EXOTIC HANDPLANES: WE TAKE 10 SUPERTOOLS FOR A SPIN

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AUGUST 2006
ISSUE #156

# POPULAR WOODWORKING

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WOOD MAGAZINE TOP VALUE APPROVED 2003

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- Motor: 1 HP, 110V, single-phase
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- Max. rabbeting capacity: ½"
- Cutterhead knives: 3
- Cutterhead dia.: 2½"
- Cutterhead speed: 4800 RPM
- Cuts per minute: 14,400
- Cast iron fence
- Approx. shipping weight: 270 lbs.

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- Motor: 2 HP, 110V/220V, single-phase, TEFC, 3450 RPM
- Precision ground cast iron table
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- Cutterhead speed: 5500 RPM
- Cutterhead diameter: 3⅛"
- Max. depth of cut: ⅛"
- Max. rabbeting depth: ½"
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- Table size: 8" x 76 5/16" • Infeed table size: 8" x 43⅜"
- Cutterhead knives: 4 HSS, 8" x ¾" x ⅛"
- Cutterhead speed: 5350 RPM • Cuts / minute: 19,600
- Cutterhead diameter: 3⅛"
- Max. depth of cut: ⅛"
- Max. rabbeting depth: ½"
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## 15" PLANER

BUILT-IN "KICK STAND" MOBILE BASE!

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

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## OSCILLATING SPINDLE / 12" DISC SANDER

- Motor: 1 HP, 110V, single-phase, TEFC
- Cast iron tables tilt to 45°
- Oscillating sander table: 14½" square
- Disc sander table: 17½" x 10"
- Spindle sizes: ¼", ⅝", 1½" & 2"
- Spindle speed: 1725 RPM
- Stroke length: 1"
- Approx. shipping weight: 180 lbs.

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- Sanding motor: 1½ HP, 110V, single-phase
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- Drum speed: 2300 FPM
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- Min. stock length: 8"
- Drum size: 4"
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- Motor: 3/4 HP, 110V/220V, single-phase, TEFC
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- Table size: 14" x 14"
- Table tilt: 45° right, 15° left
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2" to 93 1/2" (1/8" to 3/4" wide)
- Blade speed: 3000 FPM
- 4" dust port
- Approx. shipping weight. 163 lbs.

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INCLUDES QUICK BLADE RELEASE SYSTEM, 3/8" BLADE, FENCE & MITER GAUGE

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## THE ULTIMATE 14" BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table
- Deluxe extruded aluminum fence
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2" - 93 1/2" long (1/8" – 3/4" wide)
- 2 blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 198 lbs.

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- Motor: 2 HP, 110V/220V, single-phase, TEFC, 1725 RPM
- Precision ground cast iron table
- Table size: 17" x 17" x 1 1/2"
- Max. cutting height: 12"
- Blade length: 131 1/2"
- Blade sizes: 1/8" - 1"
- Blade speeds: 1600 & 3500 FPM
- Dust port: (2) 4"
- Approx. shipping weight: 342 lbs.

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## 20" PLANER

New!

BUILT-IN "KICK STAND" MOBILE BASE!

- Motor: 5 HP, 220V, single-phase
- Max. cutting width: 20"
- Max. cutting height: 8"
- Min. stock thickness: 3/16"
- Min. stock length: 7 1/2"
- Max. cutting depth: 1/8"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead diameter: 3 1/8"
- Number of knives: 4
- Cutterhead speed: 5000 RPM
- Table size: 20" x 25 3/4" (20" x 55 5/8" w/ extension)
- Approx. shipping weight: 935 lbs.

*INTRODUCTORY PRICE!*
**G0454 ONLY $1175.00**
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## 1½ HP SHAPER

SHOWN W/ OPTIONAL G1706 WING

- Motor: 1 1/2 HP, 110V/220V, single-phase
- Precision ground cast iron table
- Table size : 20 1/4" x 18"
- Spindle travel: 3"
- 2 interchangeable spindles: 1/2" & 3/4"
- Spindle openings on table: 1 1/4", 3 1/2" & 5"
- Spindle speeds: 7000 & 10,000 RPM
- Max. cutter diameter: 5"
- Approx. shipping weight: 221 lbs.

INCLUDES MITER GAUGE & FENCE WITH SAFETY GUARDS & HOLD-DOWN SPRINGS

REGULAR ~~$515.00~~
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## 3 HP SHAPER

INCLUDES MITER GAUGE & FENCE WITH HOLD-DOWN SPRINGS

- Motor: 3 HP, 220V, single-phase w/ reversing switch
- Precision ground cast iron table
- Table size w/ standard wing attached: 30 1/2" x 28 1/4"
- 3 interchangeable spindles: 1/2", 3/4" & 1"
- Spindle travel: 3"
- Spindle openings on table: 1 3/8", 2 3/4", 4 & 5 1/2"
- Spindle speeds: 7000 & 10,000 RPM
- Approx. shipping weight: 357 lbs

MAGNETIC SWITCH

REGULAR ~~$950.00~~
**G1026 ONLY $915.00**
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## 24" VARIABLE SPEED DRUM SANDER

- Drum motor: 5 HP, 220V, single-phase
- Conveyor motor: 1/4 HP
- Conveyor speed: variable, 0 - 20 FPM
- Max. stock thickness: 4 1/4"
- Sandpaper: 3" hook & loop
- Control panel with amp load meter
- Dust ports: (2) 4"
- Approx. shipping weight: 489 lbs

INCLUDES A HEAVY-DUTY RUBBER CONVEYOR BELT!

Z SERIES

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## 2 HP CYCLONE DUST COLLECTOR

SHOWN W/ OPTIONAL H7499 STAND

- Motor: TEFC Class "F", 2 HP, 220V, single-phase
- Amps: 12.5
- Cycle/RPM: 60 Hertz/ 3450 RPM
- Intake hole size: 7"
- Impeller: 13 1/2" steel, riveted
- Suction capacity: 1354 CFM @ 2.5" SP
- Static pressure: 10.4"
- Filtration: 0.2-2 micron, 99.9% efficiency
- Filter surface area: 86 sq. ft.
- Collection Drum: Steel, 35 gallons
- Approx. shipping weight: 359 lbs.

**G0440 ONLY $745.00**
**H7499 STAND ONLY $149.95**
$85 Shipping ANYWHERE IN LOWER 48 STATES

## 3 HP CYCLONE DUST COLLECTOR

SHOWN W/ OPTIONAL H7509 STAND

- Motor: TEFC Class "F", 3 HP, 220V, single-phase
- Amps: 19.5
- Cycle/RPM: 60 Hertz/ 3450 RPM
- Intake hole size: 8"
- Impeller: 15" steel, riveted
- Suction capacity: 1654 CFM @ 2.0" SP
- Static pressure: 14.2"
- Filtration: 0.2-2 micron, 99.9% efficiency
- Filter surface area: 108 sq. ft.
- Collection Drum: Steel, 55 gallons
- Approx. shipping weight: 421 lbs.

**G0441 ONLY $1195.00**
**H7509 STAND ONLY $169.95**
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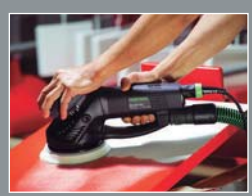
**Easily change from coarse to fine sanding/polishing**



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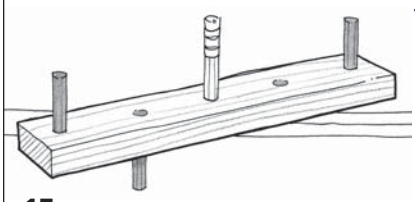
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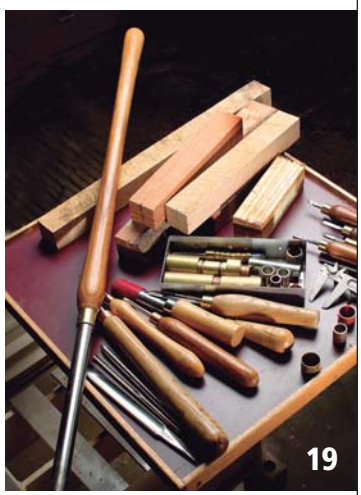
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## ON THE COVER

*Master cabinetmaker Frank Klausz shares his thoughts on basic, but important, hand tools. Then he shows you how to build a toolbox to store them.*

Cover photo by Al Parrish

## DEPARTMENTS



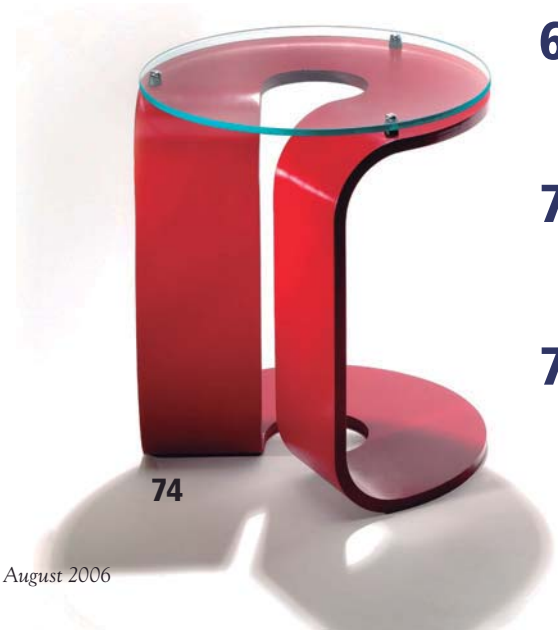
## PROJECTS, TOOLS AND TECHNIQUES











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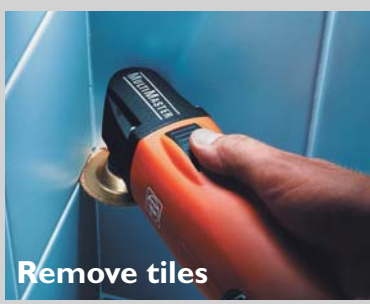


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## SAFETY NOTE

**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.**

# INNOVATIVE PRODUCTS DESIGNED FOR PRACTICAL USE

WE DESIGN OUR MACHINES TO THE MOST STRINGENT STANDARDS, TRIPLE CHECK EACH ONE FOR QUALITY ASSURANCE AND BACK EVERY MACHINE WITH A FULL TWO-YEAR WARRANTY!

2 YEAR WARRANTY

## 15" PLANER with OPEN STAND

W1723

This planer delivers the power, speed, smooth cuts and features to make your planing jobs easy!

**FEATURES:**

- 3 HP, 220V, single-phase motor
- Maximum width: 15"
- Maximum thickness: 6"
- Feed speeds: 16 & 20 FPM
- Cutterhead speed: 5000 RPM
- Cutterhead diameter: 3"
- Cuts per minute: 15,000
- Approx. shipping weight: 400 lbs.

**Head moves up and down while table height remains stationary!**

## 5 HP, 20" PLANERS

The heavyweight champion of planers! This machine has all the features you'll ever need, plus a few more!

**FEATURES:**

- 5 HP, 220V, single-phase TEFC motor
- Precision ground cast iron tables
- Table size: 25¾" x 20"
- Cutting height: 8"
- Max. depth of cut: W1683 - ⅛", W1718 - 5/64"
- Cutterhead speed: 5500 RPM
- Cutterhead diameter: 3⅜"
- Feed rates: 18 & 23 FPM
- Anti-kickback design
- Approx. shipping weight: 778 lbs.

W1718 Spiral Cutterhead

W1683 20" Planer

W1718 20" Planer w/ Spiral Cutterhead

## 10" LEFT-TILT TABLE SAW with EXTENSION KIT

The ever dependable W1677 Left-Tilt table saw is even better with this extension kit to increase ripping capacity!

**FEATURES:**

- 3 HP, 220V, single-phase motor
- Precision ground cast iron table with T-slots
- Maximum blade height: 3"
- Ripping capacity: 52"
- ⅝" arbor accepts dado sets up to 13/16"
- Heavy-duty cast iron miter gauge
- Approx. shipping weight: 474 lbs.

**Includes 7' extension rails, extension table, legs & SHOP FOX® Classic Fence**

W1677EXT1

## 6" x 89" OSCILLATING EDGE SANDER

This sander is packed with so many fantastic features that we just don't have room to list them all! Here are just a few:

W1730

**FEATURES:**

- 2 HP, 220V, single-phase TEFC motor
- Precision ground cast iron tables
- Table size: 26⅞" x 12"
- Table travel: 3¾" vert., 5" horiz.
- Aux. table travel: 10"
- Sanding belt speed: 3150 RPM
- Oscillation stroke: ¾"
- Drive drum diameter: 7"
- Platen with graphite pad: 6¾" x 30¼"
- 3 spindle drums: 1½", 2" & 3" x 4½" high
- Approx. shipping weight: 462 lbs.

**Includes adjustable miter gauge & removeable fence**

## ¾ HP MORTISING MACHINE

W1671

**FEATURES:**

- ¾ HP, single-phase motor
- Adjustable depth stop rod
- Gas spring return
- Double support columns
- Jacobs taper #2 spindle
- Heavy cast iron construction
- Micro adjustable fence
- Approx. shipping weight: 90 lbs.

**Unique swiveling head assembly!**

We designed this Mortising Machine to address all the frustrations found in other models on the market.

## 2 HP SHAPER

W1674

We designed this 2 HP Shaper to give maximum performance.

**FEATURES:**

- 2 HP, 110V/220V, single-phase motor
- Large precision ground cast iron table: 24" x 21"
- Heavy-duty miter gauge
- ½" and ¾" spindles included
- 3" spindle travel
- Heavy cast iron construction
- Cabinet stand with powder coated paint
- Approx. shipping weight: 270 lbs.

**Shown with D2057 Adjustable Mobile Base (not included)**

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# Making Peace to Make Furniture

A couple years ago I bought a vintage Disston No. 7 handsaw to round out the nest of saws that are useful to a typical furniture maker.

The saw was perfect: sharp, straight, correctly set and it felt like an old baseball glove in my right hand. But for some reason, this fine-toothed saw didn't cut well. It bound at every opportunity. Even worse, it wouldn't follow a line like my other saws did – it strayed across the board like a tipsy reveler at a DUI checkpoint.

Was it the saw? I doubt it. The No. 7 was the first model of saw that Henry Disston made (it was the forerunner to the venerable D-7 saw). Made between 1840 and 1928, the No. 7 was a mainstay of the Disston line, according to the Disstonian Institute, an online guide to Disston saws (disstonianinstitute.com). Thousands of these saws were sold to professionals – the No. 7 isn't some oddball tool.

Was it the sharpening job? That also was unlikely. I bought the saw from Steve Cooke, who runs Cooke's Sharpening & Grinding Service in York, Penn. (cookessharpening.com). Cooke has a large collection of saws and a wealth of sharpening experience.

Was it the user? Believe it or not, I didn't think that I was the problem. I've always had an affinity for handsaws since I was a kid. And though I'd never used a 12-point saw like this No. 7, all my other handsaws were obedient. I was stumped. So after weeks of trying to use the tool, I put it away and forgot about it.

A few months ago I was cleaning off the top of a tool cabinet and came across the No. 7, covered in two years of dust but otherwise perfect. I had forgotten how beautiful the handle was and how good it felt in my hand. But I was still a bit leery after our last encounter.

I cleaned off the saw, picked up a piece of maple and struck a line across its face. I drew the saw back and braced myself for disappointment. To my surprise, the saw plunged sweetly into the work. After a few strokes I could see that it was hugging my pencil line brilliantly. With this saw I am now cutting faster and cleaner joints than ever before. But all this made me wonder: What had changed?

I've had the same experience with a few handplanes, a band saw, a drum sander and a jointer. First frustration, then separation and finally satisfaction. This wasn't the first time I've had to make peace with a tool. Perhaps our brains process our first baffling encounters with a tool and then unconsciously come up with the solution.

I think that woodworkers' connection to their tools is more complex than most people think. More than just hunks of steel, iron and carbide, our tools are the conduit between imagining and creating. They are the magic wands that transform a pile of sticks into a cabinet or chair.

This is worth keeping in mind as you read through this issue, where we present three perspectives on tools from Frank Klausz, Robert Lang and myself. Each of us explores a markedly different realm. But the one thing I hope you'll do when you put down this magazine is to root through your own shop for a tool that has brought you nothing but grief and try to put it to work. You might be ready, like I was, to take a big step forward. **PW**

*Christopher Schwarz*
*Editor*

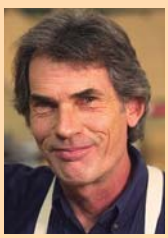
## CONTRIBUTORS

### SAMUEL L. PETERSON

In 1995, the opportunity to build a workbench led Sam to what has become a fascination with the history and use of hand tools. Upon discovering the Internet message group called "oldtools," Sam found a gathering of like-minded individuals who, together, have rediscovered long-ago forgotten techniques, and kindled the flames of self-sufficiency and honest achievement in woodworking. Sam's day job involves overseeing research funding for the University of Missouri. Researching obscure and forgotten areas of woodworking (see page 72) is how he unwinds after a hard day of hitting the numbers. Among his other interests are blacksmithing and woodcarving.

### ROBERT W. LANG

Senior Editor Robert W. Lang has been a professional woodworker since the early 1970s. He learned woodworking repairing wooden boats on Lake Erie and in a large commercial shop in Cleveland. Along the way he studied industrial design at Ohio State University, and his experience includes building custom furniture and cabinets as well as managing and engineering large architectural millwork projects. He is the author of several "Shop Drawings" books about the Arts & Crafts Movement of the early 1900s, as well as the new "The Complete Kitchen Cabinetmaker" (Cambium Press) and the forthcoming "Shop Drawings for Greene & Greene Furniture" (available in October from Cambium Press/Fox Chapel).



# Uncommon Finish a Shock at First Glance

### Byrdcliffe Cabinet Finish Superb

I think your representation of the Byrdcliffe vintage cabinet is world-class (April 2006, issue #154). When I read of the green stain I was really put off, but it came out superb. Is the color in the magazine photos accurate? If so, I think you have done the best Arts & Crafts finish I have ever seen.

Your treatment of the hardware is also great. I suspect you didn't achieve the hardware patina using household ammonia. Can you tell me what you used and a source please?

*Bill Rittner*
*Manchester, Connecticut*

*Thanks for the kind words. The color in the magazine is accurate. While it wasn't exactly common, green stains were used in the period. That was the first piece of furniture I ever stained green, and I'm pleased with how it turned out, especially now that it has had a few months to mellow.*

*To age the hardware I used 26 percent ammonia, commonly used in blueprint machines, but this strength isn't necessary. Household ammonia is about 5 percent concentration, and some hardware stores and janitorial suppliers have some that is around 10 percent. Any of these would work, but instead of a few hours it might take a day or two to age the hardware. If you use a clear plastic container, you can observe the process.*

*I used the strong ammonia because I had some on hand for fuming other Arts & Crafts furniture. Ammonia is nasty stuff, so if you only need to age some hardware, I would recommend the weaker, easier-to-find variety.*

*— Robert Lang, senior editor*

### Methodology Should Focus on Results

As an advanced beginner in woodworking, I am thankful for the publishers and authors who make available such a wide range of information about woodworking.

In the pages and online forums of magazines such as *Popular Woodworking*, I have learned about tools and techniques for machining and finishing for the woodworking I want to do. I thoroughly enjoy tips from readers, featured projects and how-to explanations for better woodworking. My success is a direct result of this information.

Any method a woodworker uses to produce a beautiful result is indeed craftsmanship. I don't think any one method represents true craftsmanship while some other method does not, if the end result is the same. Craftsmanship using machines is just as authentic as that achieved by hand.

The choice of methodology depends on the project and the skills and desires of the individual, and is intrinsic to the satisfaction of working with wood. Some methods may be "better" than others and reading about them gives me options. Criticism of methodology should focus on end results, not tradition.

*Jeff Watkins*
*Newton, Utah*

### Queen Anne Tabletop Pins Allow Conversion to Slanted Writing Desk

I was reading the article written by Craig Bentzley about the Queen Anne Table (April 2006) and it states: "No one is really sure why the tops were removable."

When I was a little fella, I was raised up in southern Oregon where I lived in the very small town of Hugo.

My parents had befriended an elderly lady by the name of Clara Stone, who ran the Hugo Trading Post and gas station. It was also the old railway station building.

Being the eldest, I was able to help Mrs. Stone with things around the shop, from inventory to cleaning and everything in between! As I assisted, I recall seeing one of those Queen Anne-style tables in her shop, just below what she used as an unofficial post

*continued on page 14*

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28-682

8" Bench Grinder

23-725

8" Jointer

37-350A

Mortiser

14-651

16 1/2" Drill Press

17-965

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22-680Y

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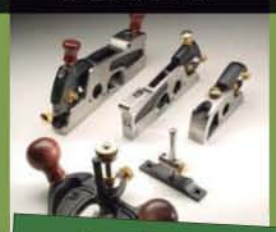

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continued from page 10

office and message center for the locals.

What I recall most is the fact, as described in the article, that the top was removable and she had me remove it at one point. The other interesting point was the rear pegs which, when removed, were a slight bit longer than the front ones and inserted into a second hole to the rear of the drawer areas. I asked her about that and she showed me where the rear pegs were stronger than the front ones and could be inserted in the holes and the tabletop then set back atop of the pegs, creating an easy-angled writing top table.

She said her parents brought it with them via a Conestoga Schooner covered wagon when she was an infant and she had seen them use it in this manner many times.

*Steven D Buckley*
*Roseburg, Oregon*

### Where Can I Buy Brass Gauge Bars?

In "Adding Accuracy" (April 2006), the picture shows some brass bars and brass feeler gauges. I can find regular feeler gauges with no problem, but I would like to get a set of the brass gauge bars. On the PBS show "Router Workshop," they use them all the time and they would be a big help and time saver. If you know where I can order some, please let me know.

*Jerry Pruett*
*Blackfoot, Indiana*

*I got the set in the photo from the Craftsman Gallery (craftsmangallery.com). It is product #32-135. A different set of setup gauges is made by Veritas and sold by Lee Valley. That's #05N58.01 at leevalley.com. I have and use both.* **PW**

*— Bill Hylton, author*

## WRITE TO US

*Popular Woodworking* welcomes letters from readers with comments about the magazine or woodworking in general. We try to respond to all correspondence. Published letters may be edited for length or style. All letters become the property of *Popular Woodworking*. How to send your letter:

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Compiled by Paul Anthony
Illustrations by Matt Bantly

# Build a Better Centerline Gauge

## THE WINNER:

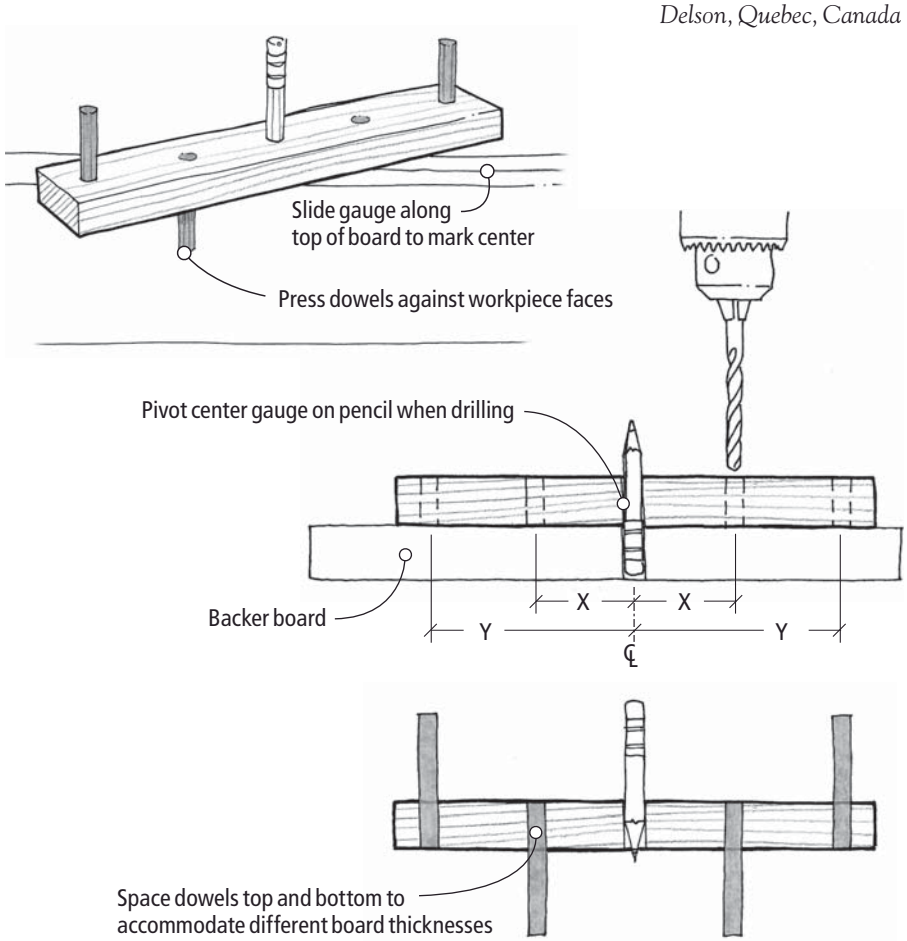
Relying on measurements when marking a centerline down a board invites errors. Instead, I use this foolproof centerline gauge. The jig is simply a 3/4" x 2" x 8" bar with a pencil at its center flanked by two pairs of symmetrically spaced dowels. In use, you place the jig across the edge or face of a workpiece, then rotate it until the dowels contact opposite sides. The pencil then gauges a perfectly centered line as the jig is pushed the length of the piece. The innermost dowels on one face of the bar will work for stock up to 2 1/4"-wide. The outermost dowels are for stock up to 6 3/4"-wide. Of course you can make a bar any length you like, with dowels of any spacing.

This type of jig has been around a long time. The trick is making it accurately. Here's how: Make the bar, and carefully gauge a centerline along its length. Locate the pencil hole at the very center, then mark the dowel locations – one about 1 1/4" away from center on each side, and one about 3 1/2" away.

Using a bit that exactly matches the diameter of your chosen pencil, use the drill press to bore a hole through the bar's center and at least 3/4" into a wide, thick backer board. Then insert a short section of your chosen pencil through the mating holes.

Change over to a 1/4"-diameter bit and shift the bar and backer for drilling one of the innermost dowel holes. With the pencil still in place, clamp the backer board to the drill-press table, then drill the first dowel hole through the bar. Without moving the backer board, rotate the bar 180° on the pencil, and drill the opposing hole. Repeat the process for the outermost holes. This ensures that the pencil is perfectly centered between the dowel holes. All that's left is to glue short lengths of 1/4"-diameter dowels into the holes.

*Serge Duclos*
*Delson, Quebec, Canada*




## CASH AND PRIZES FOR YOUR TRICKS AND TIPS!

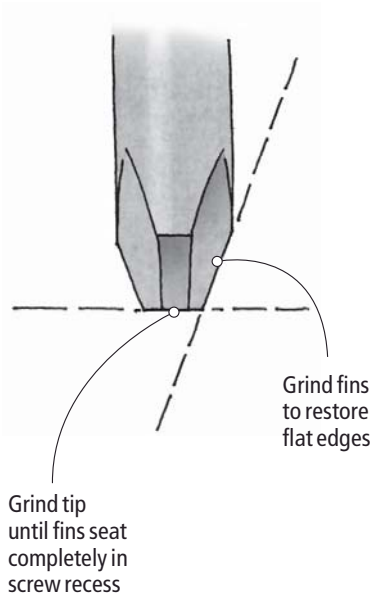
Each issue we publish tips from our readers. Next issue's winner receives a Veritas Mk. II power sharpening system. The combination of interchangeable abrasive discs and a tool rest make sharpening hand tools simple.

Runners-up each receive a check for $25 to $100. When submitting a trick you must include your mailing address and a daytime phone number. If your trick is selected for publication, an editor will need to contact you. Entries become the property of *Popular Woodworking*. You can e-mail your trick to popwoodtricks@fwpubs.com, or mail it to Tricks of the Trade, *Popular Woodworking*, 4700 E. Galbraith Road, Cincinnati, OH 45236. For complete submission information, visit popularwoodworking.com/staff/guid.html.

## Restoring a Phillips Screwdriver Tip

It's not uncommon for a Phillips screwdriver tip to wear over time. The four "fins" can become thin, creating a sloppy fit in a screw head, which tends to cause stripping of the heads. Fortunately, you can easily dress the tip of the driver once or twice before you have to pitch it. It's a simple matter of filing or grinding the outer edge of each fin flat again. Touching each edge to a grinder is the quickest method, but you'll have more control working with a file. Keep the edges as straight as possible, and keep opposing "flats" parallel to each other. After dressing the fins, grind the driver tip a bit shorter to allow the newly dressed fins to seat snugly in an appropriately sized screw head. Using a grinder, the whole procedure shouldn't take more than about a minute. Filing will take a bit longer. However you approach it, it's worth the time that you'll save preventing stripped screw heads.

*Darryl Lightfoot*
*Memphis, Tennessee*




## Truly Square Crosscutting

When you're adjusting your table saw or sliding compound miter saw to make a square crosscut, the proof is in the pudding, so to speak. That is, you need to make test cuts on an end of scrap, then check the cut using a very accurate square. The problem is that when making the cut, there's a tendency to nip just a bit off the end of the test piece – say 1/16" or so. Unfortunately, when you cut off any amount that is less than the thickness of the saw blade, the cut can cause the saw blade to deflect, and thus cut slightly out-of-square. It's usually not by very much, but it's enough to notice, particularly if you're using a premium quality blade.

To help you adjust your saw, and to ensure that you'll always get a dead-square crosscut from it afterward, make sure that there is at least 1/8" of wood to the waste side to equalize the pressure on the blade as it moves through the wood. This prevents blade deflection, and gives you a truly square cut every time.

*Al Wescott*
*Petaluma, California*

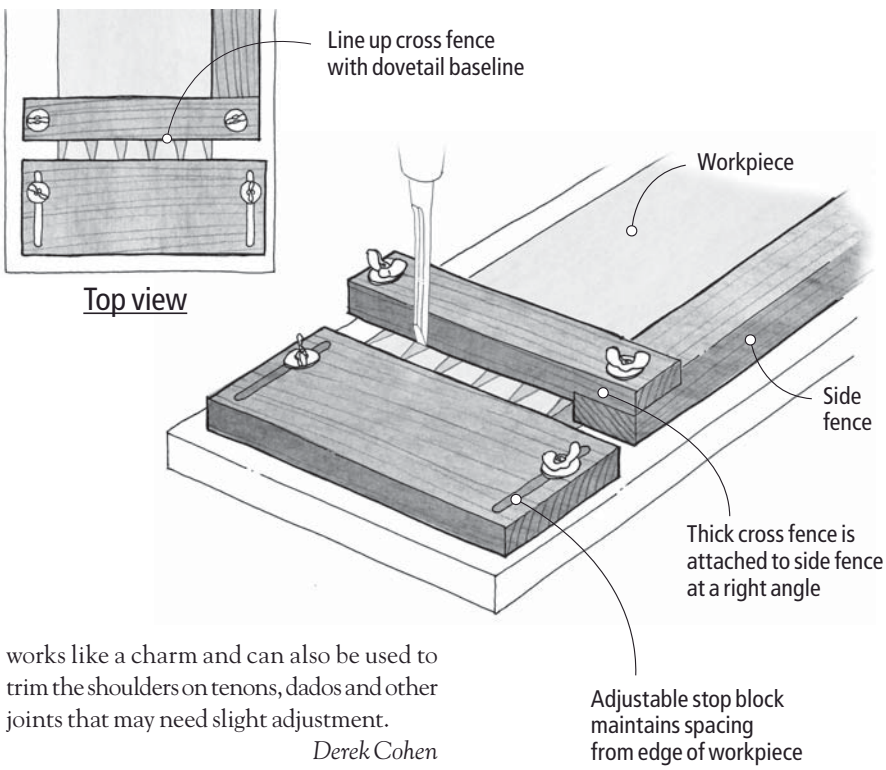
## A Jig for Paring Dovetail Baselines

I made this jig to help me accurately and uniformly pare to the baseline of dovetail joints. I use the jig after sawing the dovetail cheeks with a dovetail saw and removing the majority of the waste between tails with a fret saw. This leaves only a bit of cleanup to do, adjacent to the scribed baseline.

The jig consists of a side fence and a thick cross fence attached to each other at right angles, as well as a stop board that can be adjusted to accommodate tails of any length. After removing most of the waste as described, I place the workpiece against the side fence, and align the dovetail baseline with the cross fence. Next, I secure the stop board in place against the end of the workpiece. This allows for a quick setup when flipping the board over to pare from the other side, and ensures that cuts made from both sides will meet in the same plane.

To make the cuts, I hold the back of a sharp chisel against the edge of the cross fence and pare away the waste, stopping halfway through the workpiece. Then I flip the board over and complete the cut from the other side. The jig works like a charm and can also be used to trim the shoulders on tenons, dados and other joints that may need slight adjustment.

*Derek Cohen*
*Perth, Australia*

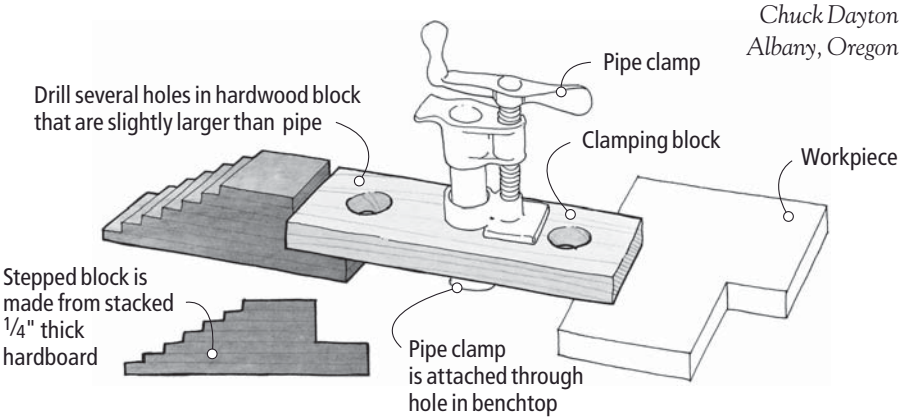


## A Benchtop Bridge Clamp

To aid in clamping workpieces to my benchtop, I use a "bridge clamp" made from a short pipe clamp and a 3/4" x 2 1/2" x 8"-long hardwood clamping block that serves as a long jaw extension. In use, the block spans the workpiece and a stepped block that keeps the clamping block parallel to the workpiece for firm contact against it. The clamping block offers a selection of holes that allow for greater or lesser clamp reach as necessary.

I first made the clamping block and drilled several holes in it slightly larger than the diameter of the pipe. I also glued together a stack of 1/4"-thick hardboard pieces in a staggered fashion to create the stepped block (it accommodates different material thicknesses). I removed the lower jaw from a short pipe clamp, slipped the pipe through one of the strategically placed holes I had drilled in my benchtop, then replaced the lower jaw.

*Chuck Dayton*
*Albany, Oregon*




## Jointer Knife Scraper

Traditional card-type cabinet scrapers are exceptionally useful in furniture making, but I prefer to use them only when absolutely necessary because they tend to lose their burr and become dull quickly, especially when scraping the dense woods that I typically work with.

After upgrading from my 6" jointer a couple years ago, I discovered a sharp set of blades that were left behind. I found that they make excellent scrapers. They don't require burnishing because the factory-sharpened edge works fine without a burr. I've found that these high-speed steel blades only need sharpening about once a year even when used day-in and day-out. The only thing I did was knock off the corners of the blades using my belt sander to prevent cutting myself when scraping.

When scraping, push or pull the knife in the direction of its flat side, angling it as you would a card scraper. A jointer knife will flex a bit, although not nearly as much as a card scraper. If the knife is sharp, and if you're handling it correctly, the cut will yield fluffy shavings instead of dust.

*Hikmet C. Sakman*
*Victoria, B.C., Canada*

## Clamping Down on Band Saw Safety

After I use my band saw, I release the tension to reduce stress on the blade as well as on the saw frame. As a reminder to re-tension the saw before using it the next time, I lay a spring clamp on the table, pinched on the blade. It's really cheap insurance against a potential disaster.

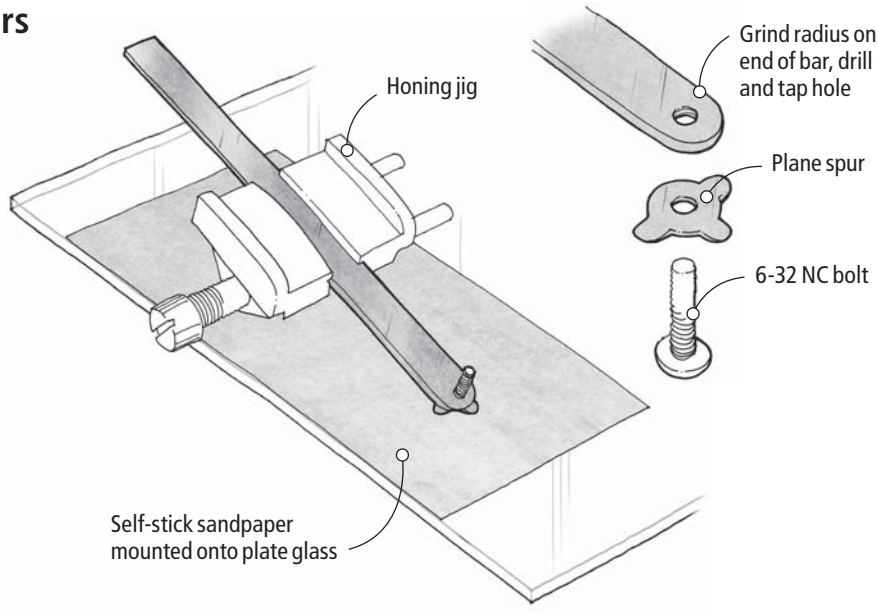
*John Hutchinson*
*Columbus, Ohio*

## Simple Tape Separation

I use a lot of double-sided tape in setting up a variety of jigs and other workshop tasks. I used to find it frustrating trying to separate the backing from the tape using a fingernail or even a sharp knife. However, I have now found that the simple act of dog-earing a small corner of the sticky surface back onto itself makes the whole process a snap.

*Ian Ross*
*Smiths Falls, Ontario, Canada*

## Sharpening Rabbet Plane Spurs




Sharpening the tiny crosscutting spurs, or "nickers," on Stanley-type rabbet and combination planes was a tedious task until I came up with this simple jig. It consists of two components: a 1/2"-wide x 3/32"-thick x 6"-long piece of stiff steel and a 6-32 x 3/4" round-head machine screw. The steel came from an old filing cabinet file-hanger rod, but you can use any stiff metal bar of about the same size. The screw, which I robbed from an electrical switch, is perfect for the job because of its slim head profile.

To make the jig, I drilled a hole 5/32" from one end of the steel bar, then tapped it for a 6-32 thread. After grinding a 1/4" radius on the end of the bar, I screwed the spur to it. (If you don't have the proper tap, you can attach the spur with a screw and nut instead.)

I mounted the bar in a side-clamping honing jig, which I set to a 30° angle using a draftsman's triangle. Then I sharpened the spur using #100- through #320-grit aluminum oxide sandpaper on glass. The narrow wheel of the honing jig allows me to tilt the cutter side-to-side to help achieve the necessary radius along the end of the spur. I use the jig near the edge of the glass with the adjustment knob overhanging so that it doesn't prevent tilting to that side. After honing the bevel, I remove the spur from the jig and hone the flat face on #320-grit paper. **PW**

*Craig Bentzley*
*Chalfont, Pennsylvania*

# Turn a Custom Tool Handle

An elegant grip that perfectly fits your hand can enhance your tool-using experience.

Photos by Al Parrish

I was embarrassed to discover, in preparing for this column, that I had very few tools with nicely made, attractive handles to show you. Well, the cobbler's children often go barefoot. So here are some of my most-used tools, many in dire need of new handles; also some beautiful and unusual woods for the handles, and assorted ferrules (mostly copper and brass, cut from plumbing fittings of various diameters).

There are at least two reasons you may want or need to make a new handle for one of your turning tools. Sometimes unhandled tools are available at a lower cost than handled, so you might choose to make your own. More often, the handle that comes on the tool is just not right for your hand; it may be too large or small in diameter, too short, too long, etc. And occasionally a handle wears out before the tool, particularly if you've used it as a hammer one too many times (or so I am told).

Pictured are a number of my own tools that are positively crying out for new handles. Some handles are too big; some are the wrong shape for my hand. Many have been inelegantly modified (i.e., chopped off), but somehow never replaced. Most of these tools will benefit from new, custom-made handles. The large bowl gouge is an example of a shop-made handle that suits the tool much better than the one it came with.

Custom-made tool handles will enhance your turning enjoyment, and quite possibly your accuracy as well. A tool that fits your hand is not only more pleasant to use, but also less fatiguing.

Making a tool handle for a gouge or other turning tool is a great project for beginners and experienced turners alike. For a beginner, it's easy to make and satisfying to use. A more experienced turner will understand what is and isn't working well with a particular handle, and can make one that exactly suits how she or he uses each tool.

## Basic Considerations

Generally speaking, you'll want fairly long handles on bowl gouges, and shorter ones on spindle tools. There are certainly exceptions. I have some smaller bowl gouges with relatively short handles for detailed or small work where little power is needed. I also have a large roughing gouge for spindle work with a handle much longer than most of my spindle tools. But for a large bowl gouge, a long handle gives you better control of sweeping curves, and more power for removing a lot of wood. On many spindle tools, a long handle just gets in the way and makes it harder to flip the tool position back and forth.

It's not hard to find brass or copper tubes for ferrules; just about any necessary diameter can be found in copper in the plumbing department. Many toilet fittings, and a few other plumbing items, are made of brass. Or check your local business phone book for tubing. Some places will sell you a box of cutoffs for next to nothing. Cut them to appropriate

by Judy Ditmer

*Judy, author of two turning books and many articles, has been turning since 1985. She teaches and demonstrates her skills throughout the United States and Canada.*

lengths with a hacksaw and sand or grind the ends smooth and square.

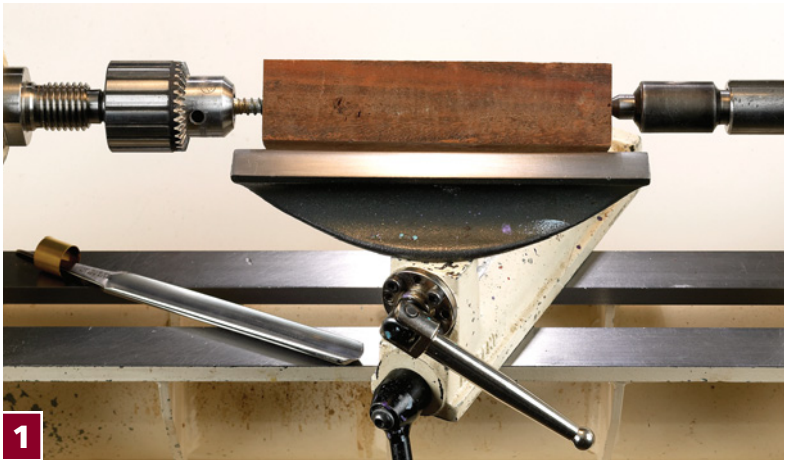
Choose any hardwood; dense, close-grained woods are best for tool handles as they will take a clean cut and are strong enough to withstand the forces they will sustain in use. Pieces should be about 1½" to 2" inches square and the desired length of the finished handle, plus a couple inches for waste.

### Mounting Your Stock

I usually pre-drill the handle and use this hole to mount the handle on a screw chuck for turning (the tailstock is used for support for most of the turning). This method offers two advantages: The hole (and thus the tool) will align with the axis of the handle, and the end of the handle can be finished on the lathe (if the machine has a sufficiently slow speed).

If the tool is milled from a bar of steel, drill a single hole of the correct diameter to fit on your screw chuck (I use a lag screw with the head cut off, mounted in a Jacobs-style chuck on the lathe), and the depth to which you wish to insert the tool. When the handle is finished, you can then re-drill the hole to the diameter of the tool itself. The depth is personal preference, but be sure you have enough steel inside the handle; this might be only an inch or so on a very small tool, or several inches on a long one. I start round spindle gouges mounted very deeply into their handles, so the protruding length isn't awkward. As the tool is used and becomes shorter, I remove it, insert a short length of dowel (to keep the shortened tool from being pushed back down into the handle), and replace the tool. The dowel can be drilled out later for a new tool.

If the tool has a tapered tang, you will need to drill a stepped hole. This is largely a matter of trial and error; try it first in a waste piece (like a small length of 2 x 4) to be sure the tool will fit properly in the handle. For the one shown, I drilled a ½"-diameter hole ¾" deep, then ¼" diameter another ¾" deep, and finally ⅛" diameter another ¾", for a total depth of 2¼". This is a little less than the length of the tang, as I want the tang to set securely just as the wider part of the gouge reaches the ferrule. If the hole is too deep, the ferrule may stop it from going deeper before it is secure. With the hole a bit shallow, driving the tool home will crush the wood inside the hole and set the tool firmly in the handle.



1

Here is a nice piece of goncalo alves, mounted and ready to turn into a handle for a new shallow spindle gouge (shown on the lathe bed) I have recently acquired. Note the ferrule, chosen for the size of the tang.

2

Using a wide, shallow spindle gouge (itself in need of a new handle!), I rough in the general shape. I prefer a handle that is wider near the ferrule than farther back, but also has a bulge on the end so I always know by feel exactly where to hold it for various types of cuts.

3

Having roughed out the handle, I begin fitting the ferrule by measuring the inside diameter with a caliper.

4

I hold the caliper and cut at the same time, but if you are not experienced, it is much better to cut, stop the lathe to check the diameter, and so on.

5

You'll want the fit of the ferrule to be snug, so check the diameter carefully. Leave it a bit large at this point; you will refine the fit later.

### Shaping Your Handle

Once you have prepared your stock, mount it on the lathe, bring in the tailstock for support, and begin turning. The shape of the handle will depend on how you are using the tool, the size of your hands, and your own personal preference. Generally, a relatively large diameter (but not so large that your hand is too open holding it) will be more comfortable for most people to use than a very small one (which can make your hand cramp).

Use a wide, shallow gouge to round the piece and rough in the shape. Measure the inside of the ferrule and cut a spigot a little larger on the mounting end of the handle. Then continue shaping the rest of the handle until you like the size and curves. You can turn the lathe off and check how the emerging

I further refine the shape by adding a beaded detail to the handle.

I'm checking the feel of the handle. (Do this with the tool rest moved away and the lathe off.) I like the beads, which fit nicely at the end of my hand.

I'm finishing the shapes, cutting as cleanly as possible and getting the curves just right.

I use a wire to burn detail lines between the beads. It dresses them up a little.

I've cut in close to center on the tailstock end, and am finishing up the sanding. I then finish with a hard wax, buffed out with the tool rest moved away and the lathe turned on.

I have removed the handle from the drive screw, placed the ferrule over the screw, re-mounted on the lathe, and have begun the final fitting. The spigot should be a little longer than the width of the ferrule, so you can trim the end after placing the ferrule.

To check the fit, stop the lathe and push the ferrule onto the spigot. Remove more material as needed.

handle feels by holding it as you will in use.

When you have the shape close to what you want, take the workpiece off the screw chuck, place the ferrule over the screw, and re-mount the handle on the lathe. Make your finishing cuts, then sand and finish the handle (I use a hard wax, buffed out with the lathe turned on). Cut in close to center at the end and sand, but don't part off yet.

Carefully finish the fit of the ferrule. It should be snug, but should not require serious force to get it onto the spigot. Once it is in place, you can trim whatever wood is protruding, sand and polish the ferrule.

With the lathe going very slowly, finish parting off the handle. Sand and finish. (At high speeds, centrifugal force will cause the handle to fly away from the axis, damaging the screw, the handle and, possibly, you. If your lathe doesn't have a very slow speed, skip this step, remove the handle from the lathe, and sand and finish by hand.)

Remove the handle from the lathe and mount the tool. Place the sharp end on a block of softwood, put the handle on the tang, and give it a sharp tap or two with a leather mallet. Now admire your newly beautified tool for a moment, and then use it to make more handles for all your turning tools. Just please don't ask me whether I've done this yet. **PW**


13

I slow the lathe way down and finish cutting the end of the handle. If your lathe isn't variable speed, skip this part and finish up the end by hand after taking the piece off the lathe. It is very dangerous to have a piece this long and thin spinning at high speeds without tailstock support.


14

Here's an advantage of a lathe with variable speed; sanding and finishing is so much easier on the lathe than off.


15

I've removed the completed handle and am installing the tool.


16

The newly handled tool in use to begin the next one. (I'm holding it a little high, so you can see the handle.)

# Keep Your Tabletops Flat

## Battens: Just one proven method to keep you on a level playing field.

The best way to keep a tabletop flat is to make it flat in the first place and to attach it properly to a rigid frame, such as that formed by a leg-and-apron assembly. But not every tabletop is attached to a frame. Trestle tables, pedestal tables, even drop-leaves lack frames to stiffen the tabletops and keep them flat.

Two common constructions effectively prevent cupping of a tabletop or of individual boards in one. The first is a batten attached or joined to the underside of the tabletop. This column will show you how to do that. In my next column I'll cover the other – a breadboard end joined to each end of the top.

### Batten Basics

So what is a batten? The idea is simple. You attach a stiffener across the grain of a board or panel to counter any tendency of it to cup. The batten has to be strong enough to resist the board's cupping power, as does the method of attachment. In addition, you must allow for expansion and contraction of the board or panel. It's common to use two or three battens per board or panel.

The drawing at right shows two basic options: Attach each batten with three screws or with a sliding dovetail. No glue is used. The obvious advantage of using fasteners is that you can cut and mount each batten quickly. In addition, a batten secured with screws can be relatively unobtrusive; cut it 3" or 4" shorter than the table's width so it can be set back from the table's edges.

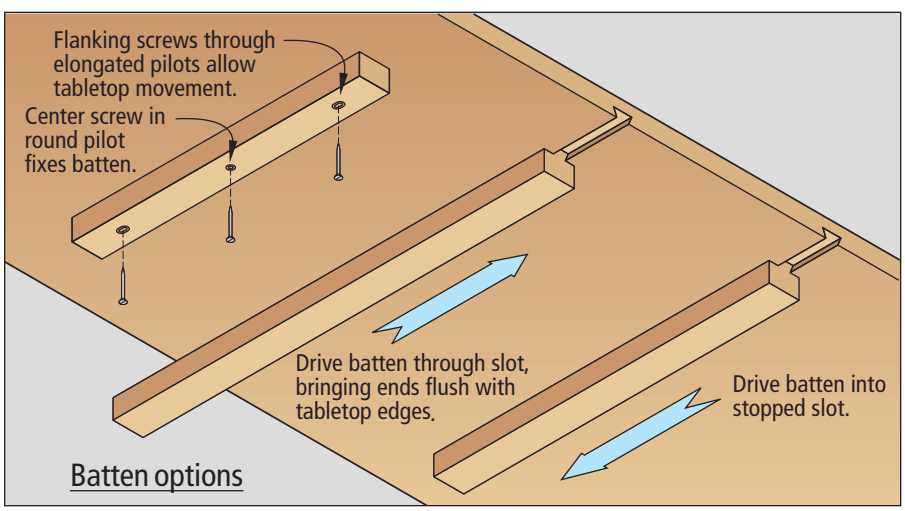
The primary difficulty in using screw-mounted battens is elongating the clearance holes to allow the wood to move freely. You can enlarge drilled holes with a small-diameter

by Bill Hylton

*Bill is the author of several books about furniture construction and router operations. When he isn't writing about woodworking, he's doing it in his home shop in Kempton, Pennsylvania.*

Photos by the author

A stout batten joined to the underside of the tabletop with a sliding dovetail will keep the top flat. Here, the batten extends to the very edge of the tabletop. In winter, when humidity is low, the top will shrink, and the batten will protrude very slightly. In summer, when the top swells, the batten end will be slightly recessed.




Batten options

round file or a coping saw. A simple but effective trick is to drill oversize clearance holes, rather than trying to create oblong ones, and use washers under the screw heads.

### The Sliding Dovetail Solution

Using a sliding dovetail to join a batten mechanically to a tabletop is more work, but it's stronger. Cutting the joint isn't difficult, but some patience is required to get a proper fit between your pieces. It's a router operation. Cut the slot by guiding the router along a fence clamped to the tabletop. Form the tail on the batten on the router table.

Most any dovetail bit will do the job, but the particular bit you choose impacts some details of the operation. A dovetail cut must be done full depth in one pass (of course!). In this application, the cut doesn't need to be more than 5/16" deep. The bottom of the cut should be just about as wide as the batten. Of course you'll use the same router bit to cut both the slot and the tail.

If you use a commonplace 1/2"-14° bit, it's prudent to first rough out the slot with a straight bit in your router. To match the slot to the batten thickness, you'll need to make two passes with the dovetail bit. A larger-diameter bit has more substance at the waist, and you should have no problem hogging out the slot in a single pass.

### Test the Tail's Fit

Cutting the tail follows. The first adjustment is bit height. You want a snug fit, with the shoulders of the tail tight against the tabletop surface, so you don't want the bit too high. The next adjustment is the fence position. Use the tweaks I described in the April 2004 issue of *Popular Woodworking* (#140). I make test cuts on scraps of the batten stock, and fit the resulting tail to the slot.

Remember that it isn't simply a matter of fitting the test block into the slot. It has to pass completely through the slot, from one end to the other. Invariably, I find tight spots – often two or three – where a block that's otherwise sliding satisfactorily binds. The test block isn't impeded by the friction buildup that will drag on the batten itself. So you must use your judgment.

You can try easing the tight spots with sandpaper. Or, feed your test block through the slot several times, abrading and easing the tight spots. Or tweak the setup, cut a new tail, and run it through the slot. (Which might convince you that the previous setup was the better one, so be sure you can return to it.)

Ultimately, you are going to have to cut a tail on the batten itself and feed it into the slot. The batten isn't glued in place. I copied a

The dovetail slot must be cut with the bit set to final depth. Clamp scrap to each edge of the tabletop to prevent tearing out the top's edges. Make sure your guide is straight and rigid, perpendicular to the tabletop edges, and securely clamped.

The dovetail slot for a batten doesn't need to be more than 1/4" to 5/16" deep. You can rout that in a single pass with a 3/4" to 1" 14° bit on a 1/2" shank. If you use a smaller dovetail bit, its waist will be weaker; then it's advisable to first rough out the groove with a straight bit.

As you set up your router table for cutting the tails on the battens, fit the test block to the slots. When you have a test block that fits the slot, slide it all the way through to ensure you won't have an unpleasant surprise during final assembly of the actual batten.

Cut the tail on each batten only after you are satisfied that you have the right fit. Slide it along the fence and cut into one face, then turn it around and cut the second face, completing the tail. You can make an angled sanding block to remove any high spots on the tail.

detail from an old table a friend owned. Tables of similar construction are in the Pennsylvania Dutch collections at Winterthur; a single wooden pin driven through the tabletop into its center fixes the batten while allowing the tabletop to expand and contract.

Slide the tail into the slot. I expect to meet resistance, so I lubricate the ways with paraffin or paste wax. It's nice if you can push the batten halfway in before resorting to a dead-blow mallet. On more than one occasion, it's taken a lot of pounding to drive the batten home. On the other hand, if it slides completely into the slot without real resistance, you may want to make a new one. Once the batten is in place, drill a hole and drive a wooden pin through the top and into the batten.

This type of batten construction is a country kind of thing. In the summer, the ends will be somewhat recessed, but next New Year's, they'll be proud of the tabletop edges. That's not what you want in a formal table. For a higher-style table, you'd shorten the battens so they aren't obvious at the top's edges, and attach them with screws. **PW**

Sliding the batten into place requires some force. Since you aren't gluing the parts, and there's going to be some seasonal movement anyway, go ahead and apply wax to the slot and the tail. As friction builds, you'll have to whack the batten with a dead-blow mallet to keep it moving.

# Powermatic PM2000 Saw Offers Features and Performance for Serious Woodworkers

My first look at the newest cabinet saw from Powermatic was last year when the company was still working out some final details. At the time, the most difficult concept to grasp was how the PM2000 would fit into the product line alongside the Powermatic Model 66 cabinet saw that has become an industry standard. In short, the Model 66 is designed for more physically demanding millwork situations, such as ripping hardwood lumber all day long. The PM2000 incorporates features that will appeal to a furniture maker who switches between setups throughout the day.


## SPECIFICATIONS

**PM2000 10" Cabinet Saw**

**Street price:** $2,100
**Motor:** 3 hp, 1 phase, 220 volt
**Table size:** 42" x 30½"
**Weight:** 600 lbs.
**Performance:** ●●●●○
**Price range:** $$$$
**Powermatic:** 800-248-0144 or powermatic.com

Let's look at a few of those new features on the PM2000. First off, it has an integrated mobile base. See it in the picture? You won't! It's built into the cabinet of the saw. To use the mobile base you pull the blade-tilting wheel (on the right of the cabinet) away from the saw to engage a second geared mechanism. That handle then becomes the adjusting handle for the mobile base. It lifts the saw only a fraction of an inch off the floor, but it's enough to get things moving (please pardon the pun).

After use in our shop for a month or so, we've noticed that the thread pitch on the mobile-base lift requires more turns than we'd prefer and there seem to be some concerns with dust getting into the threads, affecting the ease of movement. Powermatic representatives agree and both of these items are under consideration for an upgrade.

Another question we had was about the "mobility" of the saw when a 50"-fence rail and extension table without casters is added. We were told (and we checked) that once the saw is raised onto its casters, the extension table can be lifted easily enough (again, a fraction of an inch is enough) and the saw can essentially be steered from the extension table without causing any harm to the saw.

Powermatic improved the blade-changing process as well, by adding an arbor lock that allows one-wrench blade changes, doing away with the stick that we all end up jamming against the blade to make the change. The lock is easy to use and a nice feature.

The third major change (and our favorite) is the addition of a true riving knife. For those unfamiliar, a riving knife is a steel plate mounted behind the blade that raises and lowers with the blade (see photo below). Essentially it's the splitter part of the guard, but it stays in place without the guard, providing an extra level of safety when using the saw. In our opinion this is a table saw addition that's way overdue. At press time the riving knife will only be available as an accessory, but we hope that will soon change.

Powermatic has also added a dust shroud around the blade to improve dust collection and included a good quality miter gauge.

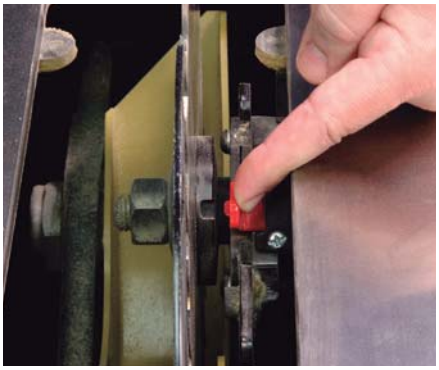
We tested the 3 horsepower, single phase, 220-volt model with the 30"-fence rail system. You may prefer the 50" rail set in your shop, but we felt the balance between mobility and capacity was best in this model. Conveniently, we had a 5hp Model 66 sitting in the shop at the same time, so we were able to compare the motor performance between the two saws.

I ripped a few pieces of 3"-thick white oak on both saws and found very little difference. Neither sliced like a hot knife through butter, but they also showed little difficulty in handling the task – a strong positive statement for the smaller motor on the PM2000. A 3 hp Model 66 is $150 more than the PM2000.

Other accessories that will be available for the PM2000 include zero-clearance and dado-insert plates. Because of the riving knife design, the PM2000 uses a different size throat insert than the Model 66.

To sum up, we like the PM2000 performance and the features it offers to both the home and professional woodworker. As a "next generation," it stands proud alongside the Model 66. *— David Thiel*

For more information, circle # 153 on Free Information Card.



The arbor lock works by sliding the spring-loaded red lever toward the blade support until the tooth engages one of the notches. A single wrench is then used to loosen (or tighten) the arbor nut.

The black riving knife serves as a splitter to keep the saw kerf in the wood from closing after the cut, which could pinch the blade. The top of the riving knife is always just below the blade height, so it can remain in place when making grooves and dados.

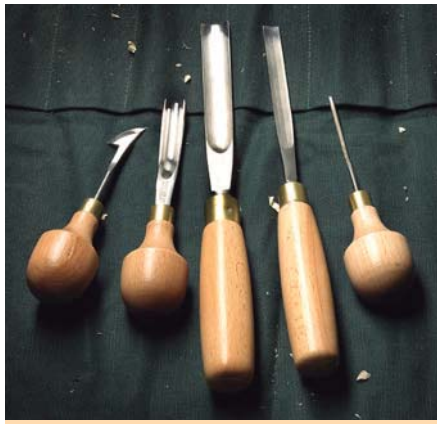
## Ashley Iles Carving Tools: Good Steel and Good Handles

Last summer and fall I extensively tested several carving gouges from English toolmaker Ashley Iles. Midway through the testing, I was impressed enough to go out and buy several additional gouges. Both the long-handled "London" pattern and short-handled palm tools were comfortable in the hand and nicely finished with beech handles and excellent quality steel.

They compared favorably to the Pfiel gouges I already own, have a nicer finish on both the handle and blade, and are competitively priced. I was particularly impressed with the condition of the blades. Many new carving tools look nice, but the shininess is due to overbuffing. The Ashley Iles blades were accurately and finely ground so only minimal honing was needed before using them. In use, they held their edges very well.

Hundreds of sizes and sweep patterns are available, as are several different sets. You also receive a discount by ordering six or more chisels. *— Robert W. Lang*

For more information, circle # 154 on Free Information Card.



### SPECIFICATIONS

**Ashley Iles Carving Tools**

**London pattern chisels:** $28.95 and up
**Palm chisels:** $19.95 and up
**Handles:** Round beech w/ ferrule
**Blades:** High carbon steel, Rc 61 hardness
**Performance:** ●●●●○
**Price range:** $$$
**Tools for Working Wood:** 800-426-4613 or toolsforworkingwood.com

## Dado Wiz Zeros in on Perfect Fit for Dados or Grooves

Our staff has an ongoing discussion about the best way to make dados. Whether using a dado stack or router, the trick is getting the dado or groove the proper thickness to match the material. I prefer using a router; that's why I was pleased to learn about the Dado Wiz.

The Dado Wiz (the black plate shown at right) locks to most clamps and guides (5/8" thickness maximum). Temporary pins are put in place on the Wiz and a sample piece is used to adjust the guide to perfectly fit the shelf or divider material.

The included brass template guide and your 1/4", 3/8" or 1/2" router bit is then used to make two passes (one up, one back) to make a perfectly sized groove or dado with a single setup. The Dado Wiz slides on your guide during the cut, controlling the position of the bit.

The Dado Wiz efficiently answers a need when routing dados. It does come at a price that's a little steep, but if you prefer routed dados, this jig belongs in your shop. *—DT*

For more information, circle # 155 on Free Information Card.


### SPECIFICATIONS

**Dado Wiz**

**Street price:** $159
**Template guide:** fits 1 3/16" hole
**Possible dado widths:** 1/4" to 1 1/2"
**Performance:** ●●●●●
**Price range:** $$$$$
**Woodline USA:** 800-472-6950 or woodline.com

## VERITAS BEVEL SETTER

At first blush I looked at this tool and said, "Twenty-five bucks for this?" Then I took a closer look and realized how many things it will do. I now believe it's $25 well spent.

Actually it's only $24.50, but let's not quibble. To understand this tool, think of the bevel setter as more of a Swiss Army Knife for angles. You can set a sliding bevel accurately to 1/2° anywhere between 0° and 60°. Or you can use your sliding T-bevel to gauge an angle and then use the setter to find out what that angle truly is.

Flip the sturdy 3" x 7" stainless steel blade over and you've got setups for seven of the most common dovetail angles, as well as settings for 12 polygon miter angles. And just for good measure, they've added a scale on each long edge marked in inches (by 1/16") and millimeters respectively.

The indicator marks on the bevel setter are etched and the finish is excellent. The machined aluminum fence moves smoothly and locks effortlessly with a knurled brass knob. Non-mar pads on the back of the fence keep the blade looking nice.

The folks at Lee Valley/Veritas continue to stretch their imaginations and offer tools that a woodworker will not only want to own, but will use constantly. The bevel setter is another in that line of tools.

Contact Lee Valley at 800-871-8158 or leevalley.com. *— DT*

## TOOL RATINGS

Performance is rated on a one-to-five scale. You won't see a low rating ("one or two") because we don't publicize inferior tools. "Five" indicates the leader in the category. Five dollar signs indicates highest price in the category. Three indicates an average price. If you have tool questions, call me at 513-531-2690 ext. 1255, or e-mail me at david.thiel@fwpubs.com. Or visit our web site at popularwoodworking.com to sign up for our free e-mail newsletter.

*— David Thiel, senior editor*

## Lie-Nielsen Medium Shoulder Plane is Exquisite

I've long been a fan of large shoulder planes and have many miles on my Lie-Nielsen 073, which I bought the first day it was available. So I wasn't sure I needed the company's new 3/4" shoulder plane when I ordered it.

Surprisingly, the medium shoulder plane gets as much use as the bigger tool. The 3/4" width gets this tool into the bottoms of dados to clean out the unevenness or junk left by coarser tools. At 2.3 pounds, it weighs almost two pounds less than its bigger brother, which makes it a bit easier to wield when working narrow stock and small rabbets.

And, of course, it excels at its primary job – trimming tenon shoulders and cheeks.

Like all Lie-Nielsen tools, the medium shoulder plane is made to high standards. I placed a straightedge on the sole and it revealed that it was perfect. Then I placed a machinist's square on the sidewalls to check their orientation to the sole. If the sidewalls aren't perfect to the sole the tool will never work quite right. Both sidewalls were dead-on perfect all along the tool's body.

The real surprise was the iron. With most tools, I've come to expect some serious work to flatten and polish the unbeveled face of the iron. Lately, I've found Lie-Nielsen (and its competitor, Veritas) to have irons that require almost no work. This one took a scant five minutes to sharpen and go. That's worth something in my book.

Which brings me to the price: $175. You might be able to buy a vintage Preston, Record or Stanley shoulder plane for a bit less, but I ask you: How will you true up the sole or sidewalls if they're not perfect? With the modern tools, you can send back the ones that aren't perfect. And for those of us who prefer woodworking to metalworking (a show of hands, please) the price is incidental. Especially when you take into account this is the last one you'll ever have to buy.

*— Christopher Schwarz*

For more information, circle # 156 on Free Information Card.

### SPECIFICATIONS

**Medium Shoulder Plane**

**Street price:** $175
**Dimensions:** 3/4" x 7 3/4"
**Iron:** A2 cryogenically treated
**Body:** Unbreakable ductile iron
**Performance:** ●●●●●
**Price range:** $$$$
**Lie-Nielsen Toolworks:** 800-327-2520 or lie-nielsen.com

## Triton MOF001KC 2¼ hp Router Offers Many Features

In a world of mid-sized routers offering both a fixed and plunge base, the Triton MOF001KC is a competitively priced, dedicated plunge with lots of features. It's a scaled down version of the 3¼ hp TRC001 plunge router, and offers all of the same features.

The MOF001KC has three plunge modes: free plunge, handle winder and micro adjust. The free plunge is just as it sounds and is selected by fully depressing the orange "plunge mode" button in the center of the right handle. The lever lock now controls the position of the plunge. To use the router with a more controlled plunge action, release the plunge mode button and pull the winder clutch ring (positioned on the inside of the right handle) toward the handle and then rotate the handle to move the motor up or down. Micro adjust is possible when in the winder mode by turning the micro-winder knob at the top of the router. The plunge options take a little getting used to, but once familiar, I found them handy.

The MOF001KC is also designed for use in a router table. When in place, the micro adjust is accessed through the back with the included winder handle. When changing bits (in or out of a table) the collet is easily reached by fully extending the collet through the base. When fully extended, a collet lock engages so only a single wrench is required. Another feature for table use is the ability to easily remove the return spring, making in-table height adjustments easier.

The Triton router is outfitted with efficient at-the-base dust collection and a below-the-base dust shroud. The variable-speed motor is equipped with soft start and a power switch door that remains in the open position when the router is on. Both are good safety features. The router also comes with 1/4" and 1/2" collets, a seven-piece template guide kit, fence and circle cutter.

I found the MOF001KC router a bit loud (91 decibels), but it performed well. It's slightly larger than some of the competition, but overall felt good during use. The many features are an advantage, but may seem overwhelming until you become familiar with them. **PW**

*— DT*

For more information, circle # 157 on Free Information Card.

### SPECIFICATIONS

**Triton MOF001KC Plunge Router**

**Street price:** $199
**Motor:** 13 amp; 8,000 – 12,000 rpm
**Plunge range:** 0" to 2 5/16"
**Weight:** 10.4 lbs
**Performance:** ●●●●○
**Price range:** $$$
**Triton:** 888-874-8661 or tritonwoodworking.com

# Egg Crate Shelves

## An easy interlocking joint begets great strength and style.

Photo by Al Parrish

The premise for our new "I Can Do That" column is that you don't need a lot of tools or experience to make a good-looking, functional project. For these shelves, we decided to put our theory to the test, and dragged the non-woodworkers on our staff out to the shop. In an afternoon, they were nearly ready to assemble a set of egg crate shelves.

The name for these shelves comes from the simple joint that holds them together, also called a half-lap joint. Each half of the joint is a notch that fits over the other piece. When put together, the two notches interlock, making a very strong and stable structure. The good news for the beginner is that these don't have to fit perfectly to work effectively.

While this isn't the fanciest joint in woodworking, it's strong and forgiving, and a good opportunity to learn about laying out and cutting joints. But before we get to cutting the joints, let's look at the design.

The material is 1 x 6 poplar, which actually measures ¾" x 5¼". All of the parts for a set of shelves as shown can be cut from two 8'-long pieces. This width of material is good for holding CDs, DVDs, paperback books or small *objets d'art*. Some of our staff members chose to use wider 1 x 8 material to better hold larger books. In either case, using the width as it comes from the home center or lumberyard greatly simplifies the work.

The shelves can be adapted in size for different purposes. A simple version with just two uprights and two shelves works well in the bathroom or as a desk accessory, while a larger version can be hung on a wall. You can tailor the depth, height and width to suit your needs or sense of style.

Leave at least 2" of board length past any joints; there is a chance that the wood beyond the joint can split when put together. To make assembly easier and prevent sagging, keep the space between joints less than 24".

The two key elements for success in this project are getting the notches in the proper

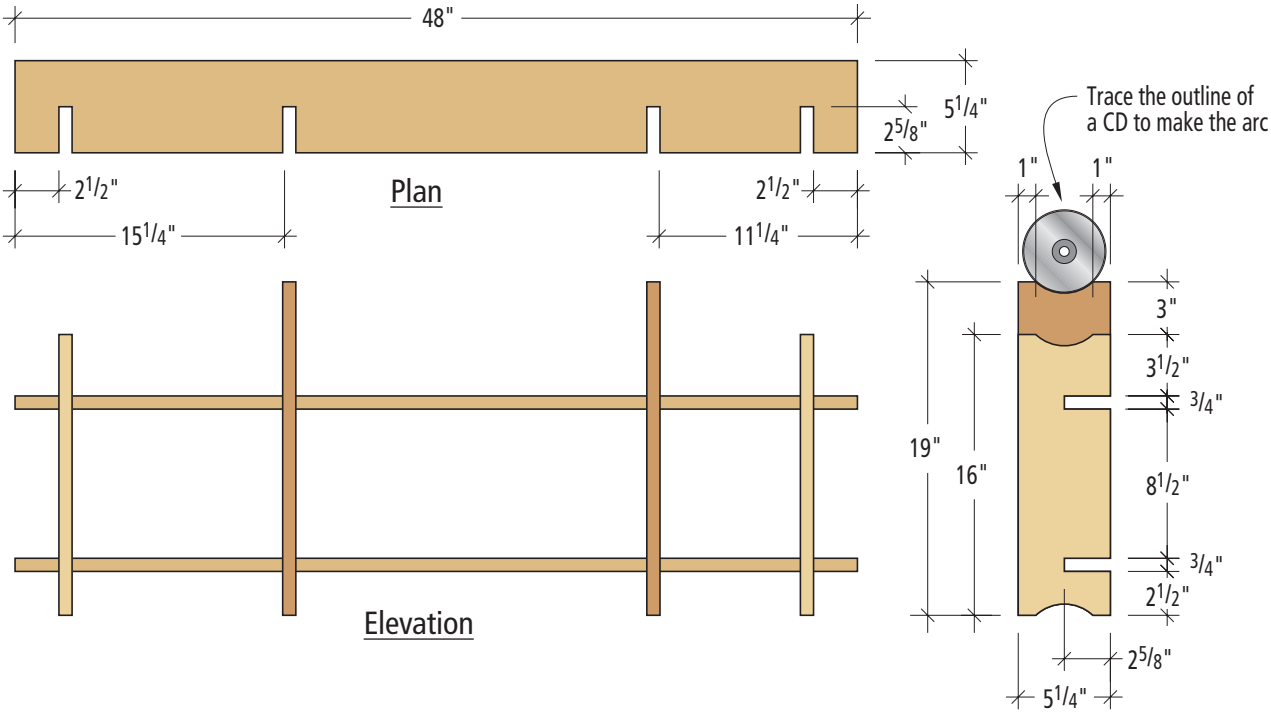
### ABOUT THIS COLUMN

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.

To download the free manual, visit ICanDoThatExtras.com.

by Robert W. Lang

*Questions or comments? Contact Bob at (513) 531-2690 x.1327 or e-mail robert.lang@fwpubs.com*




place, and making them the correct size. We have a trick to make each of those easier, and there are enough joints to give you plenty of practice. Our beginners struggled with the first few cuts, but by the end of the day they were getting good results quickly. For instructions and step-by-step photos of the joint-making process, visit ICanDoThatExtras.com.

### Keeping the Layout Simple

After cutting all the parts to length, the first step is to mark the boards for the locations of the joints. The easiest way to do this is to clamp similar parts together, and mark them all at once. This guarantees that all the joints will be in exactly the same places, even if your measurements are slightly off. Use your combination square to carry the line across the face and mark the ends of the notches.

One simple joint is all it takes to build these shelves. The decorative cut is laid out by tracing the edge of a CD.

### Plenty of Practice

After you have all the ends of your joints marked, you're ready to cut the notches. We found that using the combination square to guide the jigsaw when cutting was a great method to get a straight, even result.

We used a rasp to clean up the lines on the notches, checking the fit of each one with a piece of scrap. Doing this one notch at a time helps you improve your cutting and fitting techniques. Aim for progress rather than perfection, and start cutting the joints on the least visible pieces.

When you have all the notches ready, make sure the two long shelves are oriented the same way and slide on the uprights. You should be able to push the pieces together with firm hand pressure. If you force them together, the wood might split and break at the notch. If this happens, don't panic. Simply glue and clamp the split piece back on. After the glue dries, a few strokes of the rasp should allow the joint to slide together.

The arched cutouts at the top and bottom of the upright pieces were marked, then cut with the jigsaw. Make a pencil mark 1" in from each edge, line a CD up to the pencil marks, and draw the curved line. (If you're building wider shelves, choose an item with a larger radius, such as a gallon-paint can, to guide your line.) Cut just shy of the line, and use a rasp and sandpaper to smooth the curve.

When all the notches are cut, sand the wide surfaces of the parts, and make a test fit of the entire assembly. The pieces should slide together by pushing them by hand. If they stick somewhere, take a close look at the location and make a pencil mark along the intersection. Take it apart, and with the rasp trim down to your pencil marks.

These shelves will hold together mechanically, but some glue in the joints will make the connection permanent. If any of the joints are sloppy enough to wiggle, you can drive a nail in at an angle to hold the pieces together.

The shelves shown in the photo were stained with gel stain then sprayed with lacquer from an aerosol can. Some of our staff opted to paint their shelves. Like the layout, the finish is up to you. **PW**

## EGG CRATE SHELVES

| NO. | ITEM | DIMENSIONS (INCHES) T | W | L | MATERIAL |
|---|---|---|---|---|---|
| ❑ 2 | Shelves | 3/4 | 5 1/4 | 48 | Poplar |
| ❑ 2 | Short uprights | 3/4 | 5 1/4 | 16 | Poplar |
| ❑ 1 | Long uprights | 3/4 | 5 1/4 | 19 | Poplar |

# The Mystery of Try Squares

## Here's a clue: Only two faces need be 90°.

Photos by the author

Traditional try squares were made by the craftsman who was going to use them. By making your own try squares you can unlock some of the mysteries of 18th-century woodworking.

Furniture makers in the 18th century used shop-made wooden try squares. Though subject to wear and seasonal movement, these squares produced some of the world's finest woodwork. We've learned time and time again that if we want to do good work, it's important to have the right tool for the job. If you are setting up a table saw blade, an all-metal engineer's square may be the right tool. But if you are marking tenon shoulders and you want that joint to be tight, you'll need a wooden square. Wooden try squares feature a level of accuracy unlike all other squares currently available. Making a few for your shop is a great way to spend an afternoon.

### Making the Square

Eighteenth-century craftsmen would not have had detailed project plans. A few critical dimensions and a good sense for proportion were all that were required. The dimensions and proportions I've listed below (illustration at right) are based on a scant few examples, but the result is good enough for museum work!

***a)*** Handle – The length of the handle is typically 5/6 of the length of the tongue (*b*). Both handle and tongue are typically 1 1/2" to 2" wide. The handle is sometimes decoratively scrolled as shown, drilled for a hang hole or both.

***b)*** Tongue – The thickness of the tongue should be 1/8"- to 1/4" and planed to match the width of a chisel in your set. This facilitates the execution of the saddle joint (*d*) that joins the handle and tongue. A thick tongue gives the tool a club-like feel that I find objectionable.

***c)*** Pegs – The handle and tongue are held with glue and three to five 1/4"-wooden pegs.

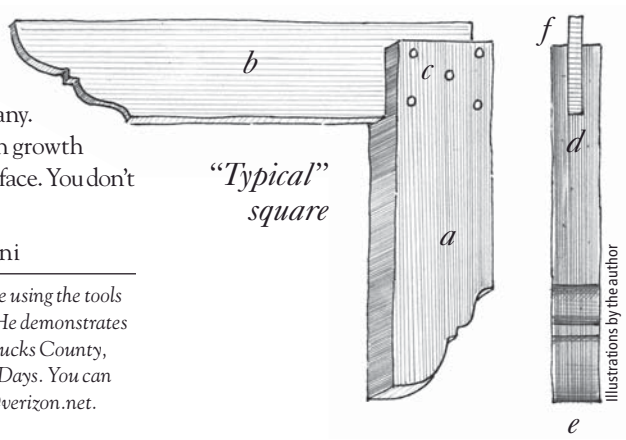
***d)*** Saddle joint – Earlier periods probably used a double-tenon joint as Joseph Moxon described in "Mechanick Exercises" (1678).

***e)*** The thickness of the handle should be roughly three times the tongue thickness, and 5/8" minimum to facilitate the marking of boards with rounded edges. I find thicker is better, 7/8" not being too much.

***f)*** The tongue should protrude 1/4" to 1/2" from the top of the handle to allow easy adjustment of this surface later.

Begin the construction of your square by finding some good straight-grained stock. You want a stable wood with fine grain. I've seen 18th-century squares in beech, birch, maple and mahogany. It's best to choose material with growth rings perpendicular to the wide face. You don't need to buy special quartersawn stock for this. You can simply rip a thin slice from thick riftsawn stuff.

Planing the thin tongue flat is the first challenge. You may find this more difficult than it seems. It's not likely you will start with perfectly flat and parallel stock. Set your marking gauge to the width of a conveniently sized




Illustrations by the author

by Adam Cherubini

*Adam makes reproduction furniture using the tools and techniques of the 18th century. He demonstrates his craft at Pennsbury Manor in Bucks County, Pennsylvania, on Historic Trades Days. You can contact him at adam.cherubini@verizon.net.*

This is why I don't recommend metallic planing stops or bench dogs! Though it seems to defy logic, I prefer a plane with a curved iron to achieve the flatness I desire. A curved blade lets you take off material precisely where you need to.

chisel. You'll later use this chisel to cut the saddle joint. Carefully work to your gauged lines, but don't sweat it too much. A little gap isn't the end of the world. The handle needn't be planed as carefully. Get the thickness you want and make it pretty. Finish squaring up the handle and tongue by carefully planing their edges parallel.

I've seen squares with twin-tenon joinery. I find this difficult to execute (because the mortise is so short) and not worthwhile. So I'm just going to saw a saddle joint into the stock and glue the blade in. Because I'll be using hide glue, I prefer a rough-sawn surface to maintain the bondline. This adds a bit of pressure to the sawing. Remember to saw down at an angle, working each corner out in turn. It would be extremely difficult to put the saw in the end grain and try to saw down with the saw held level with the floor. This is a simple joint but it requires precise work. I'm guessing this could be done quickly with a machine. But this is a quick job with a hand saw and a chance to practice your technique. If you make a mistake, you can easily start over, or later fill in any gaps with glue.

With the joint complete and tight, the next challenge is to get the blade square with the stock. Prepare a scrap board by straightening its edge with a long plane. Lay the square against the straightened edge and knife a line (a pencil line is too thick).

Reverse the square, and compare the difference between the struck line and the blade.

I'm using my carcase saw for this joint. The trick is carefully marking and then sawing the lines out.

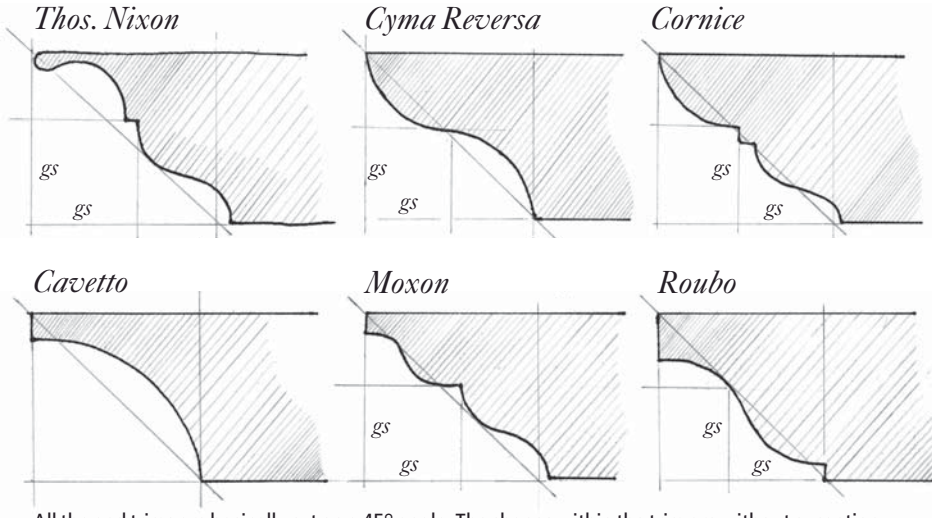
Carefully chisel in from each side. Undercutting the middle is the natural desire of the chisel and beneficial in this instance.

Strike a line with your striking knife on a piece of scrap wood.

A firming chisel, perfectly sized to fit the joint, makes paring the waste particularly easy. Like all good "square sided" firmers, the sides of this chisel are ever-so-slightly beveled like a mortise chisel.

The finished saddle joint should have a snug but not tight fit. You need some room for glue and you don't want to bend the sides of the saddle.

Flip the square over and fit the blade to the previously struck line. Though you can't see the line in this picture, the top of the blade is touching it and there is a gap at the bottom. My striking knife is pointing to the line at the bottom. There's less than an 1/8" inch gap there. So, on my first attempt, I'm out of square about a 1/16".




All the end trims are basically cut on a 45° angle. The shapes within the trim are without exception comprised of ellipses and are divided using the golden section (gs= .618).

Chisel the saddle carefully and repeat by striking a new line and flipping the square over and comparing. Continue this process until the blade, when flipped over, matches the struck line. Use this same technique to check other squares in your shop. You may be surprised by the results!

Use hot hide glue or epoxy to attach the blade to the stock. Both hot hide glue and epoxy will fill small gaps and form inflexible bonds which will help maintain the accuracy of your square for years to come. It's important to ensure the blade is fully seated in the saddle. Don't worry about squeezing all the glue out of the bottom of the saddle. The end grain won't provide any strength to the joint.

Glue the pegs in after the glue in the saddle joint is dry. If you use one of those no-good electric drills, be sure you clamp your handle to a scrap board to prevent fiber breakout on the back side of the hole.

When you work with hand tools, your squares never leave your bench. They are needed almost continuously and they are much too delicate to throw into a drawer. I know you are anxious to start using your wooden try squares, but take a few extra minutes to make them beautiful. Doing so reveals an important truth about them, and at the same time forms a wonderful connection with the past.

As woodworking became a full-time occupation, woodworkers began to see their tools less in terms of utility and increasingly as the essential instruments of their newly elevated occupation. As such, they reflected the evolved aesthetics of their makers. While we may think the end trims and delicate proportions are arbitrary or superfluous, the 18th-century woodworker probably saw such adornments as indicative of the tool's importance, and the complexity of its design and construction.

Though it is entirely speculation on my part, Thomas Nixon's squares, which all feature the same end trim, may indicate that unique end trims were used to help identify the ownership of tools that few woodworkers would willingly lend.

## Using the Square

Striking is the process of using a try square to make a mark perpendicular to a reference face. The trick to striking accurately is always using the same two sides of the square (typically the inside of the handle and the outside of the tongue) and the same two reference faces of the board. This eliminates any errors associated with inaccuracies in your square or stock preparation.

Trying is the process of using the two inside or two outside edges of the square to check the edges of boards or joints. In period work, this function is typically less important than striking. The scale of furniture carcasses or drawers for example, is typically beyond the capability of any square. For such assemblies, a string can be used to check diagonal lengths with greater speed and accuracy than any square can.

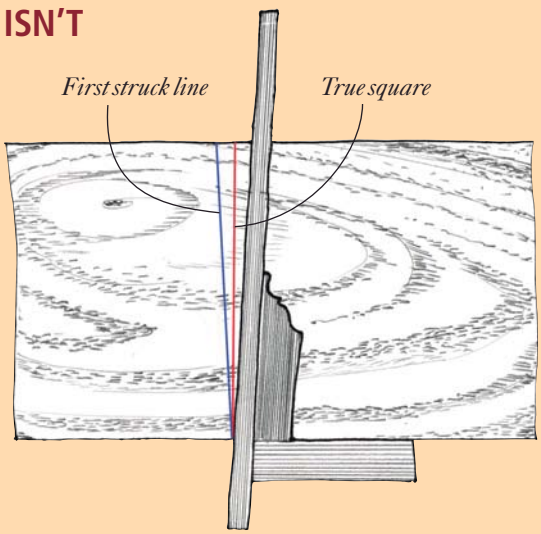
Checking a board's edge is rarely critical since period-edge joinery is usually accomplished by match planing both edges simultaneously (a process where the actual angle of the edge produced is irrelevant).

## Conclusion

So the trick to making a good wooden try square is understanding that only two edges really need to be square (the inside of the handle and the outside of the tongue).

## WHEN YOUR SQUARE ISN'T

Just like even the best machinist's tools, wooden squares need regular maintenance to remain at their very best. Since you made the square, you will easily be able to correct it. Though your square may move weekly or even daily in some seasons, you needn't correct it that often. You can simply strike a line, flip the square over, strike another, then eyeball a square line between the first marks and the second. —*AC*



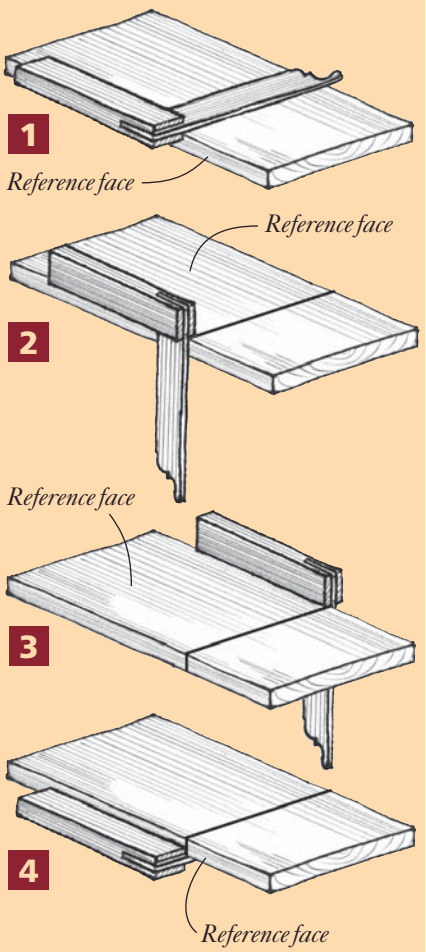

This isn't helpful only when you suspect your square isn't square enough, but whenever you need to mark across a wide panel, where even a slight error can be magnified with the panel's width.

The trick to using a wooden try square is understanding that your work will be more accurate if you only use two reference faces on any board. Never trust that your boards are straight and their surfaces are parallel.

You probably know by now that the "level of accuracy unlike all other squares currently available" means wooden squares are terribly inaccurate. But knowing that forces you to use them carefully. With a wooden square you have no choice but to use only two sides of the square, and two faces of the work.

You may think buying an expensive square is a better solution. That may be true. But sloppy technique reduces the accuracy of your expensive square and leaves you with joinery that looks like you used a cheap square. So if you want your work to show the accuracy you paid for, work with your try square like it is a wooden try square. **PW**

## USING A TRY SQUARE



No matter what your style of woodworking, you need a basic set of hand tools. Here's where to begin.

# *Your First* TOOLKIT

When I came to America, I had a lovely wife, two suitcases and 50 bucks. Oh man, where do I start?

Everybody needs a basic tool kit, especially if you want to do woodworking. I had a limited budget. Starting out in America, I got paid low wages even though I was a Master; they tried to blame it on my language skills. Thank God my first boss did not treat me well or I'd probably still be working for him!

I started to buy tools and build this toolbox. The first tool I got was a 10" dovetail saw. You need a marking gauge; I made one. I also bought a 6' folding ruler.

A week later I went to the same store and bought a nice set of chisels that included 1/8", 1/4", 3/8", 1/2", 3/4" and a 1" chisel. I bought a two-sided Arkansas oilstone, one side rough and the other super fine. The salesman wanted to sell me sharpening oil; I told him I use kerosene.

I kept going: A No. 4 Stanley smoothing plane, low-angle block plane, small hand saw, two hammers and two mallets – I made one on a lathe and the other is square. At a flea market I found an old Stanley No. 7 jointer plane.

I kept asking around about where to find old tools. I went to tool-collector meetings and tool sales. I found beautiful Stanley planes with Brazilian rosewood handles and brass fittings, and I began collecting them very fast.

But let's get back to the basic toolkit. To work wood, you need squares: a framing square and a couple of any brand of small squares, 8" or 6". Plus a 1" putty knife – make sure the blade is flexible – an awl and screwdrivers. You need at least five flat-head screwdrivers (your screwdriver should fit the screw) and three Phillips-head screwdrivers. Rasps: a Nicholson No. 50 patternmaker's rasp and bastard-cut rasp, a mill file, a cabinetmaker's scraper, a scraper burnisher, nail sets and pliers.

by Frank Klausz

*Educated in the Hungarian trade-school system, Frank is a master cabinetmaker, author and owner of Frank's Cabinet Shop in Pluckemin, New Jersey, which specializes in fine furniture reproductions and custom architectural fixtures. He also teaches woodworking. For more information, visit frankklausz.com.*


Photo by Al Parrish

## A BASIC TOOLBOX

Your toolbox does not need to be large or fancy. This small one has served me well for 20 years, both by my workbench and out on jobs.

Try not to make your toolbox any larger than you have to. This toolbox was fine for the first 20 years, but if I made it again I would try to make it a little smaller. Whatever you do, make the toolbox fit your kit of tools.

Some construction details: The sides, front and back of my toolbox are made of Eastern white pine that I dovetailed together. Your toolbox does not need to be dovetailed. Finger joints are no problem. Miters would work. There are lots of ways to build a box.

The top and bottom of my toolbox are 1/2"-thick plywood pieces that are simply glued to the top and bottom of the box with a few finishing nails, too. You could put the top and bottom in a rabbet or a groove if you want to make it more complex.

The 1/2" horizontal plywood divider between the drawers and the open section of my toolbox rests in a groove in the box and the tool holders are attached to the side and back. This could be simplified. You could put glue blocks in the box and glue the divider to the glue blocks. What's important about the divider is that it not go all the way to the sides and back of the toolbox. The longer tools, such as the chisels and screwdrivers, drop all the way to the bottom of the toolbox. This is also why the drawers aren't the full depth of the box.

My drawers are dovetailed front and back. Yours don't have to be. To save space, I did not put the 1/4"-plywood bottoms into a groove in the drawers. Instead, I cut a rabbet in the bottom of the drawer and put the bottom in that.

My toolbox sits on four feet nailed to the case. This makes the toolbox sit flat on irregular surfaces. You could use furniture glides instead or omit the feet.

It's your toolbox so it's your choice. —*FK*

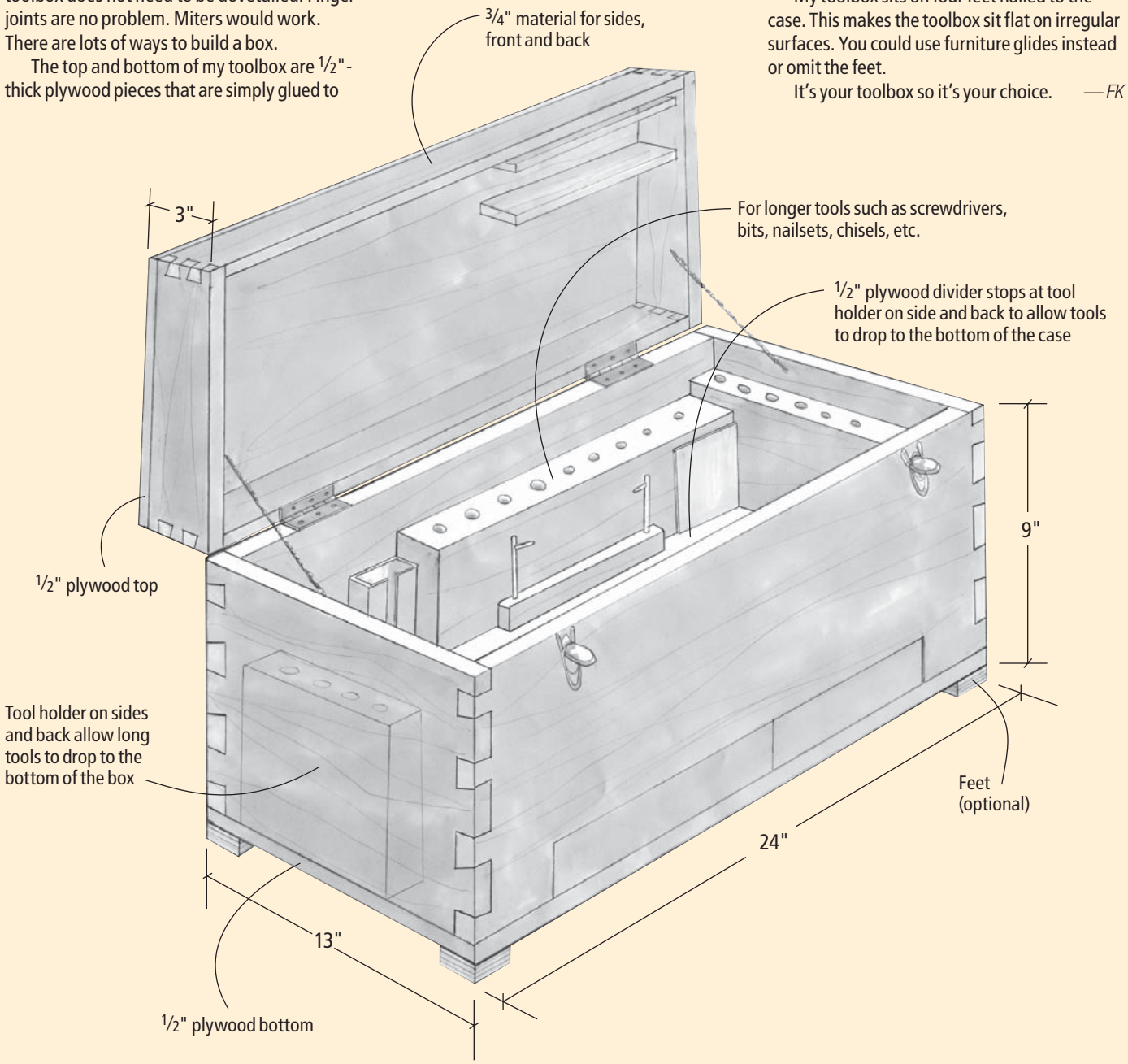



Illustration by Hayes Shanesy

You need sanding blocks: one cork-bottom block for sanding wood and one felt block for sanding finish.

As you grow in your woodworking, your toolkit will grow with you. If you want to do veneering, you need a veneer saw, tape dispenser and a small roller. If you run into curves you need a compass plane and a spokeshave. I could go on and on.

Woodworking tools have come a long way. We have beautiful high-quality tools such as those by Lie-Nielsen Toolworks and Veritas/Lee Valley. And – finally – some of these quality tools come ready to use. My first dovetail saw needed serious work to make it work for me. I had to sharpen it and make the set smaller. Lie-Nielsen and Adria dovetail saws come sharpened and ready to go.

To enjoy woodworking, you need to have sharp tools. Invest in some good sharpening stones with at least two or three different grits. When buying chisels choose your brand carefully. I have tested about 10 different brands of chisels and found Marples the best bang for your buck. The company recently changed its name to Irwin Blue Chip Chisels.

Because the top of the handle of this brand is rounded and too smooth, I recommend making it flat on the top. Take off about 1/2"; you can sand it off with a disc sander or simply rasp it off.

Although you need basic tools to work wood, the most important tool in a workshop, especially for handwork, is a sturdy workbench like mine. It holds the wood for any task. With a bench like that, you will enjoy your work.

## THE BASIC KIT OF TOOLS

Below is a list of tools essential for good woodworking. These tools are widely available from a variety of sources, from your local home center, specialty stores and catalogs.

- Six bevel-edge chisels, 1/8", 1/4", 3/8", 1/2", 3/4" and 1". Two-sided oilstone (not shown).
- Nicholson No. 50 patternmaker's rasp, Nicholson half-round bastard-cut rasp, mill file.
- Burnisher and card scraper.
- No. 4-sized smoothing plane (9"-long sole), No. 7-sized jointer plane (22"-long sole), low-angle block plane.
- 16 oz. claw hammer, tack hammer, nail sets.
- Carpenter's mallet (16 oz.) for mortising, smaller-lathe turned mallet for chopping dovetails and other light work.
- Veneer saw, small edge roller.
- Scratch awl.
- Cork-faced sanding block, felt block.
- Screwdrivers. #0, #1 and #2 Phillips screwdrivers plus at least five straight screwdrivers.
- 10" dovetail saw. I like a rip saw filed with 15 to 16 tpi. Either a straight or pistol-grip saw is fine. And if you prefer Japanese dovetail saws, that's fine, too.
- Steel framing square, 8" try square, 12" combination square, 6' folding extension rule. Tape measure (not shown).
- Marking gauge.
- Pliers, needle-nose pliers.

— *FK*

## SHOP-TESTING BENCH CHISELS

Beginning woodworkers like to ask me what brand of chisel they should buy. They are looking for a chisel that keeps its edge and doesn't cost too much.

Years ago I tested entry-level bench chisels in my workshop in New Jersey; I repeated the test again this year with some new chisels. All the chisels were 1" wide, or the close metric size, 25mm.

First I sharpened all the chisels myself. Then I marked off a series of lines about 1/8" apart on a large piece of red oak. Using my carpenter's mallet, I chopped off two lines of wood with each chisel. Then I compared the edges to see how dull they had become.

My conclusion after this test was the same as it was in my first test: I think the Blue Chip chisels (which are now made by Irwin) are a good bargain. A good chisel for a good price. **PW** *— FK*

I don't need to know metallurgy to know a good chisel. I tested these tools using a real-world test in my shop.

Here you can see the lines I marked on the oak and how I chopped to the line.

The chisels I tested (left to right): Nooitgedagt, Hirsch, Ashley Iles, Robert Sorby, Stanley, Narex, Irwin Blue Chip, Japan Woodworker-brand white steel, Matsumura-brand white-steel and Buck Brothers.

# WOODWORKING ESSENTIALS

BY DAVID THIEL

CHAPTER 7

# Casework Construction: Special Applications

Over the past six chapters of this primer on Casework Construction we've focused on how case pieces are built: the joinery, materials and construction techniques that are unique to this type of woodworking. And we've also looked at the doors, drawers and hardware that make case construction both decorative and functional.

In this final chapter we get to wander away from the ordinary and take a look at some of the special applications for which casework is used. In particular we'll discuss casework for computer and audio/visual (A/V) applications, and we'll take a look at some special storage considerations for clothing and small kitchen appliances.

## Computers and Audio/Visual

Since the first stereos, televisions and home computers were sold, there's been a constant struggle to store them in the home so that the components are convenient, but not in the way. Heck, remember console televisions? The whole idea was to build the television (and sometimes the stereo) into an attractive piece of furniture.

Beyond the physical presence of the components, there are issues of connecting the pieces (wire management) without running cables all over the place. Additionally, there is the concern of keeping the components cool during operation.

We're going to look at computers and A/V equipment simultaneously. While there are some different requirements between the two categories, there are many more similarities.

Photo by Al Parrish

**This computer armoire has a slide-out keyboard tray that brings the working surface to the user. Storage is provided for the printer, monitor and paper products, as well as drawers for CDs and storage of other peripherals. When the computer is not in use, the doors can be shut and all the untidiness is hidden away. Plans for this project were featured in the June 2003 issue (#134).**

What I want to focus on here is the special hardware and accessories that can be built into your cabinetry to maximize space and performance.

A television is most commonly a stand-alone component, although today's setups often include a cable or satellite decoder box and a DVD player, and will often also be hooked into a sound system. While you may have a stand-alone stereo receiver, you need speakers to make it work and it's likely that there's also at least a CD player tied in somewhere.

The multi-component requirements of A/V systems are similar to those with a computer. There is usually a central processing unit (CPU), printer, keyboard and monitor that all work together. Some newer computers have combined the CPU and monitor, but a printer and keyboard are still separate components.

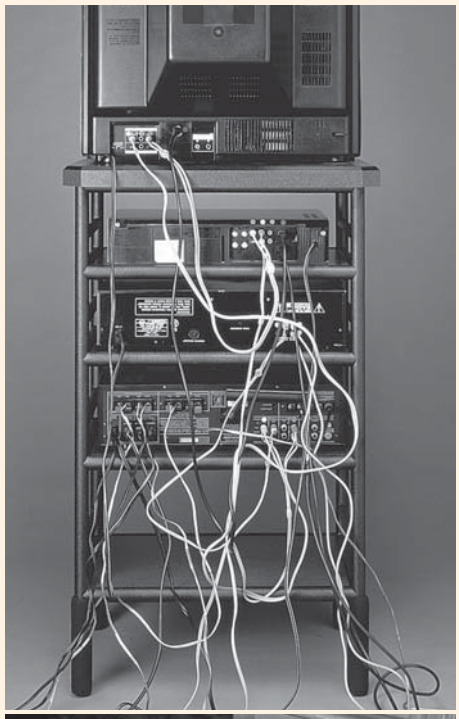
The trick with A/V or computer components is making them easy to use, and attractive at the same time. The case piece shown on the preceding page is a good example of storing all of your computer needs in an accessible cabinet, but still having the option of simply shutting the doors to hide all the components quickly and easily.

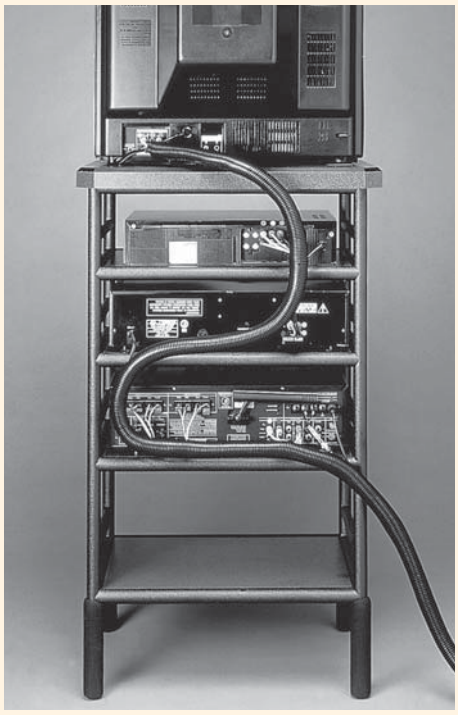
Flat-panel screens on both televisions and computers have changed the storage needs in a positive way for both types of systems. While most stereo and computer components measure a reasonable 12" to 15" in depth, the monitor of tube-style television can require 20" of depth, dramatically affecting the appearance of a storage unit.

Designing cabinetry around components is a topic in its own and one that we tackled in depth in the previous issue of *Popular Woodworking*, ("Entertaining Designs," June 2006, issue #155). So I'll just say that making sure you have adequate space (for now and the future) is a critical first step in storing A/V and computer components. One accessory that's available for standard televisions is a slide/swivel unit (shown below left) that makes storage convenient while still making viewing user-friendly.

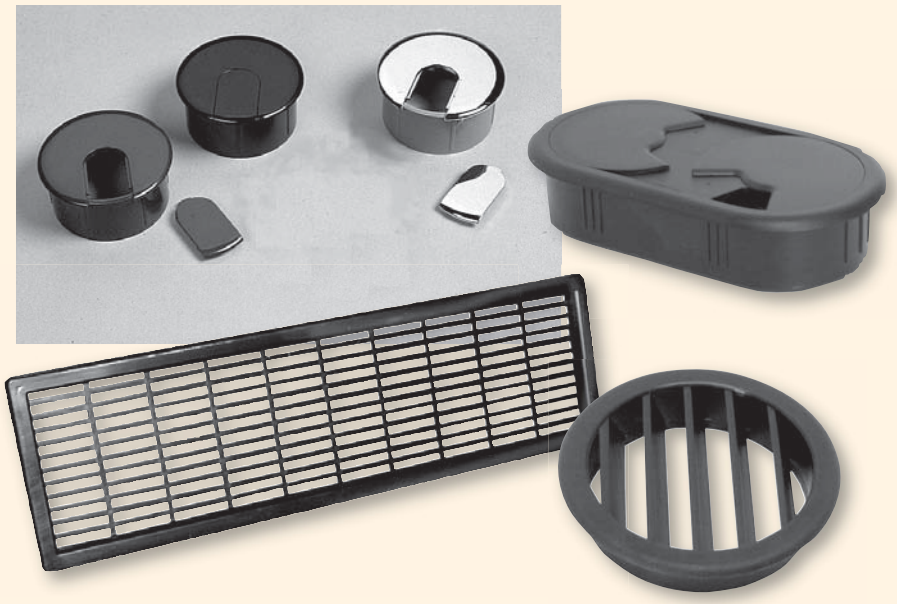
Once you've addressed the location and organization of your components, it's time to tackle the wiring. This can be a huge mess – one that you'd probably prefer to do once and never have to tackle again. Unfortunately that's not usually how we work. There's always a reason to replace or relocate a component, and that means pulling a cabinet away from a wall, crawling behind it and disconnect-

**There are still plenty of televisions out there that need to tuck into a storage space. While that's good for storage, it's not so good for viewing. That's when a turntable makes sense. This slide/turntable allows the television to pull forward and rotate to present the best viewing aspect to the seating arrangement in the room. These swivels are rated for hundreds of pounds and will easily support a large unit. The pocket doors (seen tucked back into the cabinet) are another way to hide the television when it's not in use, and special hardware keeps the doors from interfering with the view while you're watching.**





**While the two photos above are an obvious marketing ploy, they're effective. The photo on the left shows a tangled mess of wires that are not only confusing, but likely to become tangled and disconnected. One wire management solution is shown above on the right, channeling all the loose wires through a central conduit that allows access along the length of the conduit. One other problem is reaching the wires to keep them tidy. The picture to the left shows a pull-out mechanism that allows the components to slide out of the cabinet and then rotate to provide easy access.**



**While an enclosed cabinet provides a clean look, it makes it difficult to manage wires and to allow proper ventilation. Shown here are a few products to keep things cool and organized while not affecting the look of your cabinetry too much. At top left are a couple of wire grommets. Holes are cut in the top or side surfaces of your cabinets and the grommets slip into the hole. While the round grommets take up less space, they are often too small to handle larger computer cable connectors. That's what the oval grommet is for. Also shown are a couple of ventilation grommets that are installed the same manner as the wire grommets. They allow air to circulate in the cabinetry while offering a "finished" exterior.**

ing everything (and hoping you remember where everything goes).

Managing the wires and cabling so that it's organized is good for appearance, but even more important because it doesn't take much to accidentally disconnect a wire when shifting components. There are a number of different wire-management systems available, but most are flexible plastic conduits that corral the wires in a single tube, as shown on the previous page. Some of these conduits are left to hang free, while others are mounted to the cabinet to more efficiently direct the wiring.

That's half the battle, but you still have to get to the back of the components to make changes. One of the most convenient options we've seen is a pull-out mechanism that slides the components into the room and then swivels to make access a snap (this device is shown on the previous page).

Wire conduit connects the components when they're close together, but there are lots of situations where components aren't near each other. The printer for your computer may need to be on a separate shelf or compartment and that means running cable through the cabinet sides, top or shelves. Cable grommets are a tidy way to dress up the wiring holes in your cabinet. While the hole is still there, the grommet helps blend the hole with the cabinet and even allows the larger connector on the end of the cord to pass through, but can then be closed to allow an opening large enough for just the cord itself. Neat.

Other useful grommets include those for ventilation. Whether it's a computer or a stereo system, the components heat up, and not only when they're running. To keep things cool, air needs to be able to circulate inside the cabinet. Cutting ventilation holes in the cabinet back or sides is one ventilation method and there are grommets to help "dress up" these holes as well.

There are also small ventilator fans that can be mounted in cabinet sides to not only allow air to circulate, but to create air movement to quickly dissipate the heat. All of these options will extend the life of your expensive components.

That takes care of the components, but we still need to store the discs. Whether on DVD or CD, your movies, music and software can take up a fair amount of space in your cabinets. Storage options can be as simple as a set of shallow shelves at the sides of a main cabinet, or as complicated as drawers designed with a variety of manufactured inserts to perfectly fit your discs.

Shown below is an option that provides hidden storage while still offering maximum capacity and convenience. The drawer is built to open to the side rather than the top, and is built into a storage unit. Manufactured inserts keep the discs separated and in place.

When preparing storage for any medium, remember to measure the discs and cases as appropriate. While there are standard sizes, DVD movie "collections" and compact disc anthologies can throw all of your careful storage plans right out the window.

**Media storage is another big part of keeping things organized and tidy. Whether it's your collection of compact discs or your DVDs, there are dozens of inserts for vertical or horizontal storage of all these music and video formats. The inserts shown here are built into a drawer at chest height. When the drawer is pulled open, it's easy to view and access the discs you want.**

Photo by Al Parrish

**Shown above are just some of the available accessories for upgrading and organizing a closet space. The items shown are from KV (knapeandvogt.com) and include a pull-out clothes rod (left) that allows easy access to hanging clothes in a small space, some pull-out storage baskets for shoes (center) and even a small laundry hamper (right). It's simple to mix and match the accessory items to accommodate the space and needs in your home.**

## Clothing Storage

While closets aren't exactly casework, the specialty accessories designed to improve closet space can be incorporated into custom cabinetry serving as clothes storage. In fact, many newer homes incorporate walk-in closets that just beg for custom storage and organization. How can you say no?

We've come a long way from a bar for storing clothes stretched between two walls in an alcove. Today's storage makes allowances for hanging or folded clothes, and even hanging clothes can be made more readily accessible with pull-out storage bars to make it easy to find what you're looking for.

From wire racks to cedar-lined rolling shelves, your folded clothes will be better maintained and easier to select. And closet-component designers haven't forgotten your shoes and ties. There are lots of available ways to store these items.

All of these accessories are designed to improve convenience and access – and they do. But it won't take long for the price of the accessories to quickly add up to the amount of money you spent on the cabinetry itself. And as you consider the many ways in which to arrange the interior of your closet, you'll find that you're designing the space to match the accessory sizes, which may or may not be the most space efficient.

As a woodworker you have the option of buying these niceties ready to install, or you can make your own roll-out shelves for the price of a piece of edged plywood and a pair of drawer slides. It becomes a balance of convenience and expense. And, as with all things custom, being able to make your own closet fixtures gives you the flexibility to design the interior to perfectly fit your needs and space.

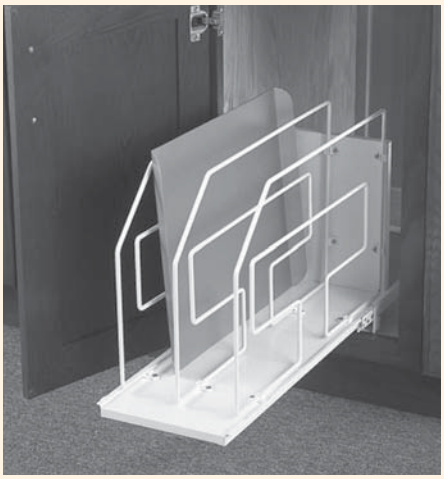
It may be smarter for you to take a look at the accessories available, decide what will work for the storage design you have in mind, then supplement the plan by building the other units that aren't available. This blend of commercial and custom should allow you to maximize space – and money.

## Kitchen Magic

Twenty-five years ago when I built my first custom kitchen, the importance was in providing the correct balance of drawers, shelving and open space to best accommodate the homeowner's needs. Today's kitchens include commercially available accessories that make a kitchen cabinet a shining example of efficiency. Many of these items can be built-in as part of the original kitchen. But most can also be added years later. So don't despair if you've got an older kitchen. That complete remodel you've been considering may only need to be a rehab.

Upgrading most kitchens is about maximizing storage. Because of the layout of many kitchens there are dead spaces that aren't accessible, or just haven't been properly divided to allow access. That's what all these cool accessories are about.

**The pantry system shown above is the Cadillac of storage. The swinging and nesting shelving allows you to access small items quickly, but still benefit from the full-depth storage of the cabinet. There are similar wire rack systems available, but I wanted to give you this image because if you're ambitious, you can make it yourself!**



A vertical storage rack allows easy access to just the item you need, but still maximizes storage space.

It's hard to avoid corners in most kitchen cabinetry, but that doesn't mean it's useless space. There are a number of Lazy Susan-style applications for making this dead corner useful. While many use a corner-shaped door, the one shown above with the canned goods uses a standard door and allows the storage shelves to swing into view. The variation shown above with the pans is very cool. Pots and pans not only swing into view, but extend for convenient access.

Let's start with the pantry. Most pantries are a tall, skinny open-shelving arrangement. You can stuff a whole lot of bottles, cans and boxes onto a shelf. The problem is, you can't find what you've stored without taking everything out again. Even the most obsessive-compulsive storage system will leave items stored at the back of the shelf. There are a number of pantry-organization accessories that allow you to incorporate pull-out shelves, or entire rack systems (as shown on the previous page) that let you swing out the shelving to maximize organization and accessibility.

And while we're talking about inaccessible areas in the kitchen, the corner dead space is one of my least favorites. Lazy-Susan storage (or variations on it as shown above) has been around for a number of years. But the opportunities for maximizing use of this problematic space continue to expand.

Drawers are usually the best way to store items in a kitchen. They allow convenient access to the back of the storage space and handle small items fairly well. But when it comes to small items, organization can quickly change a junk drawer into a spice drawer. Below are just three of the many ways to maximize and organize your kitchen drawers.

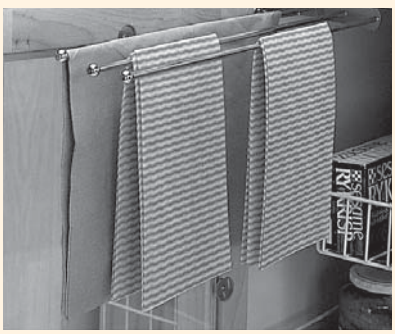
The items stored in kitchens range in size from toothpicks to blenders. In general, people tend to store same-sized items in the same area. Pots and pans are a good example. Most kitchens have some type of inefficient nesting arrangement where the largest skillet is on the bottom of the stack. If you're really organized, all the lids are stored in the same area as the pots. Because these cooking items are designed to hold food, they're essentially empty storage units themselves, making them bulky and awkward to store without take up an awful lot of valuable space. Storing "flat" items on their side takes up less space and also leaves the items easily accessible without having to unstack and restack. This not only applies to pots and pans, but dishes and cooking sheets as well. Think vertical.

As for appliances, there's a tricky balance between storing mixers, blenders

You can do dozens of things to maximize drawer storage. The spice rack at left is not only space efficient, but lets you easily see the labels on all the spices. The silverware divider trays shown at center are very space friendly, offering a top layer for the most used items, with a second layer below. And bread boxes aren't "hip" anymore, but I'll bet you could use a bread drawer! Designed to keep things fresh and off the counter, it's a great idea.


**Cookware can be tricky to store efficiently and even more tricky to access conveniently. Rack systems such as that shown at the left store items vertically, allowing good use of space and easy access. Other items that are difficult to store include mixers. Once stored it can be a hassle to get out and then you have to find counter space to use it. The mechanism shown here allows you to easily raise the mixer (or other appliance) out of its storage space on a simple lift. When at the maximum height, it locks in place and serves as a sturdy work surface.**


**The waste container at left rests inside what is essentially an inverted drawer box, with the drawer slides mounted out of sight. The box mounts to the cabinet door, making it a drawer front. For recycling concerns, other units offer separated containers. The unit on the right is mounted on a pull-out rack for stability.**




**These are two of my favorite kitchen-storage accessories. At left is a towel rack that is mounted to what is essentially a single drawer slide mounted inside the cabinet. Open the door and pull out the rack when you need it. Tuck it back in when you're done. The tip-out storage unit shown at right takes dead space and the false drawer front mounted at the sink and turns both into a functional storage area for sponges, soap and any other sink items that are a little less than picturesque. Very cool.**

and other bulky items efficiently, but still leaving them accessible. The counter top is not usually the best answer, especially if you have limited counter space. Special drawer inserts and hardware provide storage options for these bulky items, that allow you to easily bring them into use, as shown in the photo at left.

In almost any kitchen, space for storing garbage is given up reluctantly. While you want the garbage can handy, you don't want it sitting out in the open (it's a little unsightly, even if you're the tidiest of housekeepers). Storing the garbage can behind cabinet doors has become fairly common, but it doesn't leave the can very accessible. There are literally dozens of accessories available to allow the garbage container to pull out like a large drawer for easy access. They're designed for many different-sized cans and even make allowances for separating recyclable items from plain old trash in separate bins.

And speaking of things that you'd rather keep out of sight in the kitchen, how about towels and sponges? The location for storing towels in a kitchen is a bit of a personal preference, but there are some clever towel-rack systems that keep them stored out of the way, but easily accessible. The sponge storage "drawer" is actually my favorite. Designed to utilize more "lost space" in the kitchen, the false drawer in front of your sink can now become useful storage with only a minimum of work (shown below).

## Cabinet Lighting

I'll spend a little time on cabinet lighting in this last chapter. While much casework is designed to hide the items inside, some is created to showcase the items – in which case good lighting is key.

This is actually an enormous topic and one that's an article on its own. But I do want to take a minute to discuss the many choices that are now available for cabinetry. Can lights, rope light, curio lights, halogen or incandescent – all of these are easy to build into a china cabinet or other visible piece of casework. Some simply require mounting the light fixture to the cabinet with a couple of screws. Others require cutting the

fixtures into the cabinet or, in some cases designing the cabinet to build in the lighting. There are some battery-powered options, but I don't strongly recommend them. There are likely too many batteries to replace in your house already, and the light is harder to control.

Most cabinet lighting fixtures are considered ambiance lighting and provide just enough illumination to accent the pieces stored in the cabinetry. Some of the lighting styles are so unobtrusive that until they're turned on, it's not obvious they're there.

As mentioned, some of the fixtures require a little pre-planning for the best results. Can lights (that shine down on the interior) are usually cut into the top of the cabinet with the majority of the light mechanism stored outside the cabinet. Other lighting fixtures with a similar effect are often called puck lights (they look a lot like a hockey puck) and are designed to mount to the inside surface of the cabinet.

While can lights are less visible from the inside, they require something to mask the components on the outside of the case – such as crown moulding around the cabinet top.

Rope lighting throws a very pleasant light on its subject and can be adjusted for length to perfectly fit the needs of custom cabinetry, but it isn't very attractive to look at. In most cases it's a good idea to plan on building channels into the cabinet for the rope lights. The channels will allow the light to shine on the preferred objects, but hide the lights themselves from view.

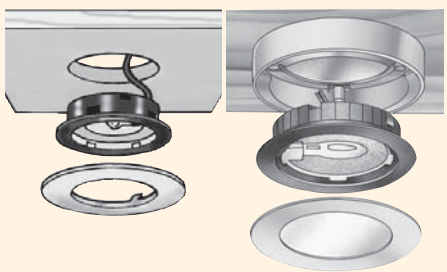
Rope lighting also gets used in cabinetry to provide accent lighting in

## SOURCES

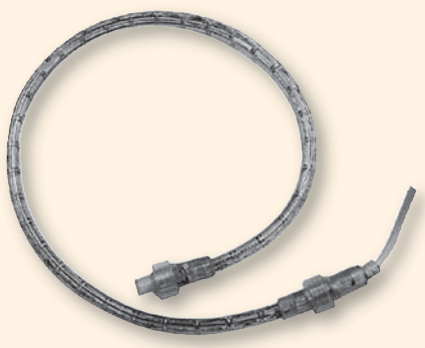
Of the dozens of items discussed in this chapter, these are but a fraction of the specialty items available to customize your cabinetry. We've listed five sources below that carry most of the storage and lighting items discussed in this article (and they provided the pictures), as well as hundreds of other items that may work for your cabinetry needs.

- **Lee Valley**
  800-871-8158 or leevalley.com
- **Rockler Hardware**
  800-279-4441 or rockler.com
- **Woodcraft**
  800-225-1153 or woodcraft.com
- **Woodworker's Hardware**
  800-383-0130 or wwhardware.com
- **Woodworker's Supply**
  800-645-9292 or woodworker.com

**Above is a great example of the effect a little lighting can have on a cabinet. The lights shown in this case are inset mount incandescent lights.**



**The image above shows the difference between an inset-lighting fixture and a surface-mount fixture. Both require a hole through the cabinet, but surface-mount lights don't protrude through the cabinet as some inset-lighting fixtures do.**



**Above is a section of rope light. It's a lot like holiday decoration lights encased in a plastic tube. These lights provide soft, even illumination of their subjects.**

**Even when planning ahead isn't an option (such as when you're upgrading a kitchen), attractive and beneficial undermount lighting can be added to cabinetry without looking clunky. The three-fixture halogen unit shown here mounts below the upper cabinet and provides bright but unobtrusive lighting to a commonly used area.**

the room. By adding rope lighting above wall-hung kitchen cabinetry, a soft glow is thrown on the ceiling and walls, providing nice accent lighting.

Undermount lighting is a lighting concept, but it's also a phrase used to commonly refer to self-contained lighting fixtures that are mounted under kitchen wall cabinets. The fixtures are larger and are designed to mount to a cabinet surface. They're used primarily as task lighting for shadowed or difficult-to-light areas such as the sink or counter. The light fixtures themselves can be multi-bulb halogen or incandescent lights, or fluorescent fixtures. While rope lighting could also be used for this application, the light from undermount fixtures is designed to be brighter and can be directed down on the work surface, rather than splashing across a large area.

Every lighting fixture will offer slightly different effects in your cabinetry. But I guarantee that a piece of furniture designed to display items is much more effective and dramatic when a little light shines on the subject.

## Conclusion

As I mentioned early in the chapter, the specialty items shown throughout the chapter are only a small selection of the accessories that are now available to upgrade, specialize and customize your custom casework.

But all of these special accessories are only icing on the cake. The information provided throughout this series will allow you to build sturdy and beautiful casework for every room in your house. Don't be afraid to experiment and have fun along the way. **PW**

## Coming Next Issue: A New Series on Setting Up Shop

**Our next "Woodworking Essentials" series will take an in-depth look at what it takes to make your woodworking shop as efficient and practical as possible. Whether your shop is in the basement next to the laundry room or in a four-car garage behind the house, we'll look at the things you can do to customize and improve where you do your woodworking.**

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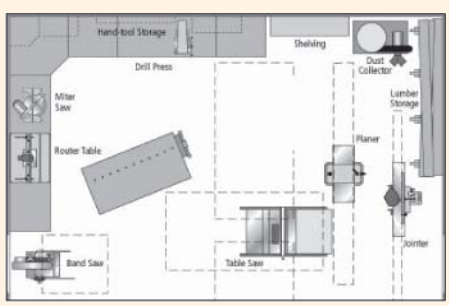
**Chapter 2 ■ Lighting and Electrical Concerns**
**Chapter 3 ■ Choosing and Placing Machinery**
**Chapter 4 ■ Hand and Small Tool Organization**
**Chapter 5 ■ Materials Storage**
**Chapter 6 ■ Dust Collection**
**Chapter 7 ■ Workstations and Benches**

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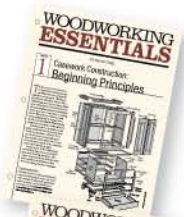


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From drawer slides to door pulls, learn how to add the best to your project.


*Back issues can be ordered online at popularwoodworking.com or call 1-800-258-0929.*

# Making Ogee Feet

Photos by Al Parrish

Sinuous and beautiful, this period furniture detail is actually straightforward to make.

The flowing curves of ogee bracket feet provide a sculptural look to desks, chests and other forms of fine casework. Although there are a number of variations of ogee bracket feet they all share the convex/concave curve that makes this style of foot so appealing. The compound curves where the ogee and bracket profile meet only add to the attraction.

Although the flowing curves can make ogee feet appear difficult to execute, the process really involves just four steps: cutting the joint, sawing the bracket profile, assembling and sawing the ogee.

by Lonnie Bird

*Lonnie is the author of "The Complete Illustrated Guide to Using Woodworking Tools" (The Taunton Press) and teaches woodworking. You can learn more about his classes online at lonniebird.com.*

The back feet are constructed differently than the front feet. Instead of a miter, the foot is made from a shaped piece on the side and flat piece at the rear that can be a secondary wood.

Note the position of the slot for the spline near the inside corner of the miter. I cut the slot using my table saw's miter gauge with the blade of the saw beveled to 45°.

## Cut the Joints First

For the greatest strength I select only clear, straight-grained stock for the feet. Straight grain is also a better choice from a visual standpoint because it doesn't compete with the curves of the foot.

Ogee feet on the front of a case are typically mitered; any other type of joinery will show in the completed foot. Although I've seen a few half-blind dovetailed feet on antiques, the joinery combines with the curves to create an odd, distracting appearance. However, the feet at the back of the case are dovetailed to a flat plank of secondary wood, which allows the completed case to be positioned snug to the wall.

After assembly you cut the ogee profile using the band saw. Although you can create the ogee profile first and miter it afterwards, the band sawing method is much more efficient.

I begin by milling the stock to size. I cut all of the primary stock from one long plank. This method not only ensures that the grain and color matches, it also ensures a match in both halves of each of the front feet and gives the appearance that the grain flows around the corner of the miter.

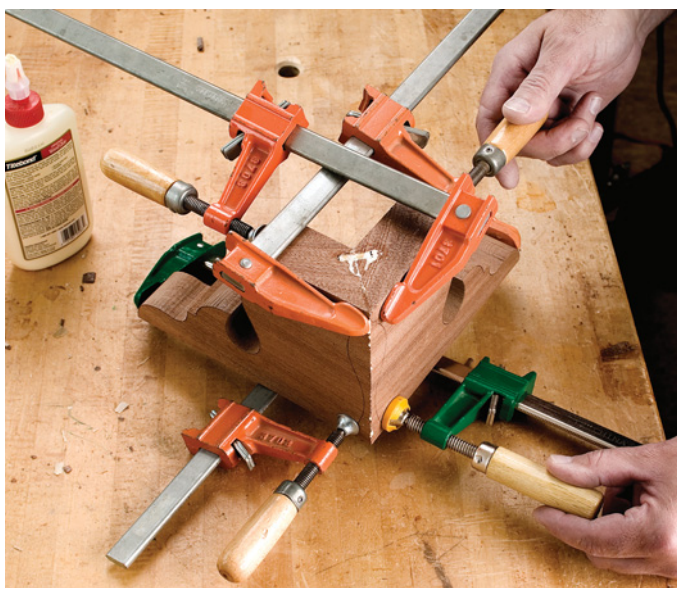
After milling, I cut the joints. The back feet are joined with half-blind dovetails to a plank of secondary wood such as poplar. A miter and spline is used to join the front feet. The spline keeps the two halves of the foot aligned during glue-up. It's important to position the spline toward the inside corner of the miter. Otherwise the spline may be exposed when the ogee is sawn.

## Band Saw the Bracket Profile

Once the joints are cut and dry-fitted, the next step is to band saw the bracket profile. Remember, the ogee on the face of each foot is not sawn until after the feet are assembled.

Depending on the tightness of the curves, you can typically saw the bracket outline with a 1/4" blade. Afterward, I smooth the curves with a spindle sander and a file. As I remove the saw marks I look to see that the curves of the bracket outline are smooth and uninterrupted.

Cut the shape of the bracket on your band saw, then clean up the cuts using a spindle sander or file. A narrow band saw blade will allow you to make the tight turns required in the bracket profiles of some period furniture forms.



Assemble the foot using four clamps as shown. Adjust the clamps to ensure the outside of the miter is perfectly tight.

### Assemble the Feet

After smoothing the bracket outline, the next step is to assemble the feet. I apply a liberal coating of glue to the miters and then slide the spline into its groove. Four small bar clamps will close the miter tight and hold the joint closed until the glue sets.

### Sawing the Ogee

Sawing the ogee curves is exciting. After the careful joinery and assembly, the sawing quickly transforms the foot's appearance. But first you'll need to build a stand to support the foot during sawing. To construct the stand, I use simple joinery: glue, screws and dados. The height of the stand should be slightly greater than the length of the foot. For stability as I'm sawing, I make the base of the stand approximately $1\frac{1}{2}$ times wider than the height of the feet.

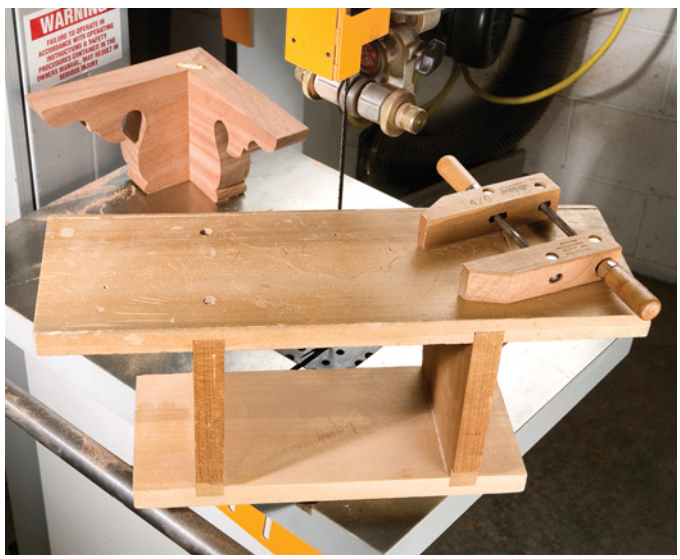
Before cutting the ogee outline, position the foot on the stand and plan your cutting sequence. For your personal safety, don't attempt to hold the foot on the stand with your hands. Instead, use a small clamp and position your hands well clear of the blade.

For the most accurate cut I make certain that the blade is sharp and under sufficient tension. There are two ways to saw the curves of the ogee: fast or accurate. As I'm sawing, I take my time to carefully follow the line.

After sawing the first face, reposition the foot on the stand and saw the second face. During the second phase you won't need to draw the ogee curve on the stock, you'll see it clearly in the outline of the miter.

Once you've completed sawing the curves the last step is to smooth away the saw marks. A file and a card scraper make quick work of this last step. **PW**

Secure the foot to the stand; I like to use a handscrew. Cut the ogee profile by following the line drawn on the stock. Carefully follow the line to avoid unnecessary clean-up work on the finished piece.



The shop-made stand supports one leg of the mitered assembly while you saw the ogee profile on the other foot using the band saw.

When you saw the ogee on the second face of the assembly you won't need to pencil in your profile. The miter of the piece will reveal exactly where to cut.

# *Test-driving Exotic* Infill Handplanes

We spend three days with the world's most expensive planes. Are they just jewelry? Or do they work better than your plane?

There are times when I wish I could find my first handplane. It was, by most standards, an utter piece of junk. I had bought it after college during a late-night run to Wal-Mart, and my purchase was guided by the fact that it was blue, cheap and the only block plane I could find on the shelves that evening.

So it was surprising (then and now) that the tool actually worked quite well. It didn't have a blade adjuster, the sole was rough and the steel in the cutter was as gummy as Juicy Fruit. But when I put the tool to wood it made that sweet "sneeeeck" sound of a perfect curl of wood being sliced from its mother board.

It was the first step in my journey. In the last 13 years I've slowly upgraded my handplanes. After buying a Stanley jack plane, the blue plane went into my carpentry toolkit. Then it went into a box in the basement. And now I can't find it. Occasionally I do get a pang of longing for it. But never have I wanted that block plane more than the day I pushed a $6,600 Karl Holtey A13 infill plane over a piece of curly maple.

A custom-built Holtey A13 is for many handplane enthusiasts the pinnacle of the planemaker's art – perfect in form, function, fit and finish. And when I first used the A13 I got the same sort of heady feeling you get when you master a handplane for the first time. However, like any buzz, after about 20 minutes of work with the A13, the buzz wore off and I began to think (somewhat) rationally about this beautiful piece of steel and brass under my command.

I set the A13 aside and picked up a plane made by James Krenov, the author of "The Impractical Cabinetmaker" (Linden) and planed the same piece of irascible maple. Then I tried a $2,800 Sauer & Steiner panel plane, a Bill Carter jointer plane, a $1,300 A13 from Darryl Hutchinson, a small $775 smoothing plane from Wayne Anderson and more infill planes from custom builders Robert Baker and Brian Buckner.

That was a very good day.

by Christopher Schwarz

*Chris is the editor of* Popular Woodworking *and has two DVDs on using handplanes and other traditional tools. They are available through Lie-Nielsen Toolworks (800-327-2520). Contact Chris at 513-531-2690 ext. 1407 or chris.schwarz@fwpubs.com.*

Before you wonder if I've won the lottery, let me explain. Many of these planes (and a dozen more) were loaned to us by a generous and trusting man named John Edwards. Edwards, a retired automotive engineer from Detroit, amassed his collection of modern handplanes after years of saving and careful purchasing. He and I are both handplane geeks, and so we got together in February in the magazine's shop, tuned up these planes and put them to work, deliriously making shavings on boards both mild and wild.

We also invited many of the makers of these tools to have a look at the planes on a following day. See the story "Mavericks for a New Era" on page 59.

After three days of using these tools, I recorded my impressions in a legal pad, took some photos and now am ready to share what we found. There were a few surprises, some disappointments and a small revelation at the end. If you've ever gazed longingly at some of these beauties on the internet or at woodworking shows and wondered "But do they work well?" you're about to find out.

Photos by Al Parrish

## Holtey A13: Perfect to the Nth Degree

I actually never thought I'd get to use one of these planes. In fact, this plane almost didn't make it here in time after getting tangled up in U.S. Customs for a breathtaking bit after its trip from Holtey's shop in Sutherland, England.

Holtey was one of the early pioneers of the modern infill makers. And his reputation, quality of work and prices all reflect the fact that most people see him as the top of the heap.

The Holtey A13 is based on a classic pattern of English plane made by the venerable Norris company. And it's one of Holtey's signature planes (his other, the No. 98, will be discussed shortly). Once you hold one of the tools you understand a bit of the Holtey mystique. The man is a perfectionist. No matter how closely you examine his tools, you cannot find cosmetic flaws. They are finished both inside and out to the highest degree. Here is just one example: Where some makers (both historic and new) will leave the bed of the plane with a few file marks (which you'll almost never see because the bed is covered by the iron), Holtey does not.


See the two steel pins in Holtey's A13? The iron is bedded against these and a steel plate at the throat – not the wood. Most unusual and interesting.

In fact, the bed of the tool is where we got our first surprise. Holtey secures his irons to the body in a way that's unlike any other infill toolmaker I know. In other infills the iron rests directly on the wooden infill below it. Sometimes there is a steel plate down by the mouth that offers support as well, but mostly it's the wood that's in charge. Some enthusiasts say it's this wooden bed that makes the tools special.

But Holtey's A13 mocks that assertion. His irons don't even touch the wooden infill. Instead, the iron rests on a steel plate by the mouth and two raised steel pins embedded in the tool's bed. What's the advantage? In my experience it made the cut much easier to adjust. Even with the tool's lever cap cinched down super-tight, the iron could still be adjusted with little effort – or risk. Many old Norris infill planes have adjusters that were stripped out by people who tightened down the lever cap too much and then adjusted the iron.

The Holtey A13 is surprisingly comfortable to use and has a wicked-heavy presence on the wood. What I didn't like about it was it was uncomfortable to hold the tool upside down when sighting down the sole – a common operation when trying to center the blade in the mouth of the tool. The tool's front bun is hard to grasp in this position.

That's a quibble, really. I think I was looking for something – anything – to disappoint me on this tool. Not much cropped up. It's as close to perfection as you can get. If I had an extra $6,600 I'd love to own one.

Karl Holtey's A13 (in the background) and his new 11-S both proved to be formidable planes when put to work.

### KARL HOLTEY A13

*Sole length:* 9"
*Weight:* 6 lbs. 2 oz.
*Pitch of iron:* 50°
*Mouth opening:* About 1/64"
*Iron:* S53 steel, .183" thick, 2 1/4" w.
*Contact:* holteyplanes.com or (UK) 01549 402500

### KARL HOLTEY 11-S HIGH-ANGLE SMOOTHER

*Sole length:* 6 1/2"
*Weight:* 2 lbs. 5 oz.
*Pitch of iron:* 60°
*Mouth opening:* About 1/32"
*Iron:* S53 steel, .168" thick, 1 1/2" w.

## Holtey 11-S: A High-angle Solution

This new model from Holtey isn't based on an old plane – it's one of his original designs. When I first saw it I thought it looked as comfortable to use as a brick. And on that point, I was mostly wrong. The 11-S is easy to cradle with your hands and to control, thanks to its diminutive size. After a lengthy planing session my right hand began to rub on the back edge of the blade, which was annoying, but not awful.

The high cutting angle (called the "pitch") of the tool made it a remarkable smoothing plane. There was nothing in our shop that it couldn't handle with ease – and I rooted deep into our scrap pile. Unlike Holtey's A13, the iron is bedded directly on the wooden infill and the lever cap is removable; it hooks around a pin that passes through the sidewalls of the plane. This feature makes it easy to remove and install the iron.

The only disappointment with this tool is one shared by many of Holtey's tools, and that's the particular alloy of steel used in the plane's cutter. The alloy, called S53, wears astonishingly well. But I found it difficult to sharpen. Some of my stones wouldn't touch it, and I had to resort to diamond stones to get a keen edge. Even then, I wasn't confident I had gotten the best edge. This is a personal opinion, but I prefer steel that is easy to sharpen, especially with smoothing planes.

Compared to other Holtey planes, the 11-S is a bargain: about $1,500 with the way the dollar is trading. This is a sweet little tool that cries out to be used. I hope it doesn't sit on a collector's shelf.

## Holtey No. 98: A Design That Changed the Rules

The No. 98 (about $2,900) is another of Holtey's original designs

**KARL HOLTEY NO. 98**

*Sole length:* 9 1/2"

*Weight:* 4 lbs. 3.7 oz.

*Pitch of iron:* 22°

*Mouth opening:* About 1/64"

*Iron:* S53 steel, .176" thick, 2 1/8" w.

My frustration with the No. 98 was in getting the iron to drop onto the pin shown here on the adjuster. It took much fiddling. Once in, however, the tool is a sweet user.

Here you can see the differences between the front buns of the two A13s – Holtey's is on the left; Hutchinson's is on the right.

and it was a groundbreaking tool when he introduced it. It was one of the first modern "bevel-up" smoothers, and Holtey's trailblazing has led to a surge in the popularity of this style of tool.

That said, for a variety of reasons, the No. 98 was my least favorite of the Holtey planes I tested. The adjuster, while ingenious, is fiddly when it comes to installing the iron in the tool. The iron is bored with a series of holes. You drop the iron onto a pin that projects from the plane's adjuster. Because the hole and the pin have a tight fit, it took me a good deal of messing about to get the iron in place on the pin.

In use, the tool is remarkably balanced and has a sleek modern look that appealed even to my traditional tastes. And it performed admirably. With a steep 38° microbevel on the cutting edge, the resulting 60° pitch made it a formidable smoothing tool.

## Classic Planes A13: A More Affordable Workhorse

Like Holtey, Darryl Hutchinson of Devon, England, also makes a version of the Norris A13. Hutchinson's plane is similar in form to the Holtey plane, but it's different in the details. Overall, the level of fit and finish and perfection is lower. But considering that Hutchinson's A13 costs about $1,300 – about one-fifth of the Holtey A13 – it's a value among premium tools.

The plane works remarkably well – as anything costing more than a grand should. It has a fine mouth and high pitch to the iron, which make it ideal for fine finishing cuts. Because of the vast price difference, it's not really fair to compare it directly to the Holtey, so here are my general impressions. The tote is pretty comfortable, though it had more flat areas than I like – I wished it were more sinuous. The front bun is sizable and I didn't find it as comfortable as an old-fashioned Stanley-style front knob during long planing sessions.

The adjuster works quite well and had little slop in its mechanism. I found it remarkably easy to get the plane running smoothly and making very sweet cuts. It's not a fussy tool.

There were some minor cosmetic things: The bed of the tool is essentially unfinished and is covered in file marks. Among its premium-priced peers this is unusual. And there were a few drips of finish in the channel for the adjuster. All in all however, the tool is quite solid, unpretentious and ready to go to work. I quite liked it.

Darryl Hutchinson's A13 (right) with a Ray Iles A5. Both are English makers and produce tools that very much evoke the classic infill planes of the 19th and early 20th centuries.

**CLASSIC PLANES A13 BY DARRYL HUTCHINSON**

Sole length: 9"

Weight: 5 lbs. 15.5 oz.

Pitch of iron: 50°

Mouth opening: Less than 1/64"

Iron: A2 steel, .192" thick, 2 1/4" w.

Contact: classicplanes.com
or (UK) +44 01647 441015

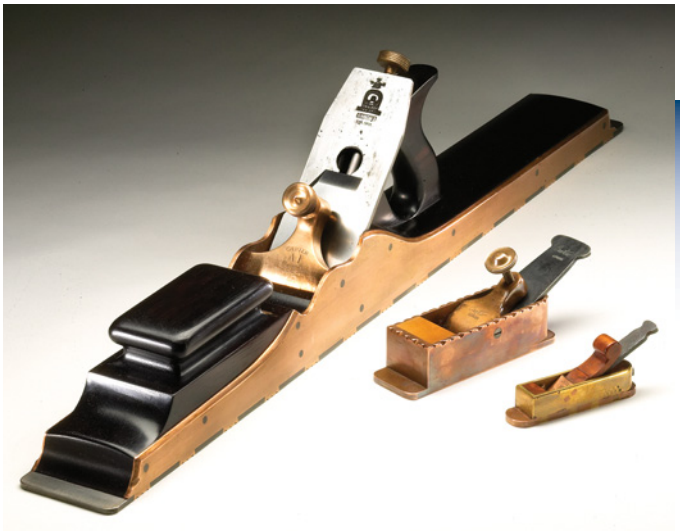
## Bill Carter A1: Beyond Massive

Bill Carter is another English tool maker, and he was probably the earliest of the modern infill makers. His hand-built infill planes have inspired toolmakers all over the world since he started building in the 1980s.

The jointer plane I used for this article is, like most Carter planes, a work of art. Carter has an excellent and eccentric eye: The dovetails in the sole are filed in the shape of a cupid's bow and he has a reputation for adding images of elephants to the sidewalls of his tools. Plus, though all his tools are obviously new, Carter ages the metal and builds them with a decidedly old-world charm.

This jointer plane is as interesting as the man who built it. The story goes that Carter built it first as a 36"-long tool, but when he took it to auctions and tool sales to show it was simply too long to fit into the allotted space in his car. So Carter chopped a bit off each end. He sent the "offcuts" to Edwards when he bought it and suggested Edwards use them as (wait for it …) sanding blocks.

This jointer plane has the presence of a museum piece. The metal



The Bill Carter jointer plane dwarfs two smaller Carter miter planes. Carter sometimes uses recycled materials – the little plane is made from a backsaw.

**BILL CARTER A1 JOINTER PLANE**

*Sole length:* 28"
*Weight:* 12 lbs. 5.5 oz.
*Pitch of iron:* 47°
*Mouth opening:* less than 1/32"
*Iron:* High-carbon steel, .169" thick, 2 1/2" w.
*Contact:* 98 Havencrest Drive Leicester, LE5-2AH United Kingdom

**SAUER & STEINER PANEL PLANE**

*Sole length:* 14 3/4"
*Weight:* 7 lbs. 15 oz.
*Pitch of iron:* 50°
*Mouth opening:* Immeasurably tight
*Iron:* High-carbon steel, .186" thick, 2 1/2" w.
*Contact:* sauerandsteiner.com or 519-568-8159

A Sauer & Steiner jointer plane (left) with two panel planes by the same maker. The Sauer & Steiner planes all have consistent lines.

is beautifully chamfered and the wooden infill is gracefully shaped. It is absolutely exquisite to behold. But pushing it is another matter. It is my opinion that infill jointers don't fit the American style of work. They are too heavy to wield for any length of time by mortals. After 10 minutes of pushing this tool up and down my bench, I was ready for a nap. Also, the front infill is difficult to grip – or perhaps I never found the right grip.

I own a small Carter miter plane, and I have used several of his other planes so I know they are eminently usable tools. This jointer deserves a place above the mantle, or as part of an upper-body workout program.

Konrad Sauer made furniture before he made tools. And it shows here in the sculptural front bun on one of his panel planes.

### Sauer & Steiner: New Kid on the Block

Konrad Sauer is a graphic designer turned furniture maker turned toolmaker. And all three of those traits are evident in his world-class workhorses. Sauer, who lives and works outside Toronto, incorporates classic touches from historic infill planes such as the venerable Spiers and Norris brands. But he blends them in a way that makes his tools both classic and distinctive. All of his tools look unmistakably like they are in the same vein, even his custom work.

As far as workmanship, Sauer's planes are at the top of the heap. I could find no flaws in the four bench planes that I inspected closely (two panel planes, one unhandled smoothing plane and a jointer plane). The metalwork was excellent. And the wood showed off Sauer's strengths as a furniture maker. The infill material he selected was itself astonishing, and the small details – fillets, curves and chamfers – were gorgeous.

But how do his planes function? Remarkably well. Everything clicks and fits together in a workmanlike manner. There's no fussing with this or that. The adjuster is precise yet not precious. The iron is well bedded on a massive steel throat plate and wooden bed. And the tools (all of them) are a joy to push. Naturally, the high pitch and impossibly tight mouth relegate the panel plane I tested (about $2,800) for smoothing large surfaces, which it does with great aplomb.

Sauer's business, which has kicked into high gear in the last couple years, will surely flourish because of his energy and the exquisite finished product.

### Sauer & Steiner No. 4: Finishing Magic

I'd really like to hold up this tool for special mention. It lacks a rear tote, which will turn off some users, but I found the plane a delight to wield. The coffin shape of the body and gracefully shaped infills conspire to make this a tool that you unconsciously reach for while working. Like the other unhandled tools I tried, there is a tendency for your hand to rub on the back edge of the iron a bit during long planing sessions, but that's a small price to pay. Because of the No. 4's tight mouth (I tried to photograph it but failed because it was too small) and 55° pitch, it's for finishing cuts alone. This was, to me, one of the most appealing tools of the whole bunch.

### Robert Baker Box Miter: Steeped in History

Baker has been making infill planes for a long time for builders of furniture and musical instruments. But his main line of business is in restoring old tools (and sometimes furniture). He's quite famous for his restoration work – many gorgeous and important tools have passed through his shop. I think it's clear that his

**SAUER AND STEINER NO. 4 SMOOTHING PLANE**

*Sole length:* 7 1/2"

*Weight:* 4 lbs. 4.7 oz.

*Pitch of iron:* 55°

*Mouth opening:* Immeasurably tight

*Iron:* High-carbon steel, .186" thick, 2" w.

The Sauer & Steiner No. 4 smoothing plane is unexpectedly comfortable. Note how the knuckle of my index finger rubs the back of the iron; this can be uncomfortable after hours of planing.

link to tools of the past has heavily influenced the tools he builds today. They have an unmistakable old-school feel.

The enormous miter plane of his that I got to use was simply an awesome piece of engineering and design. The decorative pattern worked into the sidewalls of the plane was something I'd never seen anything like before (and in fact a couple other toolmakers have wondered how he does it). The wood is finished to a high-grade furniture look. And the details are right-on. This tool was designed to be used on a shooting board and both of the sides were almost exactly perfectly 90° to the sole (the right sidewall of the tool was an airtight 90°; the left just a smidge off). As someone who has tried to "fix" a misaligned sidewall on a few tools I can tell you that this is no small achievement for a handmade tool.

The weight of the plane made it a formidable shooting board plane; your fingers fill right in next to the lever cap like they should live there. The tool was not comfortable when used upright like a bench plane – but few box-shaped miter planes are.

Here you can see in detail how carefully fit and detailed Robert Baker's work is.

Baker's amazing and huge miter plane, with two smaller examples of his work.

### Brian Buckner Miter: An Amazing Amateur

Buckner isn't a professional toolmaker – he does sell some of the planes he makes, but he also holds a high-tech day job in state government. What is particularly interesting about his tools is the level of detail he achieves because he doesn't have to put food on the table by selling his planes. As a result, everything is over the top. The chamfers he files into the steel sides are (and there's no other word for it) downright sexy. He used Damascus steel for the sidewalls of this plane, which gives the tool an unmistakable graphic look. The ebony front bun has the presence and precision of a well-made chess piece.

This tool (photo, next page) is what's called an "improved miter" pattern of plane. It's a form that is related to the box-shaped miter shown at left. What's improved about it? Well you can use it like a smoothing plane, which is something I've become comfortable doing. Buckner's tool fit in my hands and was effortless to get it set and taking beautiful shavings.

**ROBERT BAKER BOX MITER PLANE**

*Sole length:* 10 1/2"

*Weight:* 6 lbs. 1.5 oz.

*Pitch of iron:* 20°

*Mouth opening:* Immeasurably tight

*Iron:* High-carbon steel, .180" thick, 2 3/16" w.

*Contact:* 1 Fieldstone Road, York, ME 03909 or HoltzGear@aol.com. (Note: Baker does not have a catalog or web site).

### Wayne Anderson Smoother: No Two Alike

First, some full disclosure: I own this particular plane and have been using it regularly for several months now. Anderson's planes are all built with Swiss-watch mechanicals and European old-world flair. Every one of his tools is a little bit different than the ones he made before, even if it's the same basic form. They all have an organic and human-made quality to them that sets them apart from manufactured tools.

This tool, which was made in late 2005, has some unusual characteristics. First, there's no chipbreaker. This makes the tool simpler to set up – an errant chipbreaker can cause serious clogs. But it also makes the shavings bunch up in the mouth. Chipbreakers have one excellent benefit in bevel-down planes: they push the shavings up and out of the tool. With this smoothing plane (and others I've used without a chipbreaker) the shavings

Brian Buckner's improved miter (rear) and one of his unusual rabbeting infill planes – both with Damascus steel sides.

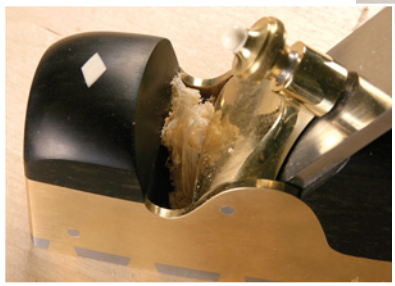
**BRIAN BUCKNER**
**DAMASCUS MITER PLANE**

*Sole length:* 8 1/8"
*Weight:* 2 lbs. 10.1 oz.
*Pitch of iron:* 20°
*Mouth opening:* Tiny
*Iron:* High-carbon steel, .182" thick, 1 5/8" w.
*Contact:* sydnassloot.com/bbuckner/tools.htm

**WAYNE ANDERSON**
**COFFIN SMOOTHING PLANE**

*Sole length:* 5 1/2"
*Weight:* 2 lbs. 1.7 oz.
*Pitch of iron:* 57°
*Mouth opening:* A sliver
*Iron:* A2 cryo-treated steel, .189" thick, 1 1/2" w.
*Contact:* andersonplanes.com or 763-241-0138

A detail of the outstanding woodwork on Buckner's miter plane. Ebony is absolutely no fun to shape in this manner.



With no chipbreaker, shavings tend to collect in the mouth. However, the tool doesn't clog, it just doesn't eject shavings as quickly.

Three Wayne Anderson planes: A rhino-horn shoulder plane (rear), a high-angle smoothing plane and chariot plane.

A plane built by James Krenov (foreground) next to a plane made by Ron Hock from one of his plane-building kits (it also works very well).

will never eject entirely out of the mouth. That said, this tool has yet to clog on me. The shavings simply pile up and come out of the tool in a less dramatic fashion – it's more like they foam up from the mouth rather than spit out.

The diminutive size of this tool would suggest it's only for makers of tiny boxes. Don't believe it. I've used this tool for smoothing large surfaces, even tabletops. And it's excellent for sneaking into small hollows to remove tearout. As with the other unhandled smoothing planes, you will rub your hand against the iron during extended use. I've taken to putting a preventive bandage there before long planing sessions.

## And in the End

The final revelation came when I put Krenov's handplane through the same paces as I did the other tools. By comparison, Krenov's small polishing plane (7 1/2" long) is crudely made – the wooden stock looks like it was roughed out with a band saw and knife. The chipbreaker on the iron was roughly ground with many little facets. The mouth was tight (1/32") but not extraordinarily so. When I disassembled the plane I found that the bed down by the mouth had a layer or two of blue painter's tape affixed there, perhaps to close up the throat.

But the plane held its own with every other plane on my bench in

terms of performance. As did my "work-a-day" tools from Veritas and Lie-Nielsen. The same goes for other high-end tools I've already written about: the Ray Iles A5, the Clark & Williams smoothing plane and the new Bridge City variable-pitch plane, which I had only limited time with. Even my vintage Stanleys had nothing to be ashamed of.

I discussed this finding with several toolmakers, none of whom were surprised by it. Robin Lee, the president of Lee Valley Tools, summed it up this way: "The wood doesn't care." And he's right. Thomas Lie-Nielsen, founder and owner of Lie-Nielsen Toolworks, put it this way: "A plane is just a jig for a chisel." And he's right, too.

If your planes meet the minimum basic requirements of a plane: a sharp cutter that's firmly secured at an appropriate angle for the wood you're working, the tool will do an excellent job. So if you think that buying a very expensive plane will make all lumber bow down before you and your tool, think again.

But there are good reasons to buy custom planes – and they're the same reasons people buy custom furniture when they could go to a discount store and buy an entire bedroom suite for $500. Some people like handmade and exquisite things. And thank goodness, because our mass-manufactured world can use a few handmade touches.

These were the thoughts that were flying around my head as I packed up all the tools used for this article to ship them back to their owner. As I taped the last box and swept up the mounds of shavings we made, I resolved to tear apart our basement looking for my little blue $15 block plane. It just might have some high-end work ahead of it – until I win the lottery, that is. **PW**

## MAVERICKS FOR A NEW ERA

When word leaked out that John Edwards and I were going to be setting up and using all of the planes featured in this article, toolmaker Wayne Anderson remarked: "Boy I would like to be a fly on that wall." After some thought, we decided to open up the door for a day and invite as many modern toolmakers as we could on short notice.

Surprisingly, many of them came. And even more surprisingly, many of them were meeting one another for the first time in our shop. The toolmaking attendees included:

- Wayne Anderson (Anderson Planes)
- Robert Baker (a custom maker)
- Brian Buckner (a custom maker)
- John Economaki (Bridge City Tools)
- Ron Hock (Hock Tools)
- Joel Moskowitz (Tools for Working Wood)
- Thomas Lie-Nielsen, Kirsten Lie-Nielsen, Mark Swanson (Lie-Nielsen Toolworks)
- Robin Lee, Terry Saunders (Veritas/Lee Valley Tools)
- Konrad Sauer (Sauer & Steiner)
- Larry Williams, Don McConnell (Clark & Williams)

We spent the entire day in our shop swapping personal stories, using all of the tools and generally having a good time. In hindsight, I think we were lucky that a meteor didn't hit the building that day or modern toolmaking would have been set back about 20 years. — *CS*

Konrad Sauer and Terry Saunders look for tear-out on a particularly nasty piece of wood.

Don McConnell tweaks the setting on a Clark & Williams smoothing plane.


Back row (left to right): Christopher Schwarz, Thomas Lie-Nielsen, Kirsten Lie-Nielsen, Mark Swanson, Joel Moskowitz, Clarence Blanchard (from the *Fine Tool Journal*), Mike Jenkins (also from the *Journal*), John Economaki, Robin Lee. Middle row: Konrad Sauer, Ron Hock, Wayne Anderson, Don McConnell, Larry Williams, Terry Saunders, Robert Baker, Brian Buckner. Kneeling, front left: John Edwards.

# Country Settle Table

This convertible project serves as a nice breakfast table, a handy small chest and a surprisingly comfortable place to sit.

When furniture was more precious to its owners, it was common for a piece to have more than one purpose in the household.

The settle table is a form that dates back to at least the Middle Ages, though some trace it back to a Roman form where even the base of the table folded flat. While it remained popular in early modern Europe, the settle table was quite common in colonial American homes. It combines the functions of table, chest and chair. In a home, it could be used as a table to serve the morning meal and then be converted to a chair and placed next to the hearth. In addition to creating a place to rest, the expansive back/top of the settle table also provided some shielding from the drafts of early American homes.

by Troy Sexton

*Troy designs and builds custom 18th-century furniture for Sexton Classic American Furniture in Sunbury, Ohio, and is a contributing editor to* Popular Woodworking *magazine.*

This version is typical in form and proportion to originals and is surprisingly straightforward to build. And like many of the originals, the base is painted but the top is not. Some furniture historians have speculated that the tops of these tables were also painted originally but were scrubbed clean so many times that they ended up as bare wood.

## Slab and Dado Construction

The base is a simple box made from glued-up slabs of ¾"-thick poplar. The bottom rests in dados in the sides, and grooves in the front and back. The front and back are secured to the side pieces using an unusual joint that is both rabbeted and dovetailed. It's nothing difficult; even beginning woodworkers should find the joint easy to execute.

The top is equally simple. The boards are joined using a tongue-and-groove joint. The rails on the underside are attached to the top using sliding dovetails.

Once you joint and plane all your material, glue up all the panels you need for the project and then begin construction by building the base.

## One Big Dovetail

After cutting the pieces for the base to their finished width and length, begin by plowing a ¾"-wide x ¼"-deep shelf dado (as used in casework) in the side pieces that's 9½" up from the bottom edge of the sides. I use a dado stack in my table saw and guide the work against the fence. A router with a straight bit is another sound option.

You also need to cut a matching groove on the front and back pieces to hold the bottom. Cut the groove on the inside face of your front and back pieces beginning ½" up from the bottom edge of each piece.

Now comes a tricky part. You need to notch out the front and back edge of your side pieces to receive the front and back pieces. This ½"-deep notch begins at the dado you just cut for the bottom and runs 8¾" up the edge. You can cut this in a variety of ways, such as with a band saw or jigsaw. I do a lot of operations with my dado stack, so I secure the work to a miter gauge and run it on edge over the dado stack.

Set the side pieces aside and work on the front and back. To

Here I'm beginning to cut the notches on the edges of the sides. With the work firmly against my miter gauge and an accessory fence, it's quite secure. If you have any trepidation about this technique, use a band saw or jigsaw.

make the large single dovetail on these pieces, the first step is to cut a 3/4"-wide x 1/4"-deep rabbet on the ends. The shoulder of this rabbet adds strength and helps square the case during assembly.

The easiest way to cut the dovetail portion of this joint is with a few sure handsaw cuts. This is easy stuff, I assure you. First set your sliding T-bevel to 14° and mark out the shape of the male portion of the joint – the tail – on the front and back pieces.

Cut this with a backsaw – I use a Japanese dozuki – and clean up the cut and shoulder of the joint using a chisel.

Now transfer the shape of the dovetail onto the mating joint on your side pieces.

Use your backsaw to cut the female pin shape on your side pieces. Try to split the pencil line with your saw. Fit the pieces together and tweak the joint with a chisel until it goes together smoothly and firmly.

Dry fit all your joints and make sure the pieces can be assembled easily. Then turn your attention to cutting the curves on the side pieces. The cutout on the bottom is a 5" radius. The top corners of the sides are rounded at a 2 1/4" radius. Cut these shapes with your jigsaw and smooth the cuts with coarse-grit sandpaper.

You don't need to cut the holes in the sides that will secure the top to the base yet; you'll bore those after the top is assembled.

Sand all your base parts and then glue up the base. Allow the bottom to float in its groove without glue. If you're going to paint your base, you can secure the joints with 18-gauge nails or cut nails for an authentic look.

The lid of the base is in two parts: the lid itself and a hinge board that is glued and nailed to the back of the base. Cut the hinge board to size so it fits tightly against the side pieces. Glue and nail it in place. To help support

I'm just about to begin cutting the dovetail portion on the notch. Here you can see the rabbet on the front and back pieces, plus the mating notches and the dados on the sides.

The rabbets on the front and back pieces also help you mark the joint on its mate. Press the tail board against your side pieces and mark the shape on the side. Then mark your cutlines on the inside and outside face of your side pieces.

This is where you should take extra care when cutting. Cut it as close as you can and clean up the joint with a chisel if needed.

The jigsaw is a two-handed tool. For maximum control, keep one hand on the tool and the other on the shoe when cutting the curves on the sides.

the lid, I recommend you glue and nail two lid supports to the sides so the lid will be supported at the sides as well as the front.

Fit the lid to the base and attach it to the hinge board with non-mortise hinges.

## A Tippy Top

I made my top from four 7/8"-thick boards that are cut to 50" long. Depending on what lumber you have available, you may need to use more boards. The top boards are joined using a close-fitting tongue-and-groove joint but no glue. The rails attached to the underside hold the top together with the help of some nails.

Begin by cutting a 1/4"-wide x 3/8"-deep groove centered on one edge of each top board. Then cut a matching tongue on the mating edges. You want the fit to be close without splitting the joint.

Clamp up the top then lay out the location of the sliding dovetails that will secure the rails. Because this is a substantial cut, you should first rough out the dovetail socket with a straight bit – I made a 3/8"-wide x 1/4"-deep dado that was 11 1/2" from the end of each individual 50"-long board.

Once you've cut the dados in the top pieces, install a 3/4" dovetail bit with a 14° slope and repeat your cuts to make the angled shoulder on the top pieces.

Now re-assemble the top pieces and line up all the dovetail sockets. Cut your rails to size, then cut the mating dovetail joint on one long edge of the rails using the following steps.

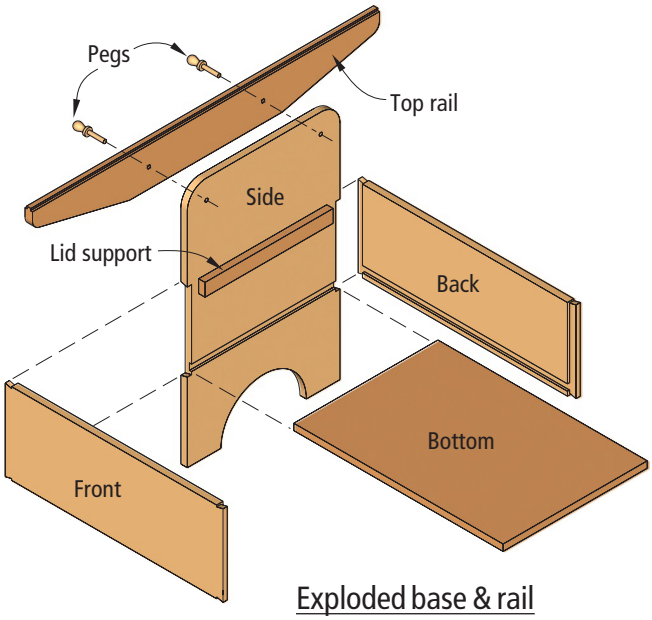
Install the same dovetail bit in your router table and make test cuts on scrap until the fit between

To cut dados and sliding dovetails, I like to use a shop-made template as shown here. With a template guide installed on my router, I can use the same template and template guide to make both the rough cut with a straight bit and the finish cut with a dovetail bit.

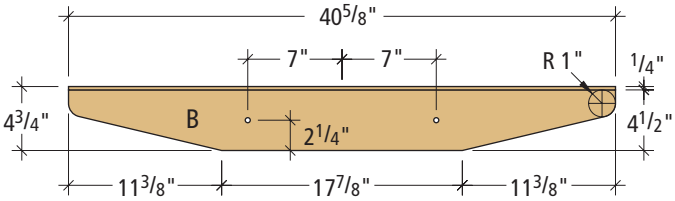
Because this is a common cut in my shop, I've also made a small block that allows me to confirm that the template, bit and template guide are all properly positioned to make the cut I'm after.

Make the dado cut on each board individually. If your parts are all the same length they'll line up just fine at assembly.

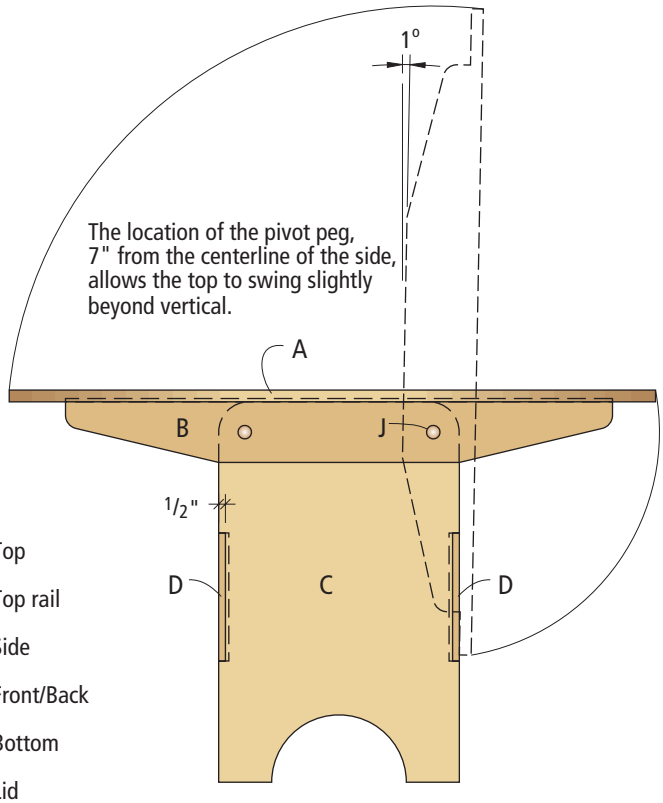
Assemble the top without glue on your bench, line up all the dovetail sockets and prepare your rail stock.



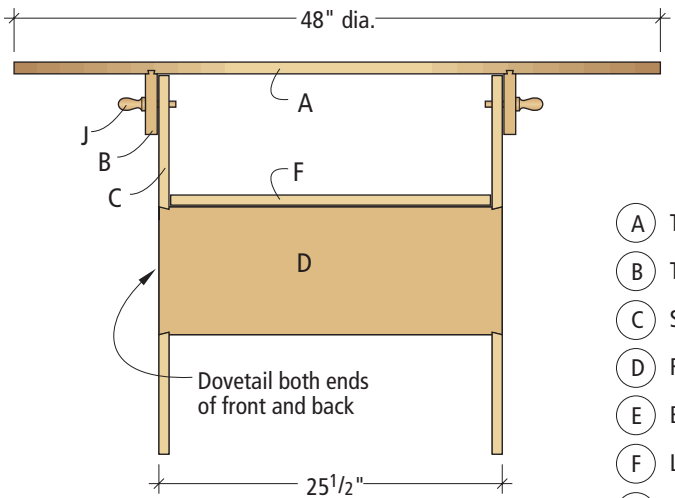

Exploded base & rail




Top rail elevation

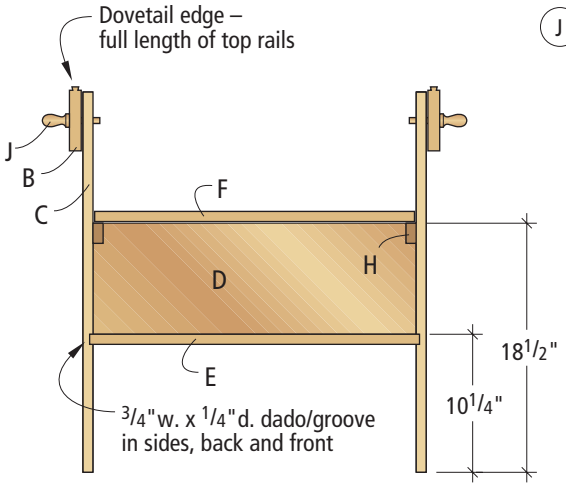



Profile

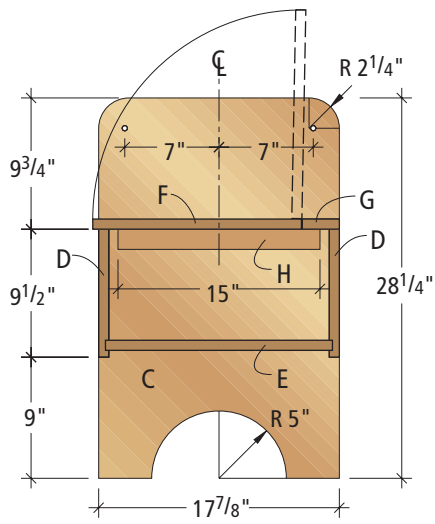



Elevation

- A Top
- B Top rail
- C Side
- D Front/Back
- E Bottom
- F Lid
- G Lid hinge board
- H Lid support
- J Top pivot peg




Long section – top removed

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## COUNTRY SETTLE TABLE

| | NO. | LET. | ITEM | DIMENSIONS (INCHES) T | W | L | MATERIAL | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| ❑ | 1 | A | Top | 7/8 | 50 | 50 | Poplar | Finishes at 48" |
| ❑ | 2 | B | Top rails | 7/8 | 4 3/4 | 40 5/8 | Poplar | 1/4"-d. sliding dovetail |
| ❑ | 2 | C | Sides | 3/4 | 17 7/8 | 28 1/4 | Poplar | |
| ❑ | 2 | D | Front/back | 3/4 | 9 1/2 | 25 1/2 | Poplar | Rabbet, both ends |
| ❑ | 1 | E | Bottom | 3/4 | 16 7/8 | 24 1/2 | Poplar | Floats in groove |
| ❑ | 1 | F | Lid | 3/4 | 15 1/2 | 23 7/8 | Poplar | |
| ❑ | 1 | G | Lid hinge board | 3/4 | 2 3/4 | 24 | Poplar | Nailed to back |
| ❑ | 2 | H | Lid supports | 3/4 | 1 1/2 | 15 | Poplar | Nailed to sides |

## SUPPLIES

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

4 • maple cupboard turn (pegs) #WCT-4, $1.60 each

**Lee Valley Tools**
800-871-8158 or leevalley.com

2 • black, ball-tip, partial-wrap hinges, #01H31.62, $3.10 each

*Prices correct at time of publication.*

the male and female part of the joint is firm. Then machine the dovetail on one edge of each rail.

Now drill the holes for the pegs that will secure the rails to the base and allow the top to pivot. Their location and size is critical. First strike centerlines on the base and rails so you can line up the top and base easily before you drill the holes. The holes should be 25/64" in diameter and their centers should be 7" from the centerline of the rails – this location allows the top to tip back just a little past 90° so it will stay upright. Then cut the rails to finished shape on your band saw; the ends have a 1" radius that tapers up to the full width of the rail.

Sand all your top components then assemble the rails and top without glue. Use Popsicle sticks to space the boards then nail the rails in place through the top. Cut your top to finished size and shape using a jigsaw and then clean up your cuts with sandpaper.

Clamp the top on the base and use the holes in the rails as a guide to locate and drill the mating 25/64" holes in the base. Add the four Shaker-style pegs from Horton Brasses (see the Supplies box) and construction is complete.

To finish this piece, I used a custom green color for the base that was picked out by the client who requested I build this piece. The top is painted on the underside and has a warm brown stain on the top. The entire project is then coated with lacquer.

What was most surprising about the entire project was sitting down in the completed piece. The entire time I was building this piece I was thinking, "This is probably not going to be a very comfortable chair."

On that point, I was wrong. It is a surprisingly nice place to sit and rest your bones, especially after a long day in the shop. **PW**

Fine-tune the fit of your rails by moving the fence a little in or a little out. And be sure to use the same dovetail bit for cutting this part of the joint that you used for the socket in the top.

Once you get the rails to fit in one dovetail socket, tweak the rail to fit across the entire top.

I use Popsicle sticks for lots of things in the shop, including establishing the proper spacing between the top boards for this project.

# Make Drift a Myth

You can tune up your band saw to resaw veneer without expensive fences or blades.

The subject most often written about in woodworking magazines is probably cutting dovetails. In second place – and not far behind – is likely resawing with a 14" band saw.

To be sure, there is disagreement from one article to the inevitable next one, but the central theme is how to adjust the fence to "follow the drift" of the blade. The disagreement is about which shop-built or purchased equipment serves this task best.

After trying some of the methods to "follow the drift" with unsatisfactory results, I decided to take a contrary approach. It occurred to me that if your car has a tendency to drift right or left and you "follow the drift" you will have a very bad result. So what do you do? You overcome the drift to avoid disaster. And that's what I do on my band saw as well.

By following this approach, drift in my shop is now a myth. And by making some simple changes to the way you work, it can be a myth in your shop, too.

In a nutshell, here's what you do: First you install a stronger blade-tensioning spring on your saw, which is available from many woodworking catalogs.

Then set your saw's fence square to the blade and clamp the outfeed side to the machine's table. Install ball-bearing blade guides in your band saw – I prefer the Bandrollers from Iturra Design (about $58, call 888-722-7078). Adjust the blade guides so there is no clearance – none – between the guides and the blade.

Finally, make a simple device using a block of wood, a couple nuts, a bearing and a hinge for a farm gate. This jig also can be used as a frictionless featherboard on a router table or on other machines. It's useful for more than resawing on the band saw.

And one more thing: You don't need a premium blade to have success with resawing. In my saw, I use a 1/2"-wide 4-teeth-per-inch skip-tooth blade from Hartville Tool that costs $10.99. With my riser block the saw takes a 105"-long blade. (Item is #B107, 800-345-2396 or hartvilletool.com.)

With this setup, I easily sliced the veneer off the plywood shown below. The resulting veneer is .025" thick. And there was no drift to compensate for as I sawed. Follow the step photos on the next page, and you'll make band saw drift a myth in your shop, too. **PW**

by Carl Bilderback

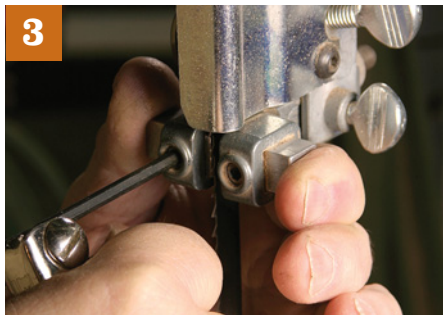
*Carl is a lifelong professional carpenter in LaPorte, Ind., and a tool collector.*

Photo by Al Parrish

With my band saw tuned, I can easily resaw the veneer off plywood if I please.

First tension your blade. I use a 1/2"-wide blade and tension it so the indicator of the saw reads 3/4". Ensure your band saw's table is square to the blade. Raise the blade guides up as far as they will go and check the blade with a square.

Set the fence parallel to the blade. The distance between the blade and the fence should be the thickness of the veneer you want to slice. I set the fence to the right of the blade so it feels more like a table saw and clamp the outfeed end of the fence to the table.

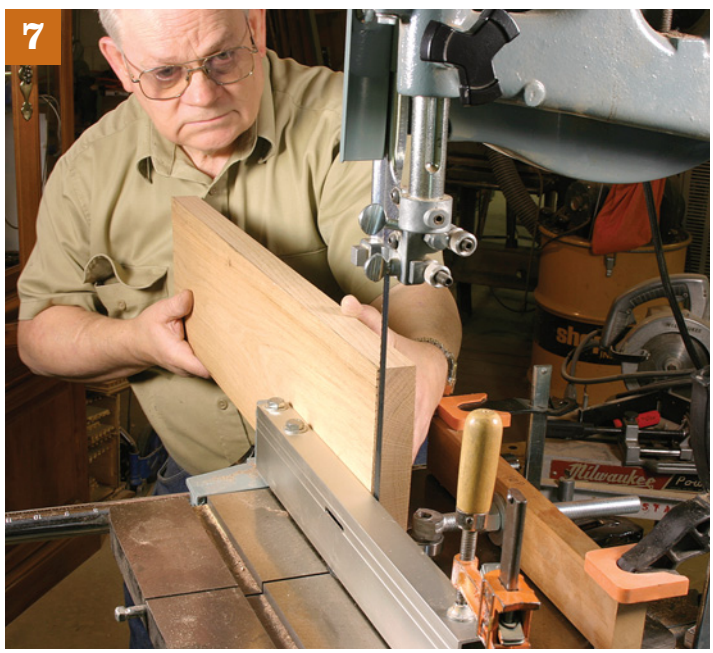


Set the ball-bearing blade guides so they are snug against the sides of the blade. Ball-bearing guides are key here. Stock or aftermarket block-style guides will either heat up the blade or wear away quickly with use. Set the thrust bearing behind the blade in its standard position – it should engage the blade only when you are cutting wood.

I put four screws on the underside of my jig so I can level it in the proper position – the bearing face needs to be dead parallel to the fence's face.

Here, you can see how my simple little jig works. The threaded section is a common $9 hinge (called a bolt hook) for a farm gate that I modified. I sawed off a vertical pin on the end of the hinge, then I bored a hole at one end and bolted a 1 1/8"-dia. bearing to the hinge (any diameter bearing will work as long as it clears the hinge). The bolt head rests on the machine's table. The threaded section of the hinge is held in place by two jam nuts and washers. The hinge is made by National Manufacturing and is stock No. N130-583. The part No. is 293.J12J1. I bought mine at Ace Hardware.

Loosen the jam nuts and move the threaded part of the jig up against the work you are going to be resawing – trapping it between the jig's bearing and your band saw's fence. Note that the bearing should be positioned so it's 1/4" to 1/2" in front of the teeth of the saw's blade.



Turn on the saw and make a test cut. Push the work through firmly but don't stress the motor. If you've set your jig correctly, you'll slice off perfectly consistent pieces of veneer. After your first cut, reset the jig's bearing against your next piece of work and make your next cut.


Photo by Al Parrish

# 'Best $20 I Ever Spent'

Bargain tools can change and challenge the way we work with wood.

Woodworking magazines present a distorted view of reality. We show ourselves working on projects using the latest and greatest tools, and it's easy to start thinking you really need this stuff to do good work. Don't get me wrong, it's a lot of fun to use a $600 ultra-precise plunge router to cut mortises and it's very cool to take a shaving you can see through with a high-end handplane. But many of the tools that make a difference in the way we work, the ones we wouldn't want to live without, are often some cheap, funky-looking things we've had for years and picked up for a song.

by Robert W. Lang

*Bob's latest book is "The Complete Kitchen Cabinetmaker" (Cambium). Contact him at 513-531-2690 ext.1327 or robert.lang@fwpubs.com.*

Driving the pointed ends of pinch dogs into the end grain across a joint takes only a few seconds, and holds as well as any other clamp. Yes, you make two ugly holes in the ends of your glue-up, forcing you to trim an inch or two when you're done. However, gluing up big and trimming to size keeps you out of trouble in at least three ways. You don't ruin the panel if: the pieces slip out of alignment, your first trim cut isn't quite square, or your planer leaves some snipe near the end.

One day in the shop, we started talking about pinch dogs, and how a $2 hunk of iron can do the work of a $40 parallel-jaw clamp. They also work much faster, and are a lot easier to carry and store. For some oddball clamping situations, pinch dogs are the only kind of clamps that really work.

We agreed that pinch dogs are among our favorite tools, and patted each other on the back for being smart enough to have them on hand. Then, we started thinking about the other inexpensive and unsung heroes that inhabit our toolboxes, and how they have affected our work.

It didn't take long to find good examples – most of mine live in my apron pocket or in easy reach near my bench. In addition to looking at our own tools, we decided to survey other experienced woodworkers we know. We found that we had a lot of common tools, and that these tools often led us to better ways of working.

We also found a tendency toward sentimental attachment. For many of us these inexpensive devices mark important points in our development – moments in time when we "got it" and our skills took a leap forward.

## Not the Number but the Size

Nearly everyone we talked to had a favorite measuring device. Slide calipers, inexpensive dial calipers and draftsman's dividers were all mentioned. The common theme was that each of these tools provide you with precision without needing an exact number.

Craftsman and tool seller Rob Cosman put it this way:

*A pair of 6" dividers – they are the best for transferring a measurement, no tape measure interpretation, aka fat 1/16", just shy 3/8", heavy 3/4". They also leave a hole where a pen or pencil point can be set to get an exact mark.*

Finishing guru Bob Flexner uses calipers for similar tasks.

*Calipers. No need for the more expensive dial type. The slide type with the measurements right on the shank are plenty accurate. Calipers coordinate inside, outside and depth measurements so you can move easily from one to the other. Check the depth of a mortise so you know how long to make the tenon. Check the width or interior of a board or mortise so you can set your table saw fence using the depth gauge.*

Chairmaker and author Kerry Pierce's favorite measuring tool is the simple wood and brass caliper from Stanley.

*It is my favorite cheap tool. I use it primarily to size tenons for chair rungs, but I find myself reaching for it often to measure all kinds of diameters and thicknesses.*

It's easy to think that precision in woodworking is about numbers. The lesson here is that avoiding numbers is a way to be more precise. Take that a step further by considering a way to clearly define a precise point on your work.

## Cutting a Fine Line

Knives were one of the most frequently mentioned tools. The common use was as a great way to mark precise lines, not shaping wood. One inexpensive knife was mentioned many times: The common X-Acto knife, which will fit inside very small dovetails and other tight places. It will make a fine line that won't rub off and will register a cutting tool right where you want it.

In addition to this knife, one of my favorites is a "Whittlin Jack" knife (Whittlin' Jack #UC-423 $6.95), a tool that is smaller than


Precision in woodworking has a lot more to do with making two pieces fit together than with knowing what the measurement is to the thousandth of an inch. Use any of these tools to transfer a size from one part to another and forget about the numbers. It is much easier to leave one of these set than it is to remember if that was 1/64" over or 1/64" under.

it used to be due to sharpening. After 20 years, I've honed away about 3/16" from the blade. I'm hoping it will last as long as I do, but for seven bucks, it might be worth it to pick up a spare.

Although it isn't ground with a single bevel like a traditional marking knife, I didn't know that when I started using it as one, and it works well. I like it because it fits in tight corners almost as well as the X-Acto, but it has a sturdier feel to it. I also use it for basic knife duties – whittling pegs, opening boxes, crosscutting veneer, etc.

An X-Acto #1 craft knife (right) retails for $2.99 and comes with five extra blades. The "Whittlin' Jack" retails for $6.95. For just a few dollars more than a box of lead pencils you can have a permanent method for marking lines that will vastly improve the quality of your work.

## Seeing Things a New Way

Maybe we're just getting old, but inexpensive aids to vision were on several lists. An adjustable-arm light mounted on a workbench provides supplemental, or raking light that improves things immensely. (Editor Christopher Schwarz replaced the clamp on a desk lamp with a wood plug that fits in a bench dog hole.)

Safety glasses with bifocal reading glasses built in, a flip-down loupe on a headband, and a photographer's slide-viewing loupe let us see what is really happening up close. Maybe these aren't merely aids to poor vision, but a reflection of a desire to get things perfect to a degree beyond the norm. If genius is in the details, the ability to see the details clearly is an excellent starting point.

Woodworker and author Paul Anthony had this to say: *One of my best friends in the shop is a plastic 8x magnifying loupe that I bought for $6 at a photo-supply store. Designed for viewing 35mm slides, it is also perfect for scrutinizing tool edges during sharpening, providing a perspective that I can't hope to achieve with my naked (and somewhat uncooperative) eyes.*

*If I'm uncertain at all about my progress or sharpening technique, the loupe lets me know whether the metal is really polishing up and whether tool faces are meeting to create a truly sharp edge. In addition to sharpening, the loupe zooms me in for all sorts of inspections, such as checking the real quality of a cut from a bit or blade, or perhaps the extent of damage from a section of lifted or torn grain.*

## Changing for the Better

No matter how long we've been woodworking, it's never too late to adopt a new tool or method. Craftsman Frank Klausz only recently started to use holdfasts on a regular basis. The recently introduced holdfast from Gramercy tools *works and is affordable*, and joins a small wood spokeshave, his other favorite inexpensive tool. *It's worth a lot more now than the $20 I paid for it.*

It isn't always the tools themselves that mean something significant. Most of these are important to us because they are a tangible reminder of a change in attitude. A physical way of saying: "I now know what's important to my work and what isn't, and I'm through with messing around."

Contributing Editor Glen


Getting from an initial cut to a finished shape usually involves removing small amounts of material in an easy to control way. This open rasp works well both for refining curves and fitting joints. The handle is optional. The tool works great without it (and is less expensive).

## SUPPLIES

**Lee Valley**
800-871-8158 or
leevalley.com

- 18 pinch dogs in three sizes
  #05E10.10 , $22.50

**Hyde Tools**
800-872-4933 or
hydetools.com

- pry bar/scraper
  #45600, $7.39

**GunAccessories.com**
800-653-7890

- original "Whittlin' Jack" knife
  #UC-423, $6.95

**Highland Hardware**
800-241-6748 or
tools-for-woodworking.com

- Shinto rasp replacement blade
  #126402, $16.99
  (blade w/handle also available)

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

- Zona knife (similar to X-Acto)
  #MS-LAYKN.XX, $4.95
- Gramercy Holdfast
  #MS-HOLDFAST.XX, $16.95

I like to get any glue squeeze-out off my work as soon as I see it. This scraper lets me put a lot of pressure on the edge with my left hand, while pulling with my right. The one in back is about five years old, and replaced the one in the front which has been sharpened so many times there's nothing left to use. I keep it around even though it serves no purpose other than to remind me of my age.

Huey had two favorite tools that had a big effect on how he works. *I was watching a segment on Sam Maloof when I spotted him using this tool to shape his Maloof/California style pieces. I found it, tried it and was sold from day one.*

*It is the Shinto rasp. While it comes with a handle that can be attached to the rasp, I choose not to use it. I use the rasp to shape about 90 percent of the work on my cabriole legs. I also found that it's great to use to thin those slightly thick tenons. Because of its shape it's easy to work tight to the shoulders. It is my shoulder plane – don't tell Chris!*

*The second tool is a router bit. I know – what is so special about a router bit? I am referring to a top-mount bearing, pattern bit. I always keep this set up in my router to cut to my created patterns. I use it to produce aprons and have used it to produce drawer divider profiles for a block-front chest.*

*It's also my tool of choice to make the cuts for shelving. When I was new in this, at that time a hobby, I had an old dado blade where the actual blades cut slightly deeper than the chippers. Hey, even the chippers had their own heights. I decided that it would be easier to instead cut those dados with a straightedge and a pattern bit. Not only that, but when you are cutting a stopped dado there is less cleanout to fit the joint.*

### Sentimental Tools

Curiously, there was a lot of sentimentality about tools for one of the most mundane woodworking chores: scraping excess glue. One of my personal favorites is the only hand tool I have ever managed to wear out: a Hyde scraper/prybar.

It was one of the first tools I purchased and it is my main glue squeeze-out cleanup tool, but it also has six or seven other uses. It's great for taking apart things and removing moulding without doing much damage, opening paint cans and using as a shim/wedge/lever.

When I realized it was too far gone to sharpen any more I headed to the hardware store to get a new one, and surprised myself when I started to worry about what I would do if I couldn't find one. Fortunately, it's still available (look in the paint department) and costs less than $8.

Ellis Walentine, a woodworker and the WoodCentral.com web master, also had an all-purpose scraping and prying tool that he made from an old kitchen knife.

*The kitchen knife I found so useful was a broken off, very stiff steel knife, sharpened along one edge and across the end. I used it to pop glue off things, pry paint cans open, sharpen pencils, pry mouldings off – more like a mini Wonder Bar. It was a great in-between tool to have around. I cut off the handle at about 4" long, and the blade was probably about 6" long and 1¼" wide.*

Sadly, it was lost in a fire.

Apparently, there is a connection between editing and having the perfect scraping tool handy. Cambium Press founder John Kelsey's favorite is:

*A $5 plastic-handled ½" chisel that I ground to a bullnose shape and use for scraping mouldings and digging crud out of the most unlikely places. I have had it for 30 years and it doesn't look like I will need another any time soon.*

### A Word of Caution

Of course we need to include a safety reminder – a warning of what a seemingly inexpensive purchase can set off. Consider this from Schwarz:

*On a sunny Spring day I stumbled on my 'Best $20' item at an antiques fair in Burlington, Ky. It was a 100-year-old Stanley No. 5 with rosewood knobs and a $12 price tag. I immediately paid the hippie who was minding the booth and took the plane home.*

*It turns out that when buying things from hippies, the first item can be a 'gimmie' – it's the next dose that costs real money. I tuned up that plane and that ignited a slumbering passion for hand tools. Since then, I've squandered a large portion of my children's inheritance on hand tools both old and new.*

*That plane, which I still use all the time, turned out to be the most expensive 'good deal' of my entire woodworking life.* **PW**


## THANKS

The following woodworkers provided their input in the preparation of this article.

- **Paul Anthony** is a woodworker and editor of our "Tricks of the Trade" column.
- **Rob Cosman** is an author, teacher and DVD host. His web site is robcosman.com.
- **Bob Flexner** is a wood-finishing guru, and author of "Understanding Wood Finishing" (Reader's Digest).
- **Glen Huey** is a furniture-maker, author, DVD host and contributing editor to *Popular Woodworking*. His web site is woodworkersedge.com.
- **John Kelsey** is the founder of Cambium Press, and a former editor of *Fine Woodworking*.
- **Frank Klausz** is a cabinet-maker, teacher, author and frequent contributor to *Popular Woodworking*. Visit his web site at frankklausz.com
- **Kerry Pierce** is a furniture-maker, author and frequent contributor to *Popular Woodworking*.
- **Ellis Walentine** is the host of the internet woodworking forum WoodCentral and former editor of *American Woodworker*. Visit his web site at woodcentral.com.

# *the* Libella

## This classic tool built civilizations. Now you can build one for yourself.

Perhaps you have seen some of these in high-end tool catalogs, and have wondered what they are. The plumb level – also called a libella – was once a standard piece of equipment for the woodworker, carpenter and surveyor. In fact, a basic set of tools would always require this tool that could do so much. It can determine plumb and level, act as a square and even as a ruler if needed. The modern toolbox would need three tools to replace it: a spirit level, a plumb bob and a framing square. While the three modern tools excel in their individual tasks, the libella can still stand on its own as a jack-of-all-trades. It also has a great history behind it.

It is the year 1280 B.C.E., and I take you to Cairo, Egypt, in the Valley of the Kings. Sennedjem, the architect, looks over the expansive plains and gazes at his crowning achievements. The tombs of Seti I and Ramesses II are well on their way to being completed. In a brief moment of reflection, he wonders in awe at the tools that make this possible. These tools of his trade are so important to him in fact, that he has the royal cubit yard, squares, two plumb levels and myriad other tools buried with him as a tribute to what they helped him to accomplish.

The family tomb of Sennedjem lay undisturbed on the west bank of Luxor until the year 1886, when a team of Italian archaeologists discovered what is considered one of the great finds in Egyptology. As they descended the narrow stairway and gazed upon the tomb, it had to amaze them to discover these tools that so resembled their modern-age counterparts.

The plumb level was an important tool in that it was primarily used to determine a level of something such as a large pyramid stone. Needless to say, it was a key development in tool history, as it allowed for a greater degree of accuracy in building.

As was the case with many tools, the Greeks and Romans were more than willing to use other's technology to further their own causes. In Greece this tool was known as the staphyle, diabetes or alpharion. Homer, in writing the "Iliad," mentions using this tool to construct Admetus' horses. Another example is of the stylobate of the Parthenon, which is carefully crowned by using this instrument. The Romans give us the term libella, and in their time, plumbers and aqueduct engineers would take advantage of the tool's

by Samuel L. Peterson

*Sam, a regular contributor to the "oldtools" online group, has been fascinated with the history and use of hand tools for more than a decade.*

Photo by Al Parrish

ability to determine an exact pitch. Every road may have led to Rome, but the libella helped ensure that their standards were met. The libella symbol can still be seen today on many of the stone structures in the region.

The initial concept was so good that the form changed very little over the centuries. Until the spirit level vial became economically feasible to produce, the libella remained an important tool, and was produced in bronze and other fine metals.

While the early European craftsman used the basic form of this tool, mariners also found it indispensable as a means of determining the trajectory of cannons. The gunner's level had inclinations on the horizontal bar that would assist them in determining proper cannon elevation and featured a curved base to fit on the cannon breach.

But with the widespread introduction of the spirit level, the reign of this magnificent tool faded into the past.

## Constructing a Libella

In this article, I will show you how to build this tool. Along the way, you'll be taught how to incorporate brass into your arsenal of woodworking skills.

Start by selecting and truing a piece of stock to 3/16" thick. For this project I chose to use air-dried walnut, which I consider to be one of the most beautiful woods for instruments such as this.

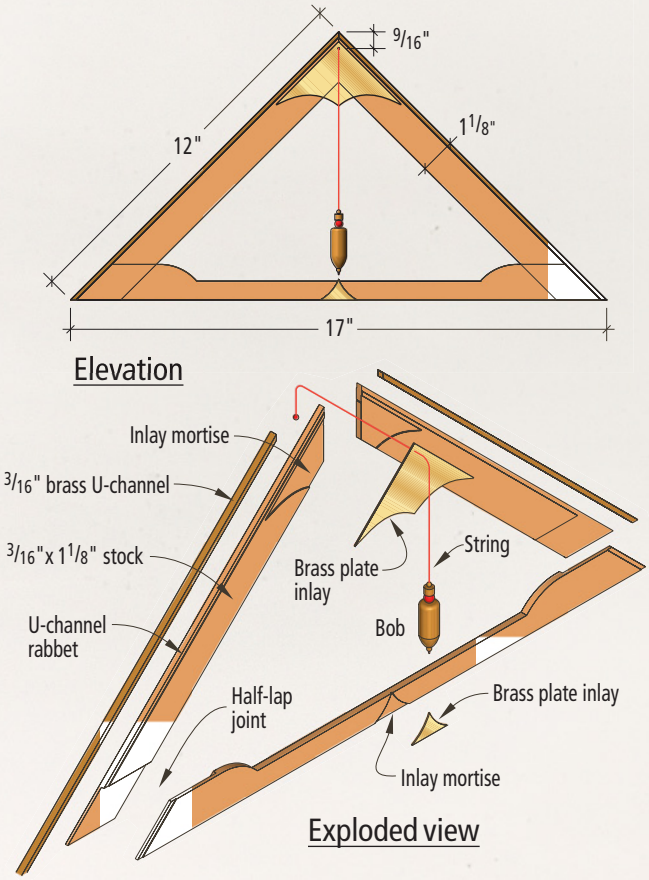
Rip the stock to 1 1/8" wide and use a low-angle block plane to get a nice straight edge. The joints used in this project are to be lapped. In order to get the right angle laid out, grab a framing square and test it for accuracy by first drawing a right angle on the inside face with it facing left and then do the same with it facing right.

Lay the stock inside the square and trace the lap areas. The angle at the top of the libella is 90°. At the base of the tool, each corner is a 45° angle. Be sure to X out the surface to be removed so there are no mistakes. There are many ways to cut lap joints. I use a small square to define the lap line and score the line with a chisel. Then I use a marking gauge to scribe the amount of wood to remove from the stock.

From this point, it is a matter of paring away the unwanted stock, leaving joints that are ready for glue-up. Being an "I can't wait" and "why use a little, when a lot will do" kind of person, two-part epoxy is what I recommend, especially when we get to the point of adding the brass. What you should now have before you is a nice wooden triangle that you're about to take to a whole new level!

Shutterstock.com

Libellas were undoubtedly used during the construction of building such as the Temple of Ramses II, on the west bank of the Nile at Luxor.




Adding brass is not terribly difficult, but accuracy is needed. Because we have used 3/16" stock, we can get 3/16" U-channeled brass from the hardware store. A slight rabbet is needed to receive the brass, and once again I will use an old tool to get the job done.

The moving fillister will do this job in no time – it controls the depth of cut and even scores the wood before the cutter slices off the desired amount. After a test fit, stir up some epoxy and glue the brass on the libella.

The center section and bottom level indicator is simply a sheet of brass that is cut in an interesting shape to enhance the aesthetic appeal of the tool. The inlay of these pieces consists of tracing the outlines and removing the waste until it is well seated, followed up by epoxy to hold it in place.

The finish of the piece is achieved by using a random-orbit sander, which will get everything flush and smooth, and also will produce a frosted effect on the brass. The string hole should be carefully drilled at a point that is 9/16" from the top and exactly centered. It should be just large enough to slip the string through. I chamfered the rim of the hole to prevent sharp edges from fraying the string. All that is left is the bob, which, in history, started out as a stone and quickly became turned brass, as evidenced by a find in Pompeii.

You can create your own style, or do as I did and visit a fishing tackle shop and pick something out from their selection of brass bullet weights with the pretty jewels and balls. Constructing the plumb bob is a piece of cake with a little epoxy and string. The string was painted red, as that seemed to do the piece justice.

If you've made it this far, it should be apparent that you can make many of your own tools, complete with adornments. As pretty as this tool is, you'll need to use it to see why it was essential for thousands of years. **PW**

# Ribbon table

## Impossible? No. Impossibly easy.

Photo by Al Parrish

If architect and furniture designer Alvar Aalto (Finland, 1898-1976) is considered to be one of the founding fathers of modern design, then Eileen Gray (Ireland, 1878-1976), who shared his profession and time on Earth, must be a founding mother. For my ribbon table, I borrowed design elements from his sensuous bentwood stacking stool and her machined glass-top side table. I guess that makes me a modern grandson.

The stability and strength of Baltic birch plywood made it my material of choice. Aalto could bend it two ways but I wanted to up the ante by twisting it in the third dimension. Segmented, radiused corners, combined with a variation on finger joinery connecting the straight vertical pieces, proved to be a successful way of pulling off the illusion. The top and bottom are made from two pieces, biscuit-joined together.

### Careful Layout

I can tell you that the outside radius of the arcs is 4", and that the length of the straight finger extensions is $1\frac{1}{2}$", but I can't give you the exact width. That's something you'll have to measure because the width of the bends must be equal to the thickness of the nominal $\frac{3}{4}$" stock you purchase. I used my dial caliper to come up with the $\frac{47}{64}$" dimension shown in the illustrations. So what's the big deal about a $\frac{1}{64}$" variation from true $\frac{3}{4}$"? A lot when you're trying to bring so many surfaces into alignment from so many directions.

by John Hutchinson

*In addition to his day job as an architect, John is* Popular Woodworking's *project illustrator. E-mail him at jhutch2@columbus.rr.com.*

I printed nested corner patterns on standard copier paper after generating them through the CAD software on my computer. The same accuracy, however, is achievable by using a square, a dime-store compass and a ruler.

### A Whole Bunch of Holes

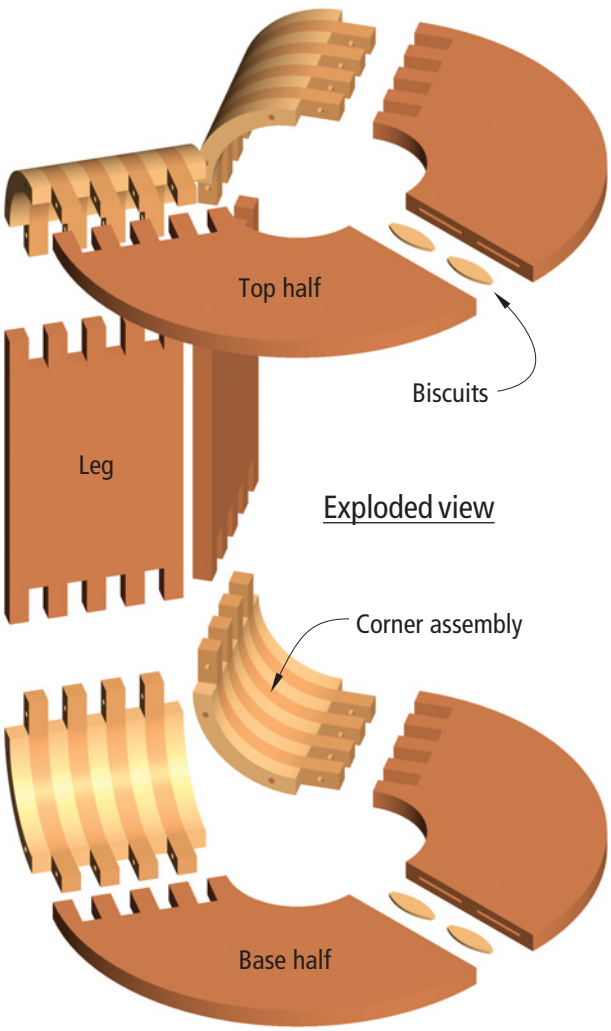
With a 17/64" brad-point bit secured in your drill press, drill the four registration holes in each of the radial corner segments. Four holes may seem excessive until the segments fall prey to the flush-trimming bit. It's amazing how a little cylinder of metal, with two innocent-looking cutting edges, can exert enough force to bend 3/4" plywood as if it were overcooked spaghetti. I tried to get by with only the two inner holes and ended up with chatter marks at the unsecured extensions of the arcs.

### Rack of Ribs

You know that I'm a band saw guy if you've seen any of my previous projects. There's something about becoming "one with the blade" and tracking a cut 1/32" outside of a line that gives me repeated doses of obsessive/compulsive satisfaction. So much for my problem. Your task will be to rough-cut 36 arcs out of a rectangle. After nesting your patterns on the stock to minimize the waste, start rough-cutting slowly and carefully, staying just outside the lines. You'll have the rhythm in no time.

### A Passion for Sanding?

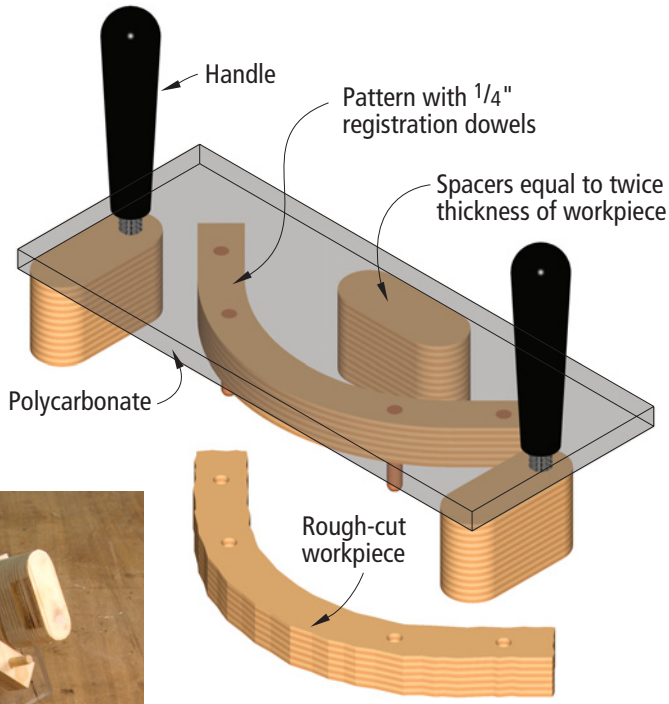
Pattern routing the corner segments isn't really necessary if your idea of the perfect day in the shop is one devoted to sanding. If that doesn't float your boat, read on. The router-table jig that I made for handling these small parts consists of a rectangle of 3/8" polycarbonate plastic, two purchased jig handles, one finely tuned pattern,




This obligatory "Man Drills Holes In Board" shot is here to remind you that accurate drilling, with a backup scrap to prevent tear-out, is key to a number of forming and glue-up steps. A 17/64" brad-point bit clears the way for the 1/4" registration dowels.

Nesting the patterns for the corner segments produces a minimum amount of waste. Make the cuts just outside the lines. You'll be a band saw master by the time you get to your 36th smiley.

four 1/4" registration dowels, and spacers consisting of two layers of the plywood stock. The spacers need to be arrayed around the pattern in a manner that prevents the jig from tipping as you run it over the router table. Remember to always feed the parts against the rotation of the bit, never with it. When the dust has cleared, you'll have a perfectly matched stack of bends.




Pattern-routing jig

Here's the whole story on the pattern-routing jig – one perfected pattern mounted to the bottom of the plastic guard, four protruding registration dowels, three spacers/stabilizers (with UHMW Slick Tape glides) arrayed around the pattern, and a couple handles.

With a rough-cut corner segment resting on the router table, and registered to the perfected pattern just below the plastic guard, feed the segment into the cutting edges of the flush-trimming bit.


Alternately stack short and long corner segments over 7" lengths of 1/4"-registration dowels for a perfectly aligned glue-up. Trim the dowels flush to the outside surfaces after the glue has dried.

But before you can glue up your corners, 20 of the pieces need to be shorter than the others to form the fingers. You can trim them to size on the band saw, or you can set up a jig and use your table saw (see photo, page 78).

### Corner Glue-up

My ingredients for this operation were: 1/4" registration dowels, a flux brush, cup of water, polyurethane glue, paper towels. And if you don't already own gloves, get some. I went macho-gloveless for the first corner glue-up and ended up with Incredible Hulk hands. Nothing but time releases polyurethane glue from your skin. Before applying any glue, I placed the segments on a dampened paper towel, let them sit for a few minutes, and then flipped them. Baltic birch plywood is pretty inert stuff and the moisture absorbed from the paper towel helps to activate the glue. Brush a liberal amount of glue on both sides of the five short and four long bends. Next stack them alternately on the dowels. When the sandwich is complete, apply a few clamps. Almost instantly, you'll have a big foamy mess of glue squeeze-out. Don't be tempted to tidy things up by wiping the foam with one of your paper towels. Doing so will lead to the sanding that you avoided by pattern routing. Be patient, let it dry, and then cleanly slice it away with a scraper.

### Dado Sledding

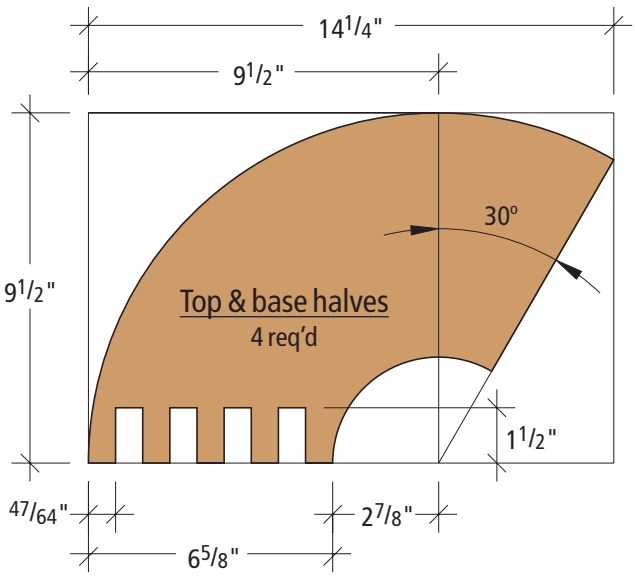
I made a simple table saw sled for the dado cuts in the "legs" and table halves. Although it seems counterintuitive, I don't recommend using a dado stack to make the notches. Because the thickness of plywood varies slightly within a single sheet, I found it best to trace the fingers of the bends on the straight sections and then nibble away the waste with a

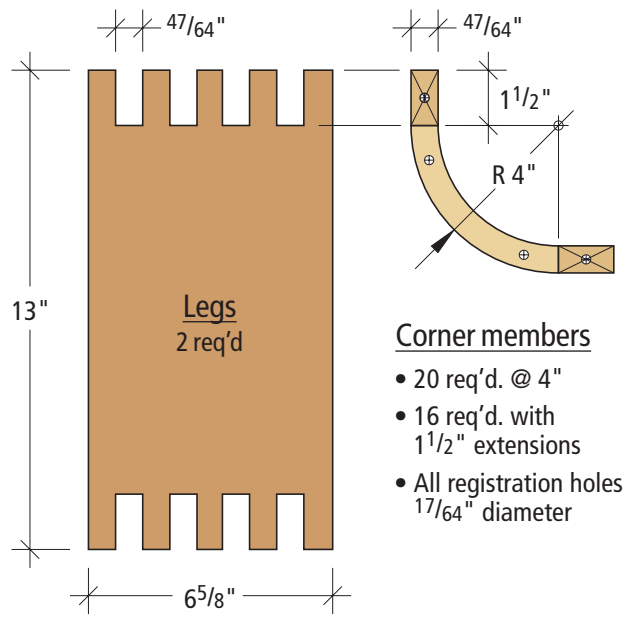
ripping blade. Start the cuts at the middle of the waste area and work outward, sneaking up to the pencil lines. This method of cutting saves you from fussing with shims and is more forgiving and far less aggressive than a dado stack.

### Getting It All Together

I glued up the base in two vertical halves and then glued the halves together, aligning the top and bottom surfaces with biscuits. The only thing you really need to watch is the right-angle attachment of the bends to the flats. I accomplished this by first clamping a flat to my workbench and then pulling the fingers together with a pair of long bar clamps. I intentionally pushed the joint beyond 90° then pulled it back

Trace the outline of the fingers of a glued-up corner to the legs, as well as the top and bottom halves, after clamping them in alignment on your workbench. The holes in the fingers are merely "leftovers" from the pattern-routing process.




**Corner members**

- 20 req'd. @ 4"
- 16 req'd. with 1 1/2" extensions
- All registration holes 17/64" diameter

My dado sled is nothing more than a scrap of plywood fastened to a couple wood runners. The fence is mounted square to the table and perpendicular to the blade. Here, I'm removing the finger-joint waste from a tabletop half.

After starting to remove the straight extensions on 20 of the 36 corner segments on the band saw, I realized that by mounting a few more registration pins on the back of my dado sled I was able to make quick work of another repetitive task. I love it when I can get double duty out of a jig.

The secret to successfully joining corner pieces to flat pieces is keeping everything flush and square. Keep it flush with the little guys. Pull it together and up to square with the big guy.

to square with a couple hand clamps. The rubber pads on the long clamps allowed this kind of micro-adjustment.

### Finish Line

I knew from day one that I wanted this to be a painted piece. Aalto was a fan of primary colors so I followed his lead with a cheerful cherry red. Your careful measuring and pattern routing in the early stages of the race will pay huge dividends when you near the finish line. A little wood filler, a little sanding, and you're good to go. I usually don't gush over a finishing product, but Krylon's motto of "no drips, no runs, no errors" is no idle boast. It's vital that the paint stays where it's placed when applying the finish in three dimensions simultaneously.

### Topping it Off

You can use any 19"-diameter disc of material for the top (solid wood, stone, metal) but it really deserves a circle of glass to display the undulations of the base. I ordered my 3/8"-thick top, with predrilled mounting holes, from a local glass fabricator. I separated the top from the base with black rubber bottle stoppers. When I can visualize a connection detail, but don't know how to accomplish it, I always head for those mysterious, arcane parts drawers at the hardware store. I'd almost settled for doorstop bumper replacements (have you checked yours lately?) when I stumbled on two drawers of cork and rubber bottle stoppers in every conceivable size. Eureka! To pick up on the machine aesthetic of Gray's side table, I through-bolted the glass to the base with stainless steel machine screws, finish washers, and cap nuts.

### Can't Help but Wonder

Some day, someone's going to take a shot at the ribbon table in solid wood. My gut instinct tells me that this is impossible due to expansion/contraction considerations, but I haven't taken the time to evaluate the force vectors. It might work or it might explode. Do I have a volunteer? **PW**

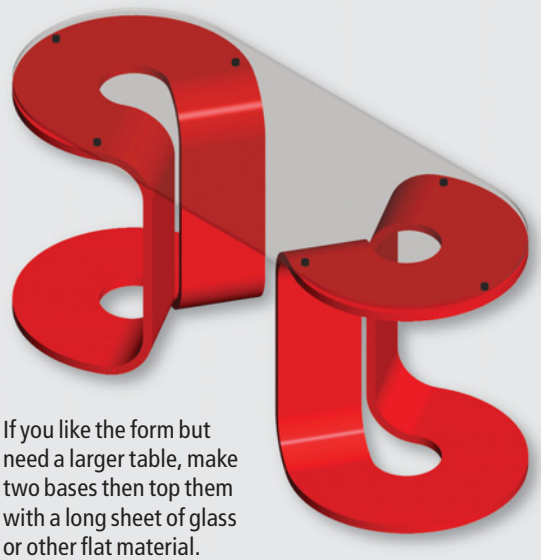
## INSPIRATION

The Aalto Stacking Stool ($149) and Eileen Gray Table ($398) are available from Design Within Reach, online at www.dwr.com.

*Prices correct at time of publication.*

Images courtesy of Design Within Reach

## VARIATION



If you like the form but need a larger table, make two bases then top them with a long sheet of glass or other flat material.

# Rub to Create a Great Finish

## Achieving a glass-flat surface is a lot easier than you might think.

Photos by the author

To create the smoothest oil finish possible, sand the second and each subsequent coat while it is still wet with finish (before wiping off) using #600-grit (P1200-grit) sandpaper.

After spending countless hours building a project, you naturally want the finish to be perfect. To achieve that you need to understand the one thing that separates an OK finish from a great one. A great finish feels smooth!

Think about it. What do you do when checking out someone else's finish, whether in a store or at a friend's home or shop? You run your hand over the finish. If it feels rough, you disapprove (though you might not say anything). If it feels smooth, you think, "Boy, I wish I could do this."

### A Great Finish is a Smooth Finish

Of course, there are also other factors, including thorough wood preparation to remove machine marks, dents and tear-outs, and achieving an even coloring – problems addressed in previous articles in this magazine. But when it comes down to it, the one factor that separates a great finish from an average finish is smoothness.

You achieve a smooth finish by rubbing it. This is the only way. You can't get a perfectly smooth finish straight off a rag, brush or spray gun.

There are two significantly different types of finish: penetrating and film-building. A penetrating finish is one that doesn't harden, so all the excess has to be wiped off after each coat. Oil finishes are penetrating finishes. Oil finishes include boiled linseed oil, tung oil, and a mixture of varnish and one or both of these oils.

All finishes that harden are film-building finishes. They can be built to a greater thickness on the wood by leaving each coat wet on the surface to dry. The procedure for rubbing is different for oil and film-building finishes; I'll discuss both.

### Oil Finishes

You can create a fairly smooth oil finish by sanding between coats using very fine grit sandpaper (#320 grit or finer). Be sure to allow each coat to fully cure, which means leaving overnight in a warm room. Some oil finishes, such as Watco Danish Oil and Deft Danish Oil, instruct to apply coats within an hour or two; following these directions won't produce good results.

You can create an ultimately smooth oil finish by sanding each coat while it's still wet on the surface using very fine grit sandpaper. Then wipe off the excess and allow what's left to cure overnight. Here's the procedure.

- Sand the wood to remove machine marks and other flaws.
- Wipe or brush on a wet coat of oil and keep the surface wet for several minutes, rewetting any areas that become dull because the finish has soaked in.
- Wipe off all the excess. Be sure to hang your wet rags to dry, or drape them singly over the edge of a trash can, so they can't spontaneously combust.
- Allow the finish to dry overnight in a warm room.
- Wipe or brush on a second coat of oil and sand the surface while it's still wet in the direction of the grain using #600-grit wet/dry sandpaper. Sand over all areas with three or four back-and-forth strokes. There's no gain sanding more than this. European standard

continued on page 82

by Bob Flexner

*Bob is the author of "Understanding Wood Finishing" and a contributing editor to* Popular Woodworking.

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When you request information, you're automatically entered in our drawing to win a Festool RO125 5" random orbit sander and a CT Mini-vacuum. The RO125's dual mode operation gives you three functions – fast stock removal, fine sanding and polishing – from one easy-handling sander that weighs in at just 4.4 lbs. Combine this sander with the CT Mini-vacuum and you get total dust extraction. The low weight and 2.6-gallon capacity enables you to work clean anywhere. The Mini is extremely quiet and has a tool-triggered and manual start. In addition to the sander and vac, you'll also receive a selection of Festool abrasives. We'll select one lucky winner from the first 200 information requests received from this issue.

*(See Advertiser Index or Product Index for circle numbers.)*

# ADVERTISER INDEX

continued from page 79

A varnish or lacquer sanding sealer has soap-like lubricants included, which make the finish powder when sanded. Sanding sealer reduces protection for the wood, however.

It's always best to sand between coats of a film building finish to remove dust nibs. Use stearated sandpaper to reduce clogging.

A folded brown-paper bag from the supermarket is fairly effective at leveling dust nibs so the finish feels smoother. As long as the finish is fully cured, the paper won't scratch it.

You can create a fairly smooth finish with an even sheen by rubbing with #0000 steel wool. Be sure to rub in the direction of the grain.

"P-grade" sandpaper is rapidly replacing the American standard. Above #220 grit, P-grade numbers move up much faster than non-P-grade. Sandpaper of #600 grit is approximately equivalent to P1200 grit; #400 grit is about P800.

• Wipe off the excess oil and allow the surface to dry overnight.

• Apply a third coat of oil and again sand wet. Remove the excess and allow overnight drying. This is usually all you need to do to achieve an ultimately smooth finish, but you can repeat the procedure with a fourth coat, and with as many additional coats as you want.

One caveat: Sanding an oil finish wet (or even sanding dry between coats) is risky if you have stained the wood. You might sand through some of the color, especially at edges. Sand lightly and carefully.

## Film-building Finishes

Film-building finishes include varnish, lacquer, shellac, water-based finish and two-part catalyzed finishes. Both varnish and water-based finish have a version called "polyurethane." This is the regular finish (alkyd or acrylic) with some polyurethane resin added. Catalyzed finish is also available in one part called "pre-catalyzed lacquer."

Except for varnish, each of these finishes hardens within a couple of hours in a warm room so several coats can be applied in a day. Varnish, on the other hand, requires overnight drying between coats.

## The Sealer Coat

The first coat you apply of any of these finishes is called the "sealer" coat. It stops up the pores and seals the wood. It also leaves the wood feeling rough, so you should always sand the sealer coat smooth. (Though you could skip the sanding and still achieve smoothness at the end by sanding just the last coat, it's easier to sand the sealer coat because it's thin.)

Varnish (not including polyurethane varnish) and lacquer are more difficult to sand than other finishes because they tend to gum up the sandpaper. So manufacturers provide a special product called "sanding sealer" to use as a first coat under these finishes. Sanding sealer is varnish or lacquer with a soap-like lubricant included. Sanding sealer powders when sanded.

If you are finishing a large project such as a set of cabinets with varnish or lacquer, it will be worthwhile to use a sanding sealer for your first coat. But if your project is small, requiring little sanding, it's better to avoid using sanding sealer because it weakens the overall protection of the finish. The included soap weakens the moisture barrier and makes this layer softer than the finish itself.

Instead of using sanding sealer to gain easy sanding, you can thin the finish itself about half with the appropriate thinner (mineral spirits for varnish or lacquer thinner for lacquer). The thinner layer of finish hardens faster so it is easier to sand sooner.

If you are finishing a wood with resinous knots (such as pine), or you are refinishing wood with silicone contamination (it causes the finish to roll up in ridges) or animal-urine or smoke odors, use shellac as the sealer coat. Shellac blocks off these problems (but it is not easier to sand). There's no reason to use shellac otherwise.

No matter what you use for the sealer coat, sand it after it dries using a grit sandpaper that creates smoothness efficiently without causing larger than necessary scratches – most often a grit between #220 and #400 (P220 and P800).

## Sanding Between Coats

It's always best to sand lightly between every coat of finish to remove dust nibs. This is done easily using very fine-grit sandpaper: #320 or #400 grit (P400 or P800). Using a "stearated" or dry-lubricated sandpaper is best because it clogs least. This sandpaper has the same soap-like ingredient as sanding sealer and is usually available at auto-body supply stores.

Sand just enough so you can no longer feel the dust nibs. There's no reason to sand out brush marks or orange peel (caused by spraying) at this point.

## Rubbing the Finish

When you have applied all the coats you want, usually three or more including the sealer coat, it's time to make the surface feel smooth. If the dust nibs aren't bad, you can usually improve the feel significantly by simply rubbing lightly with a folded brown-paper bag.

As long as you have allowed the finish to harden well (so you can no longer smell any odor when you press your nose against it), the

bag will level the nibs without damaging or changing the sheen of the finish.

To create a more perfect and attractive surface, rub it with #0000 steel wool or gray Scotch-Brite. Rub in the direction of the grain. Rub the three or four inches nearest the ends using short strokes (so you are less likely to rub over the edges and cut through). Then rub the entire length, being careful to stop just short of the edges.

You can achieve even better results by using a soap-and-water or mineral-oil lubricant with the steel wool or Scotch-Brite. Oil causes the abrasive pad to scratch the least, but cutting will be slower and the gloss attained higher. You can try one and then the other on the same surface to see which you like best. Most professionals use soap and water.

Be careful using any lubricant because if you cut through you won't see the damage until the lubricant dries.

Rubbing with an abrasive pad, with or without a lubricant, improves the feel and appearance, but it doesn't remove the flaws; it just rounds them over and disguises them with fine scratches. To achieve the ultimate rubbed finish you have to level the finish first and then rub it.

## Leveling and Rubbing

Leveling a finish is a mechanical exercise employing the same exact procedure as sanding wood, with two differences: You use finer grits of sandpaper and you use a lubricant with the sandpaper to prevent clogging. Here is the procedure.

Using a flat sanding block to back your sandpaper, sand the surface until it is perfectly flat. Use a grit sandpaper that cuts through the flaws efficiently without creating larger-than-necessary scratches that then have to be sanded out, usually a grit between #320 and #600 (P400 and P1200).

Use wet/dry sandpaper (black in color) and a lubricant of mineral oil, mineral spirits or a mixture of the two. The oilier the lubricant, the slower the cutting and the less likely the sandpaper will clog. (I find that sandpaper clogs quickly with a water or soap-and-water lubricant, but you can use one of these also.)

On unfilled, open-pored woods you may need to apply more than three coats so you don't sand through. Because finishes differ in solids content and thus build, and because everyone applies finishes differently, you will need to experiment on scrap wood to learn the number of coats necessary so you don't sand through. Think in terms of four to seven.

A finish has no grain so you don't need to sand with the grain. In fact, you can sand in circles, which I find easier, and you can sand cross-grain near the ends (to keep from sanding through the finish at the edges).

Each time you advance to a finer grit sandpaper, change directions (circles, with the grain, across the grain) until you reach your finest grit which should go with the grain. By removing the sanding sludge with naphtha or mineral spirits, you will be able to see clearly when you have removed all the scratches from each previous grit sandpaper (a big advantage over sanding wood).

You will see your progress better if you use gloss finish rather than satin. After sanding a little, scrape off the sludge from parts of the surface using a plastic spreader. If you see shiny troughs or spots, the surface isn't level. When the surface is an even satin sheen overall, it is level and you can move to a higher grit sandpaper to remove the coarser scratches.

Once the surface is level, sand or rub it with finer and finer grit abrasives until you achieve the sheen you want. Begin by sanding up to at least #1000 grit, continuing to back your sandpaper with a flat block or a felt or sponge pad. Then rub with #0000 steel wool, or with pumice and a mineral-oil lubricant using a felt or cloth pad.

If you want a higher gloss, sand up to #2000 grit (P2000 or higher) and then rub with rottenstone and a mineral-oil lubricant using a felt or cloth pad. Or use any other abrasive rubbing compound.

## A Final Word

I find that woodworkers are often afraid of sanding a finish on a newly made project for fear of sanding through. This is sort of like the fear of sanding veneer the first time. You have to do it to learn that it takes a lot of sanding to actually sand through. So with rubbing a finish, I suggest you first practice on a scrap piece of veneered plywood to gain confidence. Apply a number of coats of finish and sand them after they harden to get a feel for how much sanding it takes to sand through. **PW**

Instead of using steel wool dry, wet the surface with soap and water or mineral oil and then rub. Rubbing wet produces better results, but you run the risk of rubbing through and not seeing it happen. You will make the rub-through much worse.

If you want to create the most perfect results when using a film-building finish, you have to level it using fine wet/dry sandpaper, a backing block and a lubricant.

You will be able to see your progress leveling a finish better if you use gloss finish. When you remove the rubbing sludge, glossy spots show the places you haven't sanded enough.

You can create an even satin sheen on a leveled surface by rubbing it with pumice and a mineral-oil or mineral-spirits lubricant. Use a felt or sponge pad.

# Swingin' Outfeed Table

## Get extra outfeed space without sacrificing precious floor space.

Photos by Al Parrish

Who says that table saws aren't "hip?" This version of an outfeed table puts a little swing in one of the most useful but problematic tools in my shop, and like Duke Ellington says: "It don't mean a thing if it ain't got that swing." In my cramped shop, this is especially true. Wall space has premium value, and precious little is available to hang accessories and supplies on. The only thing more precious is my floor space.

My table saw at home is a classic contractor saw. During any rip, the pieces run off the end of the table and drop on the motor. This is not exactly safe, nor good for the components for my projects. I needed a short outfeed table for most of my work, but on the long rips or bigger panels, I needed a table with more space. Rockler offers a terrific kit for attaching an outfeed table to most table saws, whether it's a contractor saw like mine, or a cabinet saw like the one in the *Popular Woodworking* shop shown here. By combining Rockler's hardware with my own version of a drop leaf table, I came up with my swingin' new outfeed table that will work on almost any table saw to provide more workspace.

by Eric Hedberg

*Eric is a writer and woodworker in St. Paul, Minnesota. When he isn't designing creative woodworking jigs, he actually takes time to work on the projects for which they were meant.*

### Getting in the Swing of Things

The outfeed table is made up of two pieces. The short table is 12" x 40". The swing table is 24" x 40". They can be made of any suitable panel material such as Baltic birch plywood or melamine. Cut the tops to size (don't you wish you had an outfeed table?). A circular saw is fine, as absolute squareness is not necessary for them to function properly.

There are some minor steps to fit the short table to your saw. Part of that will be determined when you attach the mounting hardware to your saw (see photo on page 85). Each saw will require slightly different adjustments to mount the short table. You may need to leave more or less room between the saw and the short table's aprons, depending on the mounting procedure. A $\frac{3}{4}$" x $\frac{1}{8}$" rabbet was necessary to fit the table snug against the saw top on the Powermatic saw shown above. Also, you'll want to rout a couple of grooves

to extend the miter gauge slots into the short table. Otherwise your miter gauge bar will be blocked by the short table.

When you've finished the tabletops, it's time to cut the parts for the apron pieces. The apron can be made from any suitable soft/hardwood or even plywood stock you have available.

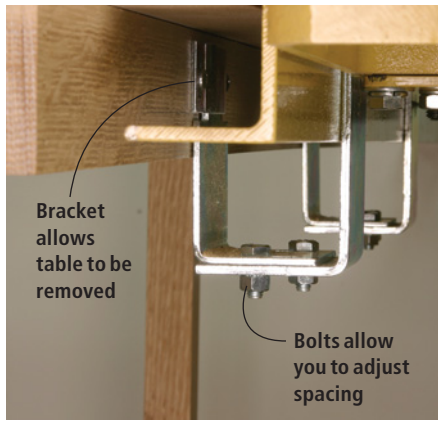
The legs are 1½" x 1½" and cut to a length appropriate for your table saw. Two levelers are included in the Rockler kit, and to ease adjustment, I suggest buying another set of levelers so that all four legs can be easily set to the right height.

### Putting it All Together

Before assembling the aprons, mount the table saw hardware on the saw according to the directions included with the hardware. Center the front apron piece and mark locations for the brackets and screws. Remember to allow for the ¾" top when aligning the apron piece to the saw's tabletop. Screw the brackets to the apron and tighten the bolts on the table saw. You can make adjustments at this stage to get the height just right without dealing with the completed table.

Now the fun starts. I used my pocket-hole jig and used pocket screws to assemble the small table and apron. Pocket screws are quick and easy to use and sufficiently strong to hold things together. If you like your biscuits, go for it. Just about any table-assembly method will work fine.

The back edge of the large tabletop will overhang the apron by 6". This gives clearance for the legs of the drop leaf. I screwed the permanent legs to the inside of the apron and attached the folding legs using the hardware included in the Rockler kit. The folding legs are staggered to allow them to fold up. You can space them as you choose, but about a ½" between them is just fine. Install the locking hinges first and then the legs. Make sure they swing in the correct direction.



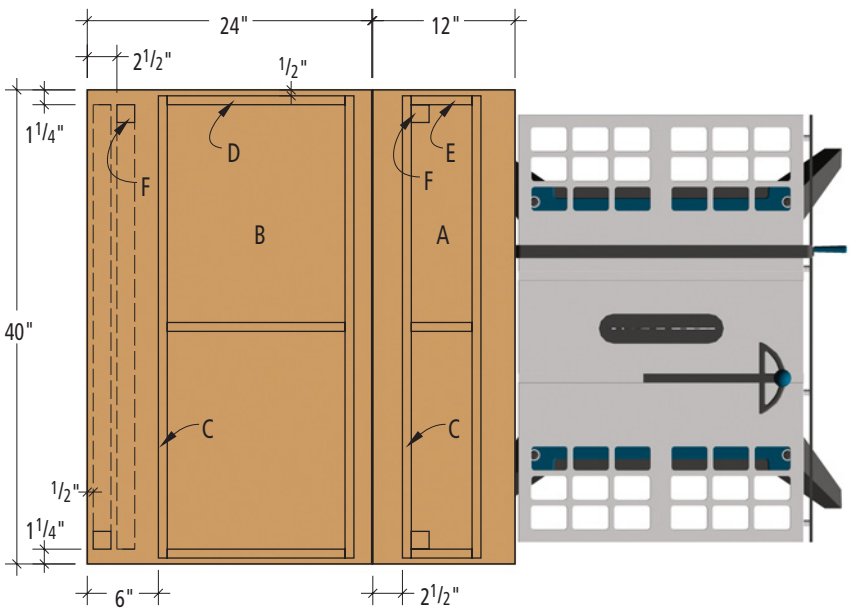

The mounting hardware from Rockler is adjustable for height and distance between the saw and table. A bracket is mounted to the outfeed apron and that bracket slips in place over the hardware mounted to the saw.

With everything upside down on your bench, slide the swing part of the outfeed table up to the mating edge on the assembled short table. Install a piano hinge to the underside of the two tables, bridging the gap. Be careful to center the barrel of the hinge on the gap. When the swing table is opened, the hinge will be at a 90° angle.

Now hang the assembly on the saw. This is a good time to tune up the leg lengths and bracket adjustments. Lift the assembly off the saw to make these adjustments.

### Hitting the Floor

When everything looks satisfactory, reinstall the assembly on the back of your table saw. Check the assembled outfeed table for operation and seal and finish the table as you choose. Most of the time you will probably, like me, find the short outfeed table sufficient, but when those panels and long pieces show up, your outfeed table will be ready to swing into action at a moment's notice. **PW**




Plan

## SWINGIN' OUTFEED TABLE

| | NO. | LET. | ITEM | DIMENSIONS (INCHES) T | W | L | MATERIAL |
|---|---|---|---|---|---|---|---|
| ❑ | 1 | A | Short table | ¾ | 12 | 40 | Plywood |
| ❑ | 1 | B | Swing table | ¾ | 24 | 40 | Plywood |
| ❑ | 4 | C | Aprons | ¾ | 2¼ | 39 | Oak |
| ❑ | 3 | D | Aprons | ¾ | 2¼ | 15 | Oak |
| ❑ | 3 | E | Aprons | ¾ | 2¼ | 5⅛ | Oak |
| ❑ | 4 | F | Legs | 1½ | 1½ | 32 -36 | Oak |

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# Common Ground

## Shared love of craftsmanship brings father and son closer.


Illustration by Pat Lewis

My dad was a cabinetmaker for most of his working life. Unfortunately, he plied this trade in a small, working-class town in Northwestern Ohio, a town with more farmers than investment bankers, with more machinists than venture capitalists. So there weren't many local residents with the financial resources to hire my dad to build the high-style period reproductions he yearned to build. Instead, he built an ocean of kitchen and bathroom cabinets, remodeled every Columbia Gas Co. office in the northern half of the state, and built a dozen homes from scratch, fitting each with custom cabinetry of unusual quality.

My first job in high school was in his shop sweeping floors, unloading lumber and watching the clock. That's what I did best – I was without peer.

After high school I went on to college, where I also worked the midnight shift at a local foundry. The hours were a better fit with my classes than working during the day for my dad. Besides, the whole woodworking thing had grown old. At the foundry, there were young guys to talk to, and the work – shoveling molding sand onto a conveyor belt – was, I guess, more manly than fussing with wood and glue and screws.

I graduated from college. My dad took a job as maintenance supervisor for the Ohio Power Co. I moved to Texas to teach secondary English. In the evenings, my dad finally got to build the kind of furniture he had always dreamed of building.

Then a funny thing happened. I bought a few tools and some wood, and I started to make things myself. Utilitarian stuff. Bookshelves made of #2 white pine, nailed together and slathered over with spar varnish. Stuff my wife and I needed but couldn't afford to buy ready-made.

When I came home to visit, my dad and I inevitably ended up in his shop. We talked about what he was making and what I was making. Also, *Fine Woodworking* magazine had recently appeared on the scene, and he'd picked up the first half-dozen issues at a garage sale. We each read them cover to cover. Then we each got our own subscriptions. We talked about what we saw there.

I built my first shop. He began to take vacations with a woodworking theme: Williamsburg, for example, and Winterthur. I bought a few power tools. I taught myself how to cut dovetails by hand. So did he.

I don't think we were competitive. My inclinations led me to Shaker furniture. His led him to Chippendale stuff. But I was aware of the quality of his work. It encouraged me to improve my own.

But our shared love of woodworking provided us with a context for our relationship. He's never liked sports, and neither of us much cares about political debate. But we both know something about wood, about craftsmanship, about the profound pleasure of bringing into being something that had previously existed only in our minds. And I don't think relationships can flourish without something shared.

A month after her mother's death, Emily Dickinson wrote to a friend that, "mines in the same ground meet by tunneling." She was talking about the relationship that had evolved between her and her mother when her mother had become older, and when Dickinson herself had become an adult.

This ultimate relationship was, I suspect, based more on things shared and less on the contention-inspiring differences that characterize so much of the interaction between a parent who is an adult and a child who is not yet there.

I don't presume to know exactly how Dickinson plugged that line into her relationship with her mother. As always, Dickinson's language is wondrously ambiguous. But when I think about those words and apply them to my relationship with my dad, I think about our shared love of craftsmanship. Yes, there are differences of age and generation, but those, I realize, are surface issues. Much deeper, in much richer ground, is our shared appreciation for the subtle but powerful joys of the workshop. **PW**

by Kerry Pierce

*Kerry is the author of "Authentic Shaker Furniture" (Popular Woodworking) and numerous other books.*


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