked out of the saw swirls around the cyclone and falls into the bucket. Emptying the bucket is faster and easier than taking apart the vacuum to change the bag. We haven't seen any loss of suction, and the addition of the cyclone is a huge improvement.

At first glance, this seemed like a pricey solution, but doing the math showed us that the money we were spending on replacement bags and filters for the vacuum would make up for the cost of the cyclone in a short period of time.

Perhaps most important, we aren't ignoring a full shop vacuum anymore. We can easily see when it's time to empty the container, and as a result we aren't blowing dust and debris around the shop. The investment in the Dust Deputy is paying off in money, time, less frustration and cleaner air. **PW**

— Robert W. Lang

Oneida Dust Deputy

Oneida Air Systems ▪ 800-732-4065 or oneida-air.com
Street price ▪ $59 to $199
For more information, go to pwfreeinfo.com.

A Joiner's Tool Chest

BY ROY UNDERHILL

It's the modern joiner's dilemma. An old house over in the next county has missing mouldings on the mantel, a kicked-in panel on a bedroom door and seven sash with rotted rails. The question is: Do you lug your full tool chest to the site, or do you pick your planes and pack them in a satchel? The big chest needs four men to move it, and the satchel is a jumble. What you need, of course, is something midsized – you need a chest for the road.

This midsized chest is also a midsized challenge. The sides are common through-dovetails, but the skirt requires a few variations that will bring your dovetailing skills up a notch.

Equally important as the dovetails are the interlocking grooves – grooves that join the bottom into the skirt, the skirt into the broad sides and the panel into the frame of the lid. Even the miter-shouldered bridle joints in the corners of the lid are just overgrown tongue-and-groove joints. The keystone to this chest is the interlock that joins the skirt to the sides. The skirt itself adds depth to the chest – without your having to glue up your stock edge-to-edge. With the narrower boards available these days, a deep dovetailed chest is usually made up from two or more boards glued edge to edge to make one broad one. But even when the joints are well executed, the built-up look of the sides is always disturbing.

Here though, after subtracting the 1½" overlap, joining the 5½" skirt to the 11¼" sides allows these readily available widths to add up to a 15¼"-deep chest.

The Gauge Rules

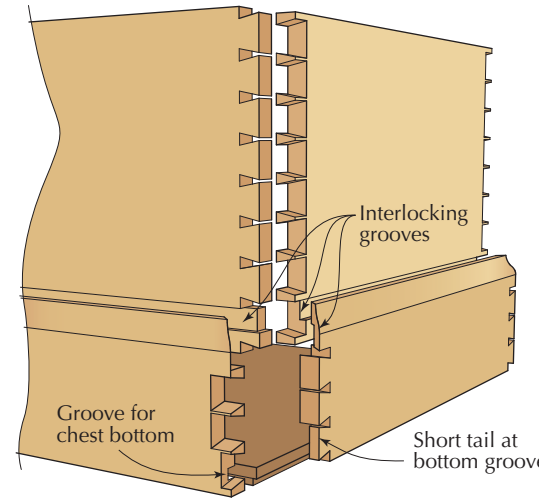
With all these long grooves (more than 38' by my measure), smart money would bet on the plow plane as the most valuable player. My vote would go instead to the double-toothed mortising gauge. The plow plane, making repeated passes and occasionally rocking over, tends to open up. By the time you get to the last board, the fence has eased and the groove is farther in from the edge than you intended. By contrast, the mortising gauge makes only one pass down each board and easily holds its setting. The sharp teeth of the gauge also help the plow plane make a clean job by severing the grain at the surface. For that matter, if you are plowless at the moment, once you've scribed the lines with the gauge, you can cut all the grooves with chisels in short (well, medium) order.

As in drawer building, grooving comes before dovetailing. Set your mortising gauge to ¾" in and ¾" wide and run it down the lower face of the side-board stock and the upper back of the skirt-board stock. Plow the groove ¼" deep within these lines. Unless you have a very long bench, you'll need to crosscut the boards into shorter sections for the plowing. You can cut the side boards to

Not too big, not too small. This chest is a handy size for a basic set of tools.

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG

Grooves, pins and tails. *Pulling away this one piece of the skirt reveals all this chest's secrets.*



CORNER - EXPLODED VIEW

Mark and make your groove. *The first joinery is making the interlocking grooves in the pieces for the skirt and top section of the chest. Mark their locations with a mortising gauge first to increase your accuracy.*

their final length, but it's wise to leave each of the four boards of the skirt an inch longer than needed – just in case.

I've dimensioned this chest so that the broad (expensive) side boards and top panel can be gotten out of a single 10' plank of pine or poplar. This gives you a chest 30" long by 18" wide, but if you want your 32"-long rip saw to fit inside, adjust accordingly.

Dovetail the Sides

Dovetails are strong in one direction and weak in the other, so it makes sense to orient them to resist the greatest load. In a tool chest that gets lifted and pulled along from the ends, the pins might logically go on the end boards. This also orients the attractive sloping face of the dovetails to the front of the chest. These days, the approved slope of dovetails has become beige and unthreatening – one in six (1:6) or so. But look at an old chest and the angle can be bold – up to a frighteningly steep one in three (1:3). For a conservative 1:6 slope, no one will object if you make the pins equal to half the 3/4" thickness of the wood at their widest point and the tails a bit less than twice the thickness of the wood. A steep slope will require bigger pins, because the slopes would converge before traversing the thickness of the wood. No matter the slope and spacing of the dovetails on the sides, treat the edge of the chest's interlock groove (which joins the skirt) as if it were the edge of the board, ending with half-pins as custom demands.

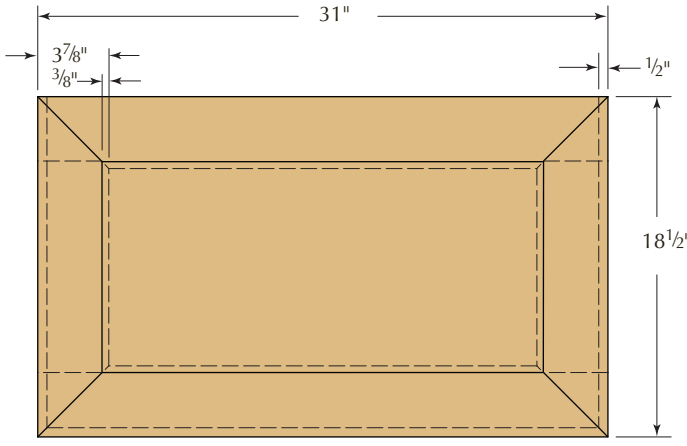
I'll assume you know how to cut the through-dovetails for the broad boards of the sides. If not, you can readily find this information elsewhere or derive my preferred method when we get to the skirt.

You may not need four people to lift this chest, but that's a good number to have around when you glue the sides. First, though, dry-fit the dovetails, pushing them at least halfway home. Pay close attention to the edges of the boards – the half pins are easily split away by a fat fit. Make any shims you'll need to fill mis-cuts and place them at the ready at each corner. Before you call in your helpers, set a box of doughnuts at the other end of the shop. Have everyone take a corner of the chest and paint on the glue. Squeeze up the sides with bar clamps, testing for equal diagonals to square the corners. Thank your helpers and send them off to eat the doughnuts – otherwise, they'll all want to help you tap in the shims. That is a job you need to do by yourself.

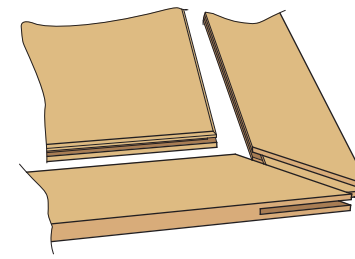
The Skirt

In a painted tool chest where the dovetails will not show as prominently, you might choose to orient the dovetails in the skirt counter to the ones in the chest sides. This is not pretty, but it's stronger and better resists the outward thrust of an expanding bottom. In a varnished chest of nice wood living a less rough-and-tumble life, however, I'd orient the dovetails of the skirt and sides in the same direction.

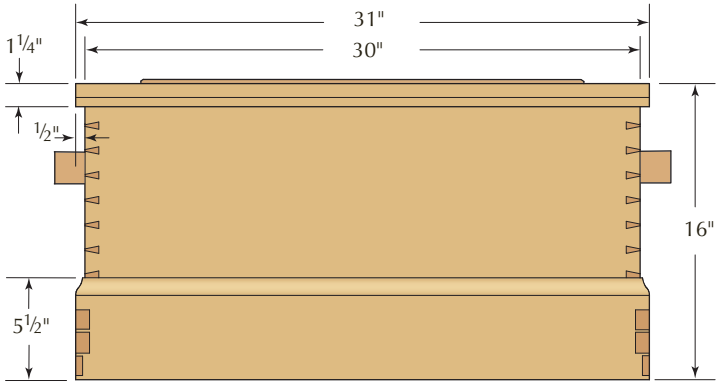
The skirt-board stock already has one groove plowed into it for the interlock. It now



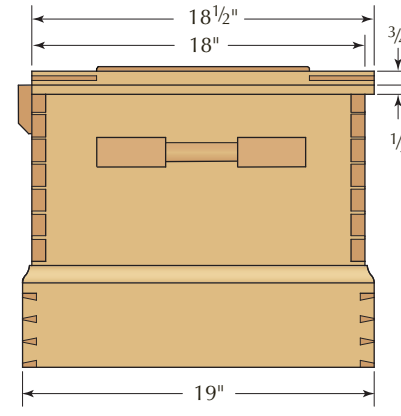
PLAN



LID CORNER JOINERY DETAIL



ELEVATION



PROFILE

Miter first. *Saw the miter in the skirt, but saw a little shy from your scribe line. You can tune up this joint later by laying a saw kerf through it.*

Straight, then sloped. *The first cut with the dovetail saw below the miter is straight across the skirt.*

Online EXTRAS

You can download a free SketchUp drawing of this tool chest from our web site:

popularwoodworking.com/jun09

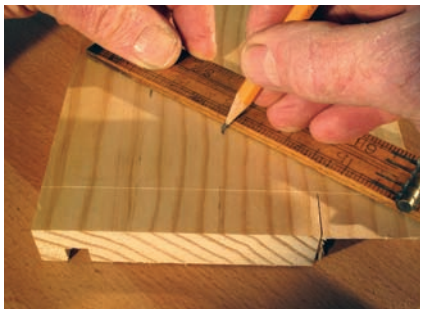
needs a second groove, 3/8" wide and 3/8" in from the edge, to hold the rabbeted 3/4" bottom. Plowing these grooves first helps you lay out the dovetails to cover them.

For the skirt joinery, it may help to think of each corner of the skirt as having two regions. The upper region is a simple butted miter joint that conceals the interlock groove and gives the moulding a neat corner. The lower region is dovetailed, with three tails and four pins. You could start in either area, but I'll begin with the miter because once you have cut it, the region for the dovetail is more clearly defined.

See that your ends are planed square and true. Set your cutting gauge to the thickness of the wood, plus 1/32", and mark all around the ends of both pieces.

Use the line scribed by the cutting gauge on the back sides as the origin for the 45° lines across the edges that define the miter joint. As always, you want to saw on the waste side of the line, but here you might choose to leave a bit more meat on each mitered face. That way, when you bring the joint closed, the mitered faces will hit before the dovetails fully seat. You'll then be able to "kerf in" and close the joint by sawing precisely down the seam. On a miter, you usually want to saw from the "inside out" so that you cut more with the flow of the grain. Once you have planed mouldings into the stock, however, you need to saw into the finished face to keep the edges from feathering. The mitered edges of the moulding are also quite sharp and easily damaged as you cut the dovetails. Leaving the mitered faces just a hair fat then kerfing them in at the finish helps protect them from damage.

Stand the piece chosen for the tails upright in the vise and square across the end grain precisely at the edge of the interlock groove. Carry this line down the face to



Sloped for symmetry. *Angle your rule across the skirt to divide the remaining area into three parts.*

From the center out. *Lay out the slopes of your tails from the centerlines you established with your rule.*

No knife needed. *Use your dovetail saw to scribe the pattern for your pins. Use light pressure. You don't want to plow a groove.*

the gauged line. Follow this line with your saw, working carefully to leave the interlock groove at its full width rather than letting the saw slip into the groove.

Lay out the dovetails using the diagonal rule method, positioning the rule to end at the centerlines of the spaces for the ending half-pins. Here, marks made every $1\frac{1}{2}$" along the rule divide the dovetailed part of the skirt into three equal parts.

Measure out the width of the pin-spaces from the centerlines and draw the slopes down to the edge, guided by your bevel gauge. Note that the spaces of the half-pins are just as wide as those for the two full pins – they are "half" only in the sense of having a slope on but one cheek.

Stand the piece upright in the vise and carry these lines square across the end grain. Saw just the cheeks of the dovetails.

Remove this tail piece from the vise and stand the pin piece in its place, positioning its end flush with a plane laid on its side. Slide the plane back and set the tail piece spanning the two, carefully aligning the mark of the cutting gauge on the tail piece with the inside edge of the pin piece. Hold everything steady as you draw the dovetail saw back through each kerf, transferring the cut lines to the end grain of the pin piece.

Square the transferred lines down the face of the pin board to the gauged line. The socket that houses the groove for the bottom

Straight across, but not straight down. *The first cut on your pin board defines the mitered area that will meet the tail board. It does not break through on the show side of the skirt.*

Crosscut the shorty. *Saw out the shallow dovetail joint at the bottom of the skirt. See the illustrations for details on what this looks like.*

Kerf in. *If the miter closes before the dovetails, run your saw through the miter joint. Saw into the joint as shown to avoid feathering where the saw exits the miter.*

Moulding after mitering. *Here I'm using a complex moulding plane on the skirt. Before moulding the skirt, remove the bulk of the waste with other tools.*

is only half as deep as the other two and must be marked accordingly. Mark the end grain of the dovetail first, indicating the wood to pare away. Then, reset the cutting gauge to mark the depth of the socket by adding 1/32" to the previous setting. This is all easier done than said.

Begin the pins by aligning your saw precisely with the waste side of the transfer marks and sawing down. Remember to saw only the inside diagonal of the cheek of the pin that coincides with the wall of the interlock groove. If you used too much pressure when transferring, the marks will be more like shallow grooves that try to pull your saw into them. Cut beside them, not in them.

Saw the mitered end, then saw out the bulk of the wood between the pins with your coping saw. Pare back to the gauge lines. On the final slice, set the chisel right in the cut made by the gauge.

Return to the dovetailed board and chisel out the spaces for the pins.

Saw and chisel the shallow dovetail flush to the line coinciding with the bottom of the groove.

When you push the skirt joint together, the miter should close just as, or just before, the dovetails hit bottom. If you need to kerf in the miter, first see that the corner is square and firmly held. Saw right down the seam from the outside face with a fine saw and be sure to stop before you cut into the half pin of the dovetail. Pull the joint open, inspect the mating surfaces and remove any remaining wood with a chisel. Close the joint again and check the fit. Four surfaces in three different planes have to meet at the same time, so you see why I suggested leaving the skirt pieces an inch or more longer than needed – you'll have at least one chance to start over.

The decorative moulding around the top edge of the skirt might be a simple bevel or an ogee or something more complex, but such decorative touches are often well left for last so they won't get banged up. Just as with the grooves, it's best to lay out the moulding with a gauge before planing. Here though, any sharp scribing points would leave their traces, so a pencil gauge or pencil divider is the ticket. Following these pencil lines, rough in the moulding with a drawknife and gouge, and use the moulding plane to bring it home.

The skirt has to fit around the waist of the chest, bottoming into the interlock. Too loose and the glue surfaces won't meet. Too tight and the skirt joints won't close. Don't glue any corners until you have fitted it all around (and inserted the bottom!). If the skirt is a bit tight, you can plane shavings from the faces of the interlock all around to make it sit a little deeper. If one broad side of the chest has the best looking wood and joinery, see if you can turn the skirt so that it too puts its "best face to London."

Bottoming

A good bottom should fit neatly inside the skirt, tight enough to stay in place but loose enough to allow movement. At some point your chest is going to sit on damp concrete or wet grass and its bottom is going to expand. This is when joining cheaper boards with tongues and grooves makes your bottom better. These joints can absorb some of the movement and prevent an expanding bottom from pushing the skirt dovetails apart.

First, join the bottom boards with tongues and grooves into an assembly that is larger than it needs to be. Gauge lines 1/4" in on one long-grain side and 3/8" in on one end-grain side. Set the chest with its dry-fitted skirt on the bottom and align the inner edges with these gauged lines. Trace the remaining two lines on the bottom and mark it and the skirt so they can be reassembled in the same orientation. Lift off the chest and add 1/4" to the new lines on the bottom.

Make a stout bottom. *A tongue-and-groove joint in your bottom boards ensures the longevity of your chest.*

Saw and plane the bottom to these lines. Flip the bottom over and use a rabbet plane or moving fillister plane to leave a 3/8"-square tongue all around. In the end, the bottom will fit only 1/4" into the side grooves, leaving 1/8" for expansion. Because the bottom boards won't expand along their length, the end-grain tongues on the bottom can fit more deeply in their grooves.

Insert the bottom and check the dry-fit of the skirt all around. Glue the interlock grooves and the skirt dovetails. You might use a dab of glue at the center of the end grain of each bottom board, but otherwise leave the bottom dry. Before the glue sets, burnish the mitered mouldings shut with the smooth back of a gouge. After the glue sets, plane off that last protruding 1/32".

The Lid

The grooves and joints that connect the frame and panel of the lid all begin as lines made by the mortising gauge. The gauge lines define the grooving and the grooving defines the joints. It's easy to see how the sockets of the miter-shouldered bridle joints are just extensions of the groove, but the grooves define the tenons as well. Plowing the grooves removes some of the potential width of the tenons, something you may discover too late if you work out of sequence. Start with the gauge, plow the grooves and work on from there.

Remove the cheeks. *With the groove already cut by the plow, the tenons' cheeks are easy to define with a saw.*

Trace the tenon. *Use the newly cut tenon to define the depth of the mortise in the short rails of the lid.*

Tenon the Long

The tenons of the lid frame go on the long front boards so that the end grain shows only on the side edges of the lid. Mark the face sides of all your pieces and run the mortising gauge around the inner edges and the ends. Plow the groove within these lines. Saw the shoulders of the tenon in a miter box if you have one. Split and pare away the waste wood on either side of the groove and run the gauge down the newly exposed wood to more clearly mark the thickness of the tenon. Now you can stand the end upright in the vise and saw the tenon cheeks without the saw pulling into the groove. This finished tenon now defines the width of the mortise.

Saw the shoulders. *A miter box makes accurate work of the tenons' mitered shoulders.*

Mortise the Short

Lay the tenon over the mitered end of the short piece and trace the breadth of its overlap. The mortise of the bridle joint is easy enough to cut out with a rip saw, chisel and rasp, but the plow plane can start the job. Plow a groove down the sloping end grain on the miters and down the short outer face of the mortise and you'll create a nice shoulder for the saw to ride against. Here's where the gauged lines rule once more. Because you can only plane down a slope, not up, you'll occasionally have to turn the wood around and fence from its back side. Unless the groove is dead center, you'll have to make a slight adjustment to the fence on the plane. Because working within the gauged lines keeps everything aligned in the same plane, you can safely adjust the plane as needed.

Place the Panel

Dry-fit the frame together, then measure the opening to find the size of the panel. As with the bottom, the panel can fit fully in the

Start with the plow. *By beginning to make the mortise with a plow, you create a guide for your saw.*

Another revealing corner. *Here you can see how the pieces to the lid come together with the panel. Be sure to allow for some expansion when figuring the width of the panel.*

groove at its ends, but the sides need room to expand. If the 1/4"-wide groove in both the frame and the panel is 3/8" deep, measure the panel to overlap the opening in the frame by only 1/4" on the sides. This will leave room for the panel to shrink and swell over a range of 1/2" without becoming loose or tight.

Joinery for the chest ends with gluing the lid-frame corners with the dry-fitted panel in place – the rest of the work is connected with fasteners. Hinge the lid with two or three butts and screw a 3/4" x 3" x 30" stop to the back of the chest to keep the lid from falling all the way back. Glue and screw a 1/2"-square lip around the front and sides of the lid, mitering the meeting ends and leaving just enough room for the lid to open and close snugly. You've done such a careful job so far, do take the time to track down proper straight-slotted steel screws.

Handles

The turned and sawn handles are smaller versions of ones found on an 1830s-vintage American tool chest. Each begins as a 12" length of 1 1/4" x 2" white oak, ash or maple. Set it in the lathe with the centers at 5/8" in from the edge. Turning such unbalanced wood is dangerous so keep it slow. You might want to saw some of the stock away to reduce the wobble and time on the lathe. When the grip is finished, cut out the curves with a turning saw and chamfer the edges with a spokeshave.

The handles take a heavy load, so it won't do to simply screw them onto the thin end boards. Use multiple screws from inside and out. If your tool chest will have tills sliding on hard wooden rails fastened to the inside ends, plan ahead and move the handles up or down to take advantage of this solid anchorage.

One-piece handle. *The tool chest's handles are each turned and then sawn from one piece of stout hardwood.*

So that's it. Locks and interior fittings are where you can really strut your stuff – or not. My chest just has two rough sliding tills and a till for moulding planes. Fastened to the underside of my lid you'll find a saw and some naughty postcards in a space that will forever go begging for fine marquetry. It's well-traveled, battered and blue. Over time, I expect that your chest will come to reflect you, too.

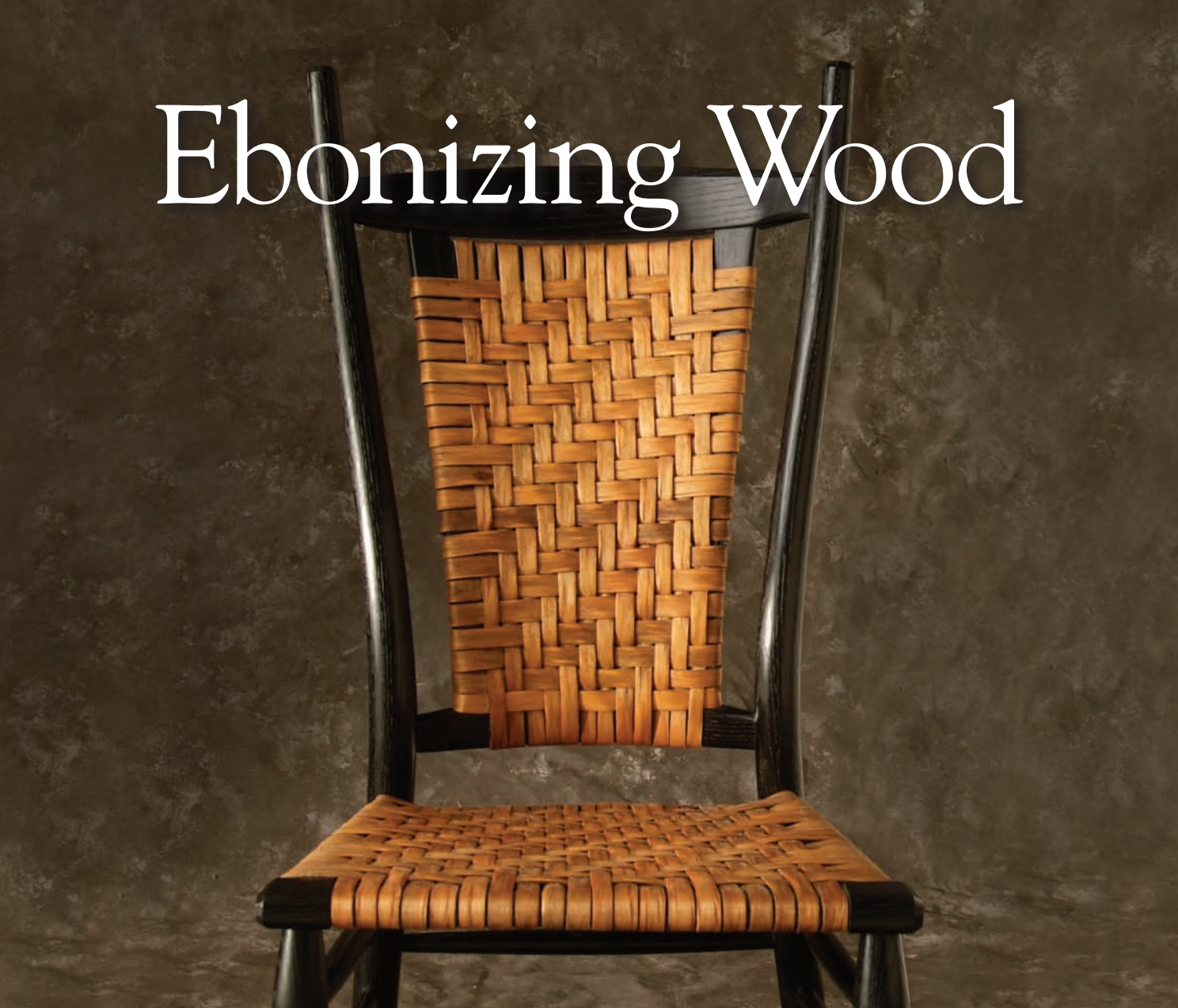
Stay sharp. **PW**

A Joiner's Tool Chest

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑	2	Side panels	3/4	11 1/4	30	Soft wood
❑	2	End panels	3/4	11 1/4	18	Soft wood
❑	2	Short skirt parts	3/4	5 1/2	19	Soft wood
❑	2	Long skirt parts	3/4	5 1/2	31	Soft wood
❑	1	Bottom	3/4	18	30 1/4	Soft wood
❑	2	Long lid pieces	3/4	3 7/8	31	Soft wood
❑	2	Short lid pieces	3/4	3 7/8	18 1/2	Soft wood
❑	1	Lid panel	3/4	11 1/2	24	Soft wood
❑		Dust lip	1/2	1/2	70	Soft wood
❑	2	Handles	1 1/4	2	12	Hardwood

Roy is the author of the new book "The Woodwright's Guide: Working Wood with Wedge & Edge" (UNC Press). And he has just opened The Woodwright's School in Pittsboro, N.C. He is the host of the long-running PBS television series "The Woodwright's Shop."

Ebonizing Wood



BY BRIAN BOGGS

Achieve a deep, rich black using household ingredients plus some powder from a South American evergreen.

It's hard to improve on the natural beauty of wood with all its various hues and grain patterns. For that reason I generally prefer a natural oil finish to just about anything. But there are occasions when there is already too much of a good thing in one space. I occasionally like to see black chairs around a particularly striking tabletop or a black frame showcasing woven hickory bark in the back and seat of a chair. For whatever reason I decide to ebonize, I prefer to do so naturally. I have tried ngr (non-grain-raising) stains, aniline dyes and oil stains and they all have their advantages for specific situations. But for depth and durability, I prefer ebonizing with iron.

I have been experimenting with using iron to stain wood for more than 20 years. I have read a little bit about it, but most of what I have learned came through experimentation. Iron staining, or ebonizing, generally uses a reaction between iron oxide and the natural tannins in wood to create a natural-looking black that is actually created in the fibers of the wood rather than a stain sitting on top. This is why it is so durable. It is integral, not superficial. I have also found it to be very light-fast.

The problem with this staining method is that it traditionally relies on the wood having enough tannic acid to react with the iron. This limits the wood choices and makes the results unpredictable. Oak is commonly used because of its high tannic acid content, and walnut is a very reliable wood for ebonizing. But even within these species there are a lot of variations.

The trick I have found to getting consistent results is to control the reaction independently without relying on the wood's varying chemistry. I saw an encouraging example of this in a chair by Randy Cochran in Knoxville, Tenn. He had ebonized a chair seat using chemical tannic acid first to saturate the fibers of the wood. Then he applied a rich iron solution made by soaking rusty nails in water for a few weeks.

The effect was an impressively deep black, but with a bluish tint like indelible marker ink. It worked well for his contemporary chair design, but I was in search of something more natural looking.

I experimented with adding chemical tannic acid and got nearly identical results to Randy's. I tried adding other stains afterward to tone down the blue tint, but I didn't like the results. When I later was explaining this problem to my father, he mentioned that he used a tree bark called "quebracho" for tanning hides. This was traditionally used because of its high tannic acid content. So I borrowed a batch of this bark powder from his stash to try.

Black beauty. *One of my favorite uses for ebonizing is to accentuate the beauty of fine hickory bark weaving such as in this woven back side chair in white oak. I prefer the rustic character of oak over finer grained woods for this piece.*

The basic kit. *The materials needed for the process are basic and cheap, but the bark powder needs to be mail-ordered.*

The Trick: Bark Powder Tea

Making a tea of the bark powder to saturate the wood did a lot to increase the tannic acid content. Using the bark tea first, then adding a solution of vinegar and iron once the wood had dried, I finally started getting close to the effect I was looking for. It was a bit chalky though, and not the intensity I wanted. Topping it off with another coat of the bark tea made all the difference. The tea completely eliminated the chalky look and the piece became a deep, coal black.

The process of ebonizing this way is pretty straightforward. Soak the wood surface with bark tea, wait until the surface moisture absorbs into the wood, then add the iron solution. Follow up with a bark tea "rinse."

Making the Solutions

For the iron I have used rusty steel wool and clean steel wood. I get about the same staining results from either, but rust solids build up in the pores from the rusted version. Any iron source will likely work, but the fine filaments of steel wool dissolve faster than anything else I have tried. I just wash a fresh pad of #0000 steel wool in soap and hot water to remove the oil and shove it into a plastic quart bottle of Heinz white vinegar. I don't know why, but I have had better luck with the Heinz brand.

It can take a week or more for the steel wool to dissolve. If you need faster results you can bring the steel wool and vinegar to a boil, then remove it from the heat. I can sometimes get a working solution in a day by boiling the vinegar and steel wool. You'll want a lot of ventilation for this, as the gasses produced are obnoxious. Either way you go, when the steel wool has all been eaten by the vinegar it is ready to strain. I put a coffee filter in the sieve and slowly pour the solution through it into the quart jar. Then I pour it back into the plastic jug. The solution should be either light gray or light reddish brown. I don't know why it varies, but it doesn't seem

What You'll Need

- One quart of Heinz white vinegar (in a plastic bottle)
- One clean, large-mouth quart jar
- One pad of #0000 steel wool
- One stainless steel spoon for stirring
- One basket-type coffee filter
- One sieve
- Quebracho bark powder
- One pint jar (for mixing)
- Two small containers (quart jar lids are big enough) or squirt bottles
- Paper towels or two brushes
- Latex gloves

OPENING PHOTO BY LOUIS CAHILL; STEP PHOTOS BY MICHAEL TRAISTER; SETTEE PHOTO BY THE AUTHOR

to matter. In either case the liquid should be quite clear rather than cloudy.

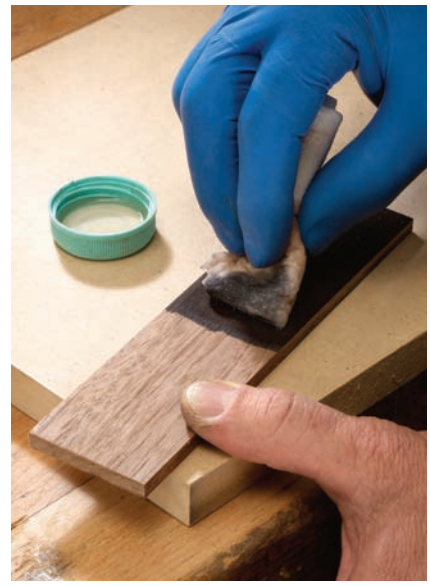
Before using the vinegar and iron solution, I always test it with a stick of oak or cherry dipped in the solution. It should turn fairly dark in a few minutes. If not, you can try just waiting another day or make another batch. I haven't found a cure for this particular failure. Nor do I know why it sometimes doesn't work well. It might be that I'm not always being thorough in getting the oil out of the steel wool. I highly recommend making this iron solution at least a week or more in advance of actually needing to stain a project. You'll want to get the feel of the whole process before putting it on a real piece of furniture.

The iron solution keeps for months in the jug. As the steel wool dissolves, gas is produced. And if the container is sealed it can burst. Just because the iron is visibly dissolved doesn't mean the reaction has stopped. So be sure there is an escape hole in the lid. A $^1/_{32}$" hole is adequate.

The bark tea is easy to prepare and can be made up right before using it. I just put a heaping tablespoon of bark powder in a pint of hot tap water and stir it up well. (It helps to mix up a slurry of the powder with a couple tablespoons of water first to get all the powder mixed, then add the rest of the water slowly while stirring. This makes it easier to avoid clumping.)

The Process

Be sure you sand the furniture well and raise the grain at least twice before the last sanding. I would stop after #320 grit to avoid burnishing the wood. It is possible to burnish with #320, so use a light touch and fresh paper. If you have to sand the wood to remove raised grain after staining, you'll need to start the staining process over. I have experimented with using the bark tea to raise the grain between the last two sandings. It doesn't take a lot of bark tea dust up your nose to realize this is probably not a healthy method, even with a dust mask.



Iron-on color. *Above, I'm wiping the first iron layer onto tea-saturated walnut.*

Different woods, same result. *Three samples of ebonized wood (oak, walnut and maple) showing color consistency with the stain with the grain variations being prominent.*

Apply a good soaking amount of bark tea to the assembled furniture and allow it to soak in. Be careful not to rub the wood; just lightly stroke the surface with the solution. If there are places where the tea can pool, blot off any excess that collects there. Once the tea has soaked in you can apply the iron solution. I like to do this when the wood is still damp, but not visibly wet. If there is tea still sitting on the wood surface the iron will react to that tea rather than the tea that has soaked into the wood. You want the reaction to happen in the wood, not on top of the wood.

Once this tea has soaked in, apply a liberal amount of the iron solution with light strokes. The wood should start turning black immediately. Keep applying until every part is turning black. Look at the piece from several angles to make sure you didn't leave any part unstained.

By this time you have put a lot of water on the piece. I recommend letting it dry for a few hours before finishing it off with the tea rinse. Once dry you can use the iron deposits left on the surface as a fine abrasive to polish the wood. Just use a clean rag and buff the piece as well as you can. Be gentle so you don't burnish the wood too much, just in case you need to re-stain. This not only polishes the wood, but it also removes a lot of the loose iron deposits. Once it is looking pretty even in sheen, it's time for the rinse. Just apply another coat of the bark tea and "wash" the surface with it just like you were washing anything. Let that dry and buff one more time. This should polish the piece very nicely.

The last step is to wash the piece off with clear water. This is to remove any residue and to help see if the stain is what you are looking for. The water makes it easier to see where you've missed a spot. If you do find a light spot, you'll need to sand that part lightly with #320 grit before starting the staining process at step one. You don't need to re-stain the whole piece, but I have only been able to fix a missed spot by sanding the whole part and starting over with that part. You don't need to remove all the stain, just sand enough to scratch the surface everywhere so the solutions can penetrate more easily.

Problems and Solutions

As simple as it sounds I have run into some perplexing problems and inconsistencies with ebonizing. They all have solutions, but with proper attention they can be avoided.

If you apply the two solutions with a rag and wipe with too much pressure, you can compress the fibers. It doesn't take much pressure to do this. Compressed wood will not absorb well so the staining will only happen on the surface, not in the fibers. As soon as you wipe off the surface after cleaning, most of the black comes off too. If this happens you'll need to sand again with #180 then #220 grit. Then start the process over.

Supplies

Van Dyke's Taxidermy
800-843-3320 or
vandykestaxidermy.com

2 lbs. ■ bark tan & dye (quebracho extract) #01347179, $6.39

Price correct at time of publication.

To prevent this problem you can brush on the liquid each time or apply it with a paper towel using light brushing strokes, keeping finger pressure off the wood.

The second problem is that a build-up of solids can occur on the surface. This is often from the bark tea being too strong, or poorly mixed. You'll notice a texture change on the surface of the wood when this happens. The only way I have been able to fix this is to sand and start over.

Sometimes it seems impossible to get the solutions into the pores of oak, especially white oak. A little soap in the liquids can help. I have had my best luck fixing this by just sanding after the first iron reaction has dried and starting the process all over. This sanding forces ebonized wood dust, iron and bark tea residue into the pores. That sounds like a problem in itself, but it sure seems to work, and I haven't had any trouble with this dust crumbling out of the pores later. The subsequent iron and tannic mixes either wash out the dust or bond it in place.

I have noticed that the solution needs to be fairly pure when applied to the wood. If you use the same rag to apply both solutions, the chemical reaction will happen in the applicator rather than in the wood. You'll be essentially applying ink to the surface rather than creating the reaction you are looking for in the wood. I recommend using a squirt bottle to get the solution onto the rag or brush. That way you never dip into the solution and contaminate it. I have also used jar lids to dispense a small amount of each solution and I only dip my brush into the jar lid, never into the main container.

Every time the vinegar rag goes over the tea-soaked wood it gets contaminated. The same happens when you use the tea rag in the rinse step. A little bit of this is not critical, but you'll need to keep contamination to a minimum. Change paper towels often, or rinse the brushes periodically to make sure only pure solution is applied to the wood.

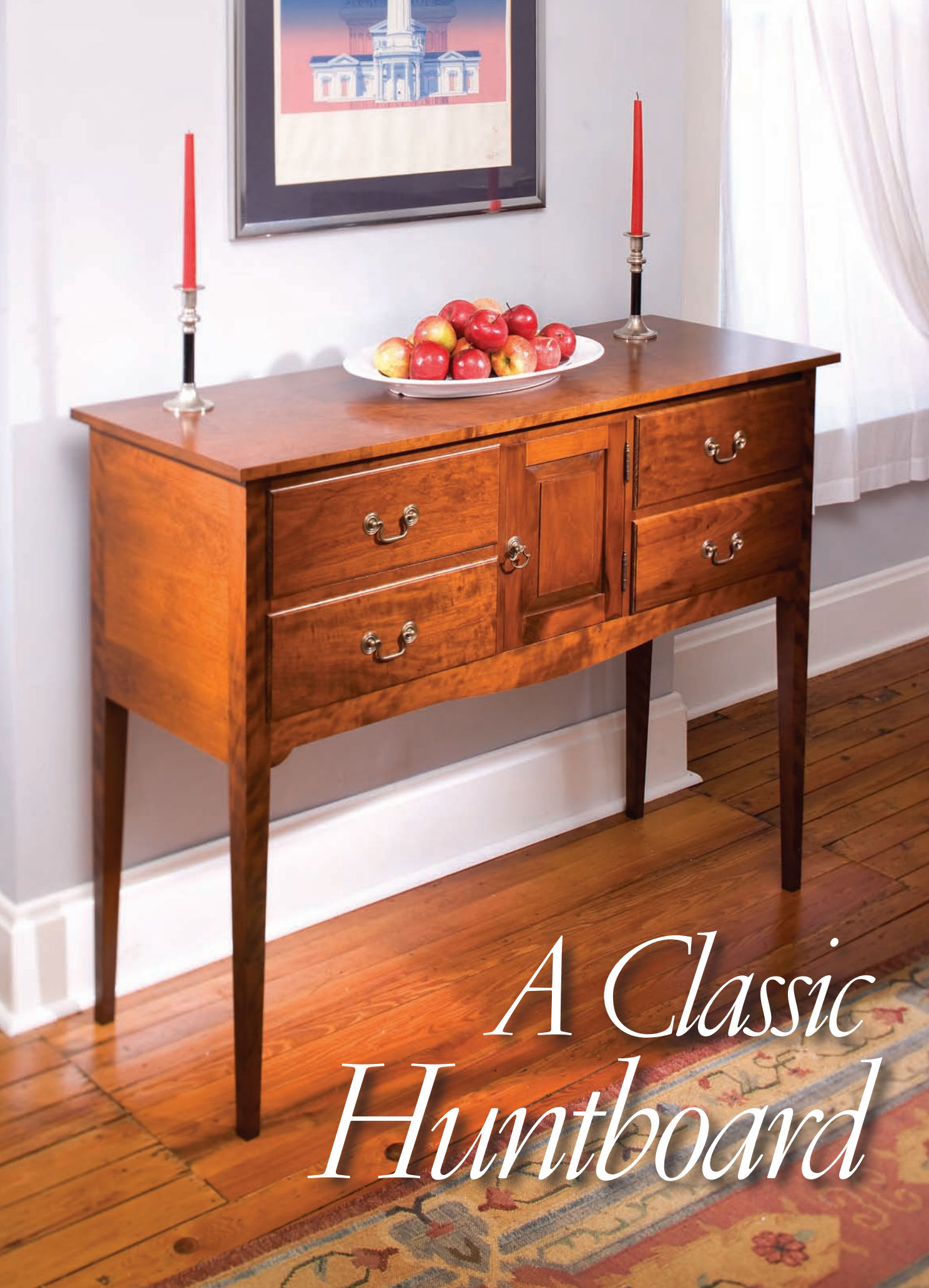
You'll need to keep the two brushes or paper towels separate. Never dip the same brush or towel into both liquids or you'll spoil the batch. Eventually any batch will get contaminated in the process of ebonizing, that's why I work out of jar lids or squirt bottles. When using the jar lids, I use up the solution before it gets too contaminated. A squirt bottle is best.

It is possible to stain the parts before assembly. I used to do this, but the hassle of keeping tenons and mortises clean is more work than staining around lots of joined pieces. It's doable either way, and the design of the piece will dictate which is more practical. This process will take patience, as does any finishing.

In my experience it tends to add about 20 percent to the cost of any project. Figuring that in to your expectation for completion time will help set reasonable goals. This is not a project to knock out in the evening after a long day at the office. Start in the morning and try to avoid interruptions. You can stop at the end of any step and come back to it later with little if any adverse effect, but I do best when I can stay with it all the way through. I also recommend only staining one piece of furniture at a time. It won't likely take much longer and I find I do a better job with fewer parts to keep up with. Ebonizing can be a lot of fun and it's a great option to add to your offerings. **PW**

Brian is a furniture maker, teacher and tool designer in Asheville, N.C. You can visit his web site at brianboggschairs.com.

Settee. *Like the chair in the opener, this settee features ebonized wood and a woven hickory bark seat.*



A Classic Huntboard

During the holidays, I remember as a youngster growing up, a card table set up in the dining room to stage the dinner platters. There was never enough room on the table, so temporary storage was a necessity. Then after dinner, I recall Mom folding the table linens to store them elsewhere in the house. There was no significant storage near the dining table.

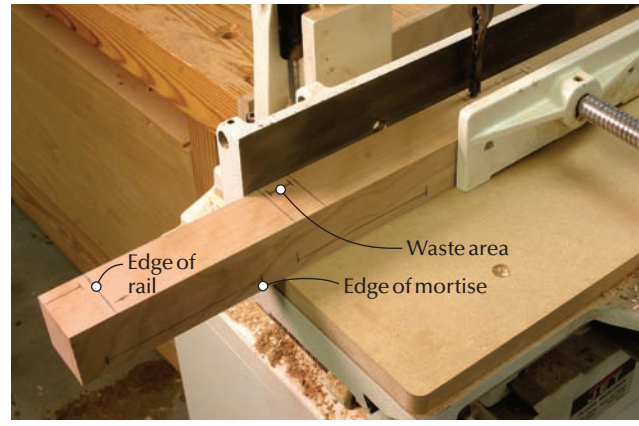
Both of these issues are solved when you include a huntboard as part of the dining room furnishings. Huntboards are narrow storage pieces with some combination of drawers and cupboard storage. And the top is flat, long and ideal for food-loaded platters awaiting a second pass around the table.

Tapered Legs

The legs for this project are long, slender and tapered along the two inside edges; that's where construction begins. Prior to any mortises, all four legs are identical, so mill your stock to size, then cut the tapers with whatever method you prefer. I taper with my jointer and believe this method is best. (If you want to see how to taper legs at a jointer, visit popularwoodworking.com/video.)

After your tapers are created, arrange the legs so the best faces are shown and the tapers are facing toward the inside of the project. Note the locations so you can reposition the legs whenever necessary.

Refer to the illustrations on page 49 to locate and mark the position of each rail or panel onto the appropriate leg. Place marks at the top and bottom edges of the piece locations, then move toward the center to locate the edges of the mortises. Full lines and dashed lines, as shown in the top photo above, help me understand the placement of each mortise.



A simple layout system. *A line fully across the leg indicates the edges of the rail or panel, a dash indicates the edges of the mortise, and a line between the dashes indicates the waste area.*

Divide to strengthen. *A single mortise-and-tenon joint for the ends has two problems: A long mortise weakens the leg and seasonal movement of a fully glued end could split the panel over time. Divide the joint into three sections and leave stock between each mortise to add strength.*

Ample storage and simple lines make this dining room server highly desirable.

BY GLEN D. HUEY

All the mortises are 1/4" wide x 1" deep. Position the mortise slots so the rails, dividers, sides and back are flush with the leg faces when installed. With 3/4" stock, position your mortises 1/4" from the face of each leg, or 3/8" to the centerline.

Due to the length of the sides and back mortises, a single mortise would weaken the joint and leg. Divide the layout into three equal sections and leave 1" of solid material between each for strength.

The mortises for the top rail are open at the end of the front legs while the lower rail and drawer dividers are housed. Pair the legs as you do your layout work to ensure accurate and equal positioning.

Now you're ready to cut your mortises. I prefer a hollow-chisel mortiser, but again, use your preferred method. (If you're using a machine to cut your mortises, leave the fence position as is; you'll return for additional mortise work shortly.)

Other Case Workpieces

Mill the remaining case pieces to size and width according to the materials schedule on page 49. This is a good time to batch-cut your tenons. With each tenon being 1" in length, a single setup is all that's needed. Use a dado stack to create the tenons, or use my favorite method, a two-step approach – the first cut defines the tenon length and a second creates the cheek.

For the top and bottom rails and for the drawer dividers, make all your face cheeks, then make the edge cuts to match the mortise layouts. Remember to make the tenons on the ends of the vertical dividers, too.

The ends of the huntboard are a bit more

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG

Choose your method. *The tenons on the ends are easy to create at a table saw in a two-step approach, or set up a dado stack. Either method requires handwork to complete the tenons.*

work. Create the tenon as if it were one continuous run. Match the ends to the appropriate legs and transfer the layout for each of the three mortises. Square a line from the edge of the tenon to the shoulder, then use a hand saw to cut the tenon's edge cheeks. Notch the ends of these tenons to fit your layout.

After cutting the edge cheeks, use a chisel to remove the waste between each tenon. As you remove the waste, keep the angle of the chisel tilted about 2° and work toward the center from both faces. The 2° angle undercuts the material to ensure there is no waste to keep the panel from a tight fit to the legs.

Supplies

Horton Brasses Inc.
800-754-9127 or horton-brasses.com

1 ■ stirrup pull cupboard turn #H-40

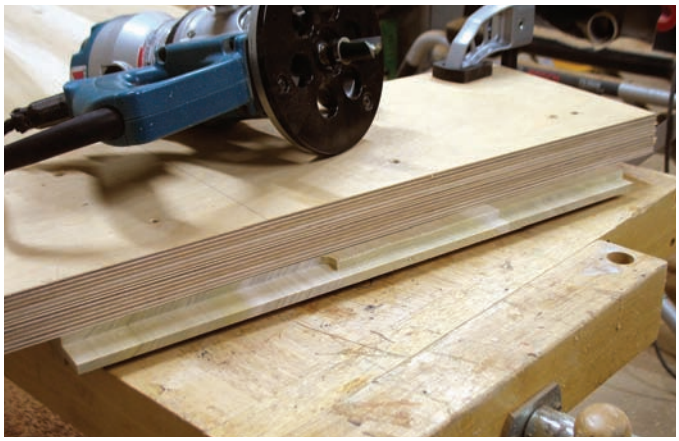
4 ■ rosette pulls with 3" bore (order backplates to match stirrup-pull backplate) #H-10S

Call for pricing.

Rockler
800-279-4441 or rockler.com

1 pr. ■ non-mortise hinge #90432, $3.89

Price correct at time of publication.



It stands tall. *The back panel is too large to stand at a table saw. Another method is to use a router, pattern-routing bit and plywood guide fence to produce clean smooth tenons.*

If you make tenons with a dado stack, the back piece presents no real issues. If, however, you use a two-step method, standing the back panel at your table saw is problematic due to its height. To make these tenons, I use a router and straightedge. Here's how:

Lay out the 1" measurement at both ends of the panel and on both faces, then scribe a line across the width of the piece with a marking gauge. Clamp your straightedge at the line and use a pattern bit to remove the waste material. Work both sides of the panel so your end thickness slides snuggly into your mortise. To finish the tenons, match the panel to the rear legs, transfer the mortise layout and finish your joinery as you did on the end panels.

The final step before a dry-fit is to cut mortises for the vertical dividers into the top and bottom rails. Use the drawer dividers to locate and lay out those mortises. Also, add the profile to the lower rail and make sure to smooth the cut before moving ahead.

Assemble your carcase before moving on. First fit each joint and arrange your clamps to make the glue-up easier.

Assemble the Case

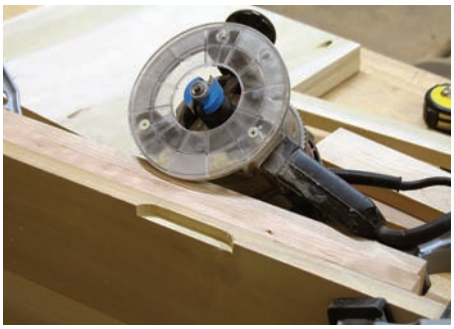
If you divide the case assembly in three steps, the entire project comes together with ease. First, add glue to the leg mortises for the back, then spread glue on the tenons and slip the back into the mortises. Align the top edge of the panel and top of the leg. Add clamps and allow the glue to dry.

Next, assemble the case front. By isolating the front, you'll have time to complete the work before glue issues arise. A specific order needs to be followed to bring this assembly home: Install the vertical dividers to the top and bottom rails, add the drawer dividers to those vertical pieces, then slide the entire assembly into a leg mortise. Make sure to apply glue to both the mortises and tenons throughout the process. Add clamps until the glue is dry.

The last step to complete the case deals with the end panels. Again, apply glue into the mortises and on the tenons, then slip the end panels into position. You need to clamp only from front to back, squeezing the panels between the two earlier sub-assemblies. Check the piece for square. If your panels are cut square and align with the top end of the legs, measurements from corner to corner should be equal.

Wiggle room. *The tenons should fit snug at the cheeks for the best glue hold, but a little space at the ends allows you to tweak the rails position.*

Three-step assembly. *It's much easier to assemble the huntboard in a series of glue-ups. Assemble the front, the back, then finish with the ends.*



Support with a half-lap joint. *Support for the cupboard hangers rests on a rabbet at the front and back of the case. Clamp a couple scraps to the case to provide a solid base for your router.*

Benefits gained. *The cupboard bottom is slid into grooves in the cupboard sides. Position the top edge of the bottom to act as a stop for the door – 3/8" above the lower rails works best.*

Block In the Cubby

There are three pieces that make up the cupboard section, the area behind the huntboard door. The cupboard bottom slides into grooves near the bottom edge of the cupboard sides. The entire assembly is attached to the vertical dividers and case back with pocket screws, and to the cupboard hangers that stretch between the front top rail and the case back.

The hangers are lapped onto notched areas at the front and back and sit equally balanced over the cupboard sides. Mark the location at the front rail, then square to the case back and transfer the layout. Use a router and rabbeting bit, balanced on temporarily positioned stock, to plow a 3/8" rabbet that's 2 1/4" wide.

Mill the stock for the hangers, cut a matching rabbet on both ends, then install the pieces to the case. Use a couple brads to hold the joint as the glue dries.

Prepare stock for the cupboard sides and bottom. Cut the cupboard sides to size and slide the panels into the case so the piece is snug to the hangers and perfectly aligned with the outer edge of the vertical dividers. Next, mark the location for a 3/4" groove that captures the cupboard bottom. Position the groove 3/8" above the lower rail so the bottom acts as a doorstop. While the piece is in place, note where to cut the pocket-screw holes. All holes are on the outside of the cupboard sides and held away from mortise-and-tenon joints.

Add the grooves to the cupboard sides, cut the bottom to fit – you can get an accurate measurement after the sides are grooved and positioned or you can calculate the width of the panel by adding the depth of the two grooves to the area between the vertical divider edges – then slide the unit into the case. Install the pocket screws and add a couple screws into the cupboard sides through the hangers to complete the job.

Drawer Extensions, Guides and Runners

The setup for the drawer area on this project begins with an extension attached behind each drawer divider. One end of each extension is notched to fit around a leg. Hold the extension tight to the drawer divider and the leg to mark one half of the notch. The second half is marked with the opposite end held tight to the cupboard side. Square the

Orientation is everything. *With the grain of the cupboard sides in line with the case back and ends, the only cross-grain concern is with the case front. Oversized holes for the pocket screws relieves that issue.*

lines until they meet, then cut the notch at the band saw.

Additionally, the extensions have two mortises that are 1/4" wide and 3/8" deep to house the tenons of the drawer runners. Each mortise is 7/8" in length. Leg-side mortises are offset from the end of the extension to compensate for the area behind each leg, while the cupboard-side mortises continue through the end of the extensions. Apply a thin bead of glue to the extensions, position each piece flush with the top edge of the drawer dividers, then secure with clamps.

Next up, mill the material for the runners and guides. Form tenons on one end of each runner to match the mortises. The wide runners are notched around the rear legs just as was done with the extensions.

Simplified installation. *Installing the drawer runners and guides is much easier when a drawer extender is used. All mortises are located and cut into the extenders, not into the rails.*

Notched runners. *Outside drawer runners are notched around the legs, while the inside runners are attached to the cupboard sides. Fit and glue a tenon at the front, add a nail into the leg of a leveled runner, then clamp a guide in place until the glue dries.*

Apply glue to the mortise and tenon for each runner, slide the runners into position, then level the runner from front to back. Each runner is secured with a 1 1/2" cut nail. Wide runners are nailed through the notch into the rear legs and the narrow runners are nailed directly to the cupboard sides.

Drawer guides are cut to fit between the legs on the outside of the drawer openings. Make sure the edge of each guide is flush with the leg. Install the guides with a thin bead of glue, then add spring clamps to hold things until the glue dries.

About the Drawers

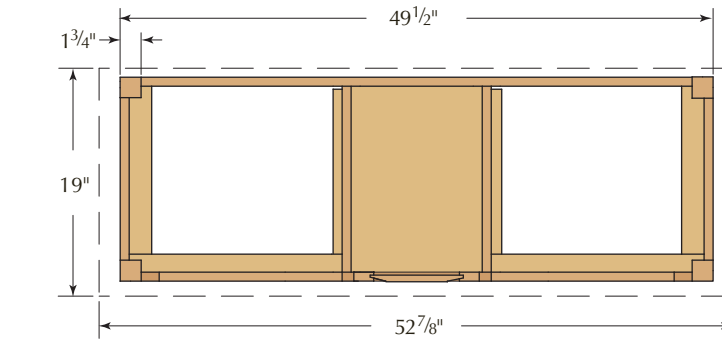
Drawers for this piece are built with standard 18th- and early 19th-century construction techniques. The drawer back joins the sides with through-dovetails while half-blind dovetails are used to connect the drawer sides to the fronts.

The drawer fronts are sized to the openings (opening width plus 5/8", opening height plus 1/4"). Edges are thumbnail moulded using a 3/16" roundover router bit. Use a 3/8" rabbet along the top and two ends to leave 5/16"-thick lips.

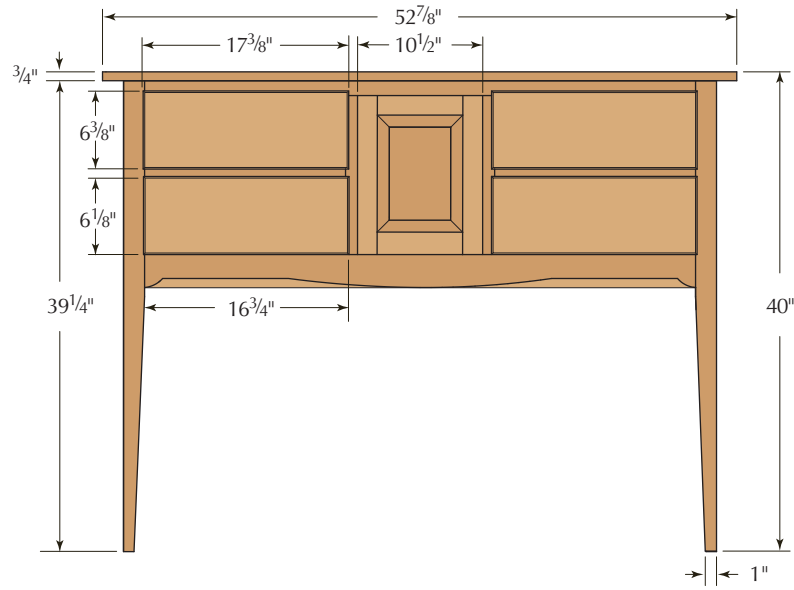
Mill the pieces for the drawer boxes and complete the dovetail joinery. The drawer bottom slides into grooves cut into the sides and drawer front. Plow a 1/4"-wide x 1/4"-deep groove just below the bottom edge of the drawer back, then sand all the parts on the inside face.

Before assembling the drawer boxes, add a small bevel to the bottom edge of the drawer fronts. This bevel helps the drawer close with ease. Instead of that edge catching the divider, the bevel rides up the divider and the lipped edge nuzzles tight to the case front.

Make the bevels at a jointer. Tilt the fence 5° back and set the depth of cut to a light 1/16". The bevel should begin at the edge and terminate flush with the thumbnail profile. To check the setup, add pencil lines across the left end of a drawer front's bottom edge,



PLAN



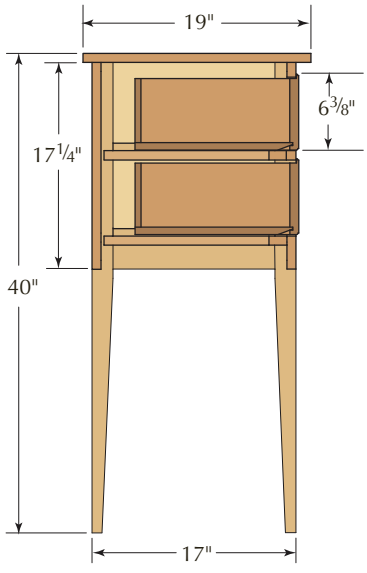
ELEVATION

Smooth closure. *A bevel on the bottom edge of the drawer front allows the front to seat to the case. There's no bump against the divider and the drawer rides up the bevel to close fully.*

place the inside of your drawer front against the jointer fence, then run a short length along that edge. The blades remove the pencil lines to show the exact cut. Make depth adjustments to gain the necessary bevel, then run each drawer front.

Assemble your drawers with glue at each joint, square the boxes, then set them aside while the glue dries. Afterward, sand the outside of each drawer box and make sure to knock off any sharp edges.

The drawer bottoms are solid wood with the grain running side to side; expansion is pushed to the back of the drawer. The front and side edges are beveled to ride in the grooves and a single slot is cut at the back edge that's even with the inside face of the drawer back. A nail is driven through that slot and into the drawer back to hold the bottom in position.



SECTION

A Slip-simple Door

The size of the door for the huntboard is rather small. While you could build the door with traditional mortise-and-tenon joinery, the size allows for a simpler method. A slip joint, or open mortise and tenon, is a quick joint that's cut at a table saw with a tenoning jig. And the joint is plenty strong.

Begin by cutting a raised-panel groove into the rails and stiles. Raise the blade to 3/8" and set your fence 1/4" from the blade. Make one pass with the face against the fence, then a second with the opposite face tight to the fence. The finished groove is now centered in your material. (A first cut directly in the middle of each piece's inner edge eliminates the possibility of a small sliver remaining if your stock is slightly thicker than 3/4".)

The next step is to create the tenons on the rails. Set the blade height to 1/4" and move your fence so there is 1 5/8" between it and the left-hand side of the blade (the width of the stiles). Use your miter gauge to guide the pieces as shown in the photo on the next page. Cut both ends of both rails.

To form the tenon, raise the blade to match the previous cut (1 5/8") and adjust the tooth of your blade to just remove the outer section, leaving the middle section intact. Four cuts per rail and you've got half the joint made.

The mortise portion of a slip joint is based on the tenons. You'll have one setup, but you'll work at two different blade heights. Adjust the blade's height to match one of the rail's tenons – in this project that height is 1 1/4" for the top rail, or 1 1/2" for the lower rail – and set the fence so the cut is just inside the groove as shown on the next page.

Make two passes per mortise, reversing the stile as you work. Cut the two top ends of the stiles, then adjust the blade to the second height to wrap up the mortises. When complete, the door frame slips together at the corners (plenty of glue area) and is sized for the raised panel portion of the door.

Classic Huntboard

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑	4	Legs	1 3/4	1 3/4	39 1/4	Cherry	Tapered two sides
❑	1	Top rail	3/4	1 1/4	48	Cherry	1" TBE*
❑	1	Bottom rail	3/4	2 3/4	48	Cherry	1" TBE*
❑	2	Middle rail	3/4	1	18 3/4	Cherry	1" TBE*
❑	2	Vertical dividers	3/4	1	15 1/4	Cherry	1" TBE*
❑	2	End panels	3/4	17 1/4	15 1/2	Cherry	1" TBE*
❑	1	Back	3/4	17 1/4	48	Poplar	1" TBE*
❑	2	Cupboard sides	3/4	15	15 1/2	Poplar	Groove for bottom
❑	1	Cupboard bottom	3/4	11 3/8	15 1/2	Poplar	
❑	2	Cupboard hangers	3/4	2 1/4	14 1/4	Poplar	3/8" rabbet both ends
❑	4	Drawer extenders	3/4	1 1/2	17 3/4	Cherry/poplar	
❑	4	Narrow runners	3/4	7/8	15 3/8	Poplar	3/8" TOE**
❑	4	Wide runners	3/4	1 7/8	15 3/8	Poplar	3/8" TOE**
❑	4	Drawer guides	5/8	1	14	Poplar	
❑	1	Top	3/4	19	52 7/8	Cherry	
❑	9	Wood clips	3/4	1	2 1/4	Poplar	
Door							
❑	1	Top rail	3/4	1 5/8	10 1/2	Cherry	1 5/8" TBE*
❑	1	Bottom rail	3/4	1 7/8	10 1/2	Cherry	1 5/8" TBE*
❑	2	Stiles	3/4	1 5/8	13 1/4	Cherry	
❑	1	Raised panel	5/8	7 7/8	10 3/8	Cherry	
Drawers							
❑	4	Drawer fronts	3/4	6 3/8	17 3/8	Cherry	3/8" rabbet three sides
❑	8	Drawer sides	1/2	6	15 1/2	Poplar	
❑	4	Drawer backs	1/2	5 1/4	16 5/8	Poplar	
❑	4	Drawer bottoms	5/8	16 1/4	15 1/2	Poplar	

* TBE = Tenon both ends; ** TOE = Tenon one end

Make a Slip-joint Door Frame

1 ***Center the groove.*** *Slip-tenon doors require centered grooves or the setup for the mortises and tenons becomes complicated. Simply reverse the piece for a second pass to ensure proper alignment.*

2 ***The rails.*** *Position the fence to define your tenon's length. Because this is not a through cut, no step-off block needed.*

3 ***Jigging out a tenon.*** *Match the blade height to the tenon length, then align the cut with the edge of the groove. After two cuts, what's left is your tenon.*

4 ***Work in stile.*** *Adjust the blade height to a completed tenon (there are two heights) and reposition your fence to cut just inside the groove. Make the cut, then test the fit. The joint should slide together snug and easy.*

5 ***Panel ready.*** *With the tenons complete, the door frame should slip together and the opening for your panel is established. Slip joints are quick and are completed, start to finish, at the table saw.*

Due to the door size, worries about the raised panel movement are unnecessary, but I still would leave a bit of wiggle room. Assemble the door frame then measure the opening. With each measurement add $\frac{5}{8}$" to arrive at your final size. Form the raised panel using whatever method you choose. I'm partial to table-sawn raised panels. It's a two-step cut.

Add a height extension to your rip fence for safety. Tilt the blade to 12° and position the fence so there is $\frac{3}{16}$" between the fence and the blade – just as the blade passes below the saw top. Raise the blade so the outside edge of the carbide tooth is flush with the outside edge of the panel stock. This results in a $\frac{1}{8}$" fillet. Cut all four edges.

Return the blade to 90°, drop the blade height to $\frac{1}{8}$" and position the fence to just trim the raw-cut edge. Again, run all four edges and all that's left is to sand the panel and glue up the door.

Finishing Touches

The huntboard top is a straight plank (nothing fancy here) that's attached to the case with a number of wooden clips around the entire case perimeter.

Slots for the clips are cut with a plate joiner in a two-step method – the first slot begins $\frac{1}{2}$" down from the top edge and a second slot, set one blade thickness below, completes the $\frac{1}{4}$"-wide slot. After stain and finish are complete, position the case onto an inverted top, measure and adjust for equal overhang, then drive #8 x $1\frac{1}{4}$" woodscrews into countersunk holes in the clips.

The finish on this project is aniline dye (Moser's Early American Cherry), a couple coats of clear shellac and a topcoat of dull-rubbed effect lacquer.

The huntboard is completed with the addition of hardware. Drawer pulls are centered in the drawer fronts. Countersinks on the inside of the drawer front keep the nuts and posts from catching linens. The cupboard turn finger is shortened to just catch the vertical divider.

Once the hardware is in place, it's a short walk into your dining room. Goodbye card table. Holiday dinners will never be the same. **PW**

Glen is a senior editor of this magazine and the author of several woodworking books. Contact him at 513-531-2690 x11293 or glen.huey@fwmedia.com.

Carve a 17th-century panel

Straightforward work with V-tools and gouges creates a lively result.

BY PETER FOLLANSBEE

Seventeenth-century New England joiners produced a variety of furniture forms; the most common surviving pieces are carved boxes and chests. The joined chests' structure is a frame-and-panel format: often three panels across the front, sometimes four. For many years, my work has been reproducing this type of furniture using methods approaching period techniques.

A common form of decoration for joiners' work is some simple, low-relief carving, often highlighted by a painted background.

The completed chest. *An example of the style of joined chest I build. The rails and stiles are joined with mortise-and-tenon joints. The panels are let into grooves.*

Natural themes. *This carved panel features themes from chests attributed to Thomas Dennis. The arch at the top is connected to tulip-shaped fronds. The bottom of the panel displays drooping leaves flowing from an urn.*

PHOTOS BY THE AUTHOR

The tools and the workholding. *Carving these panels requires a few different tools: simple carving tools (gouges and V-tools), an awl, a compass and stamping tools.*

A shaped carving. *In this reproduction of a William Savell chest, the carving is executed first with V-tools to define the shapes, then gouges to provide a more shaped appearance to the carving.*

The tools define the pattern. *In this panel, the sweep of the individual gouges used sharply defines the panel's background from its foreground.*

A few simple tools and a little practice can bring satisfying results in this style.

Three Kinds of Carving

I think of 17th-century carvings as falling into one of three forms, essentially characterized by the method of defining the pattern. Some of the more varied designs feature V-tool work that defines the outlines, while various gouges and chisels remove the background. Some of these patterns are laid out with a compass, awl and straightedge; others are mostly freehand.

A variation on this idea is a style of carving in which all the elements are defined by the shapes of the various gouges used to cut the pattern. In this work, the V-tool is not used. The gouges are struck perpendicular to the surface, then the shallow gouge follows to remove the negative background. This method creates a distinct pattern with clear separation between the background and foreground.

Another approach is work that is cut with the V-tool, then accented with various gouges, achieving a modeled, shaped look. In essence, this style has no distinct background and foreground separation.

In none of these styles is a template used. Late 17th-century joined work from the Connecticut River Valley, now known as "Hadley" chests, utilized a template. To my eye, these chests represent the dying gasp of 17th-century carving.

Oak is the preferred timber for this work. While I have done this type of carving on sawn oak, both flatsawn and quartersawn, the best material for it is green, riven oak. The riven oak results in a quality of material that is unsurpassed; each board is truly radial, resulting in a stability and ease of working that has spoiled me for the duration. Sawn timber cannot compare.

From a straight-grained section of oak, I split the log into halves, then quarters, eighths, 16ths, and (when it's a large enough log) 32nds or beyond. Then some hatchet work follows, to even out any deviation from flat in the split surface. Scrub, or fore plane work follows the hatchet. I have a German smooth plane I adapted for this work that has an iron with a pronounced curve. This plane is quite aggressive, and it leaves a furrowed surface on the stock. The next step is to produce the true, flat surface on the panel; for this I often use a jointer plane. I check with winding sticks and a straightedge then leave the panel for at least a couple weeks. This time allows the surface to lose some of its moisture. If I do the carving with the stock dead-green it cuts fuzzy, and it often breaks out. The panel will still have considerable moisture in it, but the surface will be drier than the middle of the stock. This gives you the best of both worlds: the crisp cuts of the drier stock and the ease of cutting the green wood.

Splitting the stock. *I've split half an oak log into 16ths, to be split again into 32nds. Each wedge shape is truly radial. It's very stable and, when squared, extremely satisfying to work.*

Layout and the Arch

When I come back to the panel to do the carving, I first take a few light passes with a very sharp plane to produce the final finish to the surface. Then I mark out the margins and centerline. I leave extra length on the top and bottom ends of the panel, but I trim it to the final width. The excess at the ends allows me to nail the panel to a backboard of pine that is in turn held to the bench with a pair of iron holdfasts. This way the holdfasts are not in the way of the carving. Alternately you could fix the piece to the bench with dogs and a vise. The holdfast is nice because it holds the stock down.

The pattern I carved in the following photographs is one from a group of chests attributed to Thomas Dennis (1638-1706) of Ipswich, Mass. Additionally there are numerous examples of related carvings on chests in Devon, England. This group shows a wide variety of patterns and ideas, and consequently, I have used and adapted them over and over again. I often combine elements from research photographs and notes I have collected over the years. Sometimes a chest I build will be a direct copy of a piece; other times they are combined from a couple of period examples.

After fixing the panel to the bench and marking a vertical centerline and margins, the first step is to scribe with a compass an arch at the top of the panel. This is about the extent of the layout for the carved panel.

With a V-tool and mallet, I cut the outlines for this arch. I use a turned mallet made from hickory. The first one lasted about 10 years before it was too beat up to keep. Now it knocks the wedge on my pole lathe, and this mallet is my second one. It weighs about 28 ounces.

After the arch is cut, the next step is to outline the basic shapes of the panel. I eyeball a spacing approximately one-third of the way down the panel and cut the tulip-shaped fronds that connect back to the arch. The angle at which I hold the V-tool's handle in relation to the panel dictates the depth of the cut. The lower the handle, the shallower the cut; the higher the handle, the deeper the cut. Beginners tend to cut too shallow. Too shallow a cut is actually more difficult to steer, being more likely to veer off the intended path.

I don't use a pencil to mark out the shape I want to cut, but sometimes I might scribe a ghost of a line with an awl. Even then, what I scribe and what I carve will vary. Work first one side of the vertical centerline, then the opposite. Keep aiming for the general shape, not for perfect symmetry. Although a template is not used for this style of carving, the goal is to achieve a generally symmetrical

Scratch the arch. *The layout requirements for this panel are minimal: a centerline, the margins of the carving and a single arch at the top.*

Cut the arch. *Define the top and bottom of the arch using a V-tool driven by a mallet.*

Find the right angle. *Here I'm defining the tulip shape below the arch. Note the angle of the tool. Using too shallow of an angle will make it difficult to steer.*

Defining the leaves. *Move down to the lower third of the panel and use a V-tool to define the drooping leaves emerging from the urn.*

pattern. Because the shapes are freehand, there will always be variations. That's a good thing; it results in a livelier carving.

The bottom "third" of the panel is defined by some drooping leaves that flow from an urn. I begin establishing these by carving two lines from just outside the centerlines, sweeping first upward, then drooping all the way down to the bottom corners of the panel. Now the major elements of the design are in place. The next work is to use a series of curved lines that connect the upper and lower portions, as seen below. Then the resulting interior space is set out with a tulip on each side of the centerline.

Now a little more layout, this time with a square and awl to scribe the upper and lower horizontal lines defining the urn. The ends of the urn are eyeballed from the centerline. That brings me to the finished outline, generated with just the V-tool and mallet, and a little bit of layout with the compass, awl and square.

The next step is to remove the background, then accent the foreground with some shaping and a few details with gouges and punches.

The completed outline. *Here's the finished outline of the panel, which was completed entirely with a V-tool and a few simple layout lines.*

Remove the background. *Remove the background using a shallow gouge driven by hand pressure. Here, my left hand is bracing the tool and my right is pushing it into the cut.*

More gouge work. *Continue removing background material with a gouge. The goal is a faceted surface, not a flat one. You will stipple the background later.*

The proper stance. *When I carve I keep my elbows close to my body. Most of the movement comes from the lower part of my body.*

A very shallow gouge is my favorite tool for removing the background. Often, I use hand pressure alone to drive the tool. Similar to the outlining, here the left hand holding the tool is braced against the panel. The right hand acts as the power and steers the tool as well. When the gouge comes up to the incised line, pivot it left to right to free the chip of oak. Resist the urge to flick the chip free with an upward movement of the gouge. It should be cut loose, not pried. Sometimes it's necessary to go back and re-emphasize the outline, either with the V-tool or just with a downward chop using the shallow gouge.

In some cases, it's efficient to be able to switch hands and get at things from a different angle. The background resulting from the gouge work is faceted. Don't bother to take the time to flatten the entire background. It is either left faceted or often stippled with a toothed punch.

Static photographs do not show the movement, nor the muscle, used in these cuts. The elbows are held fairly close to the torso, and much of the movement comes from the lower body, shifting from one foot to the other, and/or changing the stance in relationship to the bench.

Once the background is removed, the next step I do is some slight shaping to provide a little depth to the pattern. For this, I use the same shallow gouge that I used to cut the background down. This process requires some care in choosing which direction to cut. I think of it as going up one side and down the other. Hand pressure is usually the order of the day for this work; if I use the mallet, it's with some caution.

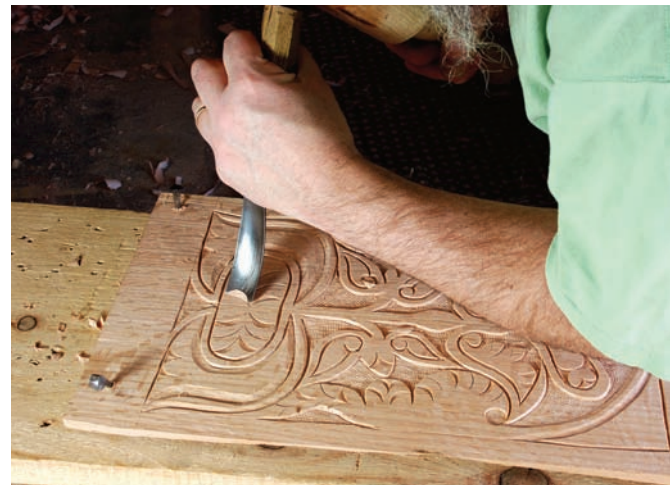
The details on the surface follow the shaping. These are the simplest of all the cuts. Most of them are just two strikes with a gouge and mallet. First I hold the gouge perpendicular to the panel and strike it hard with the mallet. Then, in the next cut, the gouge comes in behind the incision just made, is held at an angle and is struck again with the mallet. This should knock out a crescent-moon-shaped piece. The lateral movement of the gouge might be necessary to get the chip to pop out properly. These moon-shaped cuts are found all over the panel.

There are a few other elements that appear in the finished panel, and the order these are worked matters little. Punches highlight some of the initial panel surface; the toothed punch that stipples the background, and some V-tool outlining on the surface of the panel complete the design.

This pattern is one of the most involved found on early New England furniture. Learning the cuts and moves for this style of pattern will also cover the elements of some of the simpler patterns as well. Of course, with the freehand stuff, you can't go wrong – but when you have to follow a line, that's another story. **PW**

Peter is the joiner at Plimoth Plantation and is currently at work on a book called "Make a Stool from a Tree: An Introduction to Seventeenth-Century Joinery." You can see more of his work at his blog: pfollansbee.wordpress.com.

Halfway done. *This shot is halfway through the background. This shows the broad initial strokes on one half of the panel, and the finished background on the other half.*



Making moons. *The crescent shapes on the urn are cut using two strokes. Hold the gouge perpendicular to the panel and strike it hard with a mallet. Then come back with the gouge at an angle and slice out the crescent-shaped waste.*

Bed Rocks

How do new imported smoothing planes compare to a Lie-Nielsen or Clifton?

BY CHRISTOPHER SCHWARZ

Thanks to the success of Lie-Nielsen Toolworks and Veritas at building premium handplanes, it's no surprise that someone would start manufacturing Bed Rock-style handplanes in the Far East.

Bed Rock handplanes were Stanley's premium line of tools, and the Bed Rocks had a number of improvements to ensure they were stable and easy to adjust.

Lie-Nielsen in Maine and Clifton in England took many of the ideas from the now-expired 1895 Bed Rock patents to develop their own premium planes. And Lie-Nielsen and Clifton also set out to improve on Stanley's designs with better materials and machining, plus improvements to the tool's chipbreakers and irons.

Now Woodcraft and Japan Woodworker have introduced their own versions of Bed Rock planes that look a lot like the Lie-Nielsen tools, but at less than half the price. To find out how these Chinese-made planes performed, we purchased a No. 4 smoothing plane from each catalog. I decided to test smoothing planes because they are the fussiest planes to set up and would test these tools to their limits.

Comparing the Smoothing Planes

From five feet away, the Börg smoothing plane from Japan Woodworker ($132.50) looks like a ringer for an iron Lie-Nielsen ($300). The plane has the same color scheme and overall shape, but as you examine the details, there are differences.

The plane is 5/8" longer than the Lie-Nielsen, plus some of the parts are shaped differently, including the iron, chipbreaker, lateral-adjust knob, tote and knob.

The Börg's tote is squarish and not as

LEAD PHOTO BY AL PARRISH

from Abroad

comfortable as the Lie-Nielsen or an old Stanley. The front knob is also bigger.

The Wood River plane from Woodcraft ($109.99) is like the Börg in size and shape, but it has a different lever cap and rear tote. The Wood River's tote is much more comfortable than the Börg's.

As far as setting up the tools, the high-carbon-steel cutters in both tools were easy to set up. It took 20 minutes to polish the unbeveled face of the Börg and 28 minutes to do the same for the Wood River.

The chipbreakers of the Börg and Wood River both mated tightly to their irons, but both were ground out of square. That's not a deal-killer, but you'll either have to correct it at the grinder or fiddle some more when you set up the chipbreaker.

After I got the iron assembly sorted, I had to do some fettling of the body castings. Overall the castings looked highly finished and well-cast, but there were some details that had to be tended to in order for the planes to perform well.

The mouth of the Börg was rough, especially at the rear of the mouth where the frog's bed meets the mouth. I had to file the rear of the mouth to smooth the roughness and remove a metal burr. The mouth of the Wood River plane was fine, but the frog tended to slip when tightened – so much so that one

Online EXTRAS

What's the difference between gray iron, ductile iron and cast steel? Using a hammer and an anvil, we show you the difference in a free online video:

popularwoodworking.com/jun09

Sources

- Wood River planes:
  Woodcraft
  800-225-1153 or woodcraft.com
- Börg planes:
  Japan Woodworker
  800-537-7820
  or japanwoodworker.com

corner of the frog would project out of the mouth. Filing corrected that problem, too.

The planes are made from a durable material. Like the ductile iron of the premium planes, these planes would withstand a beating from a hammer on an anvil.

In putting the planes to use, other differences arose. With both planes, the adjuster nut is further forward than on a Lie-Nielsen. As a result, adjusting the iron while your hand is on the tote is more difficult.

On the Börg plane, it was tricky to retract the iron all the way into the mouth. With the chipbreaker set to take a typical shaving, the adjusting nut would jam against the frog casting when the iron was retracted. The iron would make it into the mouth, but barely.

Both planes use a lateral-adjust lever that is thinner and looser than on a Lie-Nielsen or Clifton. The lever flops around when the plane is disassembled and doesn't move with the same authority as on premium tools.

Neither plane was easy to massage into cutting the gossamer shavings that are thinner than .001". One of the things you pay for with the Lie-Nielsen, Clifton and Veritas planes is that fact that they are easy to tune to this very high level.

Perhaps some of this is sole flatness, though I'm not as strident about soles as some. Both planes had minor (.0015" to .002") concavities, according to a feeler gauge. Lapping the soles removed the concave areas and improved performance.

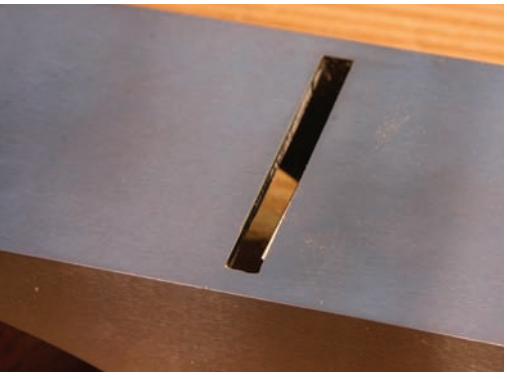
After using the planes to dress some cherry panels I noticed that the irons needed to be resharpened fairly quickly. I sent the blades out to be tested and they were a bit soft – 54 and 55 on the Rockwell "C" scale. Typical premium planes have blades that are 60 to 62.

The bottom line with the Börg and Wood River smoothing planes is that you shouldn't fool yourself into thinking you're buying a Lie-Nielsen, Clifton or Veritas. You're not.

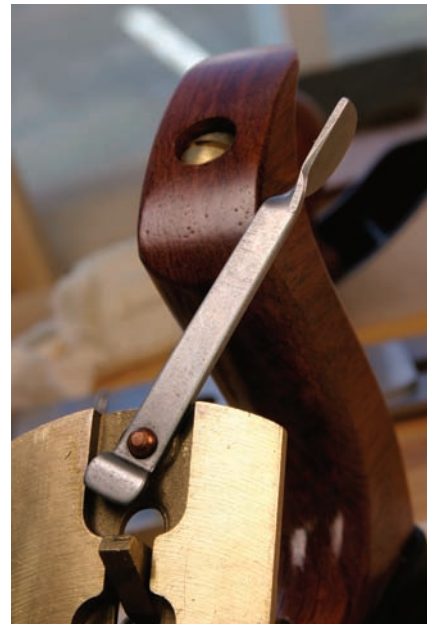
They are better than the low-end handplanes I've set up from India and China, but they don't meet the very high standards set by Lie-Nielsen, Clifton and Veritas.

Editor's note: In the interest of full disclosure, I have worked with both Lie-Nielsen and Lee Valley Tools/Veritas to provide content for DVDs and newsletters. However, I have never received a dime for my work. All my proceeds were donated to the Early American Industries Association's endowment fund and the Roger Cliffe Memorial Fund, which provides tuition assistance to students attending the Marc Adams School of Woodworking. **PW**

Chris is the editor of this magazine, a long-time handtool enthusiast and the author of "Workbenches: From Design & Theory to Construction & Use" (Popular Woodworking Books).



An extra cutter? *The frog of the Wood River plane slips below the sole when you adjust the frog. It takes some persuading to get the frog straight in the plane's body.*



A loose lateral. *The lateral-adjustment lever on both planes (the Börg's is shown) is lighter weight than the Lie-Nielsen's.*

The Wood River Block Plane

While buying the Wood River smoothing plane, I couldn't resist buying a Wood River block plane, too ($69.99). It's a standard-angle block plane, meaning the iron is bedded at 20°. This plane looks like a close copy of the Lie-Nielsen block plane, except that the lever cap is silver colored instead of bronze.

Its iron was easy to prepare – only 12 minutes to polish the unbeveled face. But then I ran into problems.

The plane's bed had excess paint in the corners, which prevented the iron from sitting flat. I cleaned that out with an awl.

Also, the bed of the tool wasn't in the proper plane. You had to skew the iron significantly to get an even cut across the mouth. And with the iron in working position, the tightest you could get the mouth was $^{1}/_{32}$" on one side and really tight on the other side. (See the photo below.) While you could file the front of the mouth to match the iron's skew, this error in the bed causes problems with adjusting the iron. Every time you adjusted the iron you needed to adjust the skew again. It's a fatal flaw in my opinion.

So I bought a second block plane. It didn't have a bed error, but it had other minor problems. The mouth had burrs that needed to be filed. Additionally, the adjustable mouth plate wasn't flush to the sole in every position, and the tightest I could close the mouth was .01". That's fairly tight, but I like it tighter. — CS

Crooked bed. *The mouth of the first block plane in working position.*

Graduated Drawers

BY GEORGE WALKER

Two sets of dividers are all you need to achieve well-proportioned drawers.

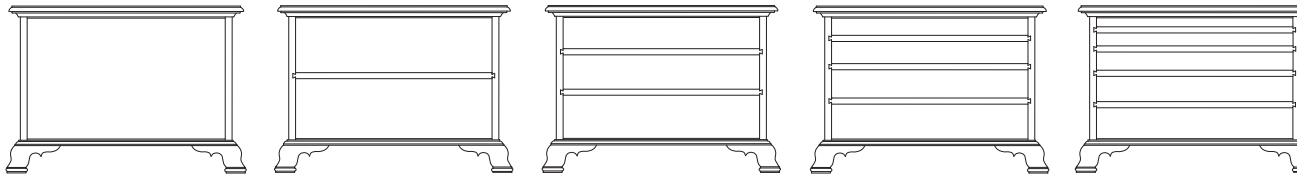
For centuries artists honed their craft by copying the works of the masters. The goal was not to become a copyist; instead the intense focus of exploring a masterpiece was a proven way to unlock the mysteries hidden within. Often it's the subtle details – proportion, light, shadow, color and texture – that set apart great work. Much can be learned studying great furniture, and it's not limited just to those interested in period reproductions. Good design is timeless.

A fine example of this is the period drawing on the facing page of a chest on chest, circa 1760 from the Philadelphia Museum of Art. It is a rare artifact for two reasons. First, because almost no shop drawings have survived from the 18th century, but more importantly because it offers a unique glimpse of a great design. The finished chest might have included elaborate decorative carving, but what we see are the stripped-down bare lines of the piece.

Just beneath the surface on many great pieces of American furniture are design secrets based on architecture. The Mickle chest drawing illustrates two methods to arrange drawer fronts to carry the eye to a focal point, which in this case would be some dramatic carving on the large central drawer at the top, as well as a decorative carving to crown the pediment.

Your first glimpse of a large chest on chest from a distance across a room only reveals the most apparent features – the overall proportions of the case, and the dramatic mouldings that emphasize the overall form. As you come closer, details like the arrangement of drawers direct the eye upward. The secretary pictured at right uses graduated drawers to pull the eye up. Notice how each drawer diminishes in height as the drawers rise up the case. It's a simple and elegant solution to deal with a series of monotonous horizontal bands (drawer fronts) that can tend to look static if left identical.

LEAD PHOTO BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG; PALLADIO ILLUSTRATION COURTESY OF LINDEN PUBLISHING



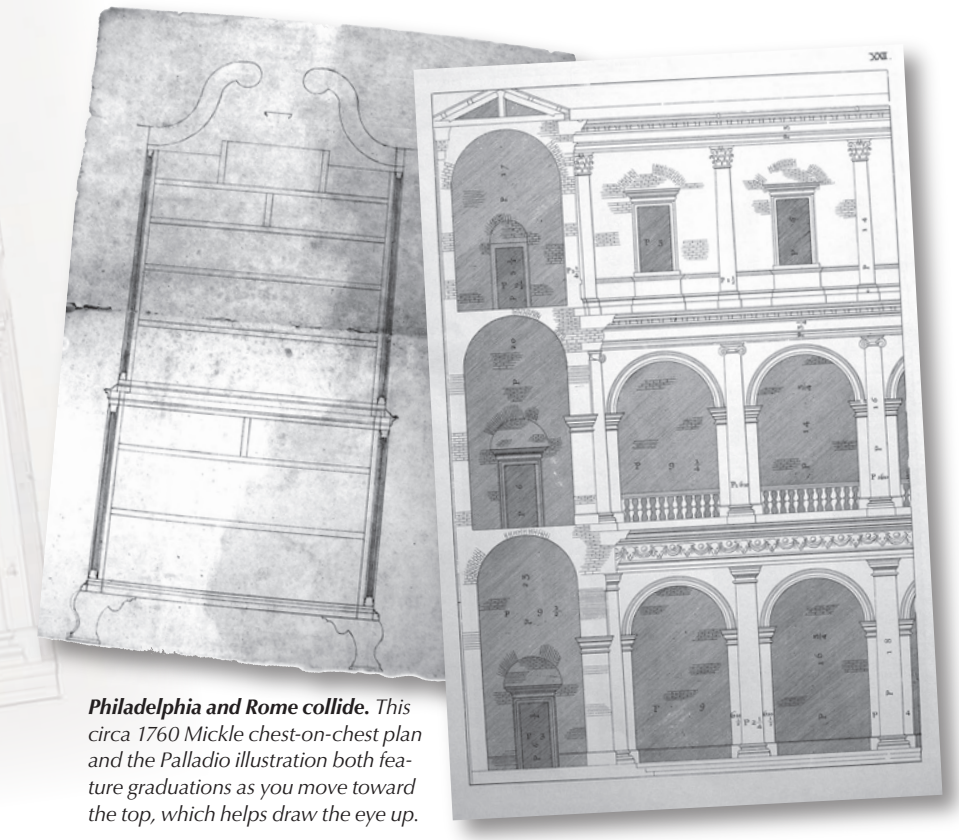
Progression. *One- to five-drawers arrangements in a typical chest carcase.*

A file cabinet is a good example of the effect of leaving each drawer the same. It might be functional, but it does not grab the eye. At best we paint file cabinets a bland neutral color and make them as unobtrusive as possible. Just adding the simple twist of making each drawer slightly shorter as it climbs up the case has a subtle yet powerful effect. The eye cannot help but be pulled upward.

Ancient Inspiration

This concept actually goes back to ancient Rome when architects began constructing multi-storied buildings with brick and concrete. Designers resisted the idea of just laying story upon story like a stack of pancakes. Instead they made each story slightly shorter than the one below. Designers used columns to give a building a sense of scale and also to control the height of each story. Because the columns taper as they rise up, they used the smaller diameter at the top of each column to act as a starting diameter for the one above it. It almost appears that the columns are continuous and each successive story is approximately 10 percent shorter than the one below. The diminishing stories help a massive building avoid feeling overbearing; they give it more of a natural feel.

Cabinetmakers later applied the same principle to stacks of drawers on case furniture. Many variations were employed, but a common method was to use the structural drawer divider (sometimes referred to as a drawer blade) as a unit to diminish the drawer heights. In the simplest of terms, each drawer height is shorter than the one below it by the thickness of one drawer blade. If the drawer blades used to separate the drawer openings are 1" thick and the bottom drawer is 6" high, then succession would be 6, 5, 4, 3, etc.



Philadelphia and Rome collide. *This circa 1760 Mickle chest-on-chest plan and the Palladio illustration both feature graduations as you move toward the top, which helps draw the eye up.*

Sectional Construction

It's apparent this principle has some limitations. If you try to squeeze too many drawers in a tall case, the bottom drawer will be excessively deep like a toy box and the top drawer becomes too short – more of a tray than a drawer. Designers solved this by breaking tall case pieces into two sections with two separate banks of graduated drawers at the top and bottom. You can see this readily in the Philadelphia chest on chest. The bottom case has three rows of graduated drawers, then another series of five rows in the top case.

Here is a simple and quick way to lay out drawer openings to achieve this graduated effect. I'll demonstrate this on a drawing for the sake of clarity, but the layout can actually be applied to the façade of a case to lay out the locations of the joinery. You won't need a calculator or even a tape measure; this is all about proportions so all that's needed is two sets of dividers and a square to mark off the positions of where the drawer blades will join the case sides.

How Many Drawers?

First you have to decide how many drawers you want. For a simple bureau 34" high, practical options are limited. One drawer is not very practical from either a functional or an aesthetic point of view. Functionally, the whole reason for creating smaller drawers is to keep clothing organized. Digging through one large drawer to locate a pair of socks is not convenient. And aesthetically, one large drawer tends to look like a Cyclops. Two drawers are still too deep and the piece will look more like a file credenza. Three or four drawers will work fine from both a functional and aesthetic point of view. But attempt to squeeze in a fifth, and we're back to the top drawer becoming more of a narrow tray than a drawer.

Drawer Blades Determine Spacing

Let's lay out the drawer openings for a three-drawer chest. Set your divider points to the thickness of the structural drawer blades

that you will be using to separate the drawer openings. This dimension is not important as long as all the blades are identical in thickness; 7/8" is typical. Now starting at the top of the case opening, carefully step off five times with your dividers and make a temporary reference mark. Set those dividers aside for now, and use the second set of dividers to step off the remaining space below your reference marks by the number of drawers, in this case three. You may have to step this off several times and make minor adjustments to the divider points until you have it in three equal divisions.

This is now your basic drawer unit and the height of the top drawer. Go back to the top of the case opening and use this setting with your square to mark the bottom of the top drawer. Use the other set of dividers (set to the thickness of the drawer blade) to lay in the first or top drawer blade. The middle drawer opening is the height of the top drawer plus the thickness of a drawer blade. You already have this if you combine the settings on your two dividers. Mark the second drawer blade below the middle drawer and the bottom drawer will automatically be the correct height.

Quick Application

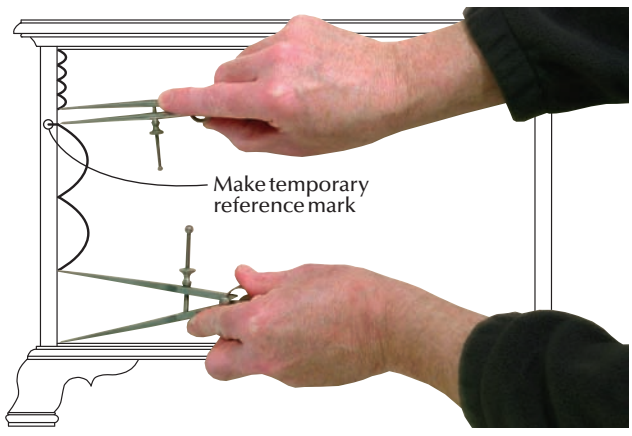
It's actually much quicker to do this layout than explain it. Typically I can do this layout in less than two minutes. Why did we start by counting down five drawer blade units to begin with? Let's back up a little.

What we are doing is filling the case opening with drawers and drawer blades. If you think about it, the three drawers are really identical in height except two of them have invisible drawer-blade thicknesses built into their height to make them taller. The middle drawer has one drawer blade built into it, and the bottom drawer has two blade heights added to its height. So then let's count up the drawer blades that actually help fill the case opening.

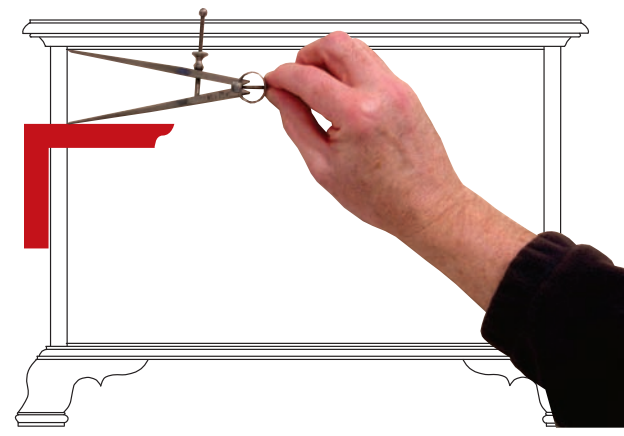
First there are two actual structural blades, then a third built into the middle drawer, and two more in the bottom drawer bringing the total to five (two actual blades, plus one middle drawer, plus two bottom drawers adds up to a total of five). Because we can set our dividers to the actual thickness of the drawer blades, we can quickly determine how much of the case opening the drawer blades will occupy. Knowing that, we can determine our basic drawer unit by dividing the remaining space by the number of drawers. That drawer unit is also the height for the top drawer.

If you choose to add another drawer and make it a four-drawer arrangement, the sequence is the same except we step off nine drawer blades, then divide the remain-

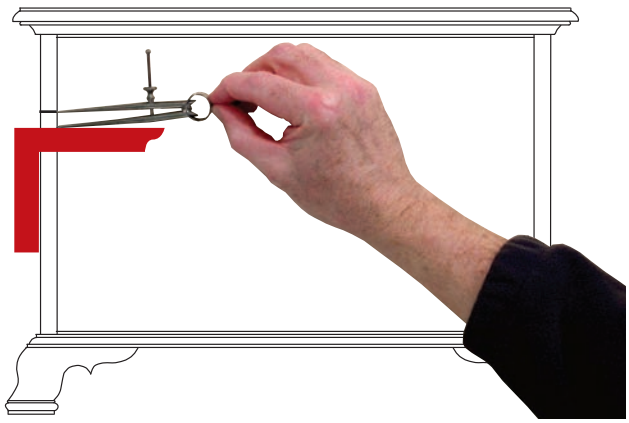
Blade width. *Set your first pair of dividers to the thickness of your drawer blade.*



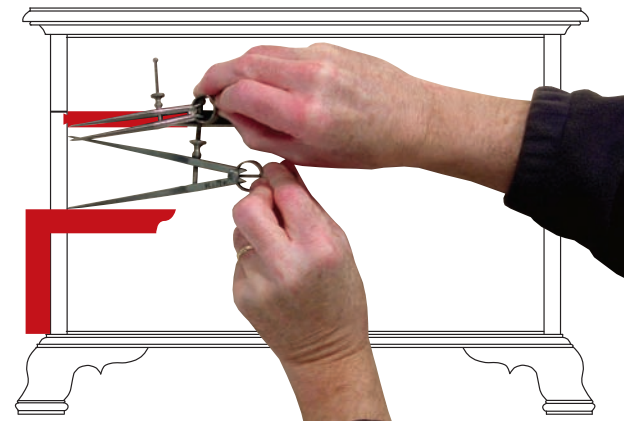
Short division. *Step off five drawer-blade units and make a temporary reference mark. Divide the remaining space by three – this setting is your top drawer width.*



Top drawer. *Use drawer unit to lay out the top drawer.*



Just add blade. *Use blade divider to lay out the top drawer blade.*



Middle drawer. *To lay out the middle drawer, simply add the two divider settings together.*

ing space by four. Why do we jump up to nine? For a four-drawer chest we have three actual structural drawer blades: The second drawer down has one hidden blade, the third drawer has another two, and the bottom drawer has three drawer blades built into the height (3 actual + 1 second drawer + 2 third drawer + 3 bottom drawer = 9 total).

Line of Recall

I mentioned earlier that the Philadelphia chest used two methods to focus the eye on a point of interest. Take another look at the series of three smaller drawers that cap the chest on chest. The drawers are laid out symmetrically on each side of a vertical centerline. In architecture this centerline is know as a "line of recall," as one side recalls the image on the other. Symmetry is often used to steer the eye to a focal point. In a building the focal point might be a fireplace or a main entry door; on this chest on chest the point of interest is the carving and pediment on top of the piece. Using these smaller flanking drawers acts like a bulls-eye to center our vision.

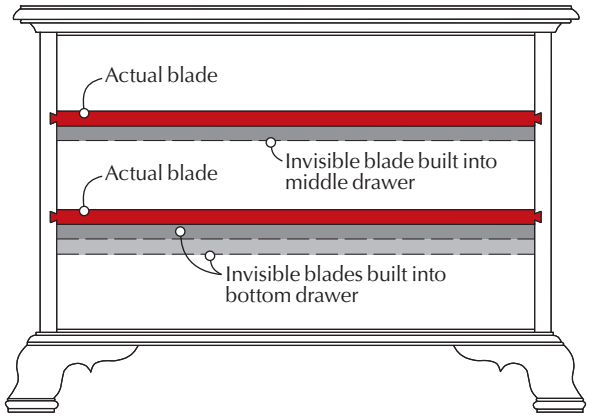
The widths of these drawers also have a proportional relationship. The outer drawers that flank the middle are a ratio of 2:3. So the widths of the openings have this little proportional sequence of 2:3:2. This is quite common in period furniture where designers played with proportions much as a composer plays with musical notes.

Here is a simple quick way to lay out the drawer widths to achieve this proportional effect. This time we are concerned with stepping off horizontal units. Start by setting one set of divider points to the width of the vertical pieces that structurally separate the drawers. Take that setting and step off twice from one side of the case opening. Next take the second set of dividers and through trial and error divide the remaining space by seven. Why seven? Our drawers have a proportional relationship of 2:3:2; the sum of those is seven.

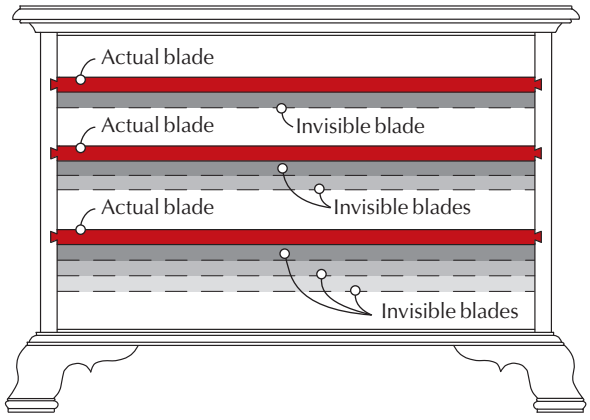
Once you have the space divided by seven go back to the side of the case and step over two times. Do this on both sides of the case opening. This establishes the width of your smaller flanking drawers. Use the other dividers to lay in the vertical separators. The middle drawer will automatically work out to be three units wide, completing the proportional sequence of 2:3:2. In this case we have a series of graduated drawers that draw the eye upward then a simple symmetrical drawer arrangement of 2:3:2 that further pulls the eye to a point of interest. In all these examples we are not actually arriving at any dimensions just proportions. Once drawer openings are established, simply make drawers to fit.

These methods, though drawn from antiquity, can be a valuable tool to give life to your designs, regardless of in what style you work. **PW**

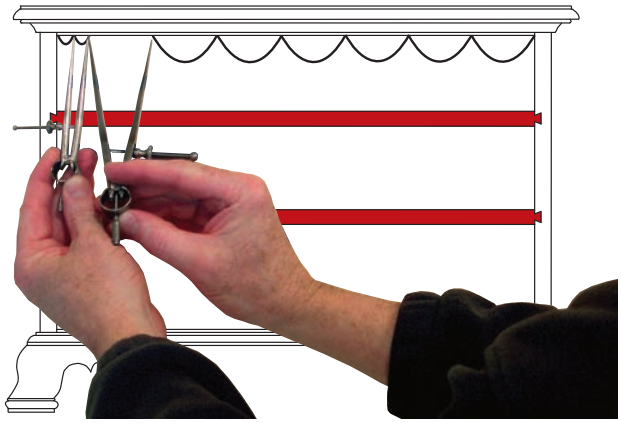
George recently completed the DVD "Unlocking the Secrets of Traditional Design," with Lie-Nielsen Toolworks. It's available online now at lie-nielsen.com or by calling 800-327-2520.



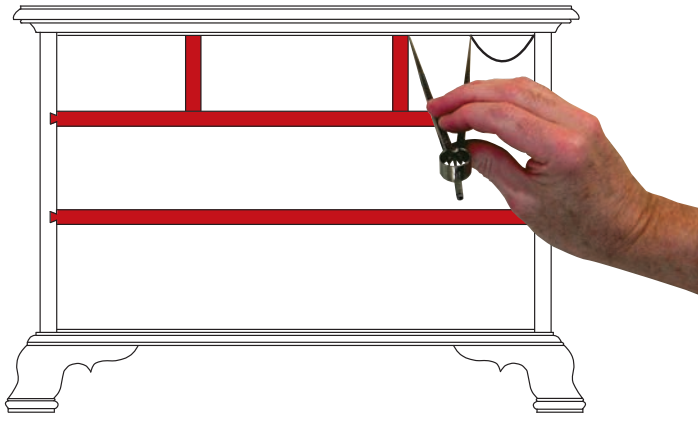
Invisible blades. *On this three-drawer arrangement, you can see the two actual drawer blades and three "invisible" drawer blades.*



More invisible blades. *Here, you can see the three actual drawer blades and six "invisible" drawer blades on a four-drawer arrangement.*



Horizontal unit. *Step off two blade-divider units then divide the remaining space into seven units with your second set of dividers.*



2:3:2 Ratio. *Lay out flanking drawers by stepping off two horizontal units.*

Dock Chair

BY SIMON WATTS

Lightweight, folding and portable, this chair is so simple to make you'll want a pair – or more.

I've always disliked the Adirondack chair and have never understood its popularity. I find it uncomfortable because the human frame does not bend at right angles and also, because it neither folds nor stacks, it's an awkward item to move and difficult to store.

When my daughter Rebecca showed me a wooden folding chair she had found in the attic of an old house in Nova Scotia, I was immediately struck by the ingenuity of the design, which combines comfort and convenience. Anyone familiar with Mies Van der Rohe's Barcelona chair will sense echoes of that famous and widely imitated design.

What I like to call my "dock chair" requires no special hardware and can be made with practically any wood, or combination of woods, in just a few hours. Anyone reasonably handy can make a pair of them in a weekend.

I made the first version using native pine and red oak slats fastened with bronze screws. I painted it signal yellow because the Nova Scotian fogs are notorious, and I didn't want to get run down by some errant vessel.

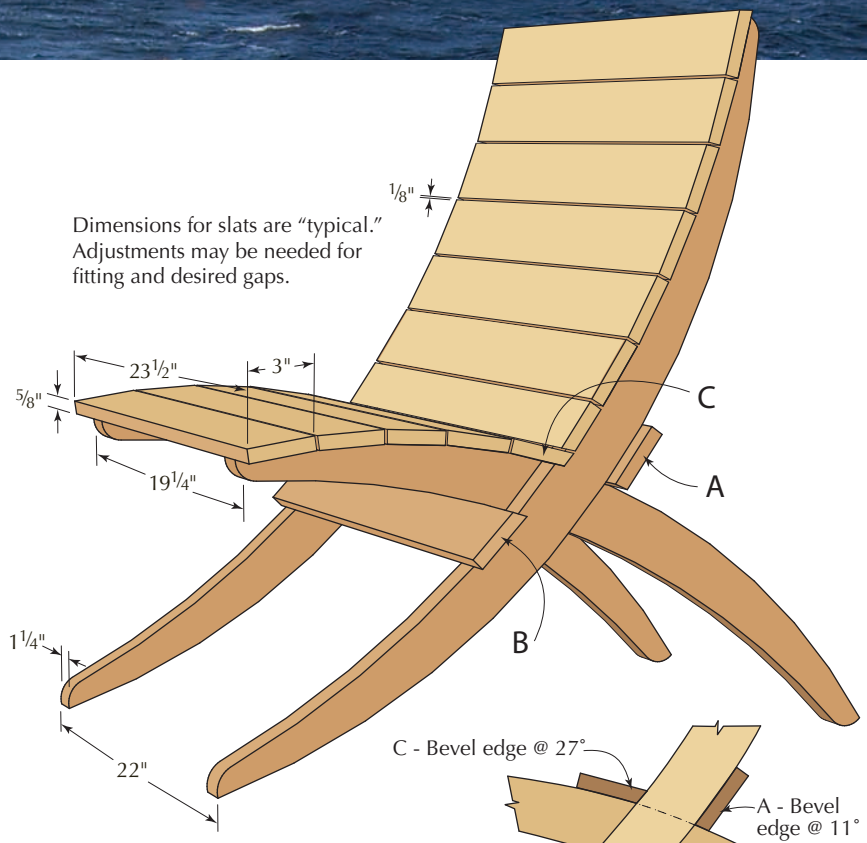
You'll see from the drawing at right that one frame fits inside the other with a clearance of 1/8". This is so one frame can slide into the other for storage or moving, as demonstrated below by our colorful local boatbuilder Kevin Wambach.

I modified the original curves to make it lighter and more elegant and this version is shown in the drawing. I used Port Orford cedar for my newer version, so the chair needs no finish and can be left out in the weather – rain or shine – and it will just turn an agreeable shade of grey. I didn't bother to make cushions for this chair but it would be no great matter to do so. I would use canvas – natural or synthetic – for the cover and stuff it with kapok. It would then double as a life raft if I fell off the dock.

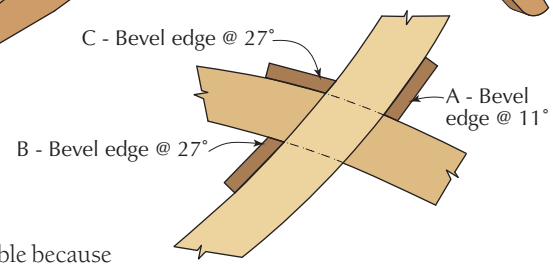
Making the Dock Chair

About all you need for this project is a band saw (or jigsaw), a low-angle block plane, a drill and a spokeshave. For materials you won't do better than spruce for the frame because it combines light weight with flexible strength. Spruce does not weather well so the wood must be sealed with several coats of marine varnish or, for a really low-maintenance finish, paint. You could also make the chair in teak or mahogany. Either would weather well, but it would be much more expensive and less portable because of the additional weight.

The slats are screwed to the frame with stainless steel or bronze screws. Leave the heads exposed or plug the holes with wooden bungs.



DOCK CHAIR



LOCKING SLATS DETAIL

Making Patterns

I've drawn the shapes of the crossed legs (see the illustrations on page 66) on a square grid. Each of the squares is 2". Rather than re-drawing, I recommend using a copying machine to enlarge the drawing, or you can download a PDF file of this drawing from popularwoodworking.com/jun09.

You will have to tape several pieces of paper together to get the full-size image and may find some minor discontinuities – flat spots and abrupt changes in curvature. Rather than build these into your chair, take a flexible batten, spring it into the right shape and redraw the curves with a felt-tipped pen. This is often done by boat builders to generate fair curves.

Use these full-size templates to mark out the frames on your stock, nesting them if possible, and taking advantage of any natural curvature or "sweep" in the grain. If the stock is not wide enough, glue up two or more pieces until you have the width needed.

One of the clever features of this design is that the grain lines are almost straight at

Slip fit. *The two curved frames slide together. When assembled as a seat, the three slats at the intersection keep it in position without any special hardware.*

Easy to stow. *The frames also slide together to allow for easy carrying and storage at the end of the season.*

PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG

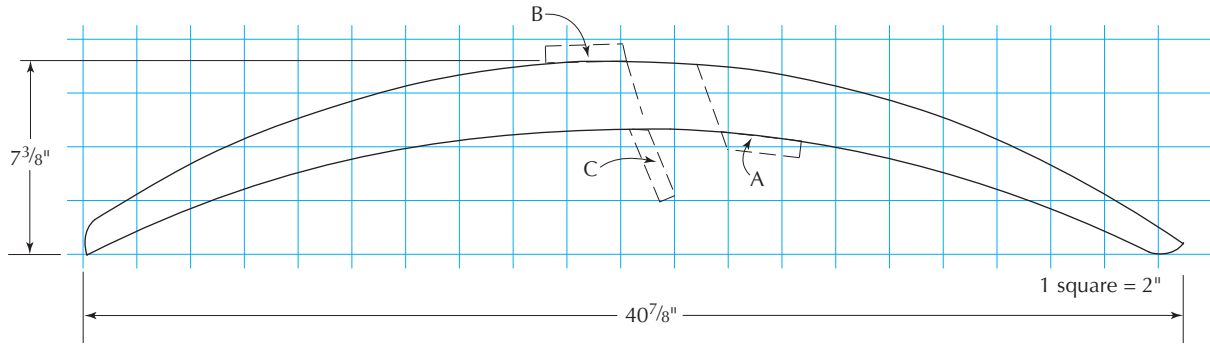
Marking multiples. *A template ensures that both frames match, and it speeds the process if you are making several chairs.*

the point where the frames cross and the maximum bending stress occurs.

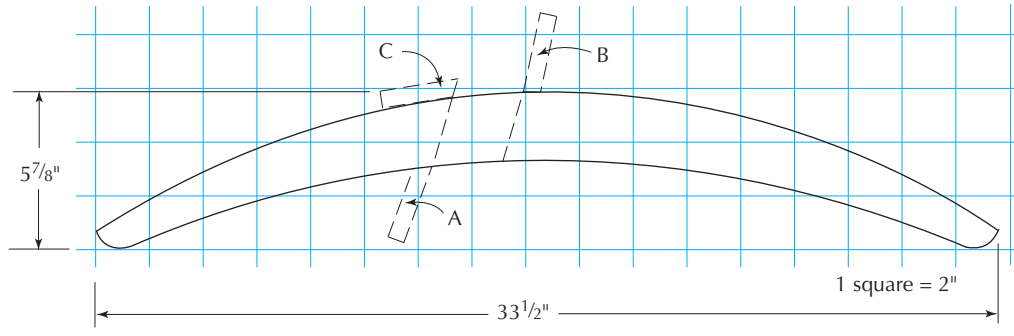
I have no band saw in my Nova Scotia workshop so I cut out each frame with a jigsaw then dressed the inside and outside curves with a spokeshave. This is a good time to do all the sanding and finishing, being sure to take the sharp edge off any corner with a sanding block. Give the frames a coat of primer (or varnish if using a clear finish), set them aside and cut out the seat and back slats.

If using a hardwood such as oak or ash, you can safely plane the slats down to 3/8". With softwood—pine or spruce—they should be at least 1/2" thick or even 5/8". The drawings and cutlist have them at 5/8".

Adding to the curve. *To maintain straight grain at the intersection, you may have to add width to your frame stock.*



FRONT LEG PATTERN



REAR LEG PATTERN

All is fair. *The spokeshave is ideal for removing saw marks and refining the curves. I find it easier to shape the outside before cutting the inside curve.*

Plane speaking. *Subtle angles and curves add detail to the chair. Work the long edges with a block plane, judging the angles by eye. When it looks good, it is the correct angle.*

Now use the template again to mark the exact position of each slat on both frames. Be precise in placing the locking slats, marked **A**, **B** and **C** in the drawing at left. These establish the angle one frame makes to the other and hence the comfort (or discomfort) of the completed chair.

It's well worth the extra trouble to plane a small flat on the convex side of the frame where a slat lands. You can also plane a very slight round on the inside of each slat before fastening it to the concave side of the frames. Otherwise you are likely to see unsightly gaps when looking at the chair from the side. Finish-sand the slats and seal them with paint or varnish as before.

The opening photo shows a hand hold so the frame can be easily carried. Include this feature if you wish – you can add one to the seat too if you wish.

Fitting and Fastening the Slats

If you plan to leave your chair out in the weather, leave at least a 1/4" gap between slats so water can drain. Otherwise, 1/8" is sufficient. Make up some 1/4" or 1/8" spacers to position the slats so the gaps are consistent for both seat and back, from top to bottom.

Start with material 3" wide for the slats. Depending on the gap between slats, and how much material you removed when shaping the frames, you may need to make individual slats slightly smaller. The top slat on the back is flush with the end of the frame.

Plane a bevel on the edge to meet the curved frame end at an attractive angle. Judge this angle by eye based on the drawing and photos. Some of the other slats may benefit from an angled edge to maintain a consistent gap between them.

Start at the top and fit and mark each slat before attaching any of them. The last slat above the seat will be about 1/2" narrower than the others. Start fitting the seat slats with the locking slat **C** in the drawing and work toward the end. The last slat can overhang the edge 1/4" to 1/2", and the chair will be more comfortable if the edge is planed to a radius.

Fastening the Slats

Screwing is more durable than nailing, especially when using softwood frames, and is better able to bear the weight of a heavy person. Be sure to either countersink the screw heads (I use oval-headed bronze screws when I can get them) so they are a fraction below the surface, or counterbore and plug the holes.

Always set wooden bungs with paint or varnish, not glue, so they can be removed to refasten the chair if that ever becomes necessary. If you are planning to use a clear finish be sure to put a drop of sealer (or marine bedding compound) in the pilot hole before driving the screw. Otherwise you are likely to get an unsightly ring around the fastener if the chair is left out in the weather.

Making the Cushions

You don't need a sail maker for this job but a local tent and awning maker will be able to handle lightweight canvas. I would simply have two rectangular cushions made, each one 16" x 24" and not more than 2" thick. They should have ties to secure them to the chair, or be connected with fabric hinges, so they don't blow away.

Instead of conventional sailcloth, I prefer a new product called Oceanus that looks and handles like canvas, and is available in solid colors. It won't mildew and resists degradation by sunlight.

I like this chair so much that I decided to make another version in aluminum with slats of teak. Holes drilled in the frames lightens the weight, and gives the frame the feel of an aircraft girder – in fact, I'm calling it the "flight deck chair." **PW**

Supplies

Jamestown Distributors
800-497-0010 or
jamestowndistributors.com

- oval-head bronze wood screws #8 x 1 1/4, $35.48/ box of 100

Price correct at time of publication.

Dock Chair

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	COMMENTS
❑	2	Front leg frame	1 1/4	7 3/8	40 7/8	Shape to pattern
❑	2	Rear leg frame	1 1/4	5 7/8	33 1/2	Shape to pattern
❑	14	Slats	5/8	3	23 1/2	Fit width and edges

Simon Watts is a woodworker, boatbuilder and author who spends his summers in Middle Island, Nova Scotia. When the cold weather blows in, he heads to San Francisco.

BY MARC SPAGNUOLO

Not Just for the New

Seasoned professionals also benefit from Woodworkers Safety Week 2009.

Did you know that May 4th, 2009 marks the second annual Woodworker's Safety Week? It began last year in an effort to raise awareness of woodshop safety. And with the accelerated growth of the Internet woodworking community, it is vital that we provide a solid foundation for all the new woodworkers just coming onto the scene.

The entire Internet woodworking community came together in an unprecedented way to make Safety Week 2008 a huge success, but perhaps the best part of all was the content itself. Gone were the days of boring recitation of safety guidelines from a manual. Instead we shared experiences, tales of near-misses and accidents that truly made the message poignant and effective.

Regardless of your experience level, it never hurts to review the basics. In fact, I believe there are a number of standard safety items and practices that not only help keep you safer in the shop, but also could very well improve the quality of your work.

Shop-necessary protection gear. *Standard safety gear and practices not only help keep you safer in the shop, they could well improve the quality of your work.*

Personal Protective Equipment

Personal protective equipment, more of a category than one specific item, is one of the most basic and fundamental things you can do to be safer in the shop. Protect your eyes, ears and lungs whenever possible. I wear my protective lenses nearly 100 percent of the time I am in the shop. Keep a pair at every machine so eye protection is never more than an arm's length away.

For the ears, I prefer headphone-style protection. My headphones have a built-in radio and a jack to connect an MP3 player. If you are a fan of podcasts, this is a major plus! But keep in mind that if you listen to music, you'll hear almost nothing of the outside world. This could be hazardous around tools where the sound of a motor or cutting edge serves as an early warning of potential problems. Turn off the music to make cuts.

To protect your lungs, rely on a half-mask respirator. I recommend you stick with one of the bigger names, such as 3M or AOSafety, as it is much easier to find replacement parts and filters. Also, it's important to make sure a respirator fits your face. If the mask does not fit properly, it won't suitably filter the air. And, if you are wearing safety glasses, you'll want to invest in a respirator with a down-firing exhaust vent to prevent lens fogging.

Dust Collection

Personal protective equipment does a fine job of protecting us from dangerous elements in our shop, but dust is one of those things that we should prevent earlier in the process. Instead of blocking the dust just inches from our faces, why not collect it at the source? This is where good-quality dust collection

Online EXTRAS

To watch a video of The Wood Whisperer as he demonstrates pushsticks and featherboards, go to:

popularwoodworking.com/jun09

PHOTOS BY THE AUTHOR

Not just for large machines. *Dedicated dust collection for portable power tools should not be a luxury item.*

Always a better choice. *Push sticks are effective and come in a variety of different designs to keep your fingers away from danger.*

Performs half the task. *All stock should be held flat to the saw and tight to the fence as you cut. A featherboard takes your guide hand out of the picture.*

comes into play. Most modern power tools come with some form of a dust port. With the growing public consciousness about the dangers of wood dust, it's clear that manufacturers see the writing on the wall.

Dust collection is quickly becoming a feature that is valued nearly as much as horsepower. There are two types of dust collection that you should be concerned with. One is for the big power tools. These tools generally take 4" connections and require a lot of air movement. Full-size dust collectors and cyclones provide that amount of movement. And if you plan on running ductwork in your shop, you really need some serious air movement to effectively remove the smallest and most dangerous dust particles.

For portable power tools, you want something like a dust vacuum or a dedicated dust-extraction unit. Dedicated systems, while significantly more expensive, are a great investment as they are built to withstand long run-times and gather fine dust.

Push Sticks/Paddles

So what's the best way to keep from getting cut by blades and bits? (And don't answer, "Have someone else do it!") One way is to increase the distance between our bodies and the cutting edge. Instead of pushing wood through our machines with our bare hands, the use of push sticks and paddles can enlarge our "safe zone." This way if disaster does strike, it is unlikely that your fingers or hands will be pulled into the action. I rarely operate tools such as my table saw, jointer or router table without a set of paddles or a push stick in my hand.

Featherboards

Much of "safe woodworking" comes from keeping the workpiece secure and moving it deliberately in the proper direction. But by design, our blades and bits are usually pushing against us. This is where featherboards are worth their weight in gold.

Trying to push a long board through the table saw can be incredibly tricky, simply because you absolutely must push forward and into the fence at the same time. But with the aid of a featherboard, you really only need to be concerned about pushing the board forward. This type of controlled cut not only yields better results but goes a long way in helping to prevent kickback.

Featherboards come in all shapes and sizes. And they're easy to make. Many commercially available models are magnetic and can be modified to work as hold-downs to make your cuts safer and kickback less of a possibility.

Splitters

The most effective device to prevent kickback is a splitter or riving knife – a thin piece of wood, metal or plastic positioned behind the table saw blade in such a way to prevent wood from contacting the back of the blade, where kickback originates.

The sad truth is that most folks remove the safety gear from their saws. At least part of the blame for this trend lies on the shoulders of saw manufacturers that have made little effort to incorporate splitters and guard assemblies as user-friendly features to their saws. But with changes in Underwriters Laboratories guidelines and a clear change in public sentiment, saws are now being manufactured with riving knives that are easy to remove and replace when necessary. It's about time!

Now if you're one of those folks whose splitter/guard assembly is gathering dust in the corner, please do yourself a favor. Pick up an aftermarket splitter and install it. It is worth your time and effort. And I must say, after years of using a splitter on my table saw, running it without a splitter feels as unnatural as driving my car without a seatbelt.

Keep wood apart. *Kickback is a hazard many woodworkers experience. A splitter or riving knife (shown here) is a safety item that reduces potential problems.*

Knowing how to protect yourself in the workshop is not something you can learn overnight, or even during Safety Week. It's a bank of knowledge and experience that's developed and honed over time. We only have one set of lungs, one set of eyes and one set of hands. These are the most important, valuable and irreplaceable tools in our shops. So, much like any other prized tool, let's use them properly, protect them and keep them in top condition. **PW**

Marc is a professional woodworker as well as the creator and host of The Wood Whisperer (thewoodwhisperer.com). The Wood Whisperer (an instructional Internet woodworking show) represents Marc's three passions: woodworking, technology and education.

About This Column

Our "Wood Whisperer" column features woodworking thoughts and ideas, along with shop techniques from Marc Spagnuolo. Each column has a corresponding video related to the techniques or views expressed in the column available at popularwoodworking.com/video.

BY BOB FLEXNER

Choosing a Finish for Color

Different finishes look different on different species.

There are many reasons to choose one finish over another. Usually the most important is for protection and durability – how well a finish protects the wood from moisture and how resistant the finish is to being damaged by coarse objects, heat and solvents.

Other significant factors include drying time (you don't want a fast-drying finish if you're brushing) and odor (some finishes have a less irritating aroma than others).

There's also color. Finishes differ in color, or the amount of color, they add to wood. For example, clear paste wax adds the least amount of color and the least amount of darkening to wood. Wax adds a little shine, but otherwise leaves the wood looking very close to natural.

Water-based finishes don't add color either, but they do darken the wood noticeably. The lack of color can be an advantage on "white" woods such as maple or ash or a disadvantage on darker woods, making them look "washed out."

Nitrocellulose lacquer and blonde or clear shellac add a slight yellow/orange tint to wood. But not nearly as much as does orange or amber shellac. (Shellac in flake form is usually labeled blonde and orange. In prepackaged liquid form the equivalent to blonde is "clear" or "SealCoat." The equivalent to orange is "amber.")

Oil-based varnish, including polyurethane varnish, and boiled linseed oil add a darker yellow/orange tint than lacquer or blonde/clear shellac. More significantly, varnish and oil continue to darken as they age – boiled linseed oil considerably more than varnish.

Mixtures of varnish and oil, often sold as "Danish Oil," fall in between varnish and oil in their tendency to darken depending on the ratio of each that is included.

Seven finishes on maple. *Top row from left: unfinished, clear paste wax, water-based finish, nitrocellulose lacquer. Bottom row from left: clear/blonde shellac, amber/orange shellac, polyurethane varnish, boiled linseed oil.*

Seven finishes on oak. *Top row from left: unfinished, clear paste wax, water-based finish, nitrocellulose lacquer. Bottom row from left: clear/blonde shellac, amber/orange shellac, polyurethane varnish, boiled linseed oil.*

PHOTOS BY THE AUTHOR

The Seven Finishes

You'll find on these pages pictures of the seven finishes (not including oil/varnish blends) on four different woods – maple, oak, cherry and walnut – to illustrate the differences in the amount of color each adds. Be sure to look closely at the woods in each of the pictures. The finishes have somewhat different effects depending on the wood.

I used the most commonly available finishes within each finish category for illustration. But there are exceptions within each of the categories. For example, though most brands of paste wax offer only a clear, some add pigment to produce colored paste waxes.

Though rare, some manufacturers of water-based finishes add a little dye colorant to make the finish better resemble the look of nitrocellulose lacquer. Information on the can or in the promotional literature will inform you of this.

Seven finishes on cherry. *Top row from left: unfinished, clear paste wax, water-based finish, nitrocellulose lacquer. Bottom row from left: clear/blonde shellac, amber/orange shellac, polyurethane varnish, boiled linseed oil.*

Seven finishes on walnut. *Top row from left: unfinished, clear paste wax, water-based finish, nitrocellulose lacquer. Bottom row from left: clear/blonde shellac, amber/orange shellac, polyurethane varnish, boiled linseed oil.*

Within the lacquer category, CAB-acrylic and water-white lacquers add considerably less color than does nitrocellulose lacquer. In fact, a good quality CAB-acrylic lacquer adds no color, similar to water-based finish. But it does bring out the richness of darker woods better than water-based finish.

In addition to clear/blonde and amber/orange shellac, some specialty suppliers offer a number of additional colors, including garnet, button, extra dark and various shades of lemon.

Depending on the oils and resins used in manufacture, some varnishes darken wood more than others. For example, Waterlox, which is a popular wiping (thinned) varnish used by woodworkers, is made with phenolic resin and tung oil, both of which are darker than the more common alkyd and polyurethane resins and soybean oil used to make most varnishes.

Though rarely used by itself as a finish, 100 percent tung oil darkens a little less over time than boiled linseed oil.

In choosing a finish for your project, you need to take into account a number of characteristics of the various finishes. One is the color the finish adds, or doesn't add, to the wood. **PW**

Bob is author of "Understanding Wood Finishing" and contributing editor to Popular Woodworking. *He will be teaching a hands-on furniture restoration workshop at the Marc Adams School of Woodworking (marc adams.com) the week of Aug. 24.*

Boiled linseed oil darkens. *Boiled linseed oil (shown here on oak) and, to a lesser extent, varnish darken considerably as they age. On the left is freshly applied boiled linseed oil. On the right is boiled linseed oil that has aged about 10 years.*

BY ROBERT W. LANG

No-nonsense Router Table

A great router table for little cost and just a few hours to build.

The original version of this router table was born out of necessity. I needed a router table at a job site, and I didn't have the space or the desire to carry my large one. I cobbled it together quickly, screwed the router's baseplate to the bottom of the tabletop, and made a simple fence. A dozen years later, it still serves me well.

It's easy to get carried away when making a router table, building something the size of a 5-horsepower shaper, full of drawers for storing every router bit in the catalog and accessories for every imaginable circumstance. If you'd rather keep things simple, or need a second table in your shop, this will do everything you need without taking much time or space. And if you want to jazz it up, this is a good starting point.

The top measures 16" x 24"—large enough to handle all but extremely large panels and small enough to store below a bench or on a shelf. The small size also helps to keep the top from sagging, a common issue with super-sized router tables.

The height of the table will be a compromise between a comfortable working height, and ease of getting the router in and out to change bits. I chose a router that clamps in a fixed base and can be quickly removed for changing bits. I left plenty of room for this operation, which leaves the top a bit high when placed on my workbench, but just right when set on sawhorses.

Begin construction by cutting the top, sides and back from 3/4"-thick plywood, particleboard or MDF. The two rails across the front are 3/4" x 2 1/2" hardwood.

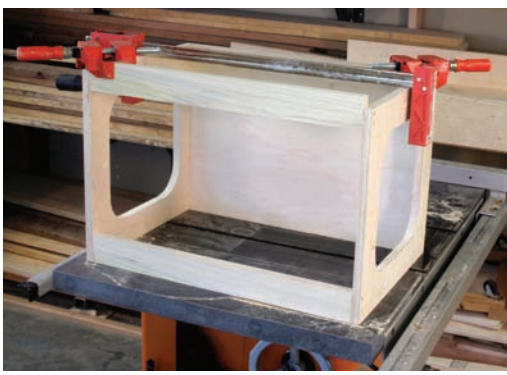
On each of the two side pieces, mark a line 2 1/2" in from each edge. Use a compass to draw a 2 1/2" radius in each corner, and cut inside the lines with a jigsaw. The curves in the corners add strength, and these cutouts in the sides make the structure lighter. More important, they provide room for F-style clamps. Clamps are used at the top to hold the fence, and they can also be used at the bottom to secure the table to a bench or sawhorses.

Not fancy, but functional. *A good router table features a flat, solid top and a straight fence. With those in place, there isn't a need for much more.*

The back goes in between the sides, secured with glue and #8 x 1 3/4" screws. To keep everything lined up, assemble the parts on the flattest surface available. The top of the table saw is a good choice for this. After the first three parts are assembled, cut the rails to length, and glue and screw them between the sides. The edge of the top rail is flush with the top of the sides.

I placed the lower rail so 3/4" is below the bottom edge of the sides. This allows me to clamp it in my bench vise, quickly securing the router table. If you don't plan on using the router table in conjunction with a vise, place the bottom edge of the lower rail even with the bottom of the sides. Always secure the router table before using it; you don't want it sliding around in the middle of a cut.

CONTINUED ONPAGE 76



Start flat to end flat. *Assembling the frame on a flat surface makes it easier to align parts, and ensures a flat surface for mounting the top.*

LEAD PHOTO BY AL PARRISH; STEP PHOTOS AND ILLUSTRATIONS BY THE AUTHOR

CONTINUED FROM PAGE 74

Front and Center

Before attaching the top to the frame, decide where and how to attach the router base to the table. If you have a drill press, it will be easier to align the mounting and center holes, but these can be carefully positioned using a handheld drill. I centered the router front to back and side to side. This provides adequate area in front of the bit, and makes access to the router easier. Moving the router back a few inches will provide more table area in front of the bit, but be sure there will be room inside for the router.

Draw a center mark on the tabletop, and position the baseplate of the router over it. Mark the locations for the mounting screws and with a Forstner bit, make a counterbore deep enough for the screw heads at each screw location. Different routers will use different size screws, and you'll likely need to make a trip to the hardware store to get some screws 3/4" longer than the stock mounting screws. Drill the holes with a bit that is larger in diameter than the screws. The oversized holes and counterbores will allow you to move the router base around to help line up the holes.

The center hole should be about 1/4" larger in diameter than your largest bit. Make the hole with a Forstner bit at the drill press, or with a hole saw and a handheld drill. If you need to enlarge the hole at a later time, cut around the perimeter with a rabbeting bit, then switch to a straight bit with a bearing mounted above the cutter. This will preserve the round shape of the hole, and if you want to use smaller inserts, they can be placed in a rabbet.

Mounting the router directly to the top involves a trade-off. It is quick and easy compared to making a large cutout for an insert plate, and keeping the top at full thickness means a stronger top that is less likely to sag over time. The disadvantage is that you lose some depth of cut.

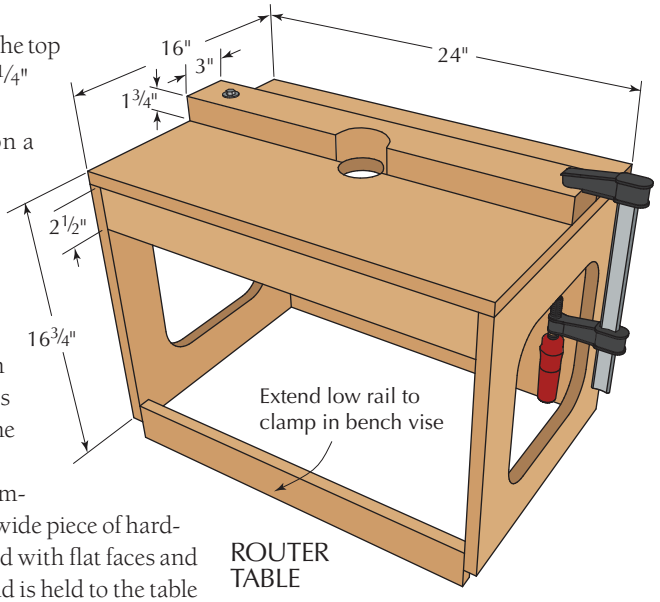
How much depends on your particular router, the bit you use and the cut you want to make. For most cuts this won't be an issue, but if it becomes one, you can always add an insert plate later.

When the holes have been placed, go ahead and attach the baseplate to the bottom side of the top. The top can be held to the frame with screws from above, but a stronger and neater attachment will be to place 3/4" cleats on the top inside edges of the frame, and attach the top from below with #8 x 1 1/4" screws.

Insert? Don't need it. *Foregoing a thin insert for mounting the router will yield a stronger top and save construction time.*

Nice and flat. *The weight of the router helps during final assembly, it keeps the top flat as the cleats are screwed in.*

Again, working on a flat surface is a must, so put the top face down on your table saw, then run a bead of yellow glue around the perimeter. Put the assembled frame on the top, screw the cleats down and leave it alone while the glue dries.



ROUTER TABLE

The fence is also simple, a 1 3/4"-thick x 3"-wide piece of hardwood, carefully jointed with flat faces and straight edges. One end is held to the table with a 5/16"–18 machine screw and nut. The fence swings on this screw to adjust the distance between the fence and the bit, and the opposite end of the fence is held down with a clamp.

I made the cutout in the fence by cutting a 2 1/2"-diameter semi-circle at the band saw, smoothing the recess with a spindle sander. If I want a continuous fence, I can flip this over, or if I want to close down the opening, I can screw a couple pieces of scrap on each side of the opening.

There isn't any need for the fence to be parallel to the edge of the table, nor is there a need for a miter slot. Operations that move the wood on end across the bit may be performed by using a block of scrap wood held against the fence as a guide.

Other than knocking off the sharp edges, the only sanding I did was to go over the top with #150-grit paper in a random-orbit sander. I ragged on a couple coats of shellac, and when that was dry I scuffed the top with a nylon abrasive pad and applied a coat of paste wax to reduce friction.

I added a fitting to the top of the fence for dust collection, and a power strip to turn on the router and the shop vacuum simultaneously. It isn't fancy, but it functions well, and it didn't take a lot of time or money to build. **PW**

Bob is a senior editor of this magazine and author of "The Complete Kitchen Cabinetmaker" available from his web site, craftsmanplans.com.

Online EXTRAS

For an online video of a simple method of cutting the recess for an insert plate, visit:

popularwoodworking.com/jun09

BY JEFFREY BRIERE

But it was a Bargain

Bird poop and bug carcasses may just be hiding a treasure.

Like most everyone reading this, I am an avid collector of wood. It does not usually matter what species, what color or country of origin. I am non-discriminatory in that department. All that matters is that the piece in question can serve a purpose in the future for a project yet to be determined.

Some horrendously disfigured wood purchases have more than once had my wife shaking her head. I reassure her that not only is the wood a diamond in the rough, but that I got it at a great price.

One recent expedition started innocently enough with a line-by-line scouring of the local classified section. The classified ad was for an upcoming estate auction of a sawmill and its entire inventory due to the untimely departure of its owner from the earth. I drooled with anticipation as I clipped the information from the classified section and plotted out the location.

Situated in the previously unknown town of Genoa, Neb., this would be a veritable gold mine in deeply discounted lumber because it was located more than 100 miles from the nearest civilization. What other human would waste a weekend driving to the middle of nowhere to bid on some rough-cut lumber? Besides, Genoa is so small it's not even on the map and would require some planning just to get there. Because I wanted to make the drive worth my while, I borrowed a flatbed trailer from a friend at work and hitched it to the back of my truck.

My young son (and trusty sidekick in all my woodworking adventures) and I departed at dawn for the Shangri-la of sawmill sales. After several hours of driving through the grasslands of central Nebraska, we finally arrived in the town of Genoa.

Our hearts immediately sank. This tiny hamlet of 200 permanent residents had been mysteriously transformed into the metropolis of the Midwest. Everywhere we looked, our auction adversaries had pickups and U-Hauls ready to load with my treasure trove. We finally found a parking spot and went to inspect the objects of our desire.

An old barn seemed to be the central hub of activity so we went to investigate. Our spirits were further squashed as we saw stacks of dark rough-cut lumber covered in horse pee, cow manure, bird poop, bat dung and insect bodies. My education in Nebraska frontier life was now complete: Barns don't keep animals out; barns are where animals live.

Fortunately for me, woodworkers are a friendly and talkative bunch. Some of the locals educated me on the fact that this was old-growth walnut, grown in the area and air-dried for decades. I scraped away some of the accumulated dirt and debris and my bidding juices began to flow anew. The auctioneer started, and my son and I entered the feeding frenzy. Fiscal restraint took a back seat. When the dust settled we were the proud owners of more lumber than we knew what to do with.

We began the arduous process of loading the trailer and driving our precious cargo back home to Lincoln. The drive was painfully slow and long because our borrowed trailer was stacked dangerously high with hard-won walnut. It was even longer as our load shifted and wore through my friend's trailer tire, which I replaced with a much more expensive new one.

As the sun began to set we pulled into our driveway looking much like nomadic wood gatherers. My wife met me in the driveway with the usual, "What are the neighbors going to think?" greeting, followed shortly thereafter by my, "Who cares. Help me unload."

As the pieces migrated past my wife to the garage, I could tell she was less enthusiastic about the embedded farm aroma and occasional insect stowaway than the fact she would not get her car in the garage until the lumber was cleaned up and stored in my basement shop.

After wearing out several sets of high-quality planer blades and 55 bags of sawdust chips later (which the trash service charged me $1 dollar a bag to haul away), these boards yielded some of the richest-colored walnut I've ever seen (lucky for me). I've since turned them into a fireplace mantle, a blanket chest, some canoe-shaped shelves, a pair of file cabinets and a Murphy bed, with enough walnut left to build an ark (or at least a very nice walnut desk).

My wife's last comment was, "I think we have enough wood for awhile." To which I replied, "But it was a bargain." **PW**

Jeffrey is a former United States Air Force pilot whose wood rack has served him well. He's built many pieces for his Lincoln, Neb., home, from a Murphy bed to his dining room chairs and table.

PHOTO ILLUSTRATION BY AL PARRISH