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November 2015 ■ #221

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- Arbor: ⅝"
- Arbor speed: 4300 RPM
- Max. dado width: ¹³⁄₁₆"
- Capacity @ 90°: 3⅛", @ 45°: 2³⁄₁₆"
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- Max. cutting depth: 1/8"
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- Approx. shipping weight: 932 lbs.

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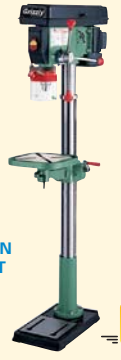

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- Blade size: 131½" long
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- Cutting capacity/throat: 16¼"
- Max. cutting height: 12⅛"
- Blade size: 131½" L (⅛"–1" W)
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CONTENTS

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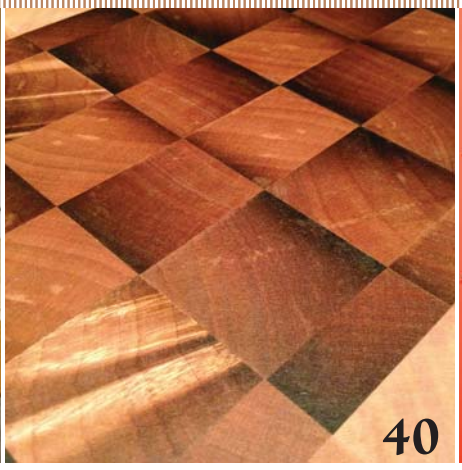

FEATURES

COVER & SUNBURST WALL CLOCK PHOTOS BY AL PARRISH; SHARPENING POND PHOTO BY WILLIAM NG; ROASTED WOOD PHOTO BY MITCH ROBERSON; THREAD CHEST PHOTO BY JIM GIPE/PIVOT MEDIA

CONTENTS

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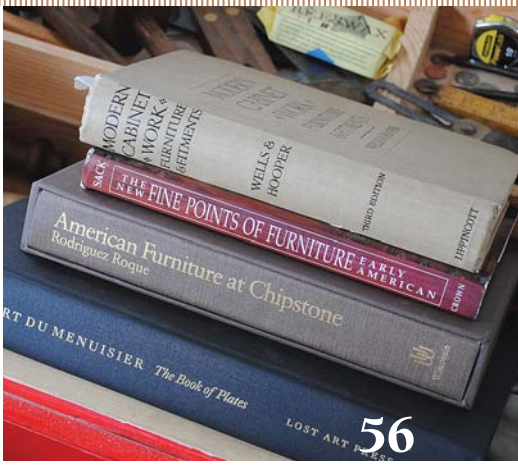

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‘The Urge to Destroy is Also a Creative Urge’

The headline above is a Pablo Picasso quotation. And while I acknowledge that beginning with a quote is among the laziest gambits in writing, darnit, I’m tired.

The open space in the picture below? It was a 16'-long wall (and a floor/ceiling) from the top of a staircase to the front door that was added circa 1955.

Right about where that bottom stud lands is what should be a 4' x 5' landing, then the steps should turn to descend to the entryway floor.

The first bookcase I want to build? It’s going in the front hall to the left of the to-be-rebuilt landing and two lowermost stairs. Until I get the staircase done, I don’t know what size to make said bookcase. Before I can rebuild those stairs, I have to shift some ductwork so the “new” landing doesn’t cover an HVAC return. There are similarly cascading issues with all other projects.

Much of the fun in rehabbing an old house is that it’s like playing a massive (and rather expensive) game of Jenga. If you’re lucky (and good), you end up with a completed project that is the perfect balance between historically correct and, by contemporary standards, comfortably livable…all while appealing to one’s aesthetics.

But of course, there is every chance things might come crashing down around you. (Measure twice, cut once... but check on load-bearing walls and beams three times.)

But the destruction (that destruction, anyway) is almost complete. Then it’s time to create.

I now have my workbench set up in the basement, and all my personal tools on hand. Sure, many of them are still in storage boxes in the dining room, but at least they’re home! And some of them are even starting to see some use.

I’ll be wielding my crosscut saw to cut out the remaining scabbed-on joists shown here, and I might finally be able to put to work a set of No. 12 hollows and rounds I inherited from my grandfather (at least I think that’s where I got them) on the staircase moulding.

As long as life doesn’t get too much in the way, by the time we print the first 2016 issue, I’ll have the landing rebuilt, a solid start on turning the many oak spindles… and will likely still be dreading the plaster repair.

But I’ll try to not bore you anymore with this house stuff here– if you care to keep up with my home reno work, please follow my personal blog at rudemechanicalspress.com (where – fair warning – cat pictures abound). Here, I’m going to try to get back to furniture-making topics – or at least make my house stuff sound as if it’s for a furniture build.

“I am always doing that which I cannot do, in order that I may learn how to do it.” (Also Picasso, and also lazy writing. Did I mention I’m tired?) **PWM**

PHOTO BY THE AUTHOR

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Ellipse or Circle?

George Walker's "Design Matters" column is always fascinating. His explanation in the August 2015 issue (#219) of how an arc can be made more graceful was very useful, but it brought up another question for me: When is a section of an ellipse or another asymmetric curve more appropriate than a section of a circle?

Peter Perotti,
Benicia, California

Peter,
There's an entire design era known as Greek Revival (circa 1800-1840) that favored curves based on an ellipse over those based on a circle.

The ancient Greeks employed the ellipse – unlike those knuckle-dragging Romans – who used sections of circles. On mouldings, elliptical curves will reflect light in a way that the transition zone between light and shadow is softer and more natural looking, while a regular curve will reflect in a way that looks harsher.

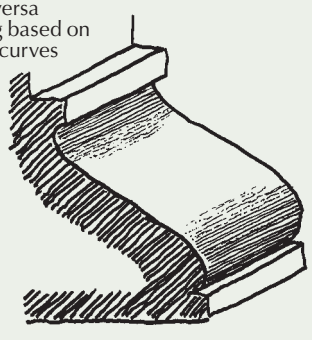
Circles can tend to look artificial or mechanical. An ellipse is one way to avoid this. That said, you can transform that mechanical-looking arc by combining short sections of regular circles that change speed (a tighter or longer radius).

But don't just take my word for it. Here's what Asher Benjamin, author of "The Architect, or, Practical House Carpenter" (1830), wrote: "The Roman…mouldings are made up of parts of a circle, which do not produce that beautiful light and shade effected by the Grecian mouldings."

And I now plan to address elliptical arcs in a future issue.

George R. Walker, contributor

Cyma reversa moulding based on elliptical curves



Moulding based on sections of circles

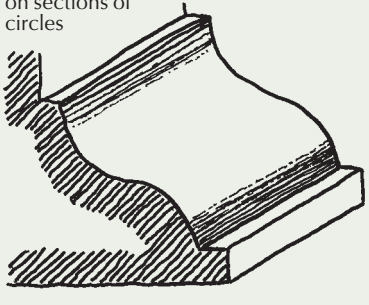


ILLUSTRATION BY GEORGE R. WALKER

Freemason Influences

Is there a Freemason's influence in the manner Jameel Abraham used the compasses (or dividers) in his beautiful chest lid (October 2015, issue #220)?

Jim Gier,
via e-mail

Jim,
I chose the dividers, backsaw and chisels because they are the three tools used to cut the joint traditionally associated with quality woodwork: the dovetail (I rather enjoy cutting fine dovetails by hand).

I'm not a Freemason. It's a common misconception that dividers are a symbol only of Freemasonry (though that's the case when accompanied by a square and usually the letter "G"). But in my research, I found numerous examples from the Middle Ages and on of carpentry and furniture makers' shop signs, trade guild insignia, coins, carvings and the like that all displayed dividers prominently. It's simply that Freemasons (and their symbol) are much more commonplace nowadays than traditional woodworkers' guilds.

Look at my additional photos from the build (benchcrafted.blogspot.com/2015/08/video-and-pics-chest-lid-article.html) and you'll see a Dutch coin from 1627 that heavily influenced my design.

Jameel Abraham, contributor

Minwax or Waterlox?

I am making a rustic dining room table with some reclaimed floor joists from a barn (the wood is either yellow pine or Douglas fir).

I already have Minwax antique oil and I'm wondering if it is similar to Waterlox, or is Waterlox vastly superior?

Brad Motteler,
Peoria, Illinois

Brad,
They are both wiping varnishes (a mix of oil, varnish and thinner). I haven't compared their relative use and performance. Both contain oil, which will bring out the luster in the wood and enhance the figure, and varnish, which offers protection.

But "vastly superior" is a moving target – it depends on your goal. If you're going for water and alcohol-resistance, neither is likely to offer much protection long term (true of any finish when it gets scratched or otherwise worn). With any wiping varnish, you're going to need multiple coats.

You can easily make your own wiping varnish and use a little less oil and a little more varnish so you get a slightly faster build.

My usual mixture is one-third oil-based polyurethane varnish, one-third boiled linseed oil and one-third mineral spirits. I just eyeball the amounts in a Mason jar, shake well to mix, let the bubbles recede, then use it (some people prefer turpentine instead of mineral spirits).

Whatever you use, keep an eye on the finish – when it starts to look worn or you notice water isn't beading on it anymore, scuff sand and add another coat or three.

But, to answer your question, I doubt there's enough difference between the two products you mention to warrant spending money on one when you already have the other. Just apply multiple coats, keep

CONTINUED ON PAGE 10

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CONTINUED FROM PAGE 8

an eye on the protection over the year(s) and add coats as needed.

Megan Fitzpatrick, editor

Hemlock for a Benchtop?

Recently we had a big, very old hemlock tree come down in a storm. Do you think it would make a suitable workbench top? I am talking 3"- to 4"-thick glued-up slabs to make a Roubo-style bench.

As big as the tree is, I probably would not need more than two or three pieces to make the width of a benchtop. I don't know how hard this supposedly softwood will be when it's dry, but I can tell you my chainsaw was not happy cutting the logs.

Jason Stamper,
Mountain City, Tennessee

Jason,

Use whatever is cheap and available. Hemlock isn't as hard or as stiff as dry Southern yellow pine, but the thickness of the top takes care of any stiffness issues.

My only caveat is that, like my white pine bench at home, the hemlock might be a bit on the lightweight side. But put a shelf across the bottom stretchers and keep heavy stuff on it – problem solved.

You'll likely get some dents and dings in the top, but who cares – better to get them in the bench than in the work on top of it.

Megan Fitzpatrick, editor

What is a 'Fair Curve?'

George Walker's design article in the June 2015 issue (#218) was a great help in demystifying the cyma curve. I've used that curve on a number of my projects, but until I read the article, I didn't even know what it was called.

Another curve that continues to mystify me is the "fair" curve. Where could one be used in furniture making? Do you have any tips on how to draw one so that it looks good?

Geary Gaston,
Semmes, Alabama

Geary,

A "fair curve" is a boatbuilder's term and describes any smooth curve that flows without bumps or hollows.

It's not always an easy thing to achieve if you have several different curves merging together, such as on the hull of a boat, a carved Windsor chair seat or the bottom of a sculptured wooden bowl.

You can use a compass as described in my June 2015 column to lay out a fair curve, but the final effect is achieved in the building process by stepping back and viewing it from several vantage points.

A fair curve looks like it grew that way from nature or was sculpted by the forces of wind or water.

George R. Walker, contributor

Conditioning Pine

When conditioning pine before staining, how long should I leave wood conditioner on before applying stain?

Thomas Ellis,
via email

Thomas,

Wood conditioner is varnish thinned with about two parts mineral spirits. You need to let it dry to be effective – not like the directions say. You should allow conditioner to dry six to eight hours in a warm room (overnight if the room isn't warm).

Keep in mind that the stain color will be lighter because the wood is partially sealed. So use the wood conditioner only if you're staining a tight-grained blotch-prone wood such as cherry, birch, maple or pine. **PWM**

Bob Flexner, contributing editor

ONLINE EXTRAS

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Highly Recommended

Though I wipe my tools with a thin coat of oil (jojoba, WD-40, whatever) after every use, sometimes rust happens (particularly on little-used tools). So I keep handy three Sandflex blocks: coarse, medium and fine.

These magic rust erasers are a rubber-like substance impregnated with grit, and make quick work of removing small spots of corrosion. Yes, they cause tiny scratches on the metal (so I use the "coarse" only in dire circumstance). But scratches are far better than rust. One set should last you a lifetime.

— Megan Fitzpatrick

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Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking Magazine*, 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.

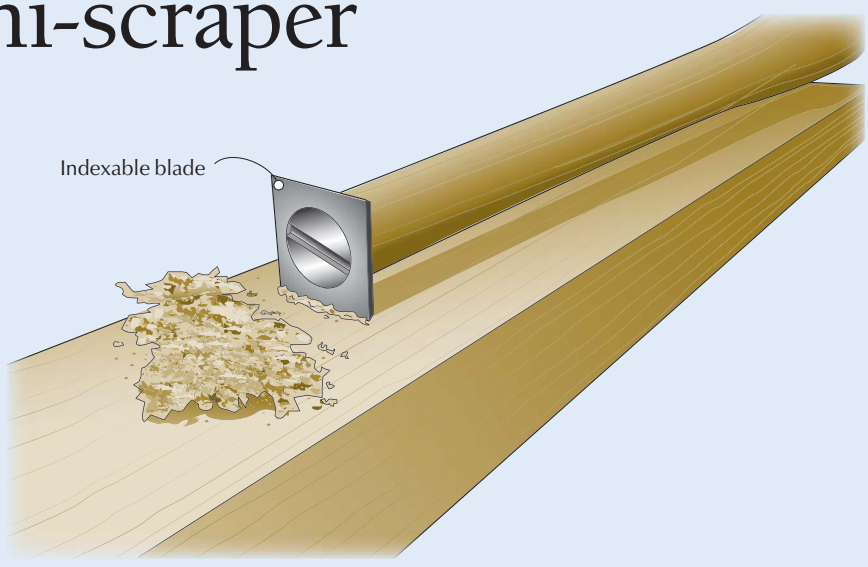
THE WINNER:

Carbide Mini-scraper

A friend needed a small tool to clean out glue inside small places. So I made him a mini-scraper using an indexable blade from my planer, screwed to a turned handle.

Each blade is about $3, plus the screw and scrap of wood turned for the long handle. The carbide cutter scrapes like a dream, and gives four sides of cutting.

Travis Knapp,
Morrisville, Vermont



Adjustable Trammel

I often need to draw a circle or arc that is larger than my largest compass can make. In the past, I've fashioned makeshift drawing tools as needed from scrap strips of wood and a nail. But finally, I decided to make the adjustable trammel (also known as a beam compass) shown here.

The measuring bar is oak; 1/2" x 1/2" x 20", and holds a length of 1/4"-wide tape from an old tape measure. I routed a 1/4"-wide shallow groove down the center of the bar to hold the tape, which is glued in place in the final step.

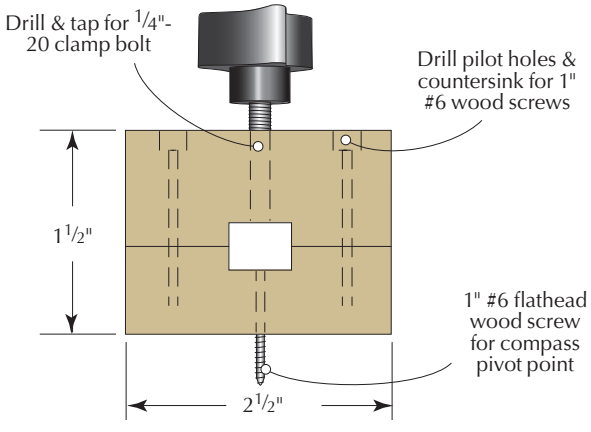
The pencil block is 1 1/2" square x 2" long, and has a hole drilled in it to accept the pencil with a press fit. I routed a 1/2"-wide groove in the base of the pencil block, then glued the oak measuring bar into the groove.

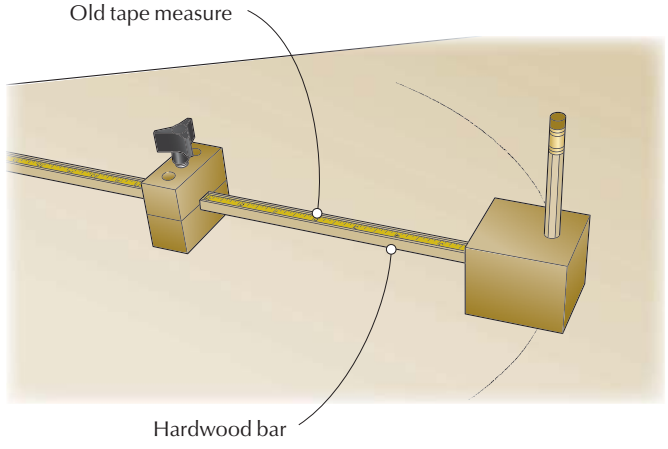
The center block, shown in the detail, is 1 1/2" x 2 1/2" x 1" and is made from hardwood in two pieces, joined with wood screws. The measuring bar passes through the 1/2" x 1/2" square hole at the center. A clamp bolt holds the measuring bar in place during use. I used a 1/4"-20 threaded brass bolt, cut off the head, ground the point smooth, and added a knob. I drilled and tapped the mating hole in the block. The pivot point is a 1" #6 flathead wood screw.

After assembling the components, I calibrated the position of the tape in the measuring bar. With a ruler, I adjusted the trammel so that the pencil point was exactly 8" (an arbitrary distance) from the pivot point. Next, I placed the tape into the groove in the measuring bar, and adjusted it so that exactly 8" was indicated on the inner face of the center block, and glued the tape in place. (Some trimming of the tape is required.)

The trammel is self-measuring; the radius of the circle is read at the inner face of the center block. To use it, set the radius, then tighten the clamping bolt.

Bill Wells,
Olympia, Washington

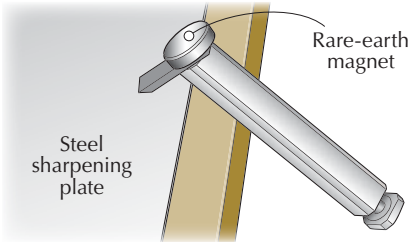




ILLUSTRATIONS BY MARY JANE FAVORITE

Small Blade Sharpening

I was trying to sharpen the bevels on the spearpoint blade of my No. 71 router plane using steel DMT sharpening plates, but I was having a lot of trouble keeping the bevel flat on the plate while sharpening the very small blade.



So, I attached a 1/2"-diameter rare-earth magnet to the heel of the blade and it holds itself to the plate, making the blade much easier to control.

I have also found this to be effective with flat router plane blades, low-angle spokeshave blades and striking knife blades.

Luke Martin,
Winlaw, British Columbia

Zero-clearance Adapter

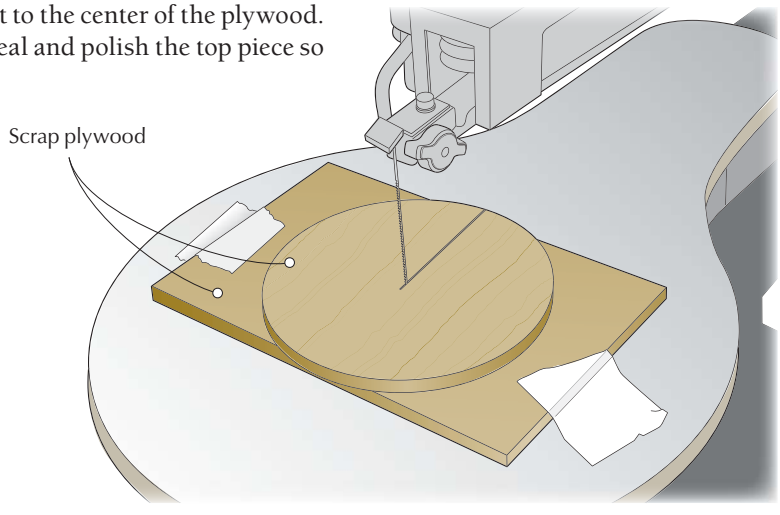
When doing inlay work or scale-model work, I was having a problem cutting out very small pieces; they kept falling through the big slots in the scrollsaw throat plate just as I finished the cut. I solved the problem by gluing together two scrap pieces of thin plywood as shown, smaller piece on top.

Use the scrollsaw to cut a straight line just to the center of the plywood. Sand, seal and polish the top piece so that any wood you will be cutting will slide smoothly on it.

When needed, slip the adapter onto the scrollsaw and tape the bottom piece of plywood firmly in place.

For a band saw, simply make a larger adapter.

Kathy Anthenat,
Springfield, Illinois



Non-skid Bench Hook

I wanted to keep my bench hook from sliding around, especially when I was using it to carve. So I bought a cheap mousepad that has one non-skid side. The other side is a slippery fabric, so instead of gluing it, I stapled the cut-up pieces to the bottom of my bench hook. The staples bed down into the soft material and won't mar the surface you put it on.

Now my bench hook stays put, even when I'm working inside on a slippery kitchen countertop. PWM

Sean Cotter,
McKinney, Texas

Fair Homemade Curves

When laying out curves on the work, one common tactic is to use a thin bendable stick of wood as a drawing bow. Bend the stick against a couple nails and trace the result.

The problem is that this does not usually make a fair curve because the middle bends more than the two ends.

The simple solution is to taper the ends of the stick, leaving it thick in the middle.

Plane the ends so they are about half the thickness of the middle. You will find your curves are much more fluid.

Charles Hayward,
reprinted from *The Woodworker*

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Cash and prizes for your tricks and tips!

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

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BT&C Hardware Store Saw

More than just a saw, this tool offers (useful) infomercial-like functions.

I'm not a fan of multi-tools. In my experience they are marketing gimmicks that do nothing particularly well. But the new Brooklyn Tool & Craft Hardware Store Saw is a huge exception to that rule.

This short panel saw is the ideal toolbox saw. Thanks to its ingenious tooth pattern it rips and crosscuts quite well. Its deep tooth gullets refuse to clog with sawdust. And while the tote is unapologetically machine-made, it actually feels fantastic in use, even after you make more than a dozen cuts right in a row.

And if that were all the saw offered, I'd still write a positive review. But the Hardware Store Saw is even more amazing because of its infomercial-like qualities:

- It's a try square! The front cheek of the hickory tote is 90° to the saw's spine. And it really is square enough for woodworking.
- It's a rule! The spine is etched with both metric and Imperial measurements.
- A protractor! You can lay out angles of 15°, 30°, 45°, 60° and 75° using holes perforated in the sawplate.
- A calculator! Convert fractions to decimals to metric on the chart etched on one face of the saw.
- Lay out dovetails! Set a bevel gauge to 1:6 or 1:8 using the angles on the sawplate.

A great throwback. *The Hardware Store Saw recalls some 20th-century saws that were packed with "features." But these are useful (unlike a laser in the handle). A close-up shows the unusual tooth filing. Though it looks complex, it's actually not much more difficult to file than a standard crosscut saw.*

Hardware Store Saw

Tools for Working Wood

- toolsforworkingwood.com or 800-426-4613

Street price ▪ $149

- **BLOG:** *Read more about the development of this fascinating tool.*

Prices correct at time of publication.

- And more!

Do you need all that stuff? During an intense two-week workout where this was my only saw, I was surprised how often I used the "gizmos" on the .030"-thick sawplate, especially the try square function. After a while it became second nature to lay out my cuts and execute them all with the saw.

So what's the catch? The blade is short – only 15¾" long – so it's going to cut slower than a traditional 26"-long saw. You also will have to get used to the short sawblade so you aren't constantly pulling the saw out of the kerf and slamming the sawplate against your work.

Second demerit: The etching on the early version I used left black marks on my work for the first 100 cuts or so. After that, it didn't mark the work. (The saw's developers are working to eliminate the problem, but it's not a big deal after you break the saw in.)

Once you clear those hurdles, you'll quite like the saw. It's the perfect companion for trips to the lumberyard. It's tough enough to use in the parking lot so you can trim your work so it will fit in your car. But it's good enough for finish cuts in the shop, too.

Oh, and one more important feature: Unlike other toolbox saws, this one can be resharpened; it even offers filing instructions right on the sawplate. This is a permanent saw – not something destined for the garbage after a few years of use.

Highly recommended.

—Christopher Schwarz

CONTINUED ON PAGE 16

PHOTOS BY THE AUTHOR EXCEPT WHERE NOTED

CONTINUED FROM PAGE 14

Ridgid 18-volt 'HyperDrive' 18-gauge Brad Nailer

If you're working with access to electricity, it's easy to plug in an air compressor and run a hose to a brad nailer. But if you're working on a site with no electric, or your compressor hose is too short for the task, well, a cordless nailer is nice to have.

This new brushless-motor, 18-volt, 18-gauge version from Ridgid (model R09890; it does not include the battery or charger) works well, with no noticeable difference in power, compared to the Senco 18-gauge air-powered brad nailer we use in our shop.

'HyperDrive' Brad Nailer

Ridgid ▪ ridgid.com or 800-474-3443

Street price ▪ from $229

▪ **VIDEO** *Watch how the "HyperDrive" nailer compares to a tethered model.*

Price correct at time of publication.

At the rear of the tool is a power-adjustment lever. I simply set it on high, then adjusted the depth of drive (with a simple twist of a knob) as I switched among different-length brads and various types of wood (the R09890 accepts fasteners from 5/8" to 2 1/8"). These are both quick, toolless adjustments.

According to Ridgid, the tool will shoot 2,000 brads (or 2,600 linear feet) per battery charge, but I didn't have that many nails to waste. I switched back and forth between the tool's single-sequential and contact-actuation modes for about 30 minutes, and the battery was still three-quarters charged, according to the indicator lights.

The major difference – quite noticeable after a half-hour – between hoseless nailers and their air-powered brethren is in weight. Though the "HyperDrive" technology replaces the company's older "AirStrike" technology with a lighter weight PVC and magnesium housing for the driving mechanism, it's still heavy, weighing in at 7.64 lbs fully loaded, and with the lithium-ion battery attached. The air-powered Senco is a mere 2.72 lbs.

Still, with a lot of moulding to attach on a tall stairway, this Ridgid is certainly appealing.

— Megan Fitzpatrick

Lie-Nielsen Toolworks Honing Guide

Since the mid-1990s I've been married to my inexpensive side-clamp honing guide, sometimes called an "Eclipse" guide after the firm that developed it. So when Lie-Nielsen Toolworks began showing its side-clamp honing guide around, I resisted even picking it up – I don't like to mess with my sharpening routine in any way.

About two years ago, Thomas Lie-Nielsen asked me to test a prototype of his guide, perhaps because I was skeptical. After six months of using it, I retired my trusty Eclipse. Why? The Lie-Nielsen is simpler to use, requires less fiddling and holds tools with a vise-like grip. Plus, a variety of additional jaws (sold separately) allow you to hold odd-shaped tools and get precise edges.

Honing Guide

Lie-Nielsen ▪ lie-nielsen.com or 800-327-2520

Street price ▪ from $125

▪ **BLOG:** *Read a longer version of this review with details on the jig's array of jaws.*

Price correct at time of publication.

The guide is simpler because it has only one opening to grip both chisels and plane irons. The Eclipse has two. One opening makes setting the sharpening angle easy because you don't have to decide which opening to use.

It requires less fiddling because the jaws are precisely machined from stainless steel. With the Eclipse guide you must first file the jaws so they are coplanar, then file the opening for chisels to hold small chisels. Even after all that, you must confirm the jig is holding a tool correctly every time you use it.

And finally, I have not had a single tool slip in the Lie-Nielsen guide, even though I tighten it with hand pressure only. With the Eclipse, I have to crank it closed with a screwdriver to prevent tools from slipping.

The bottom line is that even though the Lie-Nielsen is far more money than a $15 Eclipse guide, it is well worth the investment. It won't make you a better sharpener (only practice can do that), but it will erase a lot of frustrations so you can focus on putting the tool to the stone. **PWM**

— CS

BRAD NAILER PHOTO BY AL PARRISH

The Star Chamfer

This simple transition of surfaces helps place emphasis where you want it.

Just a week into my machinist apprenticeship I felt, for the first time, the wrath of Big Red. He was the head inspector in the tool room and got the nickname for his fiery temper.

When angry, which was just about all the time, Red puffed up like a mad rooster that attacks with wings and spurs all aflutter. He took it personally when someone did sloppy work or made a mistake.

Out of nowhere, he slammed a chunk of steel on my workbench and slapped down a blueprint, pointing his bony finger at the oil-stained paper and then at the end of my nose. I didn't know who he was or what he was mad about, but out of his mouth erupted a storm of profanity with the words "jackass" and "half-wit" used as punctuation.

After Red stormed off, I looked down at that blueprint and wondered if this apprenticeship thing was such a good idea. The old journeyman who ran the lathe next to mine leaned back, puffed his cigar and asked, "Kid, anyone ever tell you to chamfer the sharp corners on your work?"

Break it Down

Forty years later, I still break the sharp edges on my work with a small chamfer, regardless of whether it's metal or wood. Unless something has a need for a sharp crisp edge, an exposed corner is trouble waiting in the wings.

A fragile edge is too easily nicked or smashed, and it can catch and damage adjacent parts. Besides being a haven for splinters, a sharp edge can injure. But incorporating chamfers in a design goes far beyond just avoiding the scorn of Big Red. A well-placed and proportioned chamfer can have a marked effect on the function and aesthetics of a design.

Small detail, big punch. *A chamfer can transform an otherwise ordinary surface.*

A Functional Bridge

A chamfer at its simplest is an angled transition that connects two surfaces that meet at a right angle.

At a bare minimum, we want a small chamfer for the reasons mentioned above, but for functional reasons, chamfers can play a vital role.

Tools are a good example of how chamfers can make all the difference between something easy to control and comfortable to use, and a beastly object that fights your every move.

In addition to hand-friendly surfaces on tools, chamfers come to the rescue where sharp corners could pinch or bite soft human flesh, or simply show early wear and tear from contact with feet, vacuum cleaners or toddlers on the run.

Any thoughtful design will take into consideration how a piece will mesh with our bodies and its surroundings.

A chamfer is often the ideal solution.

Direct the Eye

Yet beyond these practical considerations, a chamfer can have a profound impact on the look of a design.

Think of a chamfer as a band of reflected light that defines a border and

User-friendly. *The chamfers on this wooden rabbet plane (made by M.S. Bickford) make it hand-friendly, and that translates into accuracy.*

CONTINUED ON PAGE 20

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CONTINUED FROM PAGE 18

Music incarnate. *Lively curves on this Sauer & Steiner shoulder plane positively sing, in part due to the chamfers that highlight the edges.*

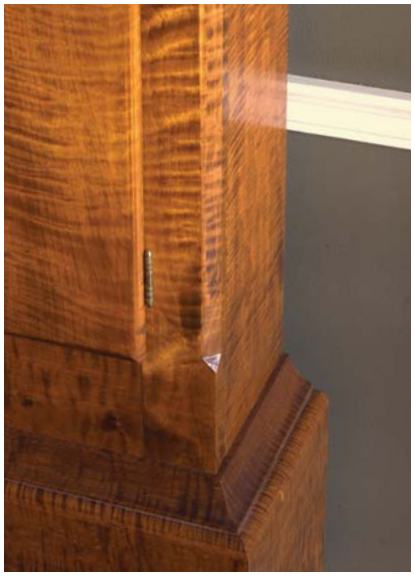
emphasizes a form. That small band of light can highlight a flowing curve, giving it a more fluid sense of motion.

We place paintings in picture frames not just to give us something to secure them to a wall, but to emphasize the artwork. Adding a chamfer as a border helps our eye take in a form and call attention to whatever lies within.

Think of a chamfer as an almost invisible picture frame that can highlight a shape. Invisible because all we are really doing is playing with light around the edges. To get someone's attention, a whisper can be more effective than a shout. A chamfer is a way to whisper with light.

Because a chamfer highlights what's already there, we can use it to place emphasis where we want it. A chamfer on the narrow waist section of a tall case clock echoes its vertical stance.

In addition to highlighting a form, a chamfer can also be used to visually lighten the mass of a piece. We can slim the look of a beefy table leg without sacrificing strength, or lighten the appearance of a tabletop by chamfering the underside edge.



Stand up straight. *Chamfers can emphasize the vertical.*

Application

You can cut a chamfer with power tools, and with the simplest of hand tools. I often use no more than a sharp chisel and a block plane. The bigger question is how to proportion a chamfer so it complements the form.

Here are a few considerations to think about when sizing a chamfer.

On a practical level, you first need to consider the thickness of the stock. The edge of a 3/4"-thick board will yield a 45° chamfer that spans just over 1" wide if we max it out. You seldom want to eat up the entire width of the stock, so at a minimum, our chamfer will be less than that.

For aesthetic considerations, I always think of a chamfer as a border and try to compare it with the space it is framing. When sizing any border, we always want it to relate to the span of the adjacent surface. For example, a chamfer on the edges of a waist on a tall case clock would relate to its width.

Amp it up. *Add reeds, flutes or carving to add interest to a chamfer.*

Divide up the width into eight, 10, 12 or even 20 equal parts and use one part to size the chamfer.

There's no magic number, but by taking this approach, it forces you to compare the border with the space it highlights. Try different divisions until you find that sweet spot that pleases your eye.

Variations to Consider

A simple flat chamfer creates contrast by reflecting light differently than the adjacent surface.

Traditionally, artisans created different effects by carving the surface of a flat chamfer. Carved reeds or flutes can add additional shadow lines that ups the octane on the highlights.

Relief carving leaves, vines or patterns can create interesting contrast by giving a sense of texture when viewed from a distance and a delightful detail when viewed up close.

Inlays and veneers in contrasting colors can also provide a bolder highlight from a distance while providing interesting detail when up close.

Take the time to look closely at chamfers on masterful work and note how they were used to successfully emphasize a form.

And don't forget to break those sharp edges before Big Red sees them. **PWM**

George is the author of two design DVDs (Lie-Nielsen Toolworks) and writer of the Design Matters blog.

ONLINE EXTRAS

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- **popularwoodworking.com/nov15**

BLOG: *Read more from George R. Walker on his Design Matters blog.*

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About This Column

Design Matters

Design Matters dives into the basics of proportions, forms, contrast and composition to give you the skill to tackle furniture design challenges with confidence.

SHOULDER PLANE PHOTO BY KONRAD SAUER

Popular Woodworking Presents

Woodturning with Tim Yoder

— Tune in now. Shows airing each Saturday! —

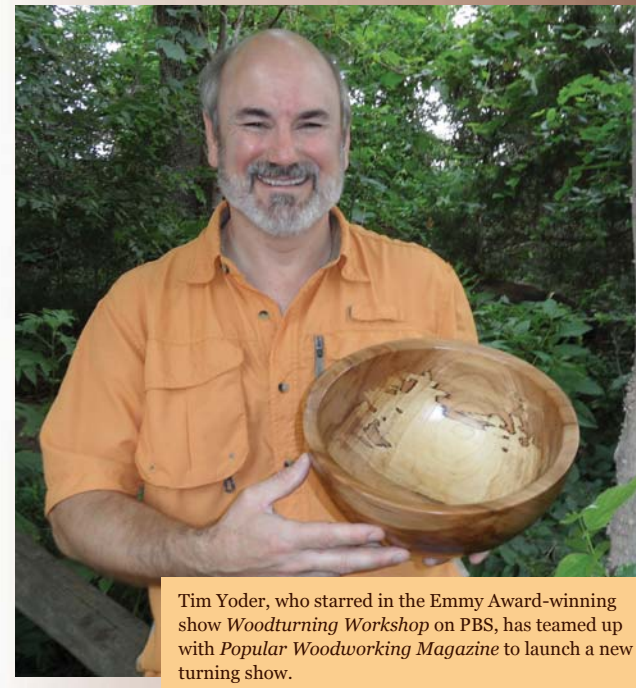
Popular Woodworking Magazine has teamed up with well-known PBS star Tim Yoder to launch a new online video show, filled with expert and friendly advice that will teach you how to become a better woodturner.

In each 30-minute episode, Tim takes you through the process of making beautiful woodturning projects, from wine stoppers and duck calls to platters and bowls. Along the way, you'll learn his favorite turning tips and techniques, and he'll offer reviews of the latest lathe tools, chucks and accessories to help you determine the best products to buy.

Whether you're an experienced woodturner who wants to improve your skills or you're new to the hobby and want to learn basic woodturning, *Woodturning with Tim Yoder* is a show you'll want to watch.

Visit **www.popularwoodturning.com** every Saturday for the latest episode of *Woodturning with Tim Yoder*.

This show is brought to you by: Easy Wood Tools, Robust Lathes, Titebond Glue, Thompson Lathe Tools, Woodworkers Emporium, and Rikon Power Tools.



Tim Yoder, who starred in the Emmy Award-winning show *Woodturning Workshop* on PBS, has teamed up with *Popular Woodworking Magazine* to launch a new turning show.

Knockdown English Workbench

BY CHRISTOPHER SCHWARZ

With $100 in lumber and two days, you can build this sturdy stowaway bench.

Many knockdown workbenches suffer from unfortunate compromises.

Inexpensive commercial benches that can be knocked down for shipping use skimpy hardware and thin components to reduce shipping weight. The result is that the bench never feels sturdy. Plus, assembly usually takes a good hour.

Custom knockdown benches, on the other hand, are generally sturdier, but they are usually too complex and take considerable time to set up.

In other words, most knockdown workbenches are designed to be taken apart only when you move your household. When I designed this bench, I took pains to ensure it was as sturdy as a permanent bench, it could be assembled in about 10 minutes and you would need only one tool to do it.

The design here is an English-style workbench that's sized for an apartment or small shop at 6' long. It's made from construction lumber and uses a basic crochet and holdfasts for workholding. As a result, the lumber bill for this bench is about $100. You'll need four 2" x 12" x 16' boards and one 1" x 10" x 8' board.

I used yellow pine for this bench, but any heavy framing lumber will do, including fir, hemlock or even spruce.

The hardware is another $75. The supplies list notes high-quality hardware from McMaster-Carr; you could easily save money by doing a little shopping or assembling the bench with hardware that is slower to bolt and un-bolt.

About the Raw Materials

The core of this workbench is ductile iron mounting plates that are threaded to receive cap screws. This hardware is easy to install and robust. The rest of the hardware is standard off-the-rack stuff from any hardware store.

No matter where you buy your lumber, make sure it has acclimated to your shop before you begin construction. This workbench is made up of flat panels, so having stable wood will make construction easier and will reduce any

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY LOUIS BOIS

Mounted for work. *The ductile mounting plates are easy to install and durable.*

warping that comes with home-center softwoods.

When I bring a new load of lumber into my shop, I cut it to rough length and sticker it. I have a moisture meter that tells me when the wood is at equilibrium. If you don't have a moisture meter, wait a couple of weeks before building the bench. Also, if the end grain of any board feels cooler to the touch than its neighbors, then that board is still wet-ish and giving off moisture. So you might want to give that stick some more time to adjust.

This workbench is made up of five major assemblies that bolt together: two end pieces, two aprons and a top. Each assembly needs some cutting and gluing. Let's start by building the legs.

Glued-up Legs

The joinery for this workbench is mostly glue, screws and a few notches. All those joints are in the two end assemblies. Each end assembly consists of two legs made by face-gluing two boards together. The act of gluing these two boards together creates a notch for the bench's aprons.

So begin making the end assemblies by gluing the 5½"-wide leg parts together for each of the four legs. If you don't own clamps, glue and screw these parts together, then remove the screws after the glue has dried. If you own clamps, I recommend sprinking a pinch of dry sand on the wet layer of glue between the laminations to prevent the pieces from shifting during the clamping process.

Four legs good. *By gluing a short piece and a long piece together, you create a thick leg and the notch for the workbench's apron.*

While the glue in the legs is drying, turn your attention to the aprons.

Laminated Aprons

Like the legs, the front and rear aprons of the workbench are made by face-gluing two parts together to thicken the piece and create notches for the other assemblies.

Each apron consists of a 2x12 glued to a smaller 1x10 piece. The 2x12 is the exterior of the workbench. The 1x10 makes notches for the legs.

The length of the 1x10 is the distance between the left legs of the bench and the right legs. In this 6' workbench, the 1x10 is 45" long. If your bench is longer, make these parts longer.

Glue and affix a 1x10 to its 2x12 – and make sure the smaller piece is centered on the length of the larger. I used glue and nails to put these parts together. Any combination of glue, screws and nails will do.

Once the aprons are assembled, you can then clip the corners of the aprons if you like. The 45° corners are cut 4" from

Aprons at work. *Here you can see the 2x12 apron glued to the 1x10 interior piece. The legs will then butt against the 1x10.*

Can't miss. *By drilling these holes while the pieces are together, you ensure they will mate up again.*

Mounting plates. *Here is how the mounting plates look when they are installed. First you tighten the bolts, then you screw the mounting plate down. This way you can't miss.*

the ends of each apron with a handsaw. The next step is to use the heavy-duty ductile hardware to bolt the legs and aprons together.

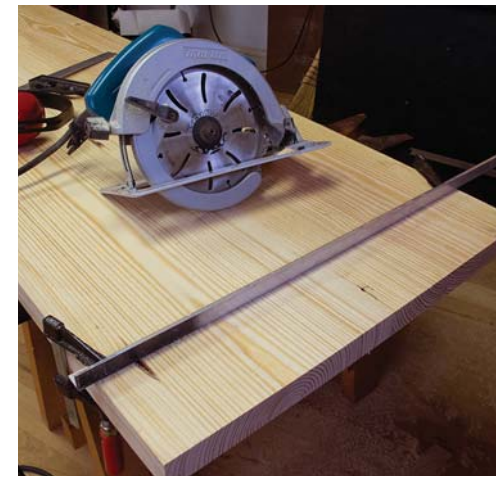
Legs & aprons. *With the legs and aprons bolted together, you can glue up the parts for the benchtop.*

Hardware Install

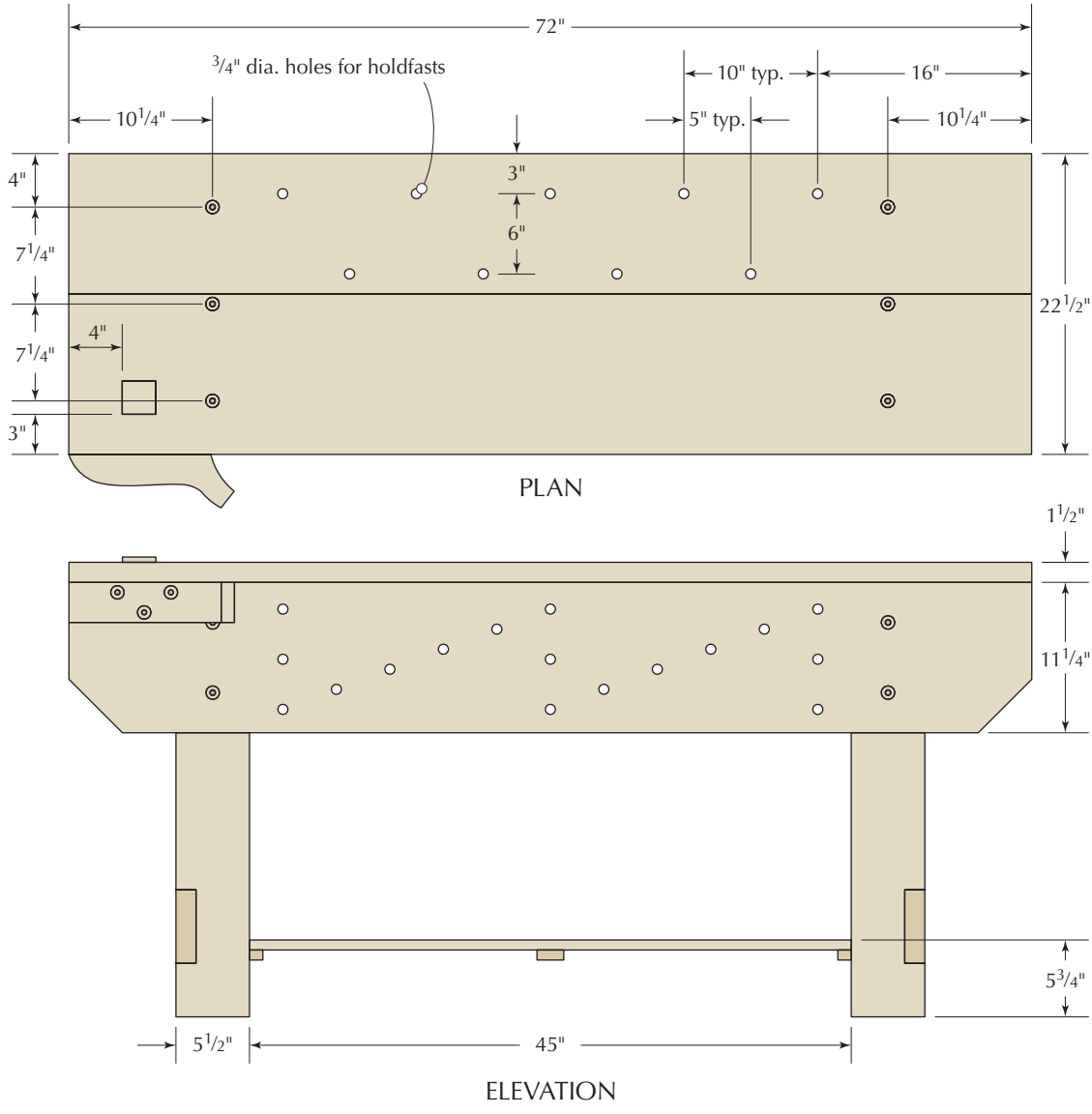
Clamp a leg to one of the aprons, making sure the leg is snug against the notch created by the apron's 1 x10. Now lay out and drill the counterbore for the washer and the clearance hole for the bolt's shaft. The clearance hole should go all the way through the apron and leg. The counterbore should be deep enough to hold the head of the bolt, the washer and the lock washer.

Now lock the leg and apron together with the hardware. Thread the bolt through a lock washer and then a washer. Push the bolt through the clearance hole. Spin a ductile mounting plate onto the bolt on the other side.

Snug up the mounting plate, then tighten the nut with a socket wrench.



Easy & accurate. *I use aluminum angle pieces for winding sticks. I also use them as edge guides for my circular saw. Clamp the aluminum angle to your benchtop and make your cut.*



Once both bolts are snugged up on the leg, you can permanently install the mounting plates with screws.

Repeat this process with the other three legs. When you are done you will have two aprons with their legs attached.

Beefy Benchtop

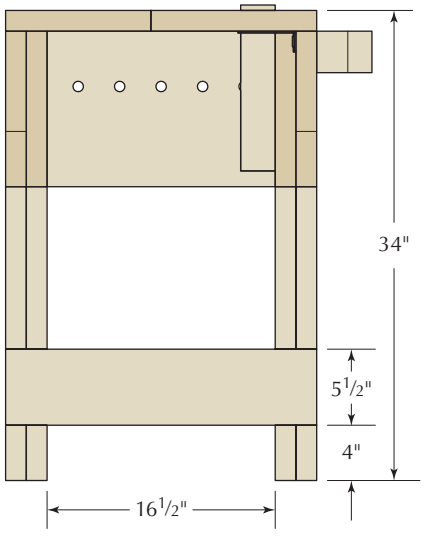
One of the downsides to many English workbenches is that the top is springy because it is thin or unsupported from below. The traditional solution was to add "bearers" under the benchtop.

These cross members ran between the front apron to the rear apron. And while they do make the benchtop stouter, I have never liked these tops as much as I like a simple thick benchtop.

The top surface of the benchtop is made from 2x12s that have been edge-glued to create a flat panel. This benchtop is 22½" wide because it is made from two 2x12s. You can make it narrower if you like – an 18"- to 20"-wide bench is stable enough for handwork.

Glue up your two planks for your benchtop and cut the top to its finished width and length.

It might be tempting to glue on the second layer of 2x12 to make the benchtop its final thickness. Resist. It is easier to first attach the aprons, legs and thin top. Then, once you finish building the end assemblies, you will know the exact size of this second top piece and exactly where it will go without measuring.



PROFILE

Leg up. *With the bench temporarily assembled like this, you can fit the pieces between the legs so they match the space available.*

Can't miss II. *With the top plate between the legs, you can put each stretcher on with screws (skip the glue because this is a cross-grain construction).*

Feet in the Air

This next step ensures that the end assemblies will be the correct size for the width of your top. Assemble the bench upside down on sawbenches. Clamp the aprons to the top and push things around until the legs are square to the underside of the top and the aprons line up with the top all around.

Once you have everything clamped as you like it, you can fit the pieces for the end assemblies that go between the front legs and the back legs. There is a top plate that is the same width as the legs, plus a top stretcher made from a 2x12 that fits between the front apron and the rear apron.

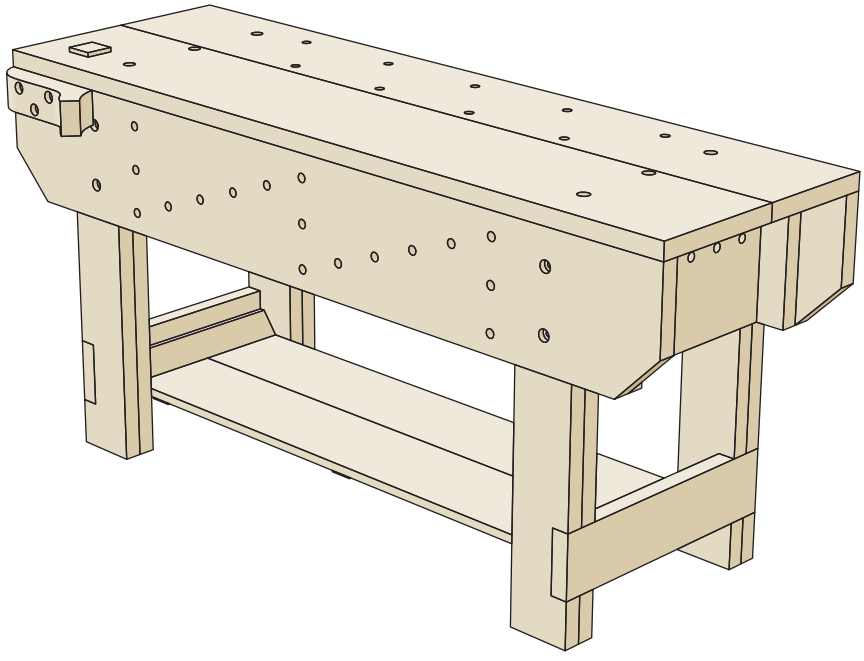
Cut these pieces to fit. Then wedge

An end, assembled. *I know this is an odd construction, but it works. And once you see it, you'll get it. Here you can see the finished end assembly with the lower stretcher ready for trimming and screwing.*

Knockdown English Workbench

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑ 4	Legs (interior)	1½	5½	32½	Yellow Pine
❑ 4	Legs (exterior)	1½	5½	21¼	Yellow Pine
❑ 2	Aprons (exterior)	1½	11¼	72	Yellow Pine
❑ 2	Aprons (interior)	¾	10	45	Yellow Pine
❑ 1	Benchtop (exterior)	1½	22½	72	Yellow Pine
❑ 1	Benchtop (interior)	1½	18	45	Yellow Pine
❑ 2	Top stretchers	1½	11¼	19½	Yellow Pine
❑ 2	Top plates	1½	5½	16½	Yellow Pine
❑ 2	Lower stretchers	1½	5½	22½	Yellow Pine
❑ 4	Glue blocks	1½	11¼	2½	Yellow Pine
❑ 1	Planing stop	2½	2½	12	Yellow Pine
❑ 1	Crochet	3	4	12⅜	Yellow Pine
❑ 1	Shelf	1½	16½	53	Yellow Pine
❑ 2	Cleats	2	2	16½	Yellow Pine
❑ 3	Battens	1½	2	14½	Yellow Pine

Flat makes flat. *If your bench base is twisted, your benchtop will be twisted. It pays to get all the base bits in the same plane.*



3D VIEW

the top plate pieces between the legs and screw the stretchers to the legs.

With the top stretchers screwed to the legs, you can take the bench apart, then glue and screw the top plates in place. Don't forget to glue the edge of the top plate to the face of the top stretcher. There is a lot of strength to be found there.

The last bit of work is to attach the lower stretchers to the legs. These stretchers are in a notch in each leg. Cut the notch with a handsaw and clear the waste with a chisel. Then screw and glue the lower stretchers into their notches.

Reassemble the bench's base so you can get the top complete.

The Top (& Details)

With the base assembled, level the top edges of the aprons and the end assemblies so they are coplanar – that's the first step toward a flat benchtop.

I dressed these parts with a jointer plane and block plane and checked my work with winding sticks and a straightedge.

Before you put the top on the base, I recommend one little addition at this stage. I attached glue blocks – for the lack of a better word – to the aprons so the end assemblies would be captured. You can see in the photo above that I used an offcut from a 2x12 and oriented the grain sympathetically with the apron. This five-minute upgrade makes the bench easier to assemble and a bit stouter.

Bench, flatten thyself. *Traverse the underside of the benchtop with a jack plane to get the surface fairly true.*

Boring for strength. *I put three bolts through each assembly. This keeps things flat. Yellow pine doesn't move much, so I allowed for only a little expansion and contraction by making my clearance holes $^{1}/_{16}$" larger than the diameter of my bolts.*

You have probably used benches with vises your entire woodworking career. A face vise and tail vise are pretty much the way to go, right?

Maybe. Maybe not.

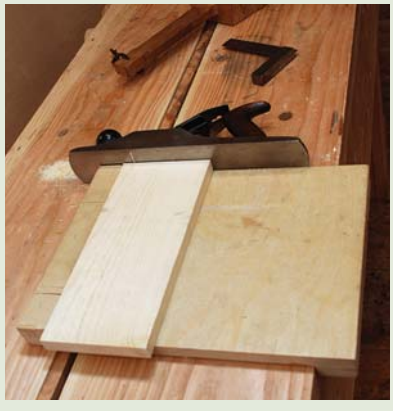
Once you get the hang of it, viseless workholding becomes very fast and can be liberating and fun. Many of these techniques are quite useful, even if you have a vise on your bench. I find them useful for the entry-level person on a budget as well as for the seasoned woodworker seeking to expand his or her options.

Let's look at how to accomplish some of the more common tasks at a bench: planing faces, edges and ends of boards; crosscutting and ripping; and sawing a couple of joints.

— Mike Siemsen

Face planing. *Face planing is accomplished by using a planing stop in combination with either battens or a doe's foot. A holdfast keeps the doe's foot in place at the corner of the workpiece to push it against a toothed planing stop. The wedge under the workpiece corner keeps a high corner from rocking. Plane toward your stop and the battens, and don't drag your plane on the return stroke, or the board will pull away from the stop. Flip the doe's foot over if the angle is wrong for a holdfast hole.*

Edge planing. *Here are two positions for edge planing: One board is in the crochet and supported by pegs (in holes in the apron) and a batten; the other is supported by the benchtop and held against the planing stop. If the pegs are too far apart, place a batten on the pegs and place the edge of your stock upon that. If the workpiece is narrow and flexes under the plane, or doesn't reach above the benchtop with the pegs in their highest position, plane the board against the planing stop on the benchtop. If there are hollows under the board, place wedges in them to keep the board from flexing away from the plane. If the board tips over, you are not planing with even pressure. End grain can be planed in the same manner, but to avoid splintering, plane almost to the corner, then flip the workpiece and finish planing.*

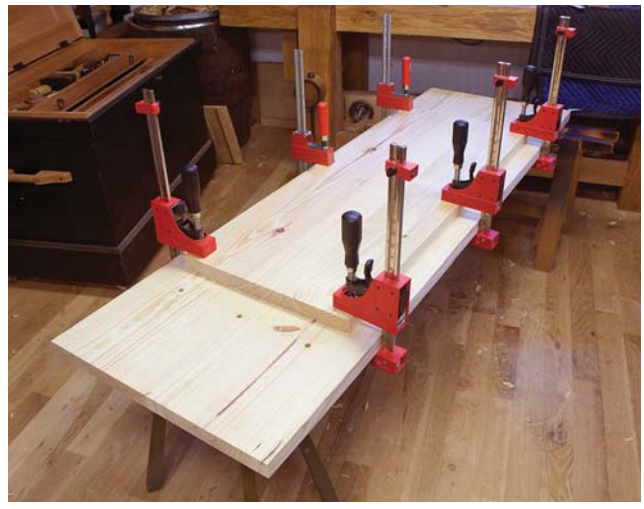


End grain. *A bench hook can be used as a simple shooting board for longer or wider boards; the plane rides on the benchtop.*

Tenons. *Tenoning can be accomplished with the material in the crochet, angled against a peg and held with a holdfast. Angle the board away from you and saw the corners, reverse the board to saw the opposite corners, then square across the bottom. Cut the shoulders in the bench hook (or at the end of the bench using pegs and a holdfast).*

Dovetail saw cuts. *Secure the workpiece against the apron with a thick batten held flush to the benchtop with two holdfasts, and supported by two pegs in the apron's holdfast holes. I like to take a scrap of stock the same thickness as the material being dovetailed and put it to one edge of the chop. I place my holdfast just to the inside of the scrap and give it a good whack. This will keep that end of the chop fixed so that I need only to loosen the other holdfast when changing out parts to be worked.*

Dovetail chopping. *Stacking the parts to be chopped saves the need to reset the holdfast individually for each workpiece.*



Overkill. *After gluing and screwing the second benchtop piece in place I also clamped things together while the glue dried.*

SUPPLIES

McMaster-Carr
mcmaster.com or 330-995-5500

15 ▪ Ductile mounting plates for 3/8" x 16 threaded rod
#11445T1, $1.83/ea.

15 ▪ High-strength steel cap screws, 3/8" x 16 thread
#92620A636, $9.95/pack of five.

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

1 pair ▪ Gramercy Holdfasts
#MS-HOLDFAST.XX, $34.95

From any retailer:

- Plain steel 3/8" flat washers (at least 15)
- No. 10 x 1" slot-head screws (for attaching the mounting plates)
- No. 8 x 2 1/2" wood screws to assemble the ends
- No. 8 x 1 1/4" wood screws for attaching the interior apron bracing (you'll need about 20)

Prices correct at time of publication.

Now you can flatten the underside of the benchtop by using the bench's base for support.

Put the benchtop on the base and plane the underside of the top flat with a jack plane – don't worry about flattening the top of the benchtop. A couple of F-style clamps on the bench base will keep the top in place during this operation.

Test your benchtop by flipping it over and showing it to the workbench's base. When the two parts meet without any rocking, you are done. Clamp the benchtop in place with the worksurface facing up. Now install the bolts, washers and mounting plates through the top and the top plate of the end assemblies. Do this in the same way you attached the legs to the aprons.

Now flip the assembled bench over. You now can see the precise hole where the second benchtop piece should go. Glue up a panel using 2x12 material and cut it to fit that hole exactly. Glue and screw it to the underside of the benchtop. Then lift the workbench base off the benchtop and clamp the top pieces together for extra bonding power.

When the glue is dry, use a block plane to bevel the mating surfaces so they will slide together easily during assembly.

Holes & Holding

You just made a table. Now you need to make it a workbench. To do that you need to add three things: a crochet, a planing stop and holdfast holes. The holdfast holes restrain your work on the benchtop and front apron. The crochet is for edge planing. The planing stop is for lots of things. Let's make the holdfast holes first.

To lay out the holdfast holes on the aprons, draw two or three rectangles on the aprons between the positions of your bench legs. Two rectangles for a 6' bench; three for an 8' model.

Connect two corners of each rectangle with a diagonal line. Then use dividers to equally space six holes from corner to corner on the diagonal lines. Then divide the vertical ends of each rectangle into three using your dividers.

Drill 3/4"-diameter through-holes at each of these locations. These holes in the aprons are great for supporting work from below, especially when edge-planing or dovetailing.

Now lay out the holdfast holes on the benchtop. My preference is to have two rows of holdfast holes on the benchtop (you can always add more later). One row is about 3" from the back edge of the benchtop. These should be spaced every 10" to 16" depending on the reach

Apron holes. *Here I'm drawing the diagonal lines for the holdfast holes in the aprons. Many people use wooden pegs in the aprons instead of holdfasts. Both solutions defy gravity just fine.*

> "The cabinet workbench is a blood brother of the plaid golf bag; there is no inherent reason why its owner should not do great things with the contents, yet he rarely does."
>
> —*Henry H. Saylor (1880-1967), American editor & author*

of your holdfast. Then make another row of holdfast holes about 6" in front of your back row. These should be spaced similarly, but these holes should be offset from the first row, as shown in the drawings and photos.

Be sure to drill some holdfast holes in the legs – both to store holdfasts and to support large work, such as passageway doors. Hold off on drilling any additional holdfast holes until you really need them.

The Planing Stop

The traditional planing stop is a workhorse. I push workpieces against it to saw them, plane them, stick moulding on them, you name it. The stop is a piece of dense wood (yellow pine is dense enough) that is friction-fit into a mortise in the benchtop.

First make the mortise, then make the planing stop to fit.

The mortise for the planing stop is right in front of the end assembly and typically 3" or so in from the front edge of the benchtop. This planing stop is $2\frac{1}{2}$" x $2\frac{1}{2}$" x 12" – a fairly traditional size.

Lay out the mortise on both faces of the benchtop. Then bore out most of the waste with a large-diameter bit. Finish the walls with a chisel. It pays to check the walls so they are perfectly square to the benchtop.

Then plane the planing stop until it is a tight fit in the mortise and it requires mallet blows to move it up and down. Some planing stops also have a toothy metal bit in the middle that helps restrain your work. You can add that later if you like. It can be a blacksmith-made stop, a piece of scrap metal screwed to the top of the planing stop or even a few nails that are driven through the stop so their tips poke out.

Square hole. *This is a great first mortise for a beginning woodworker. Take your time in squaring up the walls.*

Le Crochet

For this workbench I decided to make a crochet that looks exactly like the one in Roubo's "l'Art du menuisier." But to be honest, I don't think the shape matters much. I've used a lot of different shapes and they all seem to work fine as long as they are vaguely "hook-shaped."

I made this crochet from scraps. I glued them together, then shaped the hook on the band saw, finishing it up with rasps.

I attached the crochet with two lag screws and one cap screw, which was backed by a ductile mounting plate. This allows me to remove the crochet from the apron. As you might notice in the illustration, and in the photo above, the crochet slightly interferes with one of the cap screws through the apron. You can avoid this by altering the shape of your crochet or moving the hole for the cap screw.

A Shelf if You Like

I always like having a shelf below my bench to store bench planes and other assemblies. I haven't included the shelf in the calculation for buying materials, so you'll need some extra wood and screws to get the job done.

The shelf is simply a panel that rests on cleats that are glued and screwed to the lower stretchers of the end assemblies. You can also screw some battens to the underside (and/or top) of the shelf to help keep it flat.

The only thing holding the shelf in place is gravity.

The hook. *You can bolt your crochet on. Some early accounts indicate it was nailed on. You probably could get away with glue alone.*

And Finish

You don't want to make your bench too slippery, so stay away from film finishes (or French polish). I recommend using little or no finish. For most workbenches, I usually just add a coat of boiled linseed oil. You can use an equal blend of oil, varnish and mineral spirits or just leave the wood bare.

In the end, this really is a remarkably sturdy bench. Most people who use it cannot even tell that it is designed to be knocked down. It is only after they notice the cap screws in the benchtop that they suspect anything. **PWM**

Christopher is the editor at Lost Art Press and the author of the revised edition of "Workbenches: from Design & Theory to Construction & Use" (Popular Woodworking).

ONLINE EXTRAS

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Woodworking Excellence

Find inspiration from our 2015 award winners.

Looking through the many entries in our third annual PWM Excellence Awards highlighted the fact that good work comes in many shapes and sizes, and from people of all ages and backgrounds. It was a pleasure for the editors and contributing editors to review the submissions – but awfully difficult to select the winners from among so much stellar work. We had to make decisions, however, so here they are: the Grand Prize winner, and the Editors' Choice and Readers' Choice winners in each of our five categories. — Megan Fitzpatrick

GRAND PRIZE

Thread Chest

20" d x 24" w x 51" h

Sharon Mehrman

Florence, Massachusetts

This original design, inspired by the Art Nouveau style, is a one-of-a-kind commissioned piece. Hand-carved vines climb the legs and grow onto the sides of the case. The clematis flower design inlaid into the drawer fronts is made from maple burl, redwood burl and satinwood with burnt-edge shading, walnut burl and dew drops of mother-of-pearl.

Side-hung drawer glides make the compartmentalized drawer boxes removable for convenient use. The top five drawers are for thread storage; the bottom two drawers are for sewing sundries.

The finish is varnish topcoated with urethane and the knobs are solid brass.

See more of Sharon's work at sharonmakesfurniture.com.

PHOTO JIM GIPE/PIVOT MEDIA

EDITORS' CHOICE

Walnut Burl Pen Box
8" d x 10¾" w x 5¼" h

Roger Bean
Shelbyville, Michigan

This small box with a curved lid and shaped front is designed to hold fountain pens and bottled ink. It features a removable African blackwood tray, and a concealed mechanism controls the drawer. Built from a Baltic birch plywood substrate, the veneer is walnut burl with boxwood edging, bordered with string inlay.

The box is French polished, and features a pig suede lining and Queen Anne hardware. (If you're interested in making this box, Roger offers a step-by-step book on the entire process, available at smartboxmaker.com.)

READERS' CHOICE

Chester County Bible Box
8" d x 14" w x 6" h

William Brown
Forest, Virginia

This curly cherry box features classic line-and-berry inlay of holly, as well as other traditional decorative motifs such as the edgebanding. The maker inlaid his and his wife's initials on either end of the box using holly, red cedar and walnut.

The top is attached with iron strap hinges; the finish is shellac.

See more of William's work at LineAndBerry.com.

EDITORS' CHOICE

Birdcage Windsor Rocking Chair
30" d x 34" w x 38" h

Luke Barnett
Adrian, Michigan

This Birdcage-style Windsor chair is firmly rooted in traditional design, but with a few tweaks (the Sam Maloof-reminiscent spindles, for one) to give it a more contemporary look. It's made primarily from white oak, with a butternut seat. The finish is fumed ammonia with a garnet shellac top coat and a dark glaze to give the chair a little "age."

Barnett's chair was included in the Smithsonian Institution's traveling exhibit "The Way We Worked."

You can see more of his work at barnettchairs.com.

READERS' CHOICE

Nakashima-inspired bench
22" d x 42" w x 36" h

Jeff Clark
Elon, North Carolina

While the quarter-sawn sycamore crotch with flame figure seat is inspired by the work of George Nakashima, the walnut legs feature Sam Maloof-style joinery. The spindles and crest rail are also of walnut. The finish is satin Waterlox. In addition to winning the Readers' Choice award in this category, the bench took first place at the 2013 North Carolina State Fair.

CHAIR PHOTO BY WEPHOTO – SPECIAL THANKS TO LONA ACKER FOR ITS USE; BENCH PHOTO BY DONNA CLARK

EDITORS' CHOICE

Deco Desk

18" d x 44" w x 30" h

Kyle Toth

Temecula, Californinia

This Art Deco-inspired desk features Macassar ebony bent lamination sides and holly drawer fronts with maple sides. The finish is Waterlox and wax.

READERS' CHOICE

Nautical Compass Table

24"-dia. x 30" h

Kevin Bird

Morris Plains, New Jersey

The winner of the overall Readers' Choice award, this custom red oak end table features a maple and walnut compass inlay center, bordered by purpleheart, ipe and ebony. The maple and walnut base features turned staves. It is finished with oil.

EDITORS' CHOICE

William & Mary Spice Chest on Frame
14" d x 16" w x 36" h

William Brown
Forest, Virginia

This piece, with four secret compartments, was inspired by furniture from the maker's home region of Chester County, Penn., where he grew up on a farm.

The wood is walnut, with line-and-berry inlay of holly and red cedar, based on designs from the Winterthur Museum in Wilmington, Del. The fronts for the dovetailed drawers are maple burl veneer. The chest is finished with shellac.

See more of William's work at LineAndBerry.com.

READERS' CHOICE

Cherry Highboy
21" d x 40" w x 92" h

Kenneth Royal
Russellville, Arkansas

The primary wood in this classic highboy (following plans from "Glen Huey's Guide to Building Period Furniture") is black cherry, with white ash as a secondary wood. The piece features a natural wiping varnish finish.

EDITORS' CHOICE

Wall Decoration
24" w x 36" h

Alexander Grabovetskiy
Boca Raton, Florida

This incredibly intricate wall hanging featuring hand-carved flowers, basketwork and leaves, and is of unfinished basswood. In 2012, the maker was named International Wood Carver of the year by the U.K.'s Woodworkers Institute.

See more of his work at Grabovetskiy.com.

READERS' CHOICE

Lap Desk
9" d x 22" w x 12" h

Robert Weimerskirch
Harrisonburg, Virginia

This small table was designed to support a laptop computer while seated or lying in bed. The solid bubinga top is perforated with ventilation holes that were chiseled by hand. Their double-arch pattern carries over from the intersecting opposing-arched cherry legs, which were formed by bent lamination and joined with a half-lap. They are through-mortised and pegged to the top. The finish is Danish oil. **PWM**

Sharpening Pond

BY WILLIAM NG

With this inviting and accessible setup, there's no excuse for dull blades.

The ability to keep tools sharp is a most important woodworking skill – that's why I have a dedicated sharpening station in each of my classrooms, readily available for my students. Many woodworkers think of sharpening as drudgery, right up there with sanding. So I sought to design a sharpening station that was fun, relaxing and inviting, and facilitates the sharpening process.

I chose sapele, white oak and maple for this project (though I've built a couple of these using beech). Sapele, which is in the mahogany family, is a great outdoor wood; I use it for the station's top, knowing it will be in contact with water, and for the legs. White oak is also a good outdoor wood. It's hard and rigid – perfect for the bridge that supports and holds the stones. Light-colored maple or beech (used for the base sides, front and back) adds a bit of Asian flavor, providing a pleasant contrast to the sapele. For the tub itself, I use a bus tray (available at restaurant supply stores). It's tough and rugged enough to withstand any abuse without worry of it cracking. The proportions and design of the sharpening station are relative to the size of the bus tray.

First, Base

I use rift-sawn wood for the legs, because of its straight grain on all sides. Arrange the legs for a pleasing grain pattern before marking out then cutting the mortises. The 3/8"-wide x 4 1/2"-long x 5/8"-deep mortises are located 3/8" from the outside edge on the legs.

I like a 3/16" reveal for the leg and panel joint, and I use a 1/8" roundover on most of my furniture builds. When I round over the legs, I have a 1/16" tolerance between the leg and panel.

I cut the tenons at the table saw, using a dado set.

After dry-fitting the base, mark and drill a 3/8" hole in the left top edge of the back panel; it's for inserting the 1/4" tubing that connects to a water pump.

Now use PVA glue to glue up the base.

On Top

You'll notice in the cutlist that the top's front is narrower than the other three sides for ergonomic reasons.

When standing in front of the pond, I don't want to reach forward to sharpen. It puts stress on the upper back, so I sized the top with that in mind. I chose 7"-wide boards for the two sides and

PHOTOS BY THE AUTHOR; ILLUSTRATION BY DONNA R. HILL FROM THE AUTHOR'S MODEL

Skip & plunge. *I alternate the mortise cuts, skipping every other cut. This way I have wood on all four sides of the mortising chisel. I then come back and clean up the rest of the cuts, which have wood on two sides of the mortising chisel. That helps to exert even pressure and results in cleaner cuts.*

Sled ride. *Miter sleds make it safe, quick and easy to cut perfect miters at the table saw.*

Match length. *After cutting the 45° miters on the back top, cut one 30° miter on the front piece, then match up the front and back to mark the point for the second 30° miter.*

On end. *The workpiece rides firmly against the tall table saw fence as I cut the spline grooves on the mitered ends. Use a flat-top blade and center the cut on the workpiece.*

Spline strength. *Notice that the grain runs side to side on the spline material. This orientation provides the most strength.*

back to accommodate the size of the waterstones and to provide a workable side area. To find the width of the top's front, I use a basic trig function. Because we know the angles (30°, 60° and 90°), either of two formulas will work: Tan 30 = Op/Adj or Tan 30 = x/7 or Tan 60 = Op/Adj or Tan 60 = 7/x. Either way, that gives me 4.04".

Mill the stock for the top to its final thickness and width, but leave it slightly long.

To make the miter cuts, you'll need 45°, 30° and 60° miter sleds. Start by cutting the back top with one 45° miter.

Measure out 31" from the point then cut the other 45° miter.

Next, cut the top front with the 30° miter on one side. Put the top and front back-to-back and mark for equal length. Do the same for the two top side pieces, cutting the 45° miter first, then the 60° miter to ensure both pieces are the same length.

Next, cut 1/2"-deep grooves for the splines using a flat-top blade on the table saw.

Make the spline material by resawing a 10"-wide board on the band saw and sanding it to 1/8" thickness. Crosscut the material to 1" wide, ensuring correct grain direction.

A slope on the inside of the top's four pieces allows water drainage back into the pond. I wanted a 3/16" slope to start 2" back from the inside edges, so I simply drew it out on a piece of MDF and used a sliding T-bevel to get the angle for the cut. This angle is only for the two sides and back. The top front slope-angle cut is both shorter and steeper because of the width of the board; it starts 1 5/32" back from the inside edge, and will require a separate T-bevel setting.

Cut the slopes at the table saw by tilting the blade to the desired angle.

Water & Stone Protection

Now it's time to add a raised border to the top's sides and back for a couple of reasons: to contain any water overflow and to rest and dry the stones, without risk of inadvertently knocking them off.

Use a 3/16" bit to rout 1/4"-deep grooves inset 3/16" from the outside edges. On the back, the groove runs end to end. On the two sides, the grooves terminate about 5/8" back from the front edge.

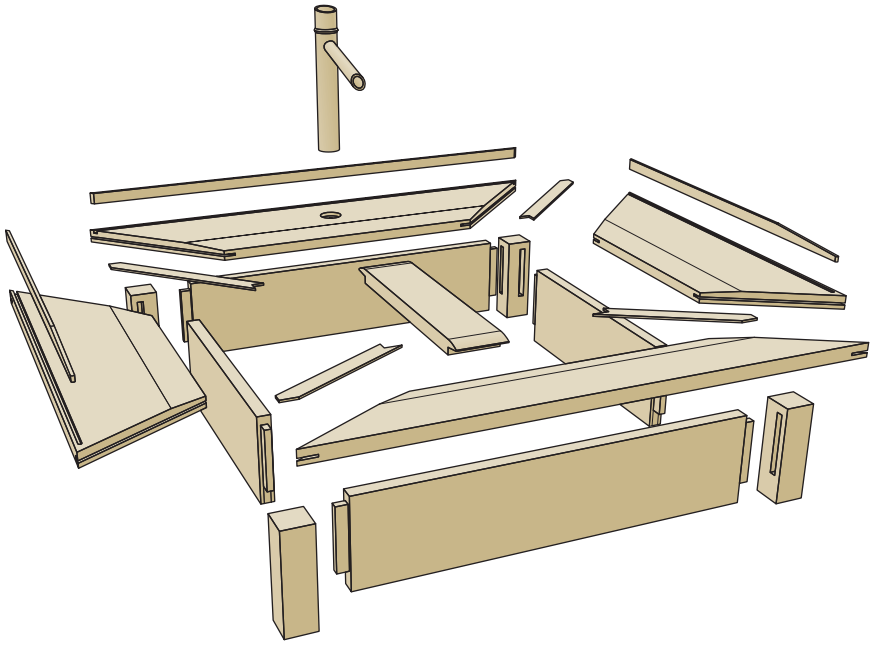
With the grooves cut, drill holes for the bamboo spout. I drill a 1/2"-deep recess hole first (centered side to side, and about 2 3/4" from the back edge), using a Forstner bit. Always select an O-ring close in size to the diameter of your bamboo, and drill to the size of the

Bevel angle. *Use a piece of scrap to determine the bevel angle, then set your bevel gauge. The saw blade is angled to match the bevel gauge.*

Sharpening Pond

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑ 4	Legs	1 5/8	1 5/8	51/2	Sapele	Riftsawn
❑ 2	Base sides	3/4	5	22 5/8	Maple or Beech	5/8" TBE*
❑ 2	Base front/back	3/4	5	15 1/2	Maple or Beech	5/8" TBE*
❑ 2	Top sides	13/16	7	23	Sapele	
❑ 1	Top back	13/16	7	31	Sapele	
❑ 1	Top front	13/16	4 1/32	31	Sapele	
❑ 4	Splines	1/8	9 5/8	1	Sapele	
❑ 2	Side borders	3/16	11/16	22	Sapele	
❑ 1	Back border	3/16	11/16	30 5/8	Sapele	
❑ 1	Stone holder	7/8	3	13 3/8	White oak	
❑ 1	Stem	1 1/4-dia.		9	Bamboo	
❑ 1	Spout	5/8-dia.		5	Bamboo	

*TBE=tenon both ends



EXPLODED VIEW

"Sharp fixes everything."

—Woodworking aphorism

O-ring, not the bamboo. For example, if the bamboo diameter is 1 3/16", I would use an O-ring with a 1 1/4" outside diameter, and drill to that size. (I use an O-ring because it's nearly impossible to find bamboo in an exact size to match a Forstner bit.)

Drill through the rest of the way using a 3/8" brad-point bit.

Use epoxy to glue up the top (don't forget to insert the splines).

For the 3/16"-thick x 11/16"-tall borders, cut two side pieces 23 " long, and a back piece 30 5/8" long. Taper the side pieces at a pleasing angle at the front, then cut and fit the mitered corners.

Because they will be in contact with water, I use epoxy to glue the borders in place. And because of the narrow groove and the messiness of using epoxy, I tape the outside edges of the groove. That way, I don't need to be too careful while applying the epoxy.

Make the Spout

For the spout, I like the look of bamboo – but it's not the easiest material to work; it's splintery and susceptible to cracking or splitting.

SUPPLIES

ViaAqua
viaaquaoceanpure.com

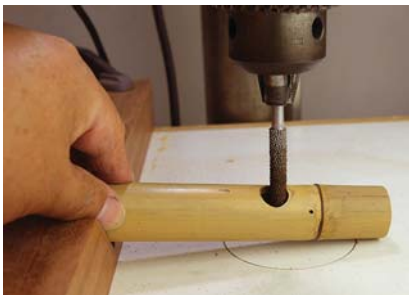
1 ■ PowerHead Pump
#VA 40, $11.95

Price correct at time of publication.

Recess & through. *Use a Forstner bit matched to the outside diameter of your O-ring to drill a mortise to house the bamboo, then drill a centered through-hole for the pump tubing.*

Tapered & mitered. *The borders on the side pieces are tapered at the front and mitered at the back. After cutting and fitting them, glue them in place with epoxy.*

Split insurance. *While it's no guarantee, you can minimize the tendency of bamboo to split by first drilling a small hole that penetrates the membrane.*



Burr cut. *After cutting the initial hole for the spout, I scribe the angle of the oval fit onto the pipe from the spout, then use a burr bit to cut to the line.*

O-ring recess. *Rout a recess for an O-ring at the bottom of the stem. Notice the cradle that holds the bamboo to safely perform this operation.*

To minimize this, I first cut the bamboo to length. I like the stem to be around 1 1/4" in diameter and 9" in length. From the bamboo node, I cut 1 1/2" to the top and 7 1/2" to the bottom. I then drill a 1/16" diagonal hole about 1/4" below the node toward the top, penetrating the node membrane. This doesn't guarantee the bamboo won't split, but it reduces the chances.

For the spout, I like bamboo branches around 5/8" in diameter and 5" in length. Cut a bevel on the tip of the spout about 1 1/4" back.

After the stem parts are cut to size, soak them in boiled linseed oil for about a day to give the oil enough time to penetrate all the pores. Then let the pieces dry for a couple of days so the oil can completely cure and seal the pores.

Use #0000 steel wool to remove any of the oil's luster; that returns the bamboo to its natural appearance.

To join the spout to the stem, I find my desired angle (10°) and drill using an angle jig on the drill press.

Always use a drill bit that's one size smaller than the diameter of the spout, then use a rasp or burr to customize the fit. Because the spout is fitted at an angle, the hole drilled has to be slightly oval in shape. After drilling the initial hole, I place the spout and scribe a line that matches the angle for the oval, then change to a burr bit to cut to the line.

Next, rout a groove, using a 1/8" radius bullnose bit, at the bottom of the stem to fit the O-ring. The depth of cut is one-half the thickness of the O-ring. The O-ring will fit snug around the bamboo and in the stem hole – but not so tight that you can't turn the assembly if you wish to redirect the water flow.

To pump the water, I use a fully submersible, self-contained fountain pump with a 23" head, which means it's powerful enough to push water 23" high. The tubing goes from the pump through the back of the base, and up through the stem and spout, stopping about 1/4" shy of the opening.

Build a Bridge

A 7/8"-thick x 3"-wide white oak bridge, with mitered stops at both ends, spans the pond from front to back to hold waterstones in place under the spout for sharpening.

At both ends, cut a 1"-long x 7/16" deep (at the shoulder) sloped rabbet, angled to match the slopes on the top. I make all the angle cuts at the table saw using a tenoning jig.

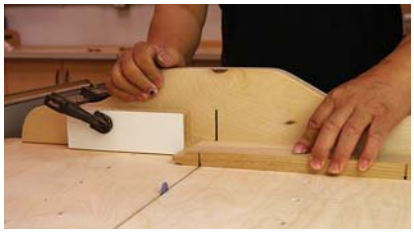
Now cut a narrow groove for the stops, located to accommodate your longest stone. Cut sapele pieces to fit, miter them at the corners, then glue them in place with epoxy. The stops serve two purposes. First, they can be used along with a wedge to keep the stones in place. Second, they help contain the flow of water to the bridge and stone.

For the finish, I used a three-part clear marine varnish. I recommend spraying (taking proper safety precuations) for the best appearance.

After I applied three coats, I noticed the finish imparts a non-slip surface that eliminates the need for wedges to keep the stone in place. (A different finish may require the wedge tactic.)

Install the tubing and hook up the pump, and you've no excuse for not keeping your edge tools sharp. **PWM**

See more of William's work, and find out how to take a class with him at wnwoodworkingschool.com.



Stop gaps. *Lower your table saw blade to cut about halfway into the bridge where you want the stone stops. That kerf serves as the groove for the mitered stop pieces.*

Close up. *Here's a close look at the mitered stone stops, and how the bridge sits across the pond.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/nov15**

WEB SITE: *Visit William Ng's web site (where he carries the ViaAqua Pump).*

IN OUR STORE: *For expert information on sharpening all types of tools, read Ron Hock's "The Perfect Edge."*

TO BUY: *"Greene & Greene Joinery Details," a video by William Ng.*

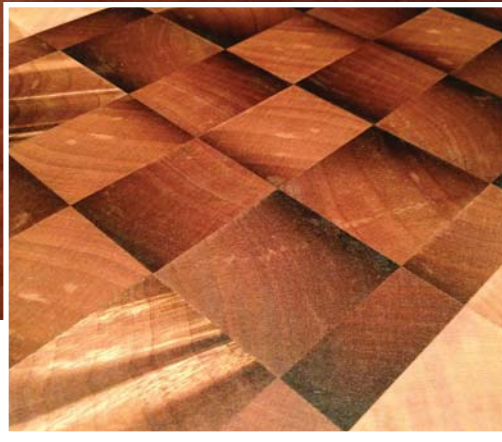
Our products are available online at:

- **ShopWoodworking.com**

Roast Your Own

BY MITCH ROBERSON

Cooking wood in your kitchen can produce results that rival specialty kilns.



Heat treatment. *Maple from the same tree may as well be a different species after roasting. Roasting brings out gold and red hues that make the wood seem to glow.*

Luthiers have long used roasted or tempered wood in stringed instruments because the roasting process pre-stresses the wood and caramelizes the sugars, sealing the pores and rendering them more resistant to moisture. While these properties are beneficial for guitars and violins, it occurred to me that roasting could be advantageous in other applications.

Roasted maple also takes on a toasty, chestnut color that enhances the figure. Could I get similar results in a standard oven? Everyone seems to be roasting their own coffee and cocoa beans lately, so why not try to roast some maple?

Trial & Error

When I first became intrigued by roasting, I looked into sources of roasted wood and found it available at specialty wood suppliers that cater to luthiers. The process seemed mysterious: They roast the wood in special vacuum-sealed kilns at 360° Fahrenheit (F).

I had some nice maple, so I experimented. I heated my kitchen oven to 360° F, put in a few pieces of maple and let them cook for several hours.

The wood became dark and toasty in some places, but a washed-out gray in others. I thought my experiment had failed and set the wood aside.

Once the wood cooled and acclimated for a few days, I started playing around with it and was surprised at how the wood had changed. It smelled like maple syrup, especially when I cut into it. But more important, the surface felt as smooth as marble.

I made a couple of cutting boards with it and was thrilled to see a rich, deep, chestnut color with a bit of red in it when I applied oil. Compared to untoasted maple from the same tree, it looked like a different species.

The Sweet Spot

Back in the kitchen, I experimented with different temperatures and roasting times. At 325° F, there was no noticeable effect on the wood, even after a few hours.

With the temperature at 360° F, I experimented with two, three, four and five-hour cooking times. There was no noticeable effect after three hours; the wood turned more black and gray after five hours. The sweet spot, at least in my tests, seems to be 360° F for four hours.

I tried roasting cherry, walnut and ash as well. The ash didn't change very much. The walnut became darker but not significantly so. The cherry changed the most dramatically of these other woods and has the most promise. I'll be doing more experiments with cherry in the future.

PHOTOS BY THE AUTHOR

Feel the heat. *Bake at 360° Fahrenheit for four hours. Serve. Enjoy.*

Reveal the riches. *A quick wipe with a wet rag reveals how the rich color brought out by the roasting enhances the figure of the wood.*

An Ounce of Prevention

I was concerned whether putting wood in an oven was a smart idea in the first place, so I did some research into autoignition temperatures for wood.

While research is difficult to compare because of different conditions and samples, in the end I consulted "Fundamentals of Fire Protection for the Safety Professional," by Lon H. Ferguson, CSP, and Christopher A. Janicak, CSP, ARM (2005, Government Institutes), which indicated "The average ignition temperature of wood is about 392° Celsius" (738° F).

Even with that knowledge, I kept a fire extinguisher handy just in case, and checked the wood at least once per hour. But it seems more dangerous – at least if I'm doing the cooking – to roast a turkey than to roast wood.

Fair warning: The wood does put off some smoke after four hours or so, but the regular oven fan vented it so well I didn't see any smoke in the room unless I opened the oven.

If you'd like to try roasting your own wood, here are some tips:

■ **Prepare the wood.** I made sure to remove any paint or glue from the wood to avoid releasing any toxic fumes, and I planed away any whispy areas on the surface. I also cut the wood far larger than my desired final dimensions to allow for warping and shrinking.

> "I like making things. I have a wood shop at home. I am a terrible carpenter but I love doing it."
>
> —P.J. O'Rourke (1947-)
> American author

■ **Think about timing.** Once the oven came up to temperature, I noted the time and listed out the next four hours. This will help you keep track and avoid roasting the wood for too short or too long a time.

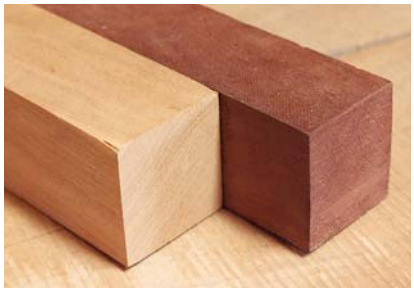
■ **Turn the wood (or not).** When I wanted an even color distribution, I turned the wood a quarter-turn each hour. Leaving it on the same side the full time will make the side facing the heating element a bit darker, which can have an interesting effect on the color.

■ **Remove the wood.** I used oven mitts to retrieve the pieces and placed them on top of the oven to cool. Wood is a poor conductor of heat, but it will be hot to the touch for 30 minutes to an hour after being removed from the heat. After roasting, I let the wood acclimate to my shop for several days at least.

Whether you need wood to be especially stable or moisture resistant, or you just want to produce an interesting color, roasting wood is easily doable at home. Aside from cutting boards and planes, possible applications include wedges for through-tenons, butterfly keys, inlays or anything else where you want to achieve a contrast. You are really only limited to the size of wood you can fit in your oven.

Experiment for yourself with different species, dimensions and cooking times. It's a fun technique to try – even if you just want your house to smell like maple syrup for a few days. **PWM**

Mitch is the writer of the blog Furnitude, furnitude.blogspot.com.



The dark side beckons. *The color of cherry darkens considerably with roasting, as seen in these two pieces cut from the same stock.*

A tasty morsel. *This Krenov-style smooth plane is made with roasted and raw maple from the same tree.*

ONLINE EXTRAS

For links to all online extras, go to:
■ **popularwoodworking.com/nov15**

WEB SITE: *Visit the author's blog.*

WEB SITE: *Read this discussion of whether heat treating the wood affects the tone of a musical instrument.*

ARTICLE: *Read about a different kind of unusual wood – mahogany reclaimed from the waterways.*

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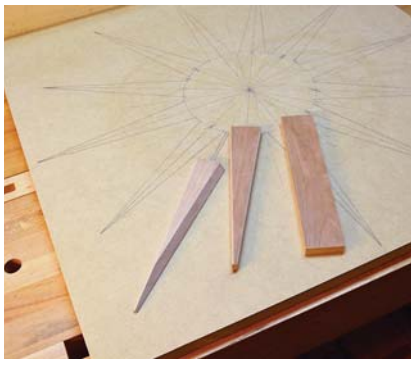
Sunburst Wall Clock

BY ANDY BROWNELL

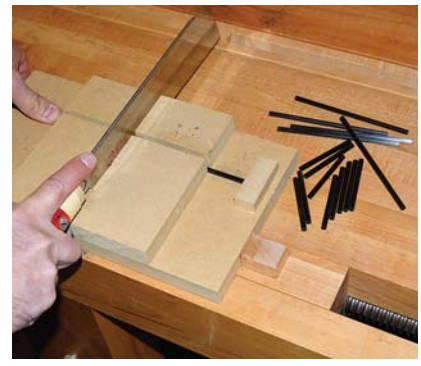
This modern take on a mid-century classic is a study in precision geometry.

The sunburst-style wall clock came in a variety of shapes and sizes during its heyday of the mid-1940s to the mid'60s. Its aesthetic captured many of the design elements common to the mid-century modern style – curves, colors, acute angles and mixed materials – all elegantly arranged to deliver both beautiful design and function. Designers such as George Nelson with his work for the Howard Miller Clock Company (the iconic polygon clock), as well as his imitators, followed a simple set of three structural elements.

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR



Out of one, many. *Working from a scale drawing and common-sized stock materials offers a variety of design options for the final shapes of the rays.*



Consistent cuts. *A small jig made from MDF holds the tubes in place, and a fine-toothed dozuki saw ensures consistent and square cuts on the tough carbon fiber.*

Table saw circles. *I cut circles on the table saw using a sled and clamp. The stock is positioned on a small pin centered 3½" from the blade (the circle's radius). Clamp the face, cut a facet, then rotate the piece several degrees for each successive pass to approximate a complete circle.*

The first is the central structure of the clock face – usually round, and either painted or adorned with a printed metal face of Arabic or Roman numerals, and, of course, the hands of the clock. Next are the spokes, typically round brass rods extending outward in a concentric pattern, and numbering anywhere from as few as four to as many as 48. Then come the rays that connect to the spokes; they often resembled sunflower petals, sun rays, globes or diamonds, and were commonly made from teak, walnut and rosewood.

These three key elements form the basis of just about all of the mid-century modern clocks that were produced last century, and they are replicated today. They also provide the baseline for developing an almost endless number of styles and variations. The version I've built here measures 30" in diameter, has 24 rays and uses Brazilian rosewood and carbon-fiber tubes – an updated look to the traditional brass.

Design at Full Scale

The great part about the sunburst design is that by alternating the number and geometric shapes of the rays, as well as the lengths of the spokes connecting them to the central dial, you can come up with a wide range of variations. My goal was to make two styles of rays efficiently by using the same dimensioned blanks for each style: ½" x 1 9/16" x 8". The inner rays are a straightforward triangle shape, while the outer rays have complex bevels on the triangle sides for added visual interest.

The rays were the perfect place to use some (pre-embargo) Brazilian rosewood I'd been saving for a special project. (Black walnut would also be a good choice.)

To get started, mill the 24 rectangular ray blanks – and make a few extras from scrap wood to use for test cuts. The blanks should be ripped from quartersawn material so you have straight grain on all the rays.

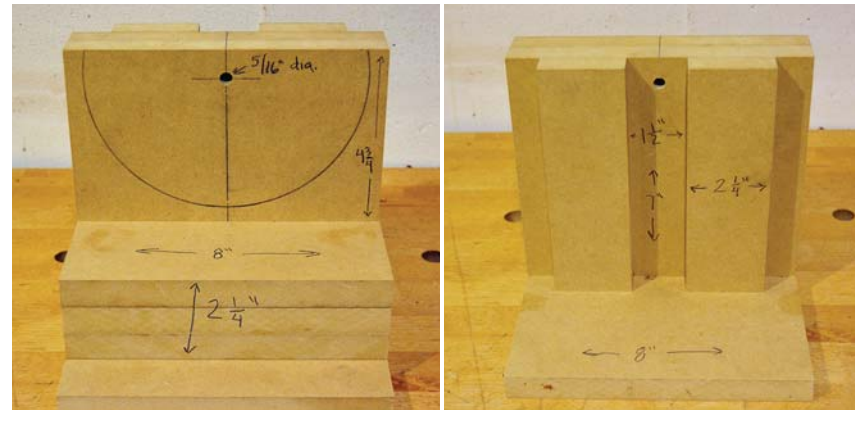
In the period, the rods were typically made from brass – and you can certainly use that for your project. This design, however, uses a far sturdier and lightweight option: 5/32"-diameter carbon-fiber tubes. To match my design, you'll need 12 pieces at 2¼" long, and 12 pieces at 5½" long. A modified bench hook (above) helps you make consistent cuts. Chamfer the ends of the rods with #220-grit sandpaper to make them slide more easily in the holes.

For the clock face, I chose Honduran mahogany. Use whatever method and tools you prefer to cut a 1 9/16"-thick x 7"-diameter circle, then drill a 5/16" hole through the center. Sand the edges fair and smooth with #220 then #320 grit wrapped around a block that matches the radius of the circle.

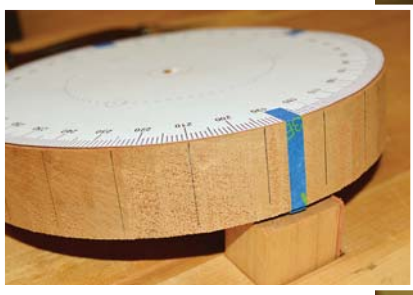
Precision Matters

Precision is a must with this project, so making many accurate geometric pieces requires some unique but simple jigs. If you stray from this particular design, you'll need to make the appropriate adjustments on the jigs to accommodate your clock's geometry.

The first is the aforementioned jig for the carbon-fiber tubes. The next one (below), serves two purposes on the drill press:



One jig, two uses. *One side of the jig (left) holds the face in position at the drill press; the other side (right) holds the ray blanks.*



Paper template. *Mount a 7"-diameter paper compass printout to the clock dial so you can squarely mark out the location of each of the 24 holes on the outside edge of the face, each spaced at 15° increments.*

Precise holes. *Moving around the dial, drill all 24 holes with a brad-point bit. Accuracy matters, so be sure to hit as close to the middle of the line as you can.*

End runs. *Made from MDF scraps, this simple yet sturdy jig helps align the ray blanks to ensure accurate drilling for the carbon-fiber tubes.*

Sunburst Wall Clock

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑ 24	Ray blanks	1/2	1 9/16	8	Rosewood	Cut extra for test cuts
❑ 1	Clock face	1 9/16	7 dia.		Mahogany	

"The time you enjoy wasting is not wasted time."

—Bertrand Russell (1872-1970), British philosopher, mathematician, historian, activist & writer

You'll need to affix the clock dial to the jig using a 5/16"-diameter shaft in the dial's center hole (I used a 5/16" drill bit) to provide precise vertical and concentric alignment of the 24 rods that connect the dial to the ray pieces.

After you've marked the hole locations, mount the face to the jig, and secure the jig to the drill press to drill 1"-deep x 5/16"-diameter holes directly in the center of the face's thickness at each of the 24 marks. So that each hole is oriented properly along the face's radius lines, use a square to ensure the 5/16" center pin is directly in line with the travel of the quill

Now turn the jig around to drill the 1"-deep holes in the ray blanks. Again, take care each hole is exactly centered on the end face and parallel to the blank's centerline.

With the drilling done, complete the clock face by routing a 1/16" chamfer on the back edge and a 3/8" chamfer on the front edge.

You'll also need to inset the clock movement on the face's back. To locate it, cut a scrap piece slightly larger than your movement and drill a centered 5/16" hole. Use a drill bit to align the location as you orient the movement with the vertical grain of the face. Then remove the waste. (For my movement, a 2 3/16"-square x 3/4"-deep recess was required, including a bit of wiggle room for easy access for battery changes.)

Now drill the holes in the ray blanks.

To cut the rays to their final shape, you'll need two more jigs; see "The Rays: Precision Geometry" at right. And I recommend you first make some practice cuts on inexpensive scrap wood before tackling any expensive stock.

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6 ▪ Rigid carbon-fiber tubes, .188" OD, 48"
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1 ▪ 6" Ivory clock dial, Roman
#D8211, $6.99

1 ▪ Clock hands set
#HND1081B, $.99

1 ▪ Mini quartz movement
#MVT7230A, $7.95

Prices correct at time of publication.

Finishing Up

With all of the pieces cut, plane the edges smooth. A few passes should do it.

Next, move onto #220- and #320-grit sanding. I secured a piece of sandpaper to a sheet of plate glass and "polished" each surface much like a jeweler polishes the facets of a gemstone.

Finally, apply two coats of Watco Teak or Danish oil (avoid getting too much oil in the rod holes), then apply a finishing wax.

Now oil the clock dial (again, try not to get much in the rod holes). Wax all surfaces but the face.

Next, apply some cyanoacrylate (CA) glue to the back of the metal clock face and affix it to the center of the dial, taking care to align the holes at the 3, 6, 9 and 12-o'clock positions. Place a flat weight on top to hold it in place while it dries.

Vise work. *Planing small pieces can be tricky; keep them securely clamped and keep your fingers away from the sharp edges. For the acute-angled outer rays, plane gently as you approach the points.*

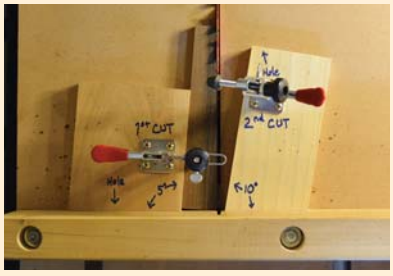
THE RAYS: PRECISION GEOMETRY

All of the rays are designed to end in a blunt point, and use a common set of angles. This is done by two simple sets of modifications to a table saw sled (or simple throw-away versions) using a pair of guide blocks and two cam-lock clamps.

To set up for the interior rays, first cut two guide blocks from 3/4" x 7" x 4" stock. On the first block, cut one long edge at a 5° angle, and on the second cut one long edge at 10°.

For the first cut, secure the 5° block to the sled (to the left of the blade slot) such that when a ray blank is secured to it, the near right corner of the blank falls exactly at the intersection of the blade slot and the sled's main fence. (The guide block will meet the sled fence just a bit more than 1 9/16" from the left of the slot.)

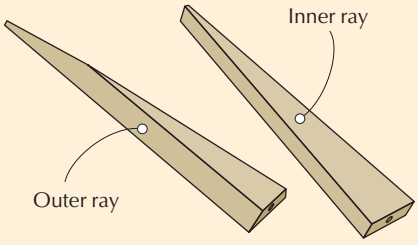
Finally, attach one of the surface clamps to the block to secure blanks for this cut. The 10° block is a bit simpler to position; it needs to be placed such that its rear left corner meets the fence precisely 1 9/16" from the right edge of the blade slot. Attach the other clamp to the 10° block for the second set of cuts.



This is all much easier to do than describe – but take your time here because precision and consistency are critical to the final appearance.

Place a test ray blank on the jig tight against the 5° block with the blank's drilled hole facing toward you. Clamp the blank and run the sled through the saw.

For the second cut, flip the test blank lengthwise, and place it to the right of the blade slot. Use the 10° block's clamp fixture to secure the blank and take a pass on the saw. If everything has been set up correctly, the drilled end of the blank should still be full-width at 1 9/16", with 5° tapers up each edge to the far end, and have a blunt at the end of about 1/8"-3/16". Adjust the setup if necessary, and cut the 12 inner rays.



For the outer rays, the jig is essentially the same, but the table saw blade is tilted 30°. Because of the sled thickness, tilting the blade will also shift the blade's slot in the direction of the tilt (by about 7/16" for a 3/4"-thick sled base).

To compensate for this, shift each guide block to the left accordingly. You can either take a pass with the sled first, then use the new slot to reposition the blocks, or make a second sled if you don't wish to sacrifice the integrity of the 90° sled. Once the guide blocks have been repositioned, use another test blank to check setup and proceed exactly as with the outer rays. — AB

Assembly

Apply a small amount of CA glue in each hole of the 12 inner rays and slide in place the 2 1/4"-long rods. Repeat this step with the 5 1/4"-long rods on the outer rays.

Once the glue is dry on the face rods, alternately glue up the inner and outer rays around the circumference. Be sure to make the rays' surface coplanar with the face of the clock; small deviations add up visually.

Finally, attach a picture hook to the back of the clock about 3/4" down from the 12-o'clock position and assemble the clock's mechanical movement to the clock dial, following the manufacturer's instructions.

Now it's just a matter of installing a battery, setting the time and hanging your clock in a prominent place to add a little mid-century modern flair to your home. PWM

Andy has studied extensively with Jeff Miller since 1996. A full-time ad man, Andy still finds time to build custom furniture in his Cincinnati-area workshop.

Not suitable for small children. *Assembling this clock reminded me of Tinkertoys – but with deadly sharp points. To make assembly easy, work on a large flat surface that provides plenty of room to rotate your project as you keep the backs of the rays coplanar to the work surface and parallel to each other.*

ONLINE EXTRAS

For links to all online extras, go to:

- popularwoodworking.com/nov15

WEB SITE: *Andy Brownell's web site is brownellfurniture.com.*

IN OUR STORE: *"Mid-century Modern Furniture: Shop Drawings & Techniques for Making 29 Projects," by Michael Crow.*

Our products are available online at:

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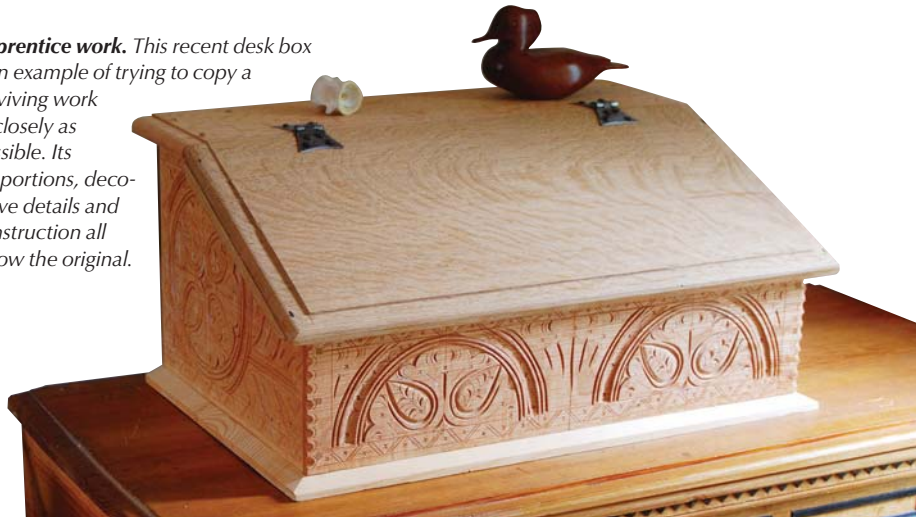
21st-century Craft Education

Always remember where you (and your work) came from.



Apprentice work. *This recent desk box is an example of trying to copy a surviving work as closely as possible. Its proportions, decorative details and construction all follow the original.*

How we go about learning to build "period" furniture today is nothing like what the makers of our study pieces did.

In the pre-Industrial era, apprenticeship was the principal method of learning any trade. In the English -speaking world, if you practiced a trade without having served your time, you would find yourself on the receiving end of some discomfort.

In early 17th-century England, the law stipulated that an apprentice was to serve "at least seven years" – no small commitment. If you spent seven years working under one craftsman, through sheer repetition, you'd learn his or her moves inside and out.

The apprentice's work would take on the look of the master's, to the point where they might be indistinguishable. There are numerous examples of surviving works in which we can see the relationship from one object to another, but careful study shows they are clearly different "hands," as we say in furniture studies.

The Long View

My research into the English apprenticeship system circa the 17th century shows a model that was limited in its scope. At that time, an apprentice received no pay, with the exception that some were paid half-wages in the final year of their time. The boy's father would make an initial payment to the master to bind the apprentice to him.

These customs were long ago abandoned. But just the functional aspects of traditional English apprenticeships are impractical in the modern world. What craftsman today would take a young person into a home and shop for seven years, taking on all the charges of that young person, while spending time and attention on his or her training?

While the traditional apprentice took up a lot of time, materials and attention in the early training years, the notion was that the craftsman got an eventual return; in later years the apprentice worked on his own to produce goods for the master.

New Teachers

But what of today? Generally speaking, craftsmen and craftswomen who earn their living making and selling their work cannot afford to take on apprentices in the traditional sense.

Today, YouTube, magazines like this one, blogs, videos – all sorts of web-based searching – might be the first step in woodworking for many. Once you leave the house, maybe then it's workshops and classes, usually short-term, from a weekend to a full week.

There are certainly schools in which those with the time, resources and dedication can devote months, sometimes years, to learning the craft. Most students at various craft schools are amateurs – they're not looking to earn their living with their woodworking.

Book Learning

My first projects were ladderback chairs, based on those in Jennie Alexander's book, "Make a Chair from a Tree" (1978). I met Alexander and Drew Langsner both in 1980 when I attended Alexander's chair class at Country Workshops. Langsner's "Country Woodcraft" also was an inspiration for me, and I made many projects based on those in his book.

I had many teachers: Curtis Buchanan, Jogge Sundqvist, Langsner and others. In some of those classes, the gist of the workshop was for the students to follow along, each really making the same project, bit by bit.

The chair classes in particular, and a coopering class I remember, were not about design but about techniques. Learn the techniques by following along as the (master in an apprenticeship) teacher in this setting showed his or her methods.

The first things I ever made in any multiples were the ladderback chairs taught by Alexander and Langsner. Once I spent some time with each of them, I could easily tell Langsner's

PHOTOS BY THE AUTHOR

chair from Alexander's, even though both chairs have the same form and format: steam-bent rear posts, two slats, 12 rungs, etc.

Had I stuck with these chairs, no doubt mine would have been another version of Alexander's chair. You can see the relationships and the differences between them all.

Building the Vocabulary

When I began to focus on 17th-century oak furniture, I copied period works verbatim as much as I could.

After years of that, I reached a point where my craft vocabulary was sufficient that I could build my own chest or chair or box in that style, but clearly mine. But it took years to get there.

In that case, the surviving furniture was my teacher to a large extent. The basic techniques were easily learned, and detailed study of the artifacts showed me what technique to use where and when. So at first, my work was much like an apprentice in his early years, mimicry squared. Eventually it came to a more fluid expression of a style and form.

In both these situations, I began by copying the teacher, whether it was a human or an artifact. I think this is a natural progression; I'm reminded of classically trained artists copying old masters in the great museums of Europe. As a craftsman gets control of techniques, hands know what to do. Then the eyes and mind can take over part of the process, and the maker can work on form, proportion etc.

Theft or Tradition?

When I first met Jogge Sundqvist, his spoons were much like his father Wille's. Now they are distinctly his.

These thoughts came up because my friend Jarrod Stone Dahl found someone copying a spoon he's made over and over – his spoon. Jarrod's question was, "what makes a spoon design your own?"

It's an especially tricky question nowadays with so much access to images and content. We all put our stuff up on the web to share, to sell and to spread ideas. I know some craftsmen who post their work on the web, only to wager how soon copies of it will appear.

Pete Seeger quoted Woody Guthrie, talking about another singer, "he steals all his stuff from me, but I steal mine from everybody." Woody was making a joke, but within it a point, too. Whether you're making a folk song, a ladderback chair or a wooden spoon, the format of these things is rooted in tradition.

In the case of Dahl's spoon, the copy was to a T, and without attribution. Compounding this, the item was for sale. That complicates matters.

My take is simple. I am a copier, to a large extent. When I teach, I try to be clear about what is my work and research, and what parts I have learned and gleaned from others.

For me it's about two things: I don't want to misrepresent something as mine that isn't, and more important, I like to make and preserve connections. I think of the link-in-a-chain aspect of my woodcraft genealogy – the various people who've taught me and helped to shape my career thus far.

By acknowledging their contributions, I maintain these gifts from them to me, then from me to the next recipient. Bill Coperthwaite, whose place is near the beginning of my chain (although I met him very late in the proceedings) used to talk of a "cultural blending," his work drawing from influences literally all around the globe.

I like to remember these people, some of whom are now deceased, as I revisit the lessons they taught me. Each teacher leaves a mark on his or her students, and these skills echo down the craft generations.

"Take what you need and leave the rest," said Robbie Robertson. And I would add the suggestion to remember where you got it. **PWM**

Jarrod Stone Dahl spoon. *Jarrod developed the details of this particular shape through carving many hundreds of spoons. Now he makes it with muscle memory; the design is fixed in his mind. It's his spoon.*

Read more from Peter on period work, tools and more at pfollansbee.wordpress.com.

Identifying details. *While my joinery doesn't vary from a 17th-century piece, the small details in this lunette carving stamp it as mine. The shapes of the tulip motif, the spacing and some tool shapes set it apart from the period carving. (Detail of a period lunette is shown at top, left.)*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/nov15**

BLOG: *Read Peter Follansbee's blog.*

TO BUY: *"17th Century New England Carving: Carving the S-Scroll" (Lie-Nielsen).*

About this Column

ARTS & Mysteries

"Arts & Mysteries" refers to the contract between an apprentice and master – the 18th-century master was contractually obligated to teach apprentices trade secrets of a given craft (and the apprentice was expected to preserve those "mysteries").

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Folding Stool

With two pieces of pine and simple tools, make this easy-to-store seat.

This simple project made from two pieces of dimensional pine can help solve seating shortages at your next gathering – and it folds neatly away for the next get-together. All you need is a 4' 1x8, an 8' 1x4, some 3/8" x 1 1/4" bolts and 3/8" nuts and washers, and a basic set of tools – all from the home center.

Perfect picnic. *A folding stool or two is perfect for a picnic in the park – or your backyard. To make a matching table, just upsize the stool components.*

Legs First

Begin by marking a centerline along the length of the 1x4, then rip it in half for the legs, seat cleats, handle and brace.

This cut is a quick and easy task for a table saw, however, the jigsaw can do the job, too. Set the jigsaw blade for no orbit (for the cleanest cut), then take your time and go slow to cut a straight line as you make the cut. (You can also clamp a straightedge parallel to the cutline, offset the width of the jigsaw's shoe, then keep the shoe tight to the straightedge as you make the cut. But don't be afraid to give it a go freehand.) Once the piece is ripped in half, use a block plane to smooth and clean up the saw marks. Each half will be approximately 1 3/4" wide.

Using a miter saw, cut the four leg pieces to length. (Go ahead and cut the four cleats, handle and brace to length, too, and set them aside for now.)

The next step is the placement for the bolts for the stool to be able to pivot open and closed. Find the center (both length and width) of each leg and cleat and mark an "X." Also mark 3/4" in from one end of each piece and place another centered "X." Make these marks on both sides of the legs and cleats. Decide now which end is up.

These pieces need half-circle curves cut on the top ends, and quarter-circle curves on the other to allow smooth folding operation. Set a compass to 3/4" and with the point on the top "X," mark a half-circle radius. For the bottom of the legs and seat cleats, reset the compass to the width of the leg and mark a quarter-circle radius.

Use a jigsaw to cut the curves – but because they're likely too tight to stay perfectly on the line, cut a series of straight lines just proud of your arcs. Then, shape the curves using a rasp or random-orbit sander.

Smooth moves. *After cutting the leg stock down the middle with a jigsaw, use a block plane to clean up the cuts.*

Cut corners. *The legs and cleats need a half-circle curve at the top, and a quarter-circle curve at the bottom.*

Clearly marked. *The holes that get countersinks (all exterior-facing bolt holes) are marked with a different colored ink.*

LEAD PHOTO BY AL PARRISH; STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY DAN PESSELL FROM THE AUTHOR'S MODEL

Lock it. *A few drops of a thread-locking product will keep the bolts in place as you fold and unfold the seat.*

The legs and cleats need bolt holes, and all those on what will be exterior faces after assembly must be countersunk, so the bolt heads and nuts won't interfere with the folding operation. Use a colored pen to mark the countersink locations.

Use a 7/8" Forstner bit to drill 1/2"-deep countersink holes. (A spade or paddle bit can be used, but a Forstner bit leaves a cleaner cut.) Verify that the hole is deep enough by placing a washer and the head of a bolt or a nut in it; the fasteners should sit below the face of the board. Now drill centered 3/8" clearance holes to allow the bolts to go through.

Screw it. *Use pocket screws to attach the brace and handle to the cleats.*

Leg Assembly

Assemble the legs and cleats together into pairs, with 3/8" fender washers behind each nut and bolt, and between the legs. Lock the nuts in place with Loctite or other thread-locking product, so they don't work themselves loose as you fold and unfold the stool.

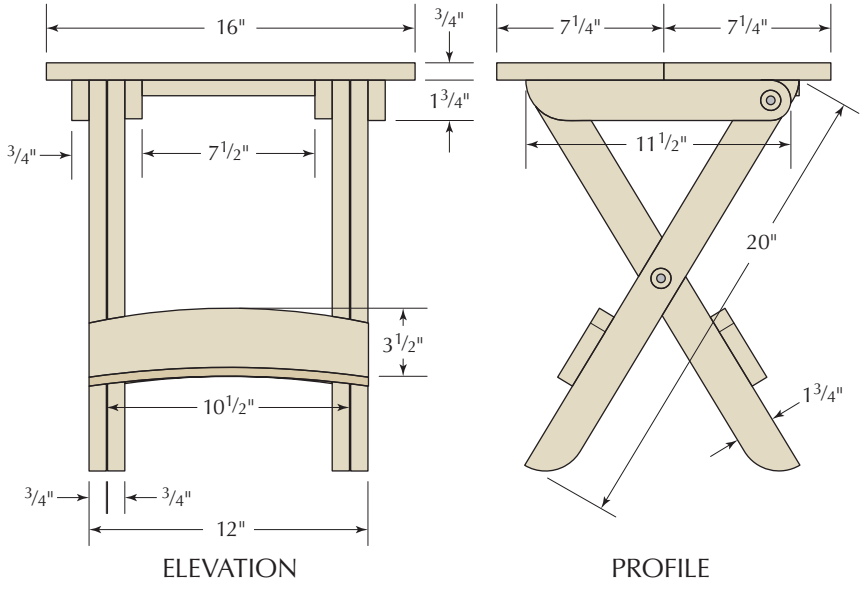
The completed assemblies should mirror one another.

The leg assemblies are connected by the handle and brace. Both pieces are the same overall size, but use a jigsaw to cut a curve in the handle for comfortable grasping. Attach the handle and brace to the cleats with pocket screws as shown below, left.

Sitting Pretty

Set the leg assemblies aside and turn to the seat. First, cut the two seat pieces to length from the 1x8 at the miter saw.

Now it's time to lay out the curved edges (if you leave the edges straight, the seat will bite into the back of the sitter's legs). Because this curve is too large for most compasses, make a simple trammel (also known as a beam compass)



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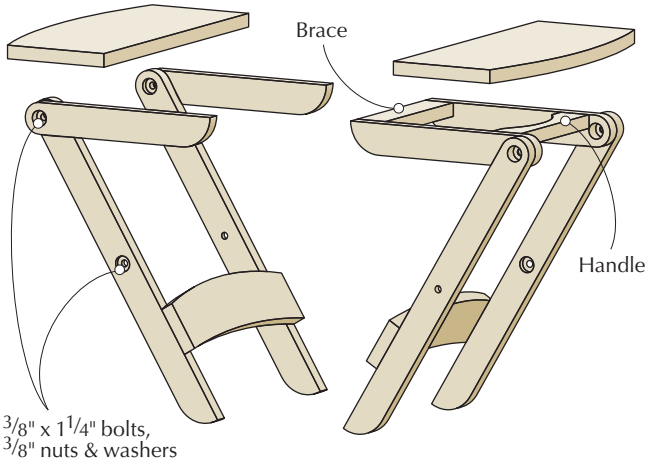

EXPLODED VIEW

Folding Stool

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑ 4	Legs	3/4	1 3/4	20	Pine
❑ 4	Seat cleats	3/4	1 3/4	11 1/2	Pine
❑ 2	Seat pieces	3/4	7 1/4	16	Pine
❑ 2	Handle & brace	3/4	1 3/4	7 1/2	Pine
❑ 1	Long stretcher	3/4	3 1/2	12	Pine
❑ 1	Short stretcher	3/4	3 1/2	10 1/2	Pine

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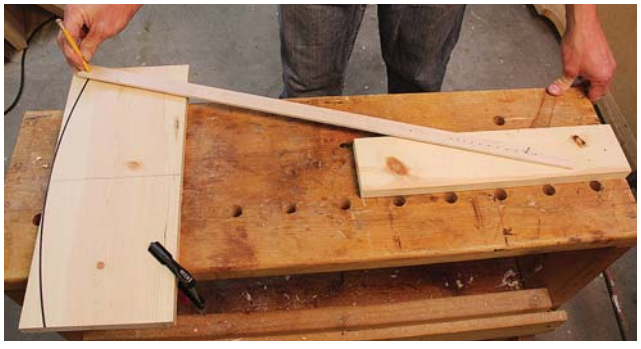


Trammel. *A thin strip of wood, a nail and a pencil is all it takes to make a simple trammel for marking large curves.*

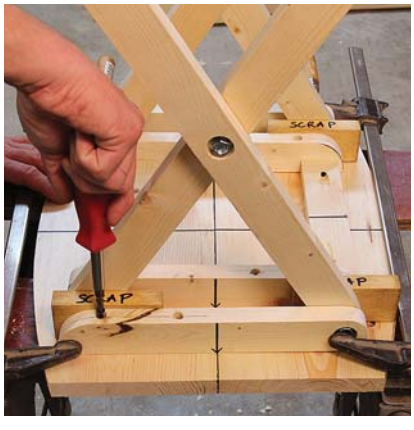
from a thin strip of wood and a pencil. Drill a hole in one end of the strip for the pencil to go through, then measure 26 5/8" to the other end, and hammer a nail through the strip at that point.

Using the nail as a pivot point, mark the arc on the two seat pieces. Note in the photo above that I have an offcut supporting the trammel at the nail end, to keep it co-planar with the workpiece.

Mark the curve on both pieces, then cut them out with the jigsaw. Smooth the edges with a block plane and/or sandpaper.

Put it All Together

With the leg assembly upside down, place it atop the halves of the seat. The centers of the leg cleats should line up with where the edges of the two seat pieces come together. (To make it easier, you can mark the centerline on the edge of the cleats as I've shown below – but you'll want to sand off those marks before you apply a finish.)



Perfect spacing. *A scrap of wood helps to locate the cleat position to the seat as you screw them together.*

Drill two 3/8" countersink holes and two 3/16" clearance holes on the toe end of each seat cleat.

It's essential that there is no binding or pinching in order for your stool to fold smoothly. So use scrap pieces of wood (in the same thickness as the legs) as spacers, placing them between the cleat and legs as you locate the cleats on the underside of the seat pieces. Now use 2"-long #8 wood screws to attach the cleats to the seat.

The final pieces are the stretchers – without them, the stool could collapse under load.

Rip the remaining piece of your 1x8 (you should have a 16"-long piece left) in half, then smooth the edges with a block plane. You'll end up with two pieces that are each approximately 3 5/8" wide. After cleaning up the cuts with a block plane, you'll be close to the 3 1/2" width noted in the cutlist (the precise width is not critical).

Now cut them to length, and use your trammel to lay out curves that match those on the seat. Cut the curves with a jigsaw, and sand the edges smooth.

With the seat folded and lying flat on the bench, align the stretchers to the legs, mark your nail locations, then drill 1/16" pilot holes. Nail the stretchers in place using 1 1/4" nails.

Stain & Finish

The smooth folding action of the legs has a tight tolerance; paint or a thick coat of polyurethane might interfere with that. So, I recommend using a stain (if you don't like the looks of raw pine) and wipe-on poly. And don't leave your stool out in the harsh weather – it does, after all, fold up for easy transport and storage.

In the opening photo, you might have noticed the matching table. That's simply a scaled-up version of the stool. You'll find a SketchUp model for it – along with the model for the stool – in the online extras. **PWM**

Chad is the host of the "I Can Do That" video series, available at ShopWoodworking.com.

Nailed it. *The final step in assembly is to nail the stretchers in place (after drilling pilot holes for the nails, of course).*

ONLINE EXTRAS

For links to all online extras, go to:

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PLAN: *Download a free SketchUp model for this folding stool, and for the matching table shown in the opening photo.*

ARTICLES: *All the "I Can Do That" articles are free online.*

VIDEO: *The online "I Can Do That" video on which Chad Stanton builds this project will be free online for one month beginning on Nov. 14. You'll find it, and all the free ICDT articles, at popularwoodworking.com/icandothat.*

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9 Useful Finishing Tips

Improve your efficiency and results with these must-know techniques.

Here are some finishing tips I hope you find of value. They are arranged in roughly the order of the typical finishing steps.

Sand Oil Finishes Wet

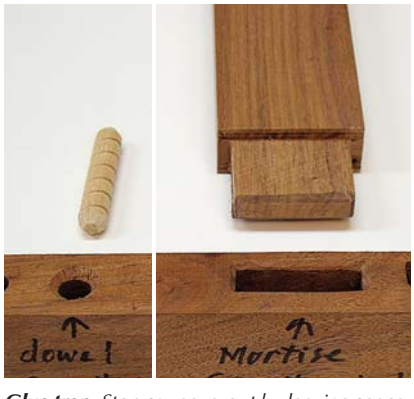
It's not at all necessary to sand wood to very fine grits with oil finishes to get very smooth results. After sanding the wood to about #180 grit, apply a wet coat of finish to the surface, then sand wet with #600 grit. Use just your hand to back the sandpaper.

This will smooth the surface even better than sanding the bare wood up to #600 grit first because the oil acts as a lubricant.

Countersinks & Chamfers

To significantly reduce the likelihood of glue squeeze-out in dowel and mortise-and-tenon joints, countersink dowel holes and mortises and chamfer the ends of dowels and tenons to create reservoirs for excess glue to collect. This takes only a few extra minutes and can save a lot of headaches caused by the squeeze-out.

Unfortunately, there's no easy equivalent for stick-and-cope joints on cabinet doors.



Glue trap. *Stop squeeze-out by leaving space for glue to collect.*

Smooth sailing. *A project is not really finished until it's finished. A few simple shortcuts can help make finishing go smoothly, so to speak. For example, sanding oil finishes wet can save time.*

Sanding Basics

When sanding in preparation for a stain or finish, you need to remove all the problems in the wood – mill marks, tear-outs, gouges, etc. – with the coarsest grit sandpaper you're using before moving on to finer grits (to remove the coarse-grit scratches).

This means that the coarse-grit sandpaper you begin with should be coarse enough to remove the problems quickly and efficiently to reduce the amount of work required.

Suggested examples are #100 grit for wood you have machined yourself and #150 grit for factory pre-sanded veneered plywood or MDF.

Aerosol Finishes

If you don't have a spray gun, keep in mind that you can buy all the major film-building finishes in aerosol containers at many stores. These finishes include polyurethane, water-based finish, shellac and lacquer. Specialty suppliers also sell pre-catalyzed lacquer. All of these finishes are available in gloss, semi-gloss and satin sheens except shellac, which is always gloss.

These finishes are the same as you buy in cans except they have been thinned more so they flow easily through the tiny hole in the nozzle. Therefore, the build you get with each coat is less.

No spray gun? *Try aerosol cans.*

PHOTOS BY THE AUTHOR

Made-to-order sheen. *Create the sheen you want from a single can of satin finish.*

Cherry blotching. *It's the board or veneer that determines whether cherry will blotch.*

Pour Off Gloss

You aren't limited to the sheens of commercially available lacquers and oil-based alkyd and polyurethane varnishes. You can create any sheen you want from just one can of satin finish.

First, let the flatting agent (the stuff you have to stir into suspension before use) settle to the bottom of the can. Then, pour off some of the gloss at the top into a separate container. Now you have two parts you can mix to any sheen you want. You'll have to experiment a little because you don't know the sheen of the mix until the finish has dried.

Keep in mind that it's the last coat of finish that is responsible for determining the sheen. So if the sheen of one coat is too glossy or flat, you can change it with the next coat.

Bury Raised Grain

The easy way to deal with raised grain caused by water-based stains (including dyes) and finishes is to bury the roughness with the first or next coat of finish. Then sand smooth, being careful not to sand through.

This is much easier than pre-wetting the wood, letting it dry, then sanding smooth before applying the stain or finish.

Blotching in Cherry

Everyone wants to know how to avoid blotching in cherry, and lots of theories are put forth. But the simple fact is that it's impossible to avoid the blotching unless you choose boards or veneers that aren't going to blotch. Even clear finishes, such as the catalyzed varnish used on the two veneered panels pictured above, cause blotching if the wood is prone to blotching.

There is no grading for blotching that I know of, so the only way to determine if the wood is blotch-prone is to wet it (with any liquid, including a solvent) and see what happens.

Brown-paper-bag Rub

It's virtually impossible to get a really smooth-feeling finish straight off a brush, rag or spray gun. You can sand the finish level, then rub with fine abrasives to raise the sheen, but this is a lot of work. There's an easier way to get good results.

As long as the dust stuck to the finish isn't excessive, and as long as the particles aren't large, you can make the surface feel smooth by rubbing with a folded brown paper bag. Give the finish a couple of days to dry first so you don't scratch it.

Lunch-bag reuse. *A brown paper bag can smooth a finish.*

Stripping Shellac & Lacquer

If you would rather avoid using paint strippers, you can instead substitute widely available denatured alcohol or lacquer thinner as long as the finish is shellac or lacquer. Because these were the finishes used on almost all old furniture and woodwork, this solution works most of the time on clear finishes.

Simply wet some rags or paper towels with denatured alcohol for shellac (or lacquer thinner for lacquer) and place them on the surface. Keep them wet by pouring more solvent until the finish has liquefied. Then you can easily wipe off the finish with the same wetted rags. **PWM**

Bob is author of "Flexner on Finishing," "Wood Finishing 101" and "Understanding Wood Finishing."

Soak it off. *Remove shellac or lacquer with rags wetted with alcohol or lacquer thinner.*

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My Best Tools are Made of Paper

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Woodworking is, all at once, frustrating, elating, challenging and straightforward stupid simple. It combines the elements of design, vision, accuracy, artistic intent and manual ability like no other pursuit I've found.

Just in the moment you believe you've mastered a part of its scope, you look up from the apex you've achieved to see higher peaks taunting you in the distance, and you know you're going to have to step up your game to reach them.

There are different paths to reaching those ever-rising peaks of achievement. I've found mine through another wood product: paper, or more correctly, books. Old books. Some woodworkers collect antique or unique tools, but it's books for me and I believe I get infinitely more practical use from my collection.

I'm not sure when the change happened. I was never a good student and though I have always enjoyed reading, I was never interested in being studious in any school subject. I relied on an "either I get it or I don't" attitude that didn't always work. It's possible none of the subjects captured my interest like woodworking does, and today I enjoy immersing myself in the study of shavings and sawdust.

This has led to a sizable and growing collection of "textbooks" on all kinds of subjects. Books on finishing and chairmaking, carving and furniture styles, historic treatises on technique and modern shop interpretations.

It's become a standard event that, roughly a week after most paychecks hit the bank, there will be a box or two arriving in the mail from an online auction or other book source. I don't usually spend all that much; judicious search terms and patience typically yield a strong crop of options.

When I first began collecting, I focused on books about tools or techniques, but over time, my favorites have become the books showing museum collections and auctions. How do you know your favorite pizza place is the best in town? You can't – unless you try at least most of the other pizza offerings out there.

Experience gives perspective and, short of possessing the time and means to personally visit all the great furniture collections across the country, these books are great ways to consume mass quantities from the comfort of my favorite chair. This exposure helps me develop a good eye for quality and proportion in my own work and often introduces me to ideas that have been nearly forgotten.

Of course, all the chair time in the world shared with the greatest woodworking tomes in history will accomplish nothing if I never step foot in my shop. Even time spent making simple things like wooden shop squares is not wasted, and it allows me to connect the insights my mind has consumed to the movement of my hands and the vision of my eyes.

I keep many quality tools in my traditional tool chest. The planes, chisels, marking gauges and more all help me take the ideas I envision and birth them into the real world. But tools are a small part of the equation of creativity.

The crucial elements aren't stored in a chest because without my hands, my eyes and the perspective and knowledge gained from my books, the most fantastic tool collection in history won't do me, or anyone else, any good.

Keep reading. Keep making. Keep learning. **PWM**

Derek is a husband and father, and a woodworker with a deep fascination with history. Visit his blog at blog.oldwolfworkshop.com.

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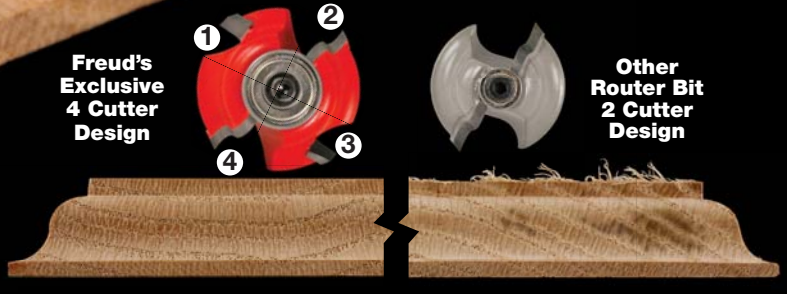

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