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WOODWORKER'S JOURNAL

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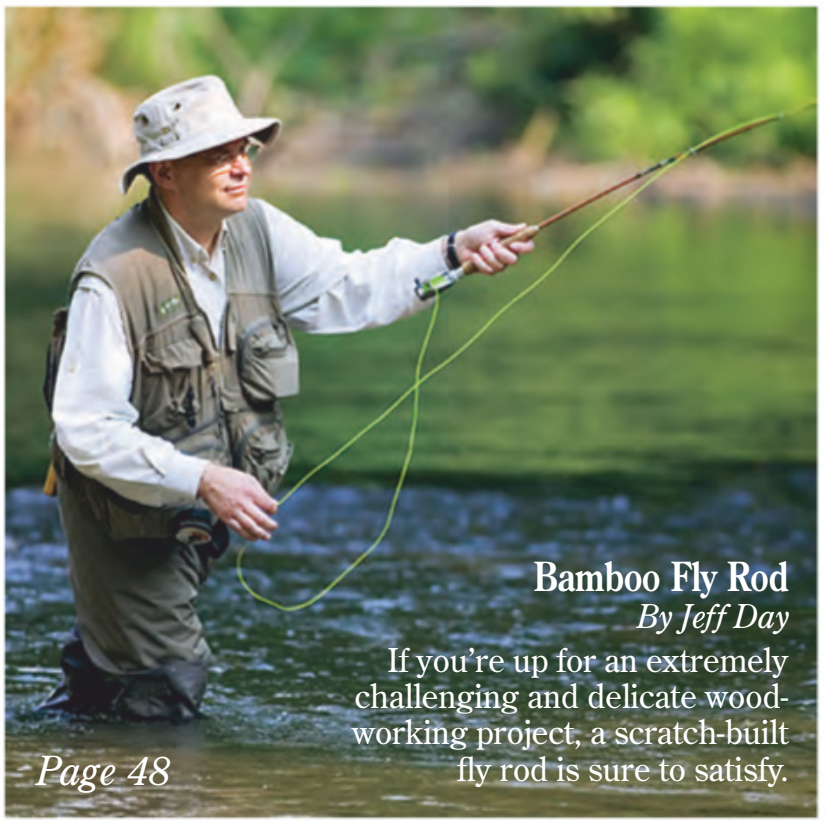
PROJECTS



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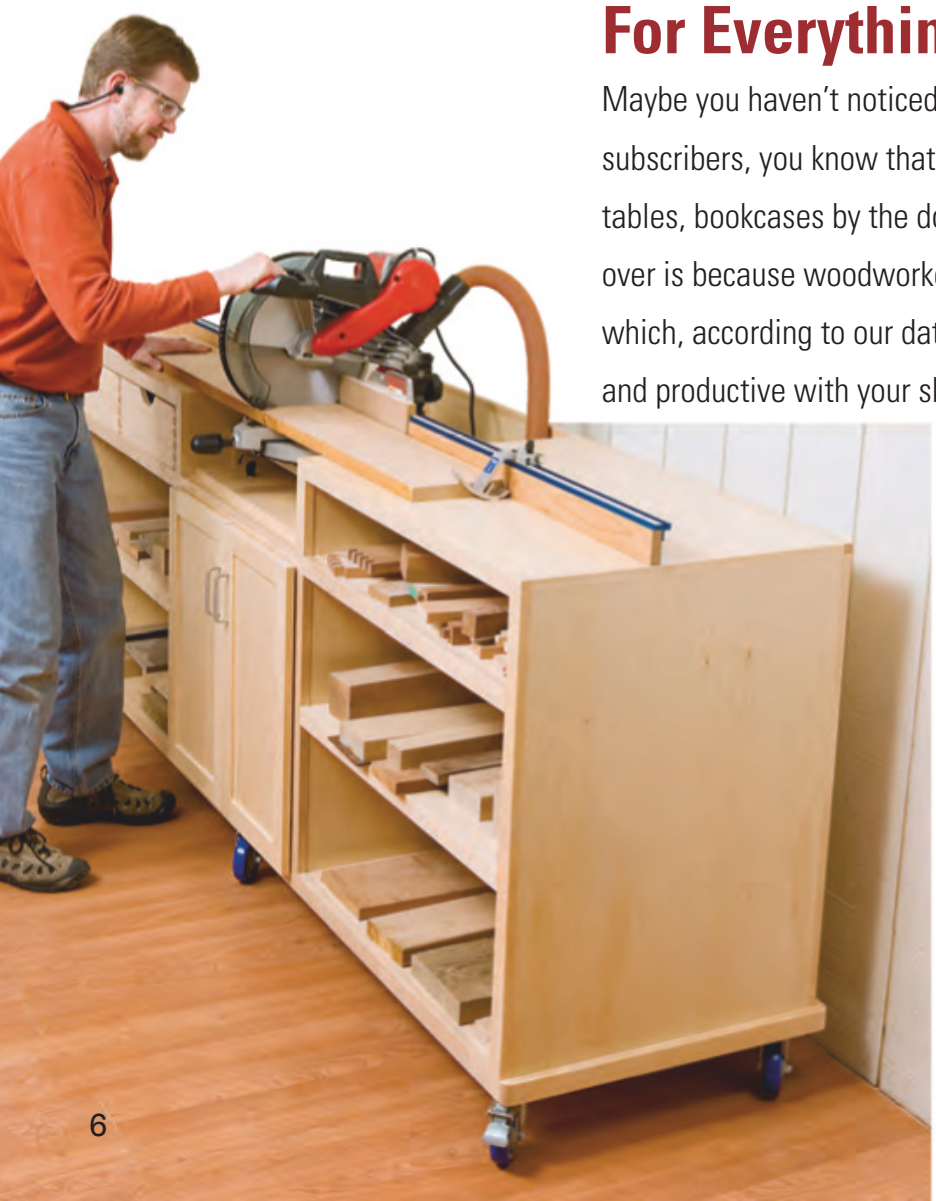

For Everything Turn, Turn, Turn

Maybe you haven't noticed, but sometimes magazines repeat themselves. If you're one of our long-time subscribers, you know that we've published multiple dining room table designs, many versions of router tables, bookcases by the dozen, dressers and beds galore. But the reason they take their turns over and over is because woodworkers love practical, fun-to-build furniture. The same goes for shop projects which, according to our data, are also very popular. And why not, as they help you become more efficient and productive with your skills, workspace and tools. Our "Ultimate Miter Saw Station" at left is a good example. Chris Marshall designed and built it for our June 2010 issue, and it has continued to be a much-requested project plan with many readers building their own versions. This issue, he reinvents it with many updated features. (Maybe we should call it the "Ultra-ultimate Miter Saw Station.") Jeff Day's article on page 48 is repurposed from 2009, and I'm happy to admit that fact. We wanted to feature a super-challenging project that pushes the boundaries of the craft; a handmade bamboo fly rod certainly meets those criteria and more, and Donna Chiarelli's beautiful photos made the decision even easier. So I decided to bring it back ... see what you think. I hope you enjoy both our all-new and gently "used" content in this issue!

— Rob Johnstone

FROM OUR READERS

What the Future Holds

A NOTE FROM THE END OF APRIL

In the regular course of events, I don't have any trouble imagining what woodworkers might be doing when our magazine is delivered to your house. In my current circumstances, that is just not so. In what I hope will be a dim memory, you may recall that the COVID-19 pandemic was looming large for most of us at the end of April. There were scads of concerns and opinions flying around with little in the way of certainty.

But one thing was true last spring that will be evident when this magazine arrives: woodworkers were in their shops making things (see below). I am grateful for the constancy that my shop fellows exhibit — we are steady Eddies who don't tend to let the events of the day overwhelm us. For that reason, I hope you are looking forward to this issue of the *Journal*. We've assembled a wide spectrum of projects — from very challenging to a lovely afternoon diversion. At the heart of this magazine, you'll find a new-and-improved Miter Saw Station from Chris Marshall, who built a previous version for the magazine a decade ago. We figured if you are going to be spending extra time in the shop, why not offer a big project to spiff that shop up a bit! Enjoy.

— Rob Johnstone

READER PROJECTS

Pandemic Productiveness

Early last spring, as many states issued shelter-in-place mandates to help quarantine the public against the COVID-19 virus, many of you hunkered down in your workshops and got busy on to-do lists of projects. In a March editorial for *Woodworker's Journal's* "Weekly" online newsletter, Rob Johnstone requested photos and descriptions of what readers were building. More than 70 people responded to his query with photos and descriptions sharing a range of projects and stories. For those of you who missed out on the fun, here's a sampling. You can see all the submitted projects at *woodworkersjournal.com* by doing a search for Pandemic Projects.

Walnut/Maple Bench

"Living in Montana, I felt lucky to score a 10-ft. slab of 8/4 bird's eye maple. I mixed it with some 8/4 walnut and designed this bench as well as an entry table for our home." - **Gary Tague**

Continues on page 10 ...

ROCKLER PRESS
THE VOICE OF THE WOODWORKING COMMUNITY

AUGUST 2020
Volume 44, Number 4

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Safety First Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturers' instructions and safety precautions.

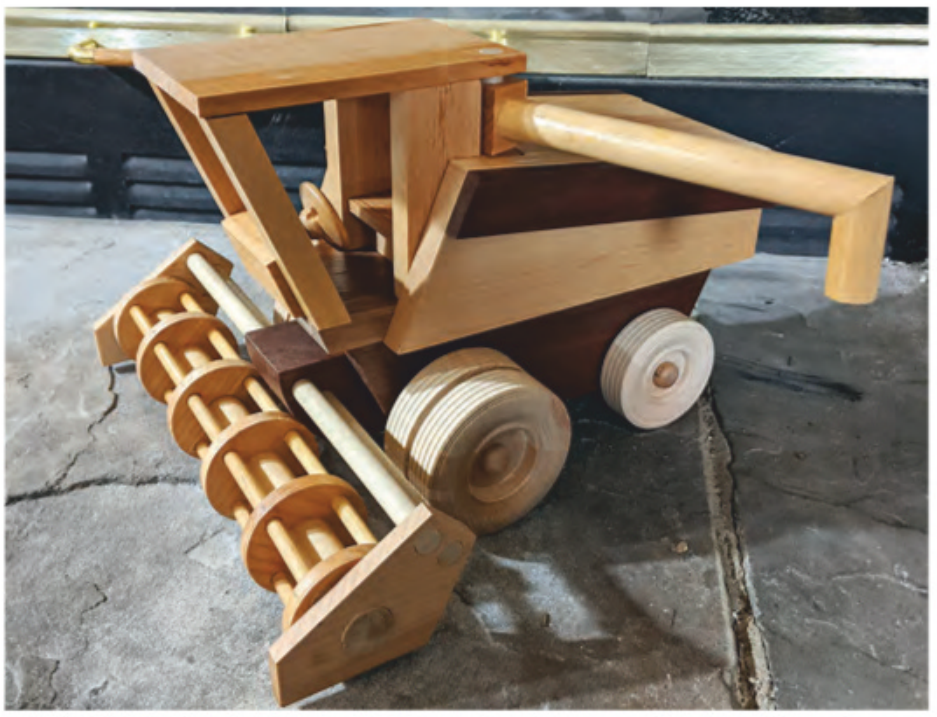
Woodworker's Journal (ISSN: 0199-1892), is published in February, April, June, August, October and December by Rockler Press Inc., 4365 Willow Dr., Medina, MN 55340. Periodical postage paid at Medina, Minnesota and additional mailing offices. Postmaster: Send all address changes to Woodworker's Journal, P.O. Box 6211, Harlan, IA 51593-1711. Subscription Rates: One-year, $19.95 (U.S.); $28.95 U.S. funds (Canada and other countries). Single copy price, $7.99.

Publications Mail Agreement Number 0861065. Canadian Publication Agreement #40009401.

FROM OUR READERS CONTINUED

Skiff from Scratch

"Forty years ago, I built yachts for a few years and worked with some old-time boat builders who could do some amazing things with very basic tools. I have always wanted to build a boat for myself, and since I am 71 years old, I figured it was now or never. This is a 12-foot skiff from a design by Spira International. I can't begin to tell you how much I'm enjoying building it." - **Wade Colclough**



A Grandson's Combine Toy

"Every year I make something for my grandkids. My grandson Otto lives on a farm and loves the combine — or as he calls it a 'bombine.' This year I made him a miniature bombine out of wood." - **Paul Vanslambrouck**

Tall Poplar Bookcase

"Recently I completed a tall narrow bookcase for my technical books and miscellaneous memorabilia that were lying around my home office. It's constructed of poplar with a walnut stain." - **Gil Jennings**

Mini Hoe Chucker

"This machine (at right) is called a "hoe chucker." It is used in the logging industry here on Vancouver Island to pile and load logs. I made this model for a retired gentleman who used to operate one, using pictures that he supplied me and from an Internet search of similar machines." - **John Baldwin**

Morris Chair/Footstool

"This is a new design for me, and I have made two of these since 2018. I call the chair the California West Greene & Greene Chair in Cherry and Curly Maple. It is not done, and with the pandemic in process it may not be done in time to enter it into the San Diego 'Design in Wood' competition this year. But that's my hope." - **Brian H. Murphy**

Continues on page 12 ...

Chessboard Good Enough for Surrogate Shop Class

"I have a close family friend who is in high school and was unable to fit wood shop class into his schedule. He asked me if we could build a chessboard — it's the shop class's first project, as the design provides introduction to lots of tools and techniques. So since school is out due to the pandemic, we were able to complete the board over a week's time. He was so excited to complete the board so quickly, which was all due to the one-on-one time we were able to spend on it. He chose wenge and ash for his contrasting woods." - **John DeVries**

Continues on page 15 ...

There's more online at woodworkersjournal.com

www.woodworkersjournal.com
MORE ON THE WEB

Check online for more content covering the articles below:

Woodturning (page 22): *Advice for moving a full-sized lathe safely (PDF and video)*

Miter Saw Station (page 30): *Elevation drawings and plywood cutting diagrams (PDF); overview of project's various features (video)*

Carved Dough Bowls (page 44): *Using a band saw and power carver to make a carved bowl (video)*

Bamboo Fly Rod (page 48): *Additional information for building a fly rod, including the author's specialized tools (PDF)*

What's in Store (page 62): *Featured tools in action (videos)*

Finishing (page 64): *Video of finishing techniques. https://www.rockler.com/6-simple-finishes-recipes (video)*

CORRECTION

In the June 2020 issue, page 44, the Ends (Pieces 2) of the Walnut and Cherry Tray should be 11½" long, not 9½" as stated in the *Material List*. We regret the error.

SURVEY

JOINING WOOD TOGETHER IS THE CORE OF THE CRAFT, BUT HOW DO YOU DO IT?

Dadoes and grooves, as well as mortises and tenons, make up a significant part of woodworking joinery. How those joints get formed is up to the woodworker. Here is a breakdown of your favorite methods.

What is your preferred method for making dadoes and grooves?

a.	Table saw	59.27%
b.	Router (handheld)	17.44%
c.	Router table	14.51%
d.	Router hand plane	.49%
e.	I don't make dadoes	5.85%
f.	Other	2.44%

What is your preferred method for making mortises for mortise-and-tenon joints?

a.	Mallet-driven mortising chisel	3.07%
b.	Drilling and paring the sides/ends with a sharp chisel	20.15%
c.	Routing the mortise	15.23%
d.	Dedicated mortising machine	29.61%
e.	I don't make mortises	28.01%
f.	Other	3.93%

What is your preferred method for making tenons for mortise-and-tenon joints?

a.	Cutting by hand with hand saw and bench chisel	5.9%
b.	Tenoning jig on the table saw	38.45%
c.	Tenoning jig with a router	5.65%
d.	Miter gauge on the table saw	15.72%
e.	Cutting them on a band saw	5.16%
f.	I don't make tenons	24.82%
g.	Other	4.3%

I prefer:

a.	Traditional mortise-and-tenon joints	63.39%
b.	Loose tenon joinery made with a router	8.5%
c.	Domino joinery	8.72%
d.	Other	19.3%

STUMPERS

Tool's Purpose Seals the Deal

Watertight Answers Pour In

R.K. Motheral's tool conundrum in the April issue opened a floodgate of responses from readers who know precisely what it is: a faucet valve seat dresser. Joe Wiley of Spokane, Washington, shares his version of the tool (above).

While a couple of you Stumper sleuths could only venture a guess at R.K. Motheral's threaded mystery tool in the April issue, more than 100 readers knew what it was beyond all shadow of a doubt — and many of you still own one.

"Having been in the plumbing trade for the past 44 years, says **Duane Haugen** of Omaha, Nebraska, "I immediately recognized it as a valve seat dresser."

Larry Graves, the son of a master plumber, and **Daniel Pagerie** of Johnstown, New York, both recall watching their fathers use these tools on the job when they tagged along on plumbing calls. "As a live-in maintenance man, I used one every week," says **George White** of Laceyville, Pennsylvania. "Mine's over a half century old and still works well."

Dave Johlin of Brunswick, Maine, explains that before faucets used O-rings, a rubber washer tightened down against a brass seat to shut the water off. "When a faucet dripped, the first thing to do was replace the washer. If that didn't work, it meant that the seat was pitted."

The valve itself would gall the brass seat as the washer or gasket wore down, which exacerbated dripping, adds **Frank Ramezzano**. Roughness on the valve seat could also damage the new replacement washer. Calcium deposits, according to **Paul E. Tilson Jr.**, of Viera, Florida, would impede a tight water seal as well.

To smooth and clean the brass seat again, the valve stem was first removed and replaced by the valve seat dresser, explains **George Pullis** of Millbrook, New York. "Rotating the handle a few turns refaced the faucet washer seat," he says.

Several sizes of rosette cutters, matched to popular faucets, provided the cutting and smoothing action, and some of those cutterheads, says, **Charles W. Jorgensen** of Brookville, Florida, are missing in Motheral's mystery tool photo. "There is a fourth cutter that is not shown for the flat rubber washer seats," clarifies **Dan Ransom,** a retired plumber. "The three that are shown are for beveled washers."

Installing the tool on a faucet required that its threaded rod be passed through the nut that secures the faucet handle. Or the tool's cone-shaped pieces could be used to center the appropriate-sized rosette in the faucet body instead, reports **Mat B.**, hailing from Lompoc, California.

"The twin conical section (in brass) has a coarse thread at one end and a fine thread at the other, says **Bernard Geatrix,** chiming in from the United Kingdom. "It can be reversed, enabling the tool to loosely screw into a variety of tap bodies." **Nick Oliver,** of Christchurch, New Zealand, offered a similar description of these cones.

The dresser's threaded rod is long enough to accommodate faucet stems of varying length, adds **Gary Lamers**.

Jim Platt says that new faucets with ceramic cartridges and non-corroding components have eclipsed the need for this tool, which has, in **Darrel D. Fox's** opinion, relegated it to "wall ornament" status. But the venerable valve seat grinder is still widely needed "Down Under," reports Ranald Grant of Brisbane. "Here in Australia, we probably have millions of these older style taps/faucets still in use."

What's This?

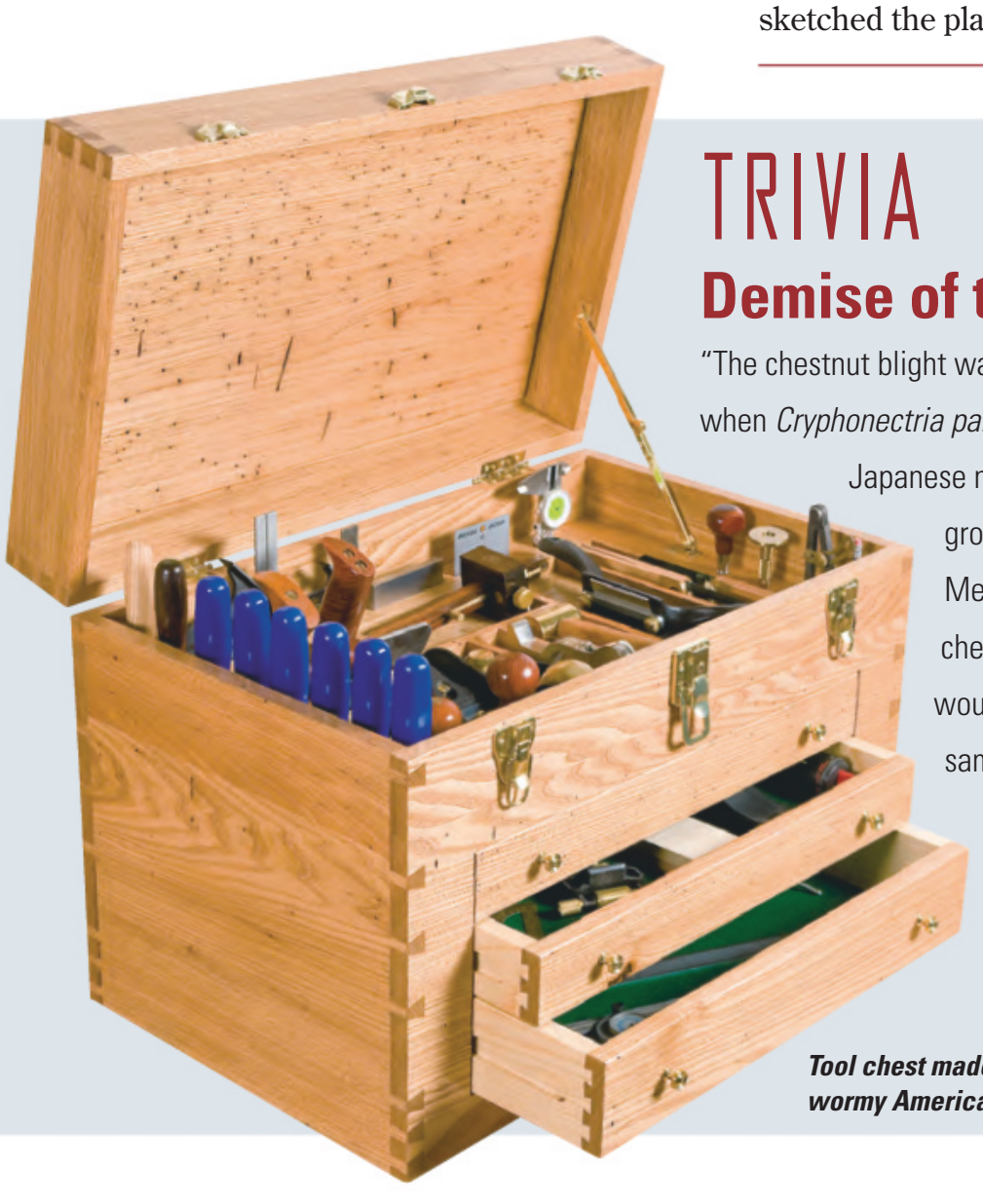
Leonard Smith of Miles City, Montana, has had this mystery tool in his "do not throw" box for years. It has an aluminum frame that holds a pivoting steel blade with two nylon rollers on top. On the back side is stamped "0.325 AP." A pair of tiny arrows, pointing inward, are embossed in the aluminum frame. A protruding steel piece is marked "Hard" and "Soft." Can you identify it? Email your answer to *stumpers@woodworkersjournal.com* or write to "Stumpers," Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340.

Model Train Walkway

"I'm building a walkway up a mountain on my 0 scale train display. It's inspired by our local metro parks where I often walk with my young grandson and our dog." - **Ernie Richmann**

"Unsimplified" Rolltop Desk

"My current project is a rolltop desk. Looking for plans online, I was disappointed in that so many are 'simplified' in their design. Lots of them use plywood and screws, which I did not like. These factors drove me to design my own version. I took pictures of what I liked and sketched the plans. Here's how it's looking so far." - **Bob Zeliff**



Tool chest made of virgin-growth wormy American chestnut.

TRIVIA

Demise of the American Chestnut Tree

"The chestnut blight was accidentally introduced to North America around 1904 when *Cryphonectria parasitica* was introduced into the United States from Japanese nursery stock. It was first found in the chestnut trees on the grounds of the New York Zoological Garden by Herman W. Merkel, a forester at the zoo. By 1940, most mature American chestnut trees had been wiped out by the disease. Saplings would attempt to grow but then would also succumb to the same blight. Around 1950, I remember walking through the woods with my dad and looking for chestnut trees taller than 15 ft., but sadly, we never found any."

Dave Smith
Sikeston, Missouri

Tips that Unstick Bits, Magnets, Wood Plugs

Bolt Makes Blade Cleaning More Efficient

When it's time to clean a saw blade, I insert a 1/2" threaded bolt through its 5/8" arbor hole. The bolt's head keeps the blade from suctioning to the bottom of the bucket I use for the cleaning solution, and the threaded shaft provides a safety handle of sorts for me to pick the blade up when it's wet. The bolt is just a 2½"-long all thread I happened to have. If I have several blades to clean, I thread a nut onto the bolt, which serves as a spacer to keep the blades from touching. This way, I can soak several blades at once to make the task more efficient.

Jim Wilson
San Marcos, Texas

Space Balls Prevent Stuck Router Bits

In the past I've resorted to a dead blow hammer to tap router bits free when they get stuck in my router's collet. Then a better solution came to me: I inserted one of Rockler's rubber "Space Balls" (item 12386) for cabinet doors into the collet to prevent the bit's shank from bottoming out. I first applied a small dab of multipurpose adhesive inside the collet (inset photo) to hold the ball in place. I've been using the original Space Ball for more than a year now. It hasn't fallen out, and I haven't had a stuck router bit since.

Gary Storme
Anacortes, Washington

A screw forms a "handle" for easier wood plug removal.

A Better Way to Pull the Plug

Removing the wood plug from inside a hole saw used to be such a pain for me, but I'm hoping my discovery can help a lot of other woodworkers and DIYers remove them more easily. Before boring your hole, mark its center point and scribe the circle with a compass. Drive a screw through the waste area about halfway between the center point and the hole's circumference. Choose a screw about an inch longer than the board's thickness. Now bore the hole as usual, unplug the drill (or lock the chuck) and grab the screw on the threaded side with a pliers to pull out the plug. Easy as can be.

Glenn Willis Jr.
Redondo Beach, California

Simple Magnet Separator

Rare-earth magnets can be difficult to separate when they are stuck together, but here's a simple jig I use that solves the problem. It's a scrap of plywood with a shallow hole drilled in it that matches the magnet's diameter. I drilled it just deep enough to recess one magnet. A second smaller hole in the middle of the magnet recess goes all the way through the plywood. To use the jig, I place both magnets on top and swipe the top magnet off of the bottom one with my finger. Then, I poke the recessed one out of the jig with a dowel.

John Jakobs
Mason, Ohio

PICK OF THE TRICKS

Tray/Drawer Combo Adds Helpful Storage to Table Saw

I finally got tired of searching for all of the throatplate inserts, push sticks, blades, featherboards and angle gauges scattered around the shop instead of stored on my mobile table saw where they belong. I was planning on adding just a drawer to my saw and locating it below the rip fence rails. But that would have left about 3" of unused vertical space above the drawer in the rail area. So I've filled that spot with a tray and a top door that opens with concealed cabinet door hinges. Now, my throatplates, push sticks, tape measure, pencils and angle gauge store in there. The drawer gives me a place for extra blades, dado set, small jigs, featherboards and the blade guard when I need to remove it. This combo unit is just the storage solution I've needed!

Edwin J. Santiago
West Allis, Wisconsin

In addition to our standard payment (below), Edwin Santiago of West Allis, Wisconsin, will also receive a Milwaukee M12 FUEL™ 18GA 1/4" Narrow Crown Stapler Kit for being selected as the "Pick of the Tricks" winner. We pay from $100 to $200 for all tricks used.

To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. For your chance to win, submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340.

Or send us an email: tricks@woodworkersjournal.com

SHOP TALK

Grow Against Poverty

By John Roccanova

Proceeds from couples' woodcraft sales benefit education for Kenyans.

The annual "Crafts for a Cause" fundraising sale takes place in the one-room historic Irondale Schoolhouse in Millerton, New York.

John Roccanova and Helen Mukanda, director of Grow Against Poverty-Kenya, plant a tree seedling outside the community building funded by Grow Against Poverty-USA.

Helen shows Jean Roccanova how she winnows corn with a couple of buckets.

One item up for sale at "Crafts for a Cause" is Roccanova's tea box: it's made of oak with a mahogany lid, Brazilian ebony handle and splines.

Last March, *Woodworker's Journal's* online "Weekly" asked for project submissions to share what we've been working on during the pandemic stay-at-home (see "Pandemic Productiveness," page 8). I submitted photos of a few of the hundreds of items that I've been building to be sold at our annual holiday "Crafts for a Cause" sale for education and community development projects in Kenya.

Fifteen years ago, my wife Jean and I read an article about education becoming free in Africa. Schools became overcrowded, often with more than 100 students in a class. We contacted Michael Kremer, a Harvard economics professor and subsequently a Nobel Prize recipient, about how we could help. He said that donating money to sponsor a teacher would be beneficial, which, as teachers, we were very happy to do.

Our Kenyan contact person, Helen Mukanda, told us of the many needs of the Nambale community in Busia County. In 2010 we decided to start a 501(c) (3) nonprofit called Grow Against Poverty and to raise money through the sale of my woodcrafts. Since then we've raised over $71,000 selling salad bowls, cutting boards, toys, tea boxes, candleholders and other works in wood.

Ideas for the programs and projects come from community residents, school staff, Helen and other volunteers, who see education as an important way out of poverty. Using Grow

Students, staff, school board members and Grow Against Poverty members gather at the opening ceremony of the "Pedal Power for Kenyan Education" program.

Students at St. Mary's School with Buffalo Bicycles: these bicycles have been designed and built to handle the rough roads while making commuting to school more efficient.

Roccanova makes a variety of decorative and practical items, including these walnut and maple peace earrings, to raise funds.

Against Poverty proceeds, we've implemented school projects and programs. Classrooms have been built, and we've outfitted a 12-station computer room. We started a meal program, which is now community-funded, and we've planted school organic gardens as well as tree seedling nurseries. These will soon become self-sustaining.

Pedal Power Program

A particularly effective program that was started two years ago is a school bicycle transportation program called "Pedal Power for Kenyan Education." Many students walk over 5 miles each way to and from high school, often needing to wake up at 4 a.m. to make their morning classes. Grow Against Poverty has provided St. Mary's School with 50 bicycles, helmets, safety vests and tool kits to loan to students, most from subsistence farming families living on less than a dollar a day. With a reduced commuting time, students have more time for studying, caring for siblings and working on family farms. Attendance, promptness and academic performance have all improved through this bicycle program. Seven recent graduates have gone on to university, compared to four the previous year. This success has brought requests from five other schools for similar programs. We are starting to raise money to furnish each school with 50 bicycles and accessories.

The immediate focus of Grow Against Poverty is the predicted famine that could affect this region because of the current COVID-19 pandemic. We've sent funds to purchase hoes called *jembes* and other tools and supplies for 100 farm families so that students who are home from school can provide extra help with food production.

Charitable donations of wood and other supplies for my woodcrafts make our fundraising for these Kenyan projects possible. Local businesses have given me woods such as oak, cherry, walnut, mahogany, teak and Brazilian ebony for this endeavor. A local hardware store has supplied glue and finishes. Online businesses have donated finishes, veneer and inlays, too. I supply whatever else is needed as well as pleasurable time in the shop with a hobby that has the extra benefit of helping others.

To find out more about Grow Against Poverty's programs, visit: *www.globalgiving.org/projects/pedal-power-for-kenyan-education;* and *www.growagainstpoverty.wixsite.com/kenya.*

School organic gardens have been started to teach agricultural practices and to add fresh vegetables to school lunches. Students use hoes called* jembes *to get started.

Apron-maker Shifts to PPE Amid COVID Crisis

By Michael Williams

Responding to national shortages, Calavera Tool Works makes masks.

Under normal circumstances, I spend most of my time hand-making leather work aprons and a variety of other leather goods under the Calavera Tool Works brand, which I founded some five years ago. But early last spring, the COVID-19 pandemic shook me from the comfortable life I had established for my young family here in Charleston, South Carolina. While I'm not one to worry much over myself, I certainly struggled with the uncertainty and potential health consequences ahead for those I love most, including my wife, four children and aging parents. At the same time, there was a national shortage of protective masks to meet the challenges at hand. The need for personal responsibility and action rapidly became all too clear to me.

I've never been much of a bystander, so I quickly set to work on prototypes for personal protective equipment (PPE) that I hoped to produce in sufficient quantities to at least cover the needs of my closest friends and family. And since "crazy" seems to know my exact location at all times, it took less than 48 hours for a major national news network to find me and place an order for 8,500 face masks for the purpose of protecting their reporters and staff who would be so critical in covering news of the crisis.

To make this essential, yet (then) extremely scarce piece of gear a reality, we ramped up from a single part-time employee to a team of 10 to seamstresses working from home. Calavera purchased many thousands of the most expensive vacuum bags known to our woodworking and construction industries and scrounged for every inch of elastic we could get our hands on. By the time of this writing, we have shipped well over 20,000 high quality, well-fitting masks, including a couple thousand donated outright to veterans hospitals, food banks and many other good causes around the community. (And yes, I made sure Mom and Dad had plenty from the start to stay safe.)

We must take responsibility for one another, regardless of politics, beliefs or any of the other factors that make individuals out of each of us. I have been extremely grateful for the opportunity to put whatever skills I have to use for the greater good, in whatever small manner that may be. And well, if I'm being honest, I do enjoy a good challenge and a little bit of chaos now and then. Stay safe, good people, in these challenging times.

Last spring, Calavera began to manufacture protective face masks, made of vacuum bags and elastic, to help offset PPE shortages.

Michael Williams, founder of Calavera Tool Works, assembling a custom leather work apron — the company's primary product line.

Tips for Buying a Used Full-Size Lathe

By Ernie Conover

There are bargains to be had in second-hand lathes if you shop wisely.

Used full-size lathes come on the market because of cross-country moves, downsizing for retirement or an estate sale, and scoring one of these can offer a significant savings over buying it new. Older machines that have seen some use can go for as little as 40 percent of their new value. In 2015, I bought such a lathe from a good friend who was preparing to move into an assisted living facility. An avid turner, his paragon machine was the Oneway 2436 shown above. He called me to see if I knew of a buyer. My immediate reply was, "Yes, me! How much?" We settled on $3,500. At that time, a new 2436 went for about $8,000 shipped. What a deal!

While it was a stroke of good fortune, my opportunity actually wasn't rare. It may take some patience, but used full-size lathes are fairly common. You have to accept the machine as-is and without a warranty. But not a lot goes wrong with a lathe, and you can plug it in to make sure it runs before closing the deal. Lathes are also easy to fix — replacing the bearings and belts will often make a used machine run like new again.

If you're in the market for a full-sized used lathe, keep the following factors in mind.

Envelope and Build

Your first consideration should be the lathe's overall capacity — its "envelope." My Oneway will swing a 24" blank over the bed and hold a piece 36" long between centers. Most full-size lathes will swing at least 16". Think about the kind of work you want to do, and buy a used lathe that will satisfy your turning goals for the future.

Any full-sized machine will weigh 400 lbs. or more. The more it weighs, the better, because that density dampens vibration during turning. Some older machines are built almost entirely of cast iron, and several current models, such as Powermatic's 3520 and 4224, are still made that way. Other full-size lathes use welded-steel construction, which has some advantages. It allows smaller batch size and customization. For example, Oneway will add stainless steel ways to their lathes for an added fee.

More commonly, construction is hybridized: welded-steel bed and legs with headstock, tailstock and banjo being cast iron. All full-size lathes will have either cast-iron or welded steel legs.

Spindles and Levers

Don't buy a full-size lathe with a 1" spindle. Although large "school" lathes were made with this spindle size in the past, it is not adequate for heavy faceplate work (bowls), which is the main interest of most turners today. I would not consider any machine with less than a 1¼" spindle. Other common sizes are 33 mm (which is slightly bigger than 1¼") and 1½"; the Powermatic Model 90 and Conover lathes are two examples with this spindle size.

Most full-size lathes have stout levers that lock the tailstock, banjo and tool-rest securely with minimal force applied by you. Test these features by locking them down, then apply sideways force to see if they move. They should stay put.

Variable-speed Options

Variable-speed control is a desirable feature as well, allowing you to safely manage stock from rough out-of-balance blanks (turned at low speeds) to final finishing (high speeds). To accomplish this, most full-size machines made in this century will have a variable frequency drive (VFD) controller with a three-phase induction motor. The speed of an induction motor is controlled by the frequency of the current — 60 cycles in North America. The VFD outputs three-phase current (even if plugged into single-phase) to the motor and any frequency from about 2 cycles to more than 60 cycles. Very low speed is possible with almost no drop-off of power. VFDs are easy to replace and widely available. You might find a lathe equipped with a DC controller and motor instead. As long as it is in good working order, this is a reliable form of variable speed. Solid-state replacement DC controllers are obtainable.

A third form of speed control is variable-width V-belt pulleys — what is called a Reeves drive. A lever controls the distance between the halves of the headstock pulley. Bringing the two halves together effectively makes the pulley larger, changing the spindle speed. It's necessary to replace belts more frequently on Reeves drives, and they do need lubrication and adjustment once in a while. But if in good shape, they work fine.

Indexing: Don't Sweat It

Full-size lathes have at least 12-position indexing with 24 positions being common and 60 positions on some. Indexing is a feature some buyers seem to worry a lot about but

Stepping up to a full-sized lathe should be an investment in the growth of your hobby. Keep a used lathe's envelope in mind first and foremost, to make sure its swing and distance between centers will satisfy the work you plan to do.

Oneway uses a 33 mm spindle, which is 1.299", making it .049" larger than a 1¼" spindle. Either size is good, but avoid a 1" spindle — it's too small.

Minimal force on the levers of the author's Oneway solidly lock the tailstock, banjo and tool-rest. When evaluating a used lathe, check these locking features. Once set in place, they should not move.

This Powermatic lathe has electronic speed control with a VFD (being pointed to) at the back of the headstock. The author is adjusting the speed with a potentiometer on the face of the headstock.

The author's Oneway 2436 has 48-position indexing. While this is certainly a beneficial feature, don't fret about too few indexing positions. You can get around the limitation in various ways, such as using dividers.

never actually use. Since my wife Susan is a fiber artist, I frequently repair spinning wheels and am often faced with 48-position indexing not giving me the spacing I need. A set of dividers solves that problem easily enough. Don't waste time worrying about indexing. There are simple workarounds for it.

Assessing a Used Lathe

It is easy to see how much a lathe has been used: the condition of the paint and the bare metal surfaces are good indicators. Spilled finish and glue under the spindle are common and easily removed. Light rust can be removed, but if there is extensive pitting from corrosion, the accuracy of the bed can suffer. Check the condition of the spindle nose. Are the threads clean and straight or are they beaten up? Are the pulleys in good condition with smooth, flat inner faces? Look at the bottom ends of the legs. Are they rusted with the paint flaking off? This is an indicator of a damp basement.

Any lathe older than 15 to 25 years will probably need new bearings. An automotive machine shop can usually replace them if you do not want to do it yourself. Anytime you replace bearings, replace the belt as well. Part availability can be a problem for older lathes, so contact the manufacturer if they're still in business. Bearings, pulleys, belts and levers are shelf items. You can often find a working replacement, but it may not be an exact match. Good sources for these parts are McMaster Carr, Granger and Bearing Distributors Inc.

Bonus Accessories

One advantage to buying a used machine is that the seller might include lots of accessories and tools when a turning hobby is coming to a close. A used lathe should come with a set of centers and a faceplate, so these should be part of the price. However, the seller may happily throw in a set of turning chisels and other accessories such as scroll chucks, casters and even a grinder. If you're fair with the initial asking price, accessories can sweeten the deal so both you and the seller go away from the bargaining table satisfied. Best of luck finding your gently used big lathe!

Ernie Conover is the author of The Lathe Book *and* The Frugal Woodturner.

Advice for Moving a Full-size Lathe

How the heck do you move a full-size lathe into a workshop in the first place, especially if it's in a basement? Well, if you think getting a big lathe down *into* a basement is daunting, moving a used one *out* of it is even more challenging! But, take heart: it's very doable. My online video and supplemental text (*woodworkersjournal.com*) should help, and I offer some tips for moving heavy woodworking machinery in general.

www.woodworkersjournal.com
MORE ON THE WEB

VIDEO For a video overview the author's tips for dismantling and moving a full-size lathe, visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

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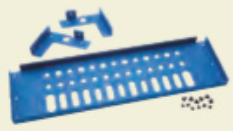

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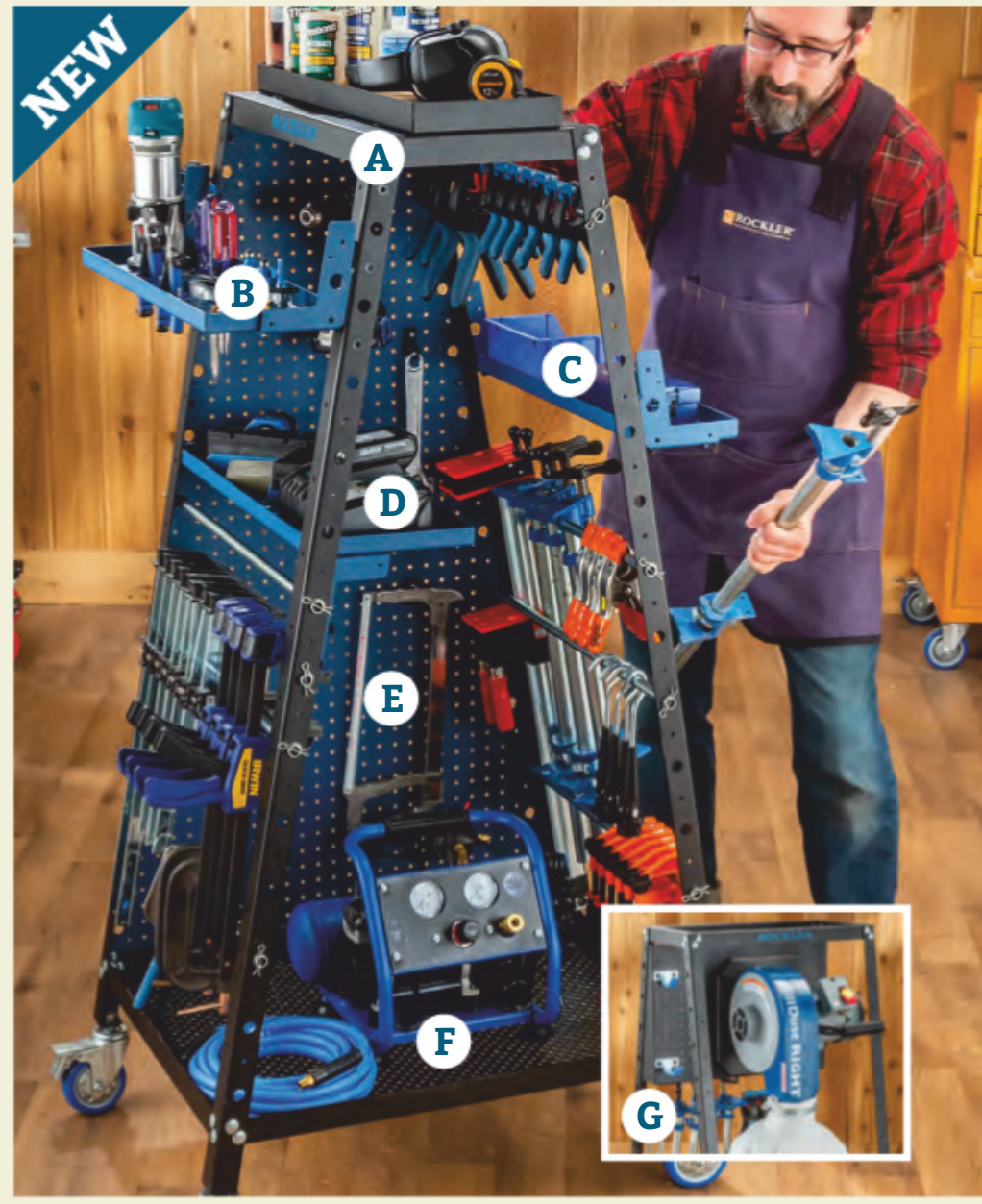

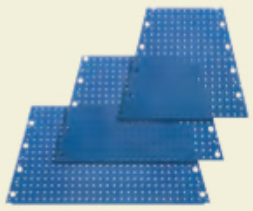

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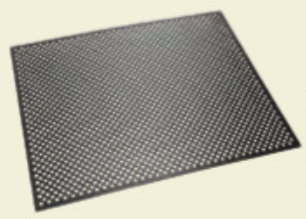

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Miter Saw Station

By Chris Marshall

After a decade of using a previous (and popular!) station, our author goes back to the drawing board to reinvent his own design with many updates.

A miter saw station I built for our June 2010 issue (see page 6) became our most popular shop project in *Woodworker's Journal's* history. But 10 years of regular use have provided a "punch list" of improvements I've been itching to incorporate into an updated design. For one, at 8 ft. long, it dominated wall space and was a battleship to roll around. This second go-around is much shorter, at 64¼", because I'm using my drill press table as the right-hand support surface for crosscutting long workpieces. There's still plenty of shelf space for offcuts or general storage, plus two drawers that I'm planning to use for stowing valuable short scraps. You won't find a long fence beside the saw either; it really isn't necessary and sometimes can actually hinder safe crosscutting of distorted wood. That fence typically includes a work stop to make repetitive crosscuts easier, but here the feature is taken care of with an aluminum T-track and Corner Stop from Rockler. I've also come to the realization that miter saws need both active dust collection (via shop vacuum or dust collector) and a passive way to capture what suction inevitably doesn't. So this station has a chamber behind the saw to help contain

The author used a short piloted mortising bit and a pair of scrap fences to sandwich a couple of spacers of the project plywood in order to create exact-fitting dadoes in the uprights.

Rout a 1/4"-wide x 1/2"-deep spline slot along the full length of the mating edges of the wide and narrow back panels. A piloted slot-cutting bit (inset) makes the task simple and quick.

floating dust as well as a pull-out tray below that you can dump or vacuum out when needed. (It's also a nifty way to recover those pesky little offcuts that can get trapped under a saw if it sits on a solid platform rather than on a couple of support blocks as it does here.) My first design collected a hodge-podge of shop clutter behind the long fence. On this "Miter Station 2.0," I've integrated an upper cabinet with steel-clad doors to fill that space. It offers dedicated storage plus a way to hang your notes or plans within easy view, using magnets.

Even if these features have you nodding approval, definitely measure your saw to be sure it will fit the station's 24½"-deep x 26¼"-wide compartment (most compound miter saws should). Sliders need to be a "rail forward" design to accommodate the back panel. If your saw fills the bill, here's how to build my "latest and greatest" miter saw station for your shop.

Making the Carcass

Get this station underway by cutting the bottom panel to size (see *Material List*, page 33). Then download our "More on the Web" elevation drawings so you can lay out and cut the four uprights to shape from 3/4" plywood. Label them A through D, to index them from left to right on the final assembled project. Carefully glue and clamp uprights C and D together so their edges and ends align to create a double-thick upright.

Rout 3/4"-wide, 1/4"-deep dadoes across the appropriate faces of the uprights for the upper cabinet bottom panel, wide and narrow shelves and web frame. Here's the dado schedule:

- **Upright A:** Dadoes for the upper cabinet bottom, web frame and wide shelf in the right face.
- **Upright B:** Dadoes for the upper cabinet bottom in the left face and two narrow shelf dadoes in the right face.
- **Upright C/D:** Two narrow-shelf dadoes in the left face.

Cut the wide and narrow back panels to size. These are differently sized so that their shared seam will be hidden behind upright B when assembled. Rip and crosscut a pair

Drill or rout two rows of shelf pin holes in the upper cabinet area of uprights A and B. Here, a guide collar and straight or spiral bit in a plunge router take the place of a drill/driver to produce tearout-free holes.

of solid-wood edging strips to hide the outer edges of the two back panels. Glue and clamp them in place. If you have a biscuit joiner, a few #20 biscuits can help to align the parts and make the clamping process easier. When the glue dries, plane or sand the edging flush with the plywood faces as needed.

Plow a 1/4"-wide, 1/2"-deep groove along the inside edges of the back panels that will house a continuous spline. I used a slot-cutting bit in a handheld router for the task. Plane a strip of 1"-wide stock down to 1/4" thick to create the spline. Or, use 1/4" plywood for the spline instead, as I did. Either way, make sure the spline fits easily but snugly in the panel slots.

Decide where you want the shop vacuum hose to pass through the miter station in what will become the chambered area behind the saw, and determine how large this hole needs

On a large, flat work surface, attach the bottom panel to the uprights with 2"-long countersunk screws. Notice how a pair of wooden hand screws can help to keep the bottom panel upright during this construction step.

Install the wide and narrow back panels with the carcass facing down. A glued spline, being inserted here, reinforces and aligns the back-panel's mating seam. Prevent the carcass from tipping forward by clamping a scrap in the upper cabinet area to act as a temporary leg against the floor.

to be to suit your shop vac hose. For my saw, I chose upright C/D for this "pass-through" hole, but a hole through the back panel might be a better choice for some saws. Bore the hole now. I cut mine with a 2½"-diameter hole saw in a drill press. While you're at it, mill two rows of 1/4"-diameter shelf pin holes into the right face of upright A and the left face of upright B within the upper cabinet area so you'll have plenty of adjustment options for a shelf. When that's done, arrange and fasten the uprights to the top face of the bottom panel with countersunk 2" screws. Locate upright B so its left face is 34¼" from the left end of the bottom panel.

Now you can install both halves of the back panel on the carcass, joining them along the middle seam with the spline glued in place. Fasten the back panel to the uprights and bottom panel with counterbored 2" screws. The bottom end of the back panel should extend 3/4" past the bottom face of the bottom panel. Make sure upright B is also centered on the back panel's splined seam.

Mount 4"-diameter casters to the bottom cleats with 1" lag screws and washers. Arrange the locking casters on the project's front corners and the non-locking casters in back.

Rip and crosscut the short and long bottom cleats to size, and install them with glue and countersunk screws or brad nails. Align the outer edges of the cleats carefully with the bottom panel edges. While the project is still lying down, locate and mount the four casters on the bottom cleats. I positioned the caster mounting plates flush with the outside edges of the bottom cleats. Arrange the locking casters in front and the non-locking casters in back. Bolt them on and stand the project up on its wheels.

Cut the plywood top panel to size, and glue strips of short and long solid-wood trim to its ends and edges to hide the edge plys. When the glue dries, install the top on the carcass with 2" counterbored screws. The ends of the top panel should overlap the outer uprights by 1". Its front edge should overlap the front edges of the uprights at this stage by 1¾".

Head back to your stack of plywood to cut the narrow shelves, wide shelf, a panel for the web frame and the shelf supports to size. Make two large cutouts in the web frame panel that form a pattern of 2"-wide "stiles" and "rails" around its perimeter and across the center (see *Exploded View*, next page). The purpose of this web frame is to form an attachment point for the drawer divider and to enable easier access inside the drawer compartments for installing the slides, later.

Miter Saw Station Hard-to-Find Hardware

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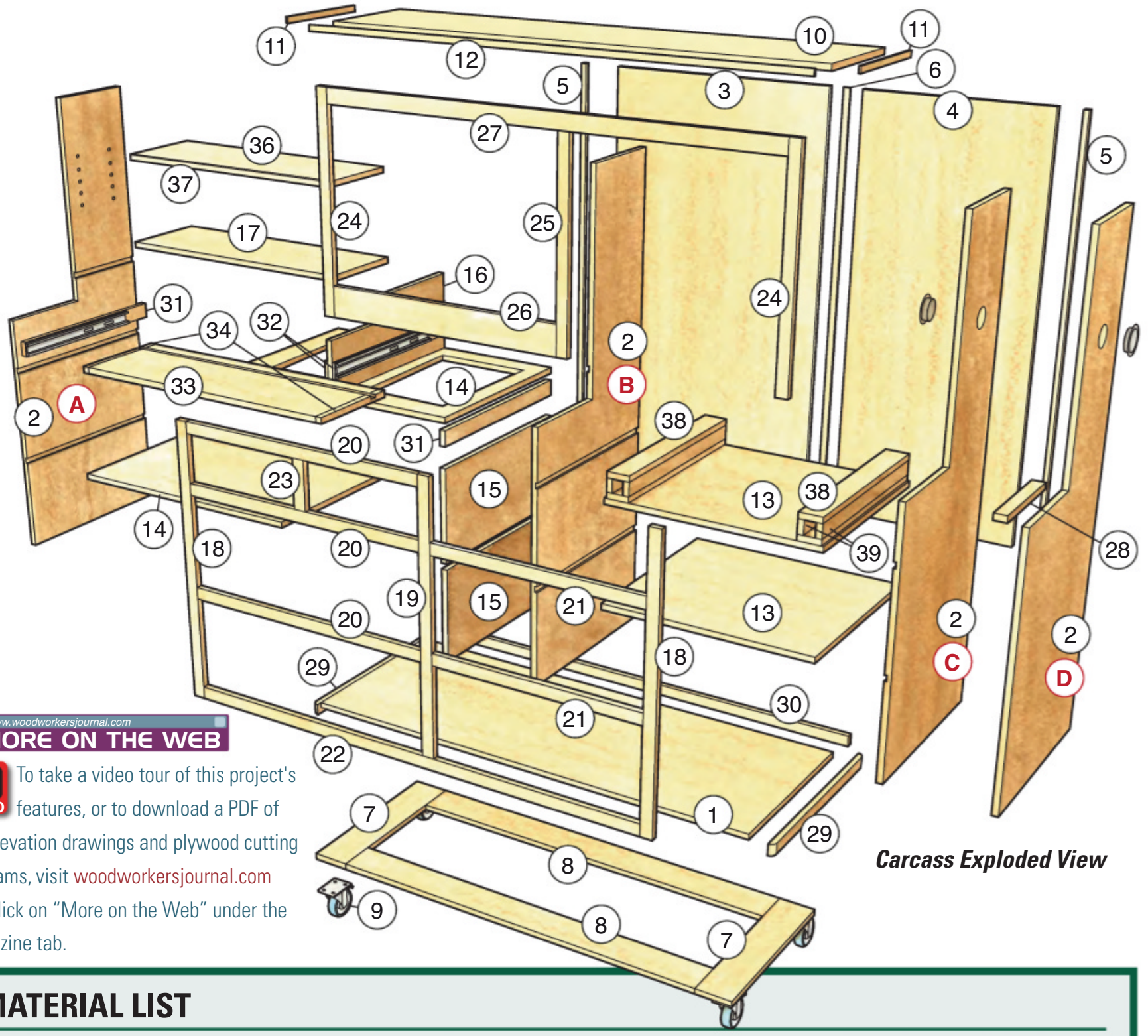

Carcass Exploded View

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MORE ON THE WEB

VIDEO To take a video tour of this project's features, or to download a PDF of the elevation drawings and plywood cutting diagrams, visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

MATERIAL LIST

Carcass	T x W x L
1 Bottom (1)	3/4" x 23¾" x 62¾"
2 Uprights (4)	3/4" x 23¾" x 60¾"
3 Wide Back Panel (1)	3/4" x 33⅞" x 62¼"
4 Narrow Back Panel (1)	3/4" x 27⅜" x 62¼"
5 Back Panel Edging (2)	3/4" x 3/4" x 62¼"
6 Spline (1)	1/4" x 1" x 62¼"
7 Bottom Cleats, Short (2)	3/4" x 5" x 23¾"
8 Bottom Cleats, Long (2)	3/4" x 5" x 52¾"
9 Casters (4)	4"-Dia. Swiveling, Locking
10 Top (1)	3/4" x 13½" x 64¼"
11 Top Edging, Short (2)	1/4" x 3/4" x 13½"
12 Top Edging, Long (2)	1/4" x 3/4" x 64¾"
13 Narrow Shelves (2)	3/4" x 23¾" x 26¾"
14 Wide Shelf, Web Frame (2)	3/4" x 23¾" x 33¾"
15 Shelf Supports (2)	3/4" x 12¼" x 23¾"
16 Drawer Divider (1)	3/4" x 10" x 23¾"
17 Upper Cabinet Bottom (1)	3/4" x 11½" x 34"
18 Face Frame End Stiles (2)	3/4" x 1½" x 35"
19 Face Frame Center Stile (1)	3/4" x 1½" x 33½"
20 Face Frame Rails, Long (3)	3/4" x 1½" x 32"

	T x W x L
21 Face Frame Rails, Short (2)	3/4" x 1½" x 26¼"
22 Face Frame Bottom Rail (1)	3/4" x 1½" x 59¾"
23 Face Frame Drawer Stile (1)	3/4" x 1½" x 6"
24 Face Frame End Stiles (2)	3/4" x 1½" x 28"
25 Face Frame Center Stile (1)	3/4" x 1½" x 26"
26 Face Frame Bottom Rail (1)	3/4" x 4" x 32"
27 Face Frame Top Rail (1)	3/4" x 2" x 59¾"
28 Bridge Rail (1)	3/4" x 1½" x 11½"
29 Side Skirt Boards (2)	3/4" x 1½" x 26"
30 Back Skirt Board (1)	3/4" x 1½" x 62¾"
31 Filler Strips, Thick (2)	3/4" x 2" x 23¾"
32 Filler Strips, Thin (2)	3/8" x 2" x 23¾"
33 Work Surface (1)	3/4" x 11½" x 33½"
34 Work Surface Edging (2)	3/4" x 3/4" x 11½"
35 T-track (1)	35"
36 Upper Cabinet Shelf (1)	3/4" x 10¾" x 33¼"
37 Shelf Edging (1)	1/2" x 3/4" x 33¼"
38 Blocking (4)	3/4" x 2⅞"* x 23¾"
39 Risers (4)	3/4" x 1¾"* x 23¾"

* Width will vary, depending on miter saw

Apply finish to the carcass and shelves before the face frames are installed, while the inside surfaces are still easy to reach. Keep finish off of the shelf and web frame ends, as well as out of the dadoes, so these joints can be glued together. The lower portion of upright B's left face also should remain bare.

While you still have easy access to the carcass's inner surfaces, now is a good time to apply finish to it, as well as to the shelves and upper cabinet bottom panel. But first, mask off the ends of those parts that will fit into dadoes to keep finish off of these areas. On the left face of upright B, keep the full area below the dado for the upper cabinet bare — you'll be gluing the shelf supports to these surfaces. As you apply finish, keep it out of the dadoes and off of the ends and back edges of the cleats and bottom panel — the skirt boards will need to be glued to these surfaces after a few more steps.

When the finish dries, glue the narrow shelves into their dadoes in uprights B and C. Glue the wide shelf and web frame into their dadoes in upright A. Spread glue on the shelf supports and set them into place against upright B so they straddle the right ends of the wide shelf and web frame.

Now install the upper cabinet bottom into its dadoes. Slide the drawer divider into place; be sure its front end is flush with the front edge of the web frame. Carefully center the divider between uprights A and B and along the length of the upper cabinet bottom panel. Attach the divider by driving 18-gauge brads down through the upper cabinet bottom panel and countersunk screws up through the web frame.

Two supports install on the left face of upright B to locate the wide shelf and web frame instead of with dadoes. They prevent the need to cut dadoes on upright B into both faces of the same spots, weakening it.

Carefully center the drawer divider between uprights A and B. Attach it to the upper cabinet bottom panel with brad nails and to the web frame with screws. Scrap spacers, shown here, ensure that the divider is centered.

You can also cut plywood panels to shape for the drawer divider and the upper cabinet's bottom panel. Make the notched portion of the drawer divider measure 3¼" x 12¼". Now dry fit the wide and narrow shelves, web frame, upper cabinet bottom and drawer divider in the carcass to make sure they are ready for installation. Then remove and finish-sand them.

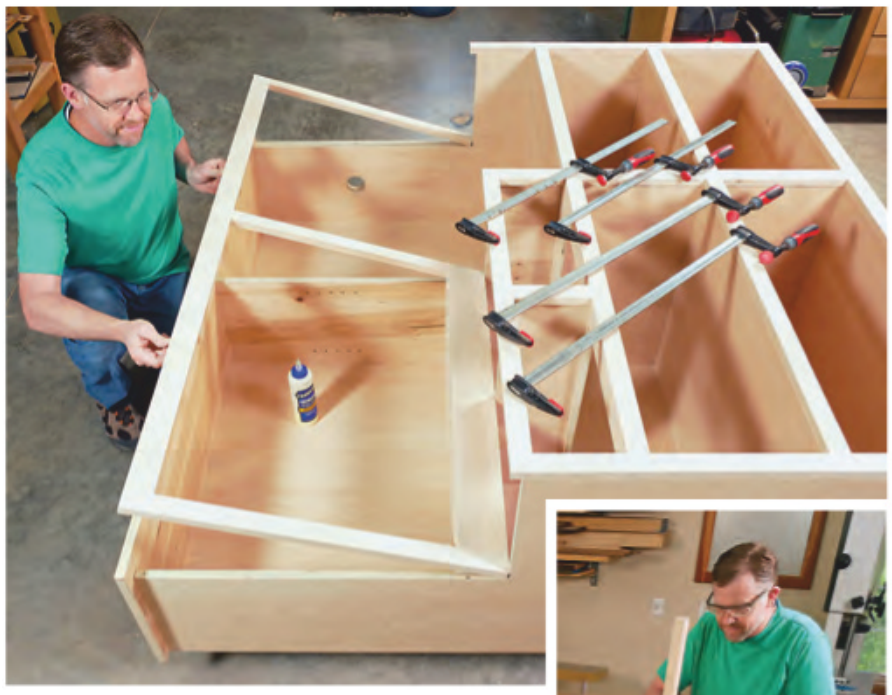
Adding the Face Frames and Work Surface

The lower face frame consists of two end stiles, a middle stile and a short drawer stile, three long rails, two short rails and a bottom rail. Rip and crosscut these parts to size from solid wood, but make the end stiles about 1/16" wider than the other members. Doing this will give you a bit of extra left-to-right adjustability when installing the face frame on the carcass.

Arrange the parts into the face frame shape on a large work surface, and mark the joints for pocket screws. Assemble the rails and stiles carefully, connecting the parts with pairs of 1¼" pocket screws at each joint.

Set and clamp the face frame into position on the front of the carcass, adjusting it so the middle rail covers upright B and the shelf supports; adjust the bottom rail flush with the bottom faces of the bottom cleats. If everything fits well, glue and clamp the face frame to the carcass. You can reinforce the glue joint with brad nails, if you wish. Repeat the process to assemble and install the upper face frame. Make its end stiles a bit wider than necessary, and take note that the top rail for this face frame is 2" instead of 1½".

When both face frames are in place, trim their end stiles flush with the outer uprights using a block plane or sanding block. Rip and crosscut the short bridge rail, and glue it to upright C/D between the upper and lower face frames.



The author assembled lower and upper face frames with pairs of 1¼" pocket screws at each joint (inset). Glue and clamp the face frames in position on the carcass; you can reinforce these joints with brads as well, if you wish, to keep the process moving.

Locate the T-track on the station's work surface about 1" back from the face of your saw's fence or sacrificial fence facings. The author plans to use Rockler's T-track Corner Stop (item 58673) to set same-length cuts.

Recess the T-track into a 3/8"-deep, 3/4"-wide groove milled into the work surface (inset). Install the work surface by driving screws through its edging strips (below). The author is leaving these screw heads exposed.

The side and back skirt boards hide the long and short cleats and bottom panel from view. Make these skirt boards from strips of 3/4" x 1½" solid stock. I rounded the outer corners of the side skirt boards with 3/4" radii at my disk sander to help them stand up better to wear and tear. Install the side skirt boards on the carcass so their front ends are flush with the front of the lower face frame. Glue and brad-nail them in place. Then fit and install the rear skirt board with more glue and brad nails.

The drawer slide hardware will be mounted on filler strips located inside the drawer openings. These filler strips enable the slides to be installed flush with the inside edges of the face frame stiles. A pair of thin filler strips attach to either side of the drawer divider, and a thicker filler strip is located on upright A and B. Measure the amount of actual recess behind the face frame for each of the four filler strips, and prepare stock to match these recesses at your thickness planer. Rip and crosscut the strips to size. Install them on the uprights and divider with countersunk 1¼" wood screws, centering the filler strips vertically in their drawer openings.

Next up, cut a panel for the work surface to size. You can use ordinary plywood for this workpiece, of course, but consider the option of white melamine or covering the work surface with plastic laminate. Either material will enable you to mark the work surface with a pencil when crosscutting multiple pieces to the same length, then wipe off the marks when you're through. It's a nice convenience to have.

Glue and clamp a strip of solid-wood edging to the ends of the work surface. I reinforced these joints with three #20 biscuits per end to keep them aligned during clamping.

When the glue dries, plow a 3/4"-wide, 3/8"-deep groove into the top face of the work surface to fit a T-track. Position this groove so the T-track will be located 1" behind your miter saw's fence (or sacrificial fence facing, if you use one) when the saw is installed in the station. To determine the groove's location, set the work surface and your saw temporarily in place on the project. Raise the saw on scrap blocks until the saw's table is flush with the work surface. Use a long straightedge, held against the saw fence, to register where the T-track will need to be. Then cut the groove with a dado blade at the table saw or on your router table with a 3/4"-wide straight bit. Cut a piece of aluminum T-track to fit the full length of the work surface groove. Install it on the work surface with short flathead wood screws, making sure they don't protrude beyond the work surface into the drawer compartments below.

Determine the riser width by standing your saw on stacks of two blocking pieces and measuring from the saw table to the work surface. Fasten pairs of risers and supports together to form two saw supports (inset).

Go ahead and install the work surface on uprights A and B with countersunk 1½" screws driven down through the edging strips and into the uprights. I decided to leave these screw heads exposed, in case wear-and-tear on the work surface should ever make me want to replace it in the future.

The upper cabinet still needs a shelf, so cut one to size, and glue a strip of solid wood to its front edge to hide the edge plys. Plane or sand the edging flush to the shelf faces when the glue dries. Apply finish to the shelf, then mount the shelf inside the upper cabinet on four shelf pins.

Your miter saw's base will stand on and be attached to a pair of saw supports that consist of top and bottom blocking pieces with two risers in between. The blocking pieces need to be wide enough to enable you to bolt or screw your saw base to them with the blocking also flush against uprights B and C/D. Set your saw back in the compartment to determine the correct blocking width for your saw base, then cut the four blocking pieces to width and length.

The height of the four risers will also vary, depending on the working height of different miter saw bases. To determine the correct width for your saw, stack the blocking face to face in pairs and set them in place in the station. Set the saw on these stacks. Now measure the height from the saw table to the work surface; this measurement determines the riser width. Cut the risers to width and length, then assemble the four parts of each saw support with glue and brad nails or screws.

Final-sand and apply finish to the face frames, saw supports and any other bare surfaces at this point to complete them. When it dries, set the saw supports into place in the saw compartment. Attach them by driving countersunk screws through the upper narrow shelf from below and into the bottom blocking of the supports.

Building the Drawers

It's time to install the drawer slides in their openings. To do that, unclip the cabinet-side components of the slide hardware from the drawer-side components. Position the cabinet-side components on their filler strips so the hardware will be centered in the drawer openings, vertically. The front ends of the slides should be flush with the back edge of the face frame. To make sure the slides will be parallel with one another, set them in place on a scrap spacer before driving the attachment screws to secure them. Choose the horizontally slotted holes in the slides so you can move the hardware forward or backward slightly, if needed, when the drawers are hung.

Reinstall the drawer-side components of the slides onto the cabinet-side components, and measure the distance between the slides for each drawer. This measurement sets the final length of the drawer fronts.

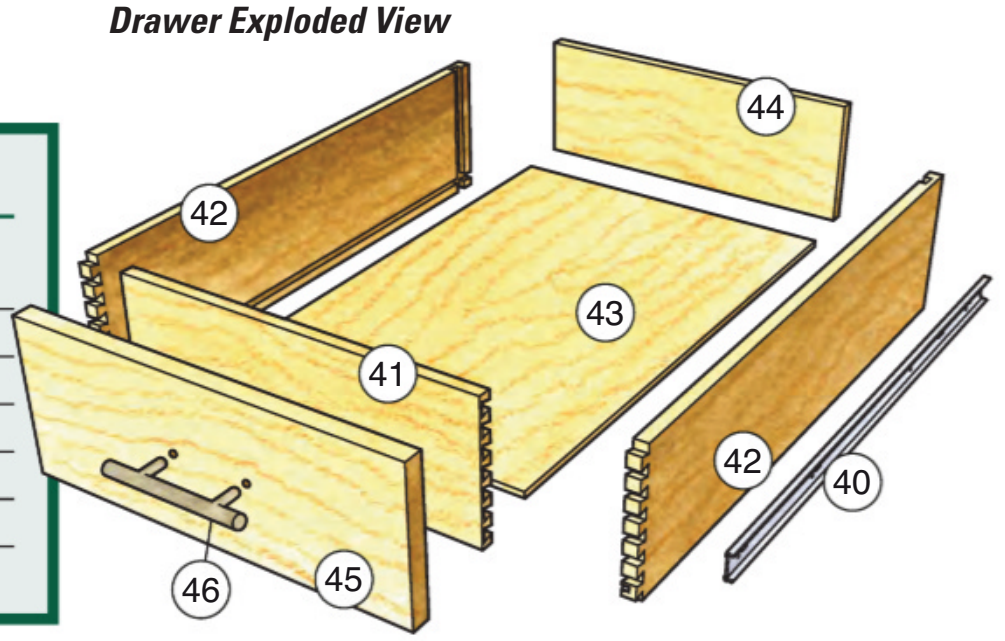
Rip and crosscut enough 1/2"-thick stock to make the fronts, backs and sides for both drawers. For now, leave the drawer backs overly long. Make up a couple of test pieces to

A scrap spacer makes it easy to center the drawer slides inside their compartments vertically, while also ensuring they are square to the carcass from front to back. Attach the hardware initially through its slotted holes only, to allow for adjustment.

MATERIAL LIST

Drawers	T x W x L
40 Drawer Slides (2 Pr.)	20" Full Extension
41 Drawer Fronts (2)	1/2" x 5½" x 14¼"
42 Drawer Sides (4)	1/2" x 5½" x 22"
43 Drawer Bottoms (2)	1/4" x 13¾" x 21½"
44 Drawer Backs (2)	1/2" x 5" x 13¾"
45 Drawer Faces (2)	3/4" x 5⅞" x 15⅛"
46 Bar Pulls (5)	4" Nickel Finish

Drawer Exploded View



Half-blind dovetails will form rock-solid connections for the front corners of these drawers. The author milled them on his router table using a Leigh RTJ400 "template down" style dovetail jig.

help you refine your joint-cutting setups in the next step, too.

I used a dovetail jig to rout half-blind dovetails for joining the box fronts to the sides. Be sure to rout test pieces first, to fine-tune your jig's settings, before milling the actual parts.

The drawer backs fit into 1/2"-wide dadoes that are located 1/4" in from the back inside faces of the drawer sides. Cut these dadoes at the table saw or router table. Then switch to a 1/4"-wide dado setting or a 1/4" straight bit so you can mill grooves in the drawer sides and fronts for the drawer bottom panels. These grooves are 1/4" deep. Position them so they're hidden inside the lowest tail sockets of the drawer fronts and behind the lowest tails of the drawer sides.

Go ahead and dry fit the drawer sides on the drawer fronts and square up the corners carefully in order to verify the final length of the drawer backs. Cut the backs to length, slide them into place on the drawer boxes and take a final measurement for the drawer bottom panels. (The back end of the bottom panels will extend to the back faces of the drawer backs.) Cut the bottom panels to size from 1/4" plywood.

Final-sand the parts before gluing and clamping the two drawer boxes together. Do this carefully, measuring their diagonals before the glue sets to make sure the drawer boxes are square. When the drawers come out of the clamps, drive a few 1" brads up through the drawer bottoms and into the drawer backs to fix the bottoms in place. Give the outside surfaces of the drawers a final sanding, as needed, to flatten the dovetailed surfaces.

Your drawers are ready for hanging! Lay out the drawer slide locations on the drawer sides, and install the slides on the drawer boxes with screws. The front ends of the slide components should be flush with the drawer fronts. Connect the slides again, and test their action to make sure the drawers open and close smoothly. If they do, rip and crosscut a couple of drawer faces from 3/4" stock. Size the drawer faces to allow for about 1/16" of clearance all around when the faces are installed in the drawer openings. Final-sand the drawer faces, then position the faces on the drawers temporarily with pieces of double-sided tape. When you have them located and adjusted to your satisfaction, drive several #6 x 1" screws through the drawer fronts and into the drawer faces to secure them. Mark the faces for drawer pulls, and install the hardware with long screws driven into them from inside the drawers. Tweak the drawer slide positions, if needed, so the drawer faces close flush and fit evenly. Then you can install more screws into the slides to lock their positions.

Scraps of plastic laminate provide about 1/16" of clearance for positioning the drawer faces in the face frame. Double-sided tape holds them in place temporarily before the drawers are opened and clamps are installed.

It's easy to make sturdy cabinet door frames with stub tenons fitting into matching grooves. Here, these 3/8"-long tenons are being raised on the ends of the rails using a wide dado blade (inset). For this project, the door panels are a two-piece combination of 1/4" plywood and 24-gauge galvanized sheet metal.

Adding Steel-clad Cabinet Doors

Cabinet doors don't have to be hard to build, and I've kept these easy for any skill level. The corner joints are 3/8"-long stub tenons on the ends of the rails that fit into 3/8"-deep grooves in the stiles. This same groove is milled along the inside edges of all four stiles and rails to receive the door panels and a facing of 24-gauge galvanized sheet steel.

Start by ripping and crosscutting the four stiles and rails from flat, straight 3/4"-thick stock. Then carefully measure the combined thickness of the sheet metal and the plywood you'll be using for the two-piece drawer panels. This thickness determines the actual width of the rail-and-stile grooves as well as the final thickness of the stub tenons on the rails. Plow a 3/8"-deep, centered groove along one edge of each rail and stile with a stacked dado set to match the panel thickness you need or by making two cuts with a standard blade. Make a test cut first on scrap stock that matches your rail-and-stile thickness to confirm your blade and rip fence settings.

Now stack a wide dado blade to mill 3/8"-long stub tenons on the ends of the rails. Make these cuts with the rails backed up with your miter gauge equipped with a sacrificial fence to reduce tearout. When the sawing is done, dry fit the door frames together to inspect the corner joints, as well as to take inside width and length measurements for the final panel sizes. Cut the plywood and sheet metal to these proportions. Carry out another dry fit with the plywood and sheet metal installed; make sure the corner joints still close properly. Final-sand the face of the plywood panels that will show when the doors are opened, then glue and clamp each door together. When the doors come out of the clamps, final-sand the frames and fit them in the cabinet opening. Trim their edges and ends at the joiner or with a hand plane, as needed, to create even clearance all around when they're hung.

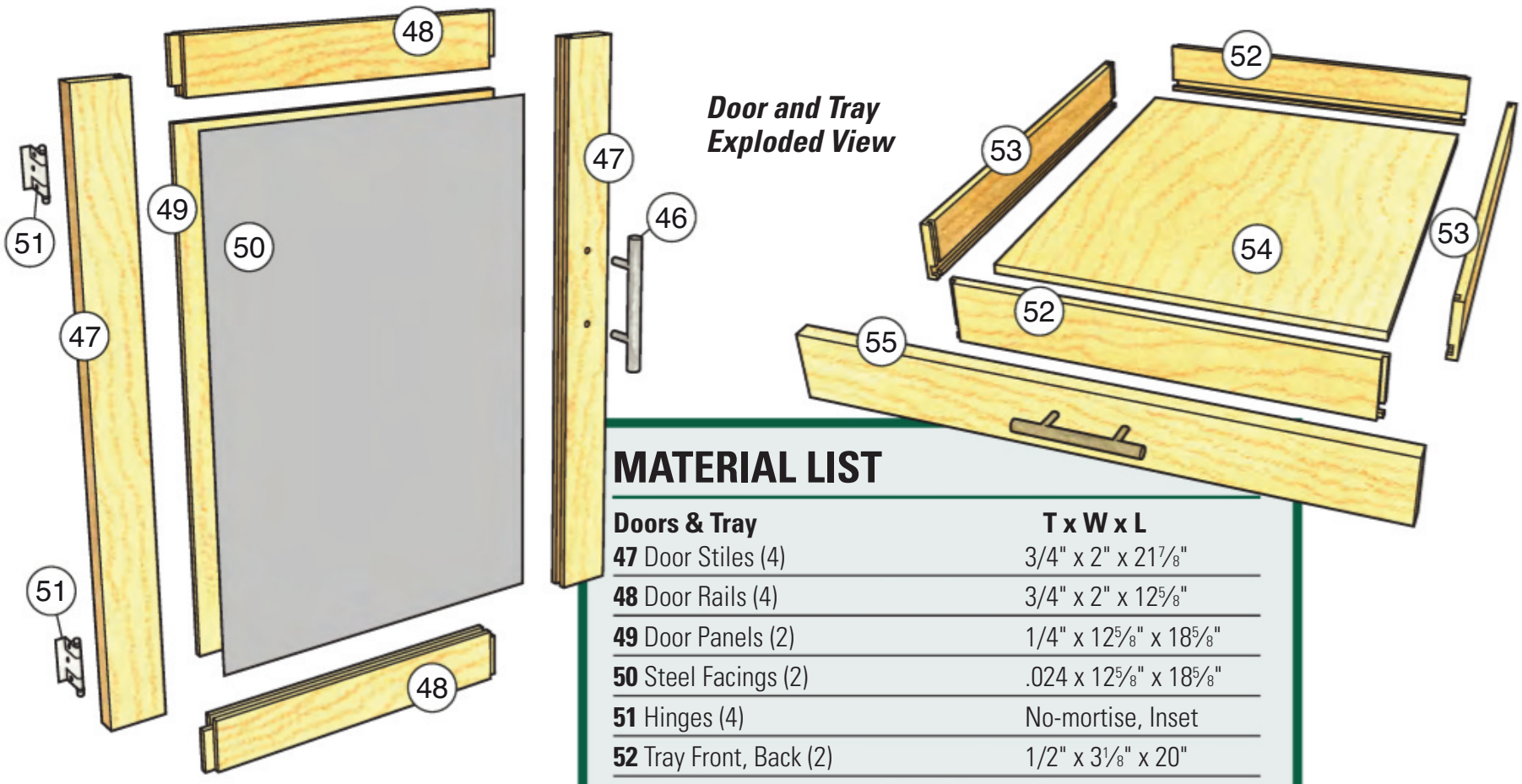
I mounted my doors to the face frame with no-mortise hinges to give this project the look of classic cabinetry while also making the door-hanging process easy. To install them, locate and attach the hinge leaves to the face frame stiles with pairs of screws driven into the slotted holes of the hinge leaves. Set each door in its opening, marking the hinge leaf locations on its back face. (It helps to set a thin spacer between the bottom edge of the door and the bottom face frame rail to maintain swing clearance while you mark the hinge locations.) Carefully drill centered pilot holes for the hinge leaf screws, and attach the leaves to the doors to hang them. Adjust the doors up and down, or from side to side, as needed to create even spacing between them — slotted holes in the hinge hardware provide some helpful adjustability here.

When my doors hung evenly, I could really see the end of this big project in sight! I'll bet you will, too. But we've got some ground to cover before we're through. So remove the doors and bore holes for the pull hardware, then give them a final sanding and apply finish. You can rehang them when the finish cures. Glue a block of scrap behind the top rail so you can mount a simple magnetic door catch to it for each door.

This pull-put tray catches residual sawdust and debris that falls below the saw base. Rabbet-and-dado joints (inset) form the corners. Make sure the tray is as square as possible before the glue sets.

Making the Pull-out Saw Tray

The tray, which captures debris below the saw, is joined at the corners with simple rabbet-and-dado joints. Rip and crosscut the tray front, back and sides from 1/2" solid stock. The length of the tray front and back should be 1/2" less than the span between the inside faces of the saw supports.



Door and Tray Exploded View

MATERIAL LIST

Doors & Tray	T x W x L
47 Door Stiles (4)	3/4" x 2" x 21⅞"
48 Door Rails (4)	3/4" x 2" x 12⅝"
49 Door Panels (2)	1/4" x 12⅝" x 18⅝"
50 Steel Facings (2)	.024 x 12⅝" x 18⅝"
51 Hinges (4)	No-mortise, Inset
52 Tray Front, Back (2)	1/2" x 3⅛" x 20"
53 Tray Sides (2)	1/2" x 3⅛" x 23¾"
54 Tray Bottom (1)	1/2" x 20" x 23¼"
55 Tray Face (1)	3/4" x 3¼" x 26⅛"

Mill the tray's corner joints by cutting 1/4" x 1/4" rabbets into the ends of the tray front and back. The tray sides require 1/4"-wide dadoes to receive the rabbet tongues; position these dadoes 1/4" in from the ends of the parts. You can cut these joints on either a table saw or router table, but be sure to test your set-ups on scrap stock before machining the actual tray parts. If the joints fit together well, mill a 1/2"-wide, 1/4"-deep groove along the inside faces of the tray front, back and sides for a bottom panel. Dry assemble the tray frame to double-check the proportions of the bottom panel, and cut one from 1/2" plywood. Finish-sand the parts, then glue and clamp the tray with the bottom panel in place. Be sure it remains square.

Rip and crosscut a face for the tray from solid wood, giving it about 1/16" of clearance inside the saw compartment opening. Set the tray in place between the saw supports, and position and clamp the face to the tray so the face fits its opening evenly. Drive countersunk 1" screws through the tray front and into the face to secure it. Then install a centered drawer pull on the face, just as you did for the drawers.

I applied several strips of 3/4"-wide Nylo tape to the narrow shelf alongside the saw supports. They stretch the full front-to-back length of the tray opening and enable the tray to slide in and out almost as easily if it was mounted on metal slides.

Helpful Hardware Finishes Things Up

I installed a pair of plastic 2½"-diameter grommets on each side of the vacuum hose opening I cut in the right upright of my miter station. The grommets add a nice finished touch to this pass-through, hiding the cut edges in the plywood.

Set your miter saw in position, and make sure it will swivel fully, left to right, without contacting the back or side walls of the chamber. I drove screws down through my saw's base mounting holes and into the saw supports to secure it.

Two pieces of hardware can add even more convenience to this project. First, Rockler's 2½" O.D. Dust Right Coupler enables me to attach my shop vacuum to the miter saw's dust hose conveniently (see photo at right). I used a short length of Rockler's Flexiport hose and two adapters from its Power Tool Hose Kit to connect the saw to the coupler. This way, my shop vacuum can be used for miter saw dust collection or detached quickly and easily for other clean-up duties around the shop.

Various Rockler Dust Right components connect the saw to a shop vac hose. An iVac switch automatically activates the vacuum when the saw starts.

Another handy accessory is an iVac outlet switch (yellow in photo). With both the saw and shop vac plugged into it, turning on the saw automatically starts the shop vac. The iVac keeps the shop vac running for an extra 5 seconds after the saw is turned off to clear any remaining dust.

Add a workpiece stop to the T-track of your new miter saw station, and this saw-enhancing project is finished! Now roll it into position next to your drill press, plug it in and enjoy the added convenience it brings to your miter saw's operation.

Chris Marshall is senior editor of Woodworker's Journal.

This multipurpose mobile desk adjusts easily to either standing or seated heights. Accessorize it as you like and use it for office or school work, crafts or as a dinner table in front of the TV.

Adjustable Mobile Desk

By Dan Cary

Whether you're working from home, eating in front of the TV or just looking for some extra counter surface, this versatile project can help.

In an effort to keep people healthy and safe last spring, most of us were spending more time at home. This was definitely true at my house, and one of the side effects was that between my wife and I working and our kids doing school from home, we found it a lot more challenging to find separate workspaces. My solution was to build an adjustable-height mobile desk that could be used in a variety of ways and fit just about anywhere. Once the plans were ready, I built mine in about a day. It's the perfect size to park a laptop computer, prop up a tablet, work on crafts or even enjoy a meal while binge-watching a favorite TV series.

Adjustable Mobile Desk Hard-to-Find Hardware

1/2" Baltic Birch Plywood, 24"W x 30"L (1) #63446 ..... $15.99 ea.
3/4" Baltic Birch Plywood, 24"W x 30"L (2) #63453 ..... $21.99 ea.
2½" 1/4-20 T-Bolt, 5 Pack (1) #37295 ..... $5.99 pk.
Rockler Easy-to-Grip 5-Star Knob, Female Threading (2) #58085 ..... $3.99 ea.
3" Aluminum Caster with Polyethylene Tread (2) #64837 ..... $14.99 ea.
3" Aluminum Caster with Polyethylene Tread and Brake (2) #60876 ..... $16.99 ea.

To purchase these and other products online, visit www.woodworkersjournal.com/hardware *or call 800-610-0883 (code WJ1577).*

Optional

Design and Material Choices

My intent was to make this desk easy to build from materials that are readily available and relatively inexpensive. It's made from 1/2"- and 3/4"-thick Baltic birch plywood. I'm providing *Plywood Cutting Diagrams* on page 42 that show you how to cut all the parts from three 24" x 30" pieces of plywood.

The range of desk heights is determined by a few factors, including the lengths of the adjustable post, base post and post slot as well as the size of the casters. The dimensions I'm providing in the *Material List* make the lowest desk height setting roughly 27½", which is perfect for sitting on a couch. The highest height setting is 37¼", which works well as the standing height for my wife and daughter. It would be better for my son and me if the desk could extend a few inches higher, but that would change the lowest setting, which was more important for our family.

Of course, you can change the dimensions of the above-mentioned components to influence the range of heights that better suit your needs. If you choose to use different-sized casters than I did, be sure they feature brakes for at least two of the casters. If none of the casters have brakes, you may find yourself unintentionally pushing the desk as you work and slowly chasing it around the house.

Cutting the Parts

Use the *Material List* and *Drawings* on page 42 to lay out and cut all of the parts. Most of the cuts you'll need to make are straight and can be done easily on a table saw or circular saw. The tapers and various curves on the base legs, top side rails and base posts can be cut with a jigsaw or band saw. In a pinch, you could make all of the cuts with only a jigsaw. It's easiest to cut the cup holder hole with a drill press and 3¾" hole saw, but a jigsaw will also do the job.

Forming the Slot and Bolt Holes

While I experimented with a few mechanism options to adjust the desk height, I decided to keep it simple and go with a slotted post and a couple knobs to secure it in the base. The downside of this mechanism is that it leaves a slight risk of the desk dropping if the knobs loosen. The top half of the desk is so lightweight that it hasn't been a concern for me. But if you have young children at home that might loosen these knobs when you're not there to support the desktop, then I advise adding safeguards of some sort, such as drilling locking pin holes at commonly used heights or replacing the knobs with hex nuts that can't be loosened by hand.

Drill 5/16"-diameter holes to establish the ends of the slot. The top hole is 3½" from the top edge and the bottom hole is 19" from the top.

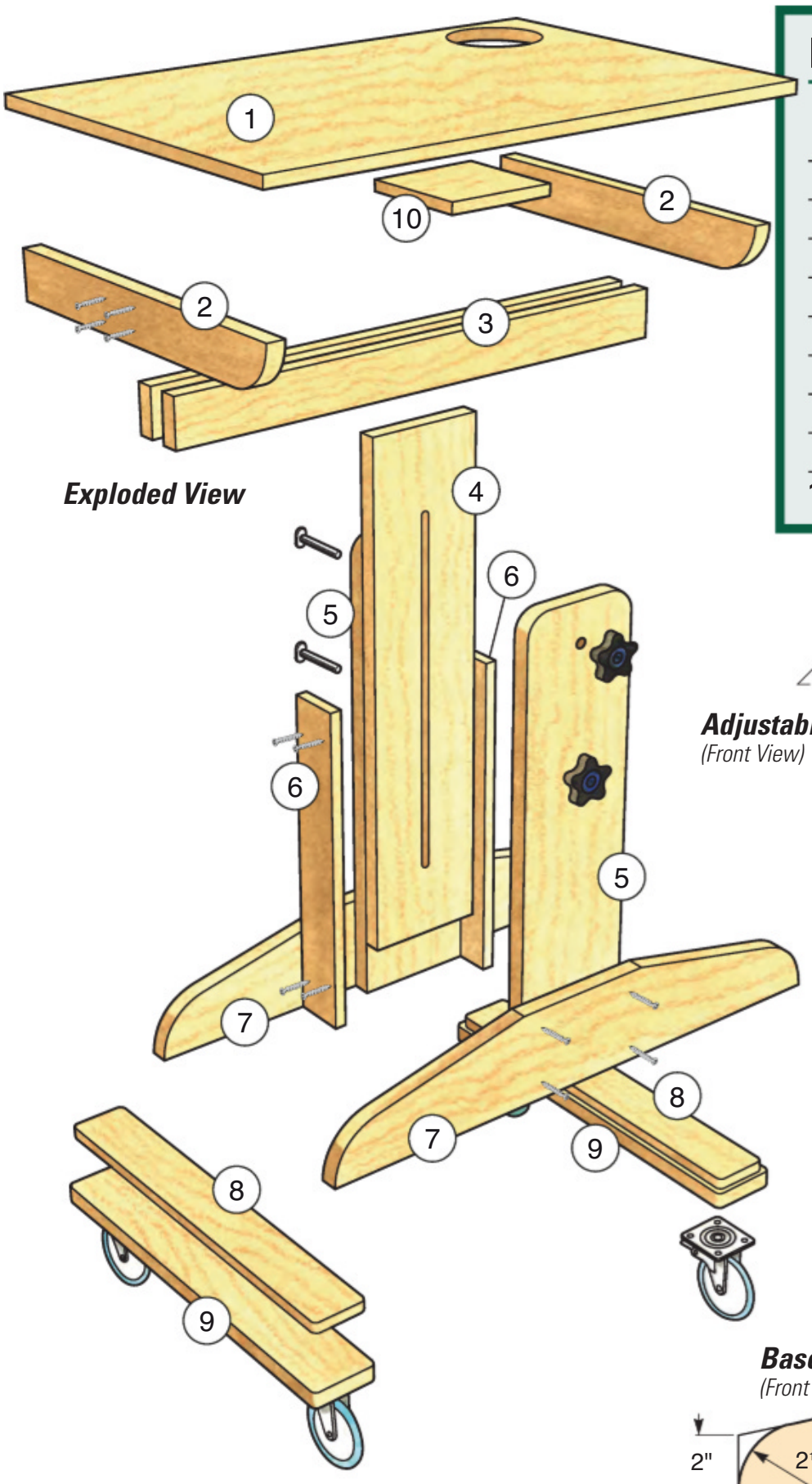
Install a 5/16" straight bit in a router table. Set the bit height to 1". Place the adjustable post on the router table with the top hole on the left side, and fit the router bit through the top hole. Position the router table fence up against the edge of the workpiece. Then turn on the router and feed the board along the fence to cut a slot from the top hole to the bottom hole.

Drill 5/16"-diameter holes through the adjustable post at each end of where the slot will be located. The *Adjustable Post* drawing on the next page provides these locations. Then rout a 5/16"-wide slot connecting the two end holes. If you don't have a router table, you could also use a jigsaw or a handheld router guided against a straightedge to cut this slot instead.

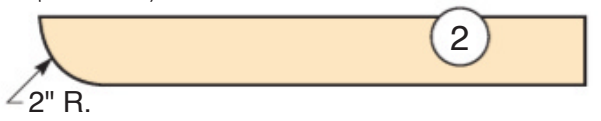
MATERIAL LIST

	T x W x L
1 Top (1)	1/2" x 16" x 24"
2 Top Side Rails (2)	3/4" x 2" x 15"
3 Top Stretchers (2)	3/4" x 2" x 22½"
4 Adjustable Post (1)	3/4" x 5" x 22"
5 Base Posts (2)	3/4" x 5" x 20"
6 Base Post Sides (2)	1/2" x 2¼" x 14"
7 Base Legs (2)	3/4" x 4" x 24"
8 Top Feet (2)	1/2" x 2½" x 17½"
9 Bottom Feet (2)	3/4" x 3" x 18"
10 Cup Holder Base (1)	1/2" x 5" x 5"

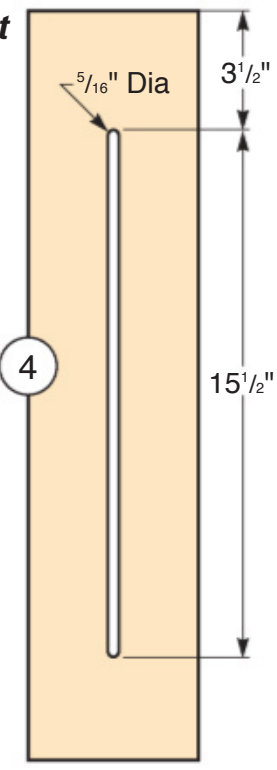
Exploded View



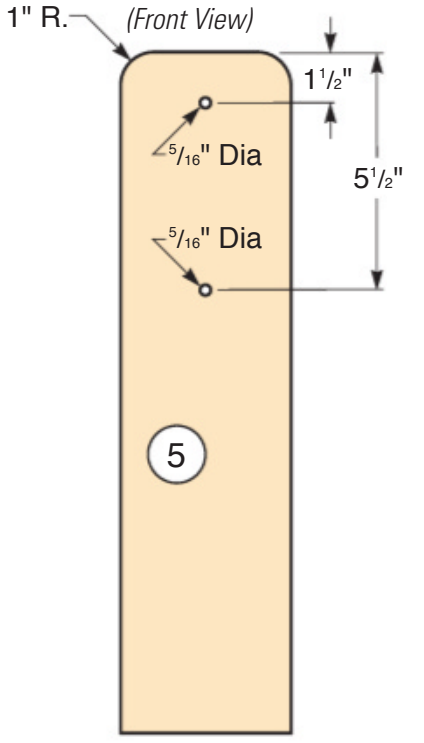
Top Side Rails
(Side View)



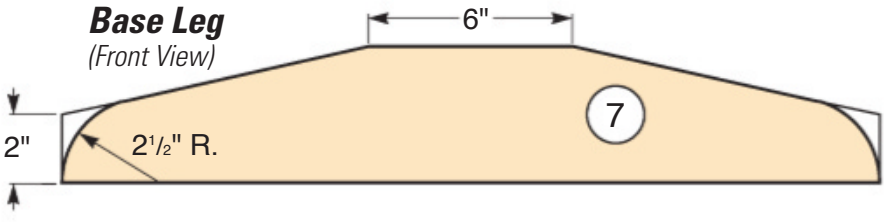
Adjustable Post
(Front View)



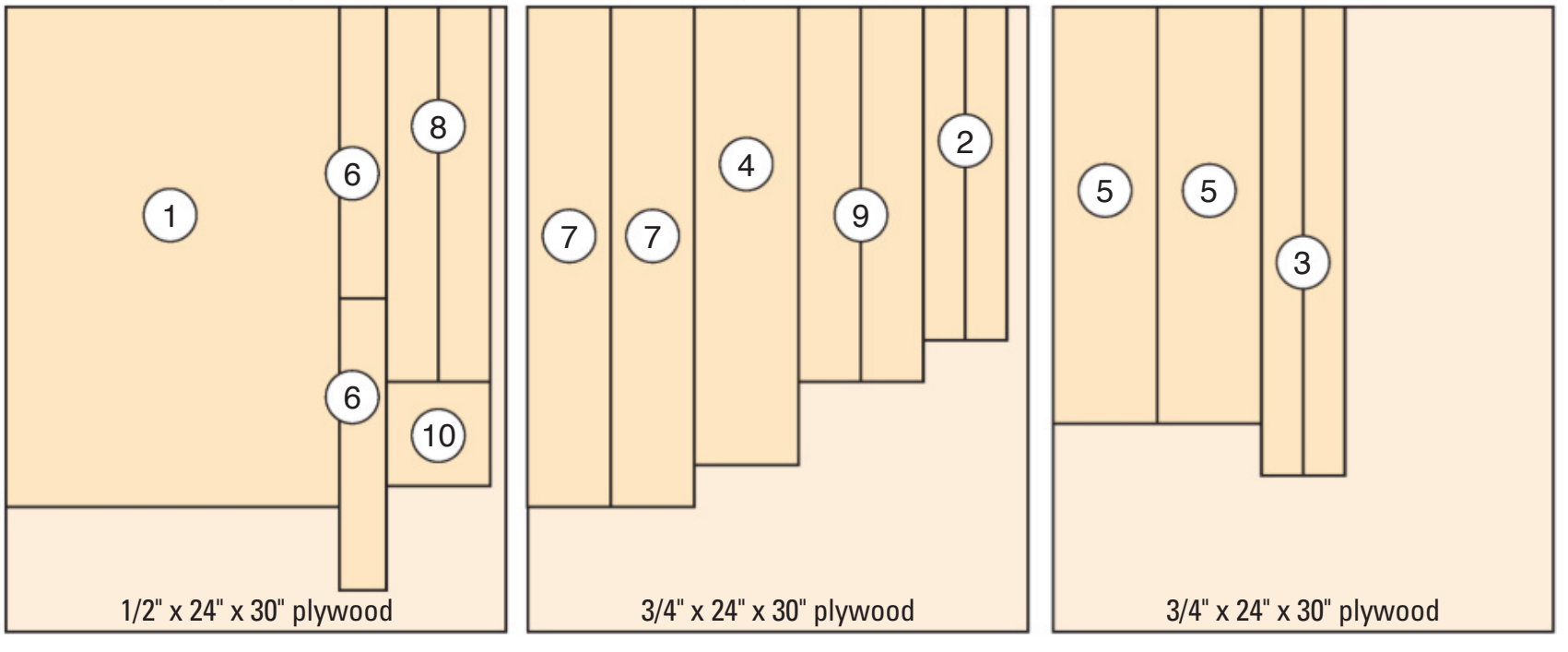
Base Post
(Front View)



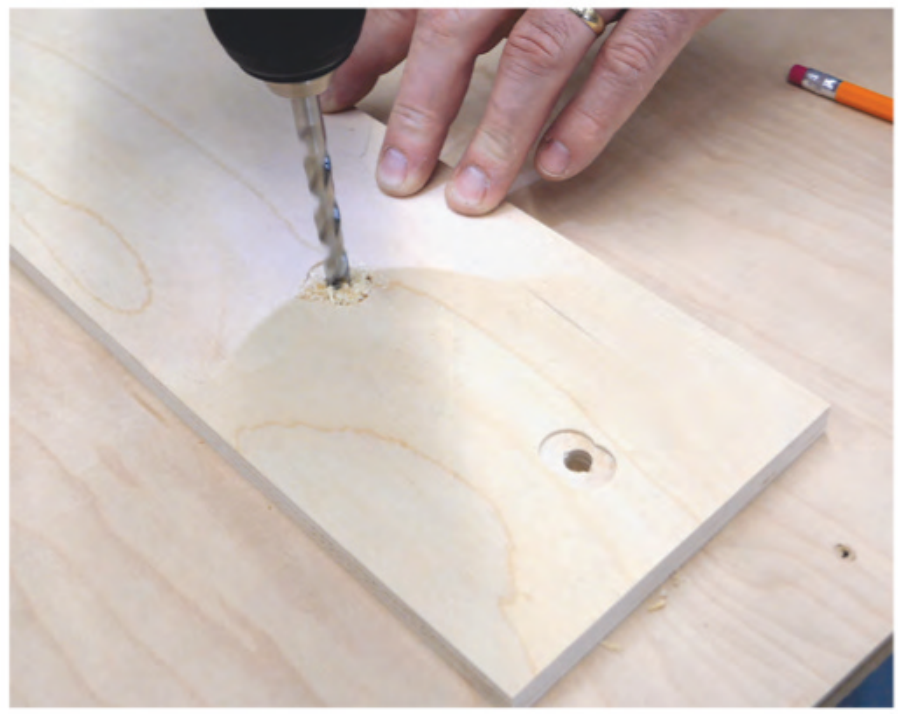
Base Leg
(Front View)



Plywood Cutting Diagrams



Using a 1/2"-diameter Forstner bit, drill two 1/16"-deep recesses that will prevent the bolt heads from spinning when tightened. Overlap two holes to form each recess, as shown in the inset photo, above.



Drill 5/16"-diameter T-bolt holes through both base post pieces. Drill the holes through the back base post first, centering the holes in each bolt head recess. Then use the back piece as a template for drilling the holes through the front base post.

The knobs thread onto T-bolts. I cut recesses in the back of the base post to capture the heads of the T-bolts and prevent them from spinning freely. To do this, use a 1/2"-diameter Forstner bit to drill two 1/16"-deep overlapping holes (see photos, above left). Then, drill a 5/16"-diameter hole through the center of these recesses.

Assembling the Desk

Round over all of the sharp edges and smooth the part surfaces with a sander and 120- or 150-grit sandpaper. Then assemble the desk parts with wood glue and #8 x 1¼" screws, following the *Exploded View* drawing as a guide. Drill countersunk pilot holes for the screws to recess their heads. Start with the base parts, using the adjustable post as a spacer between the base posts when attaching the base post sides. There should be slight friction between these components, but the adjustable post should still slide freely inside the base assembly. Next, assemble the top parts of the desk and attach them to the adjustable post. I didn't use screws to install the cup holder base on the top. Instead, I just glued and clamped it to the underside of the top.

Apply two coats of water-based polyurethane or the finish of your choice. This desk would also look nice painted, but I would not paint the adjustable post and inside faces of the base posts, because their painted surfaces would likely stick together and impede their ability to slide past one another easily.

After the final coat of finish has cured, attach the four casters to the bottom feet with panhead screws that are no more than 1¼" long, to prevent the pointed tips from breaking through the top feet. I mounted the two locking casters on the front side of my desk so the brake levers are easy to access.

Finally, slide the adjustable post assembly down into place. Install the T-bolts in their holes in the base and through the post slot, seating their heads in the recesses. Secure the bolts with washers and star knobs, then raise the desktop to whatever height you need and tighten the knobs.

This project has worked better than expected around our house. Now the problem is deciding who gets to use it. I just might need to make another one ...

Dan Cary is senior content strategist of Woodworker's Journal.

This mobile desk could be just as useful in the shop as in the house — for referencing online woodworking plans, watching YouTube videos or keeping your printed project drawings organized.

Carved Dough Bowls

By Rob Johnstone

Inspired by treenware from the past, these carved bowls are an enjoyable afternoon's effort. Their use is up to your imagination.

Based on antique bowls that used to hold bread dough while it rose, these three versions are made from green blanks cut from discarded boles of local hardwood.

Time and time again in countless antique stores all around the United States, I have been drawn to various styles of dough bowls. Bread-rising bowls are long sections of wood, scooped out to form a trough, often with rounded ends. As you can imagine, years ago, bread-making was an everyday task for poor and working-class families of all stripes. Bread dough can be sticky, so a baker would rub oil or butter on the surface of the bowl to stop it from adhering to the wood. Additionally, many bread recipes have a fat component — butter, lard or an oil of some sort. All those applications of fat to wood created a lovely "finish" on its surface and a gorgeous patina. Even decades later, that smooth finish is still apparent on the antique dough bowl examples I've found.

Most of the antiques I've seen were made of maple lumber, although during my travels through southern states I have also found many made from what appears to be long-leaf pine. I have always assumed that this ubiquitous treenware was made from local trees. I would love to find one made of chestnut. I am not sure why, but the local and individual manufacture of these items has increased my enjoyment of them. In the practical world where these essential products were made, form follows function. The similarities between all the examples I've seen is remarkable.

The occurrence of everyday at-home bread-making is never going to be as widespread as it once was. But if it ever comes to that, I will be ready. However, these bowls can certainly have other uses, and their practical beauty can enhance many decors. For that reason I set out to make a few of my own, inspired by examples from the past.

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MORE ON THE WEB

VIDEO For a video demonstrating the process of power-carving a bowl, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

The author decided to start his carved bowl project by finding suitable logs and band-sawing green blanks from them. A simple plywood carriage secures the wood as it is being cut so it does not roll and break the saw blade. Here the blank is ash scavenged from a yard waste drop-off site.

Logging In

To get started, I needed to find some appropriate sections of logs. I am certain the original bowls were made from green wood, so that was what I wanted to do, too. Also, I am not an expert carver (with power or otherwise), so green wood had the additional benefit of being easier for me to carve.

Luckily, there is a drop-off site nearby where our local government lets folks drop off their brush waste and cut tree sections. I "help" the site regularly by grabbing chunks of wood that will make great bowl-turning blanks — or in this case, power-carving blanks. I grabbed some 10"-diameter ash and birch logs. While they seemed very large to me as I was lugging them out of the site, it turned out that I wish I had found some with a 14" diameter instead. That would have allowed me to carve bowls more to the scale of the ones I've seen in the antique stores. They tend to be 12" wide, at least. With my 10" boles, I produced bowls about 8" or 9" wide.

You don't need to start with "firewood," however. If you have some slab stock that is 4" or 5" thick and 9" to 12" wide, that will work great, too!

Sawyer Saturday

With my logs in hand, I set up my band saw to cut them into the blanks I wanted. I use a simple inverted T-shaped fixture to hold the log as I cut it. I drive screws through the upright piece of plywood to hold its orientation as I slice off a section. I have broken band saw blades by not taking that extra step ... purchasing a $100 resaw blade has made me more prudent. My band saw has the capacity to cut up large pieces like this, but if that is not possible for you, you can use a splitting maul and wedge to extract your blank from a log.

Once I have a flat surface, I can turn that face down and use my rip fence to complete the blank-cutting process. But if the log has bumps or a curve along its length, then use the fixture once more to get two flat surfaces roughly 90 degrees to one another. At that point you are ready to cut out a rectangular blank that will serve to make your bowl.

After one flat surface is formed, turn that face down and cut another flat surface at 90 degrees to the first. If the bole of the log is straight along its length, you can guide it using the band saw fence. If not, reuse the fixture.

Spin the log around and cut a third flat surface onto it. Try not to remove too much material, as the blank gets narrow in a hurry. This is a dusty process, so dust collection is a good idea. Consider wearing a respirator, too.

The rectangular blank is completed with a fourth cut. You need to think about how deep you want your bowl to be before you make this cut. In this case, the drop from the log is still thick enough to make a turning blank.

The last step on the band saw is refining the edges and ends of the newly formed blank. Here the author angles the sides of the blank. Next he will cut the curves onto the ends of the lumber. Then it's on to power carving.

If you are like me, you'll want to do a couple more steps on the band saw, but it's your call. Once I have the rectangular blank, I decide on the rough shape I want the bowl to become. I sketch out the curved ends of the bowl and get an idea of slope of the sides. Then I step back to the saw and form those shapes and angles on the blank. With that done, I'm ready to start carving.

Wood Chips in the Wind

I use an Arbortech TurboPlane mounted on a Makita battery-powered angle grinder. I also prefer to do the carving outside. Power carving throws chips everywhere, so I employ a leaf blower to clean up my driveway. Since the chips fly off at considerable force, I use a face shield to protect my eyes. And while the machine doesn't make a lot of noise, you'll be running it for a quite awhile. My hearing has become more sensitive in recent years, so I wear hearing protection.

To keep the blank in place while I'm carving, I screw it to a narrow piece of plywood longer than the blank. Then I clamp the plywood to my workstation. The blank won't go anywhere, and I can protect the surface of my workstation at the same time.

Carve the outside of the bowl first. The TurboPlane does a good job on end and straight grain, but you do need to hold the angle grinder securely. You will also come to learn which way the cutter does best in each area of the blank. I try to cut "into" the rotation of the cutter rather than pulling it "along" the grain. Work methodically, carving away stock in controlled strokes. I find it very useful to step back and look at the blank from a couple of angles to get a good idea of how the overall shape of the piece is emerging. It helps me keep the shape symmetrical and know where I'm headed with the overall design. I remove the clamps and spin the blank around, when needed, to keep the shape I am forming even and for easier access to the blank.

During the power-carving stage, you'll apply a lot of force to the blank. To secure it while carving, screw it to a long, narrow piece of plywood. Then clamp the plywood to your work surface. This anchors the blank and helps keep the cutter from damaging your work surface. You can also rotate the blank end-to-end by un-clamping and spinning the plywood around.

When I'm happy with the shape of the outside of the bowl, I sand it while it's still secured. For my purposes, I want to leave uniform carving marks in the surface of the wood to mimic the chisel-carving marks I see in the antiques I admire. So my goal for sanding is to smooth the surface but not remove the irregularities of the cutter. I use a random-orbit sander to start off but finish sanding by hand.

Get the Inside Out

With the outside completed, I remove the blank from the piece of plywood and flip it over. Once again, I screw the blank to the plywood to secure it while I carve the interior of the bowl. I sketch a lip for the bowl before grabbing the power carver. Removing material from the center of the bowl isn't difficult, but I've found that rotating the blank end-to-end regularly helps the process go faster and more easily.

Just as if you were turning a bowl on a lathe, keep your eye on the thickness of the bowl's wall. Carving through the wall would be a disaster, considering all the work you have put into it so far. Pay special attention to the ends of the bowl: the end grain will blow out more easily than the long grain. In my experience, this is another reason green wood is best for this task, as the end grain seems more durable before it dries out. Keep carving until you are satisfied.

Carve the outside of the bowl first. When that's completed, sand the outside smooth (top right photos). Then remount the blank on the plywood to carve the interior of the bowl. Draw the lip of the bowl before you begin to remove material. When the interior is deep enough, sand it smooth, both with a power sander and by hand. After that, you're ready to apply finish.

Finishing Details

Sanding the interior can be a little trickier than the bowl's exterior. I use a smaller random-orbit sander and then switch to hand sanding.

I've used a few different finishes on my dough bowls, including boiled linseed oil, Watco oil and amber shellac. I used tinted Watco on spalted birch because I wanted to add some color to it. Linseed oil ambers the wood tone, but it takes forever to dry. My favorite so far was two coats of amber shellac, rubbed down with a gray synthetic abrasive pad. I put a coat of paste wax over the top of that and polished it with a soft cloth. I think it looked and felt great.

This is a fun project, and the bowls make great gifts — give it a try!

Rob Johnstone is publisher of Woodworker's Journal.

Bamboo Fly Rod

The author ground an edge on the side of one of his bench chisels to rough out his rod blank. Using it, he splits the culm of Tonkin cane (the only cane used in rod-making) from stem to stern. It is then precisely machined down to size in a number of steps and glued together (right) to form an incredibly strong and flexible six-piece tapered hexagon.

By Jeff Day

The author, a fly fisherman and woodworker, imagines himself during the various stages of rod-making as a "lumberjack, cabinetmaker and finisher."

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MORE ON THE WEB

For more information about building a bamboo fly rod and the various tools Jeff uses for this process, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

I've been a woodworker and a fly fisherman for years, so it was probably inevitable that sooner or later I would build a bamboo fly rod. Inevitable, perhaps, but not necessarily a walk in the park. It cost me a fishing season. I broke rods long before they left the shop. I made rods that worked better as tomato stakes. I fried one rod to a crisp. I suffered epoxy failures and polyurethane busts. In short, I enjoyed every minute of it and, three rods after I started, I have a rod that I'm not ashamed to show to the world.

A bamboo fly rod is made of six strips of bamboo glued together to form a hexagon. The strips are triangular in cross-section, and since the rod tapers from handle to tip, the triangular strips taper, too — the triangle is bigger at one end of the strip than the other.

All of this is done in three stages: First, you rough out a rod blank, splitting the bamboo stem to stern, kiln-drying it, and then planing it into long triangular strips — a set of six strips for each section of the rod. In the second stage, you taper the triangular strips with a block plane and a special metal form. Then you apply glue to the pieces and clamp them together by wrapping them tightly with thread. On a good day, it's a piece of cake. On a bad day, it's worse than getting skunked on the stream. Far worse. The final stage is applying the finish and attaching the hardware. I like to think of the stages as lumberjack, cabinetmaker and finisher.

Stage One: Lumberjack

This stage begins with a piece of Tonkin cane, the only cane used in rod-making, because its long, dense fibers make for a powerful rod. In the entire world, Tonkin cane grows in a single 30-square-mile patch of China.

Technically, bamboo is a grass, and a stick is called a culm. The easiest and fastest way to get the strips you need is to split the culm the way Windsor chair-makers rive a chair back from a log, and for the same reason. Splitting bamboo gives you a piece with long parallel strands of grain. Rod-makers often make their own splitters that they drive into the end of the culm. Mine are chisels with edges that are ground to a rounded point. As the pieces get smaller, I hold the end of the chisel on the bench with one hand, and feed the bamboo into it with the other. The goal: six strips plus whatever else you can get from the bottom five feet of the culm. This will be the butt section. The tip comes from the upper five feet of the culm, and because rods traditionally have an extra tip, you'll want to split it into 12 pieces.

The author uses a heat gun to bend bamboo and get rid of its nodes (photo above). Running the bamboo strips through a planer in a special shop-made jig (photo below) progressively turns them into the tapering triangular strips needed to construct the fly rod.

Using a shop-made "bamboo cane kiln," our author demonstrates one of the many steps required to create a bamboo fly rod.

At this point, a couple of minor adjustments are required. A stick of bamboo is divided into shorter sections by a series of bumps, called nodes. You need to get rid of them and deal with the bends that typically occur around them.

Fortunately, bamboo bends when heated. Holding the node directly over a heat gun until the wood is almost too hot to handle makes the heated section bend like warm plastic. Once I've heated it, I can flatten the node completely (or almost so) by clamping it in a vise with the outside face against a jaw. I count to 10 as I clamp the edges between the jaws to straighten out the bends. If any of the nodal bumps remain, they're sanded out by hand with 240-grit paper and a hard rubber sanding block.

Before shaping each piece into a triangle, there are two more steps. The first is to get each piece down to a manageable width. Traditionally this is done with a hand plane — it may be a grass, but bamboo works like wood. Tradition has its place, but this isn't really the time for it. I rip the strips to width on the table saw (use lots of featherboards), and then I plane them into

triangles on a jig in the planer. The planer jig is a simple oak auxiliary table with 60° grooves routed into it. Battens on the bottom fit snugly against the front and back of the planer bed to hold the jig in place. Each groove is slightly shallower than its neighbor — the largest is about 3/8" deep and the smallest is about 1/16" deep. I feed all the strips into the first groove, flip them edge for edge, and then feed them into the next shallower groove. I slowly work my way down the table until I've planed the strips to the exact size required by the rod.

Like any piece of lumber, your strips of bamboo need to be kiln-dried. This not only drives out water that might haunt you down the road, but it also tempers the bamboo, turning what would otherwise be a soft rod into one with backbone. It doesn't take long — about 10 minutes at 350 degrees for the butts, and slightly less for the tips. I use a heat gun, combined with a couple of heat ducts — one inside the other — with lots of insulation around the outer pipe.

The heat gun shoots heat down the outside duct; it rises into the inner duct at an even temperature. I use two meat thermometers, one at the top and one at the bottom of the ducts, to monitor the temperature.

The author created a rod-making plane by routing a .003" groove in the sole of a block plane with several passes on his router table.

A Custom-Built Rod-maker's Plane

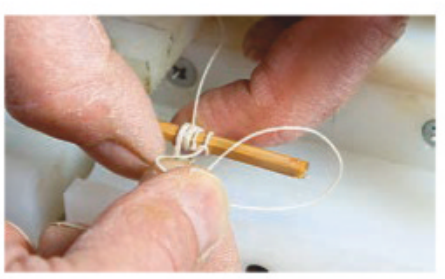
At some point early in your rod building, the edge of your plane will dig into the planing forms you've just spent a small fortune to buy. Everyone does it, and no one likes it. But special rod-maker's planes give you the control you need to avoid gouging. They have a groove milled down the middle, creating two outside "rails" that glide along the form. The groove travels over the bamboo, and the blade extends just far enough to do its work without cutting into the planing form.

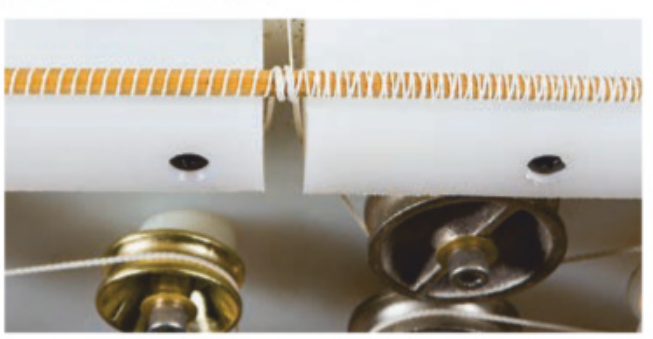
The only rod-maker's plane on the market is a beautiful piece of work, but you'll pay for it. Instead, I made my own by routing a groove along the sole of an old block plane first, then on a good one I currently use for this task. I used a 5/8" straight bit in my router table and set the distance between the bit and rail to 1/2" — the width of a rail. Raise the router bit to make a cut about .001" deep. When everything is right, take the blade out of the plane and run the plane across the spinning bit, holding it tight against the fence. Turn it around, and make a pass with the other side of the plane against the fence. Raise the bit and repeat until the groove is .003" deep.

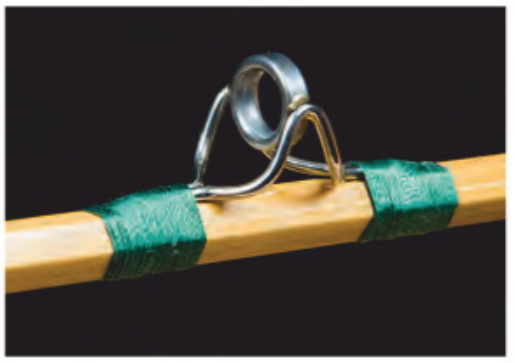
Clamping Up: Rod-maker Style

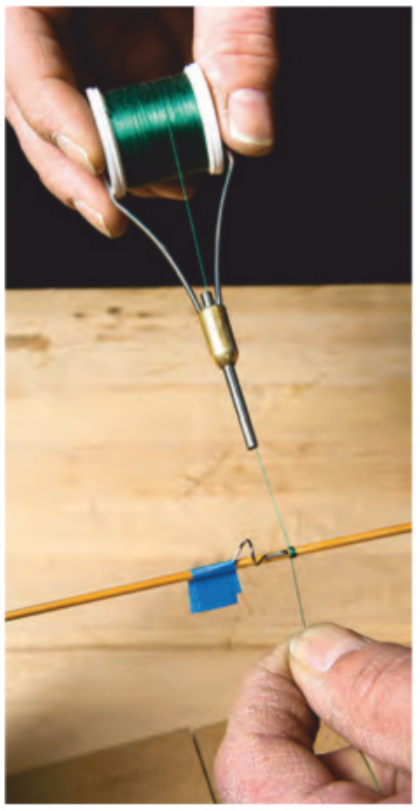
The strips that make up a fly rod aren't going to clamp together with even the best clamps, so rod-makers clamp them with a shop-made jig (designed by Everett Garrison) that binds the pieces together in taut, spiraling wraps of upholstery thread. Glue is applied first, using a toothbrush to spread it over all six strips, which are lined up side-by-side on top of a piece of masking tape. You roll the pieces together and then run them through the binder. A drive belt made of kite line turns the rod and moves it forward as upholstery thread, fed from above, wraps tightly around the rod.

The fishing weights hanging from the drive belt determine the pressure with which the string is applied. On a tip as tiny as this one, as I discovered, the weight of anything more than the pulley is enough to snap the rod until you get a good 10" from the tip. At that point, I add a 12-ounce weight. I use a 16-ounce weight on the butt section. Once the rod is wrapped, you remove any twists, and then roll it under a board, a J-roller or both, to straighten it. I set it under weights on the planing form to keep it aligned while the glue cures. There will still be minor twists and bends when the glue dries, but you straighten them out with gentle heat from the heat gun.









The guides are held in place by silk thread wrapped around the rod. The author finds that his fly-tying bobbin is the easiest way to start the wrap. Once started, he runs the thread through the middle of a book to create drag and turns the rod to wrap the guide. To install the ferrules, he files down the ends as the blank turns on his lathe.

Stage Two: Cabinetmaker

Here, tradition rules, and I am fine with it. You are working with a finely tuned plane, a razor-sharp blade and a tapering jig that adjusts to thousandths of an inch. I enjoy it the way I enjoy fly casting — nothing matters but what you're doing, and what you're doing is about as good as it gets.

The fact is that while there is no perfect taper for a rod, there are thousands of bad ones. I chose a time-tested taper developed by Everett Garrison. Garrison made some 700 rods from 1927 until his death in 1975, and they are considered some of the finest ever made. I copied the 7-ft. rod he used on the last day he went fishing. Some of his other tapers, as well as his directions for building, can be found in his book *A Master's Guide to Building a Bamboo Fly Rod*, coauthored with Hoagy Carmichael. Understanding how rod-making works means understanding how the tapering jig works. The tapering jig, also called a planing form, is made of two bars of steel 5 ft. long. The edges that face each other are chamfered and form a V-groove when the bars are put together. At one end of the jig, the chamfers form a deep valley; at the other end, they form a shallow valley. In between, the chamfer forms a valley that slopes evenly between the two ends. The bamboo sits proud of the jig, and you plane it until the plane is riding on the jig. When it is, the bamboo is the same shape as the valley — wide at one end, narrow at the other. Because of the hundreds of different rod tapers, you can adjust the depth of the valley every five inches using a pair of bolts. One bolt pushes the metal bars farther apart, the other pulls them together.

Setting the forms to the proper taper requires two tools from the machinist's trade — the dial caliper and a depth indicator with a pointed tip. Initially, you set the forms with a depth gauge and, after planing a test strip, you check the setting's accuracy with the dial caliper.

Gluing the Rod Together

When the strips have been planed to final dimension, it's time to glue them together. Initially, I used polyurethane glue. It is widely available, affordable and waterproof. It fills gaps, has a working time of 20 to 30 minutes and dries the same color as bamboo. Unfortunately, 20 to 30 minutes isn't a lot of time when you're trying to clamp up six pieces of bamboo only slightly thicker than the butt end of a leader. The pieces slipped, slid and twisted as I worked, and to make a long story short, the polyurethane rods were the ones that became tomato stakes. I use industrial epoxy now, which is surprisingly friendly — it dries slowly, so if I have a problem I have hours to solve it.

Stage Three: Finisher

All that remains is putting the ferrules, handle, reel seat and line guides on. Ferrules first: The inside diameter of the ferrule is less than the outside diameter of the rod, so you file down the ends as the blank turns on the lathe. You'll need a three- or four- jawed chuck and a support to keep the far end of the blank from whipping around. I made my support by bolting a piece of plywood to a table saw outfeed stand. Drill a hole in the plywood, line it with something soft (like a cork with a hole drilled in it), and then feed the rod through the hole to steady it. The handle and reel seat get glued on next — I suggest ready-made ones for your first rods; learn to make your own later.

Finishing, as a friend observed, is half science and half snake oil. Garrison hit upon the method most rod-makers use today. He dipped the rod, narrow end down, into an upright pipe filled with varnish, and pulled it out with a motor running at 1 rpm. This requires a pretty tall ceiling. I don't have one, so I began to think about the last days of each semester in my college woodworking courses, when the shop smelled of Waterlox and Watco. It was the dustiest place on the planet, and yet because we were using oil-based finishes that we wiped off, we could still get blemish-free finishes. So far, I've finished my rods with Birchwood Casey® TRU-OIL® Gun Stock Finish, a pure tung oil that is also traditional rod finish. I apply it with a rag, rub it for about five minutes and set it aside to dry. If there are any imperfections, I sand them out gently with 1,000-grit paper. After three or four coats, the finish rivals the smoothness of varnish.

If you start in the fall, and make no tomato stakes or start no fires, it will probably be early January by the time you apply the several coats of varnish that hold the silk thread in place. Around here, it will be a couple more weeks before the blue-winged olive hatch. See you on the stream.

Jeff Day is a woodworker, rod-maker and fly fisherman.

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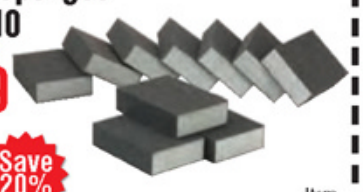

Coarse ITEM 46751/63918

Medium ITEM 46752/63915

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TOOL TUTORIAL

Hand Planes: A Plain-talk Overview

By Rob Johnstone

There is no more iconic tool in woodworking than a hand plane. Hand planes have been around so long that a mystique has grown about them. This article demystifies some common confusions about them.

We know nothing of who first came up with the idea of a hand plane; all we do know is that it was a long, long time ago. The oldest woodworking plane on record is nearly 2000 years old. Found in Pompeii, it dates from around 79 A.D., but woodworkers with a bit of plane knowledge would immediately recognize it, because its form clearly defines its function. (Incidentally, its dimensions are very close to a #3 smoothing plane!) In the earliest days, planks were likely flattened with an adze-like tool, such as the one shown at right. When the idea of mounting a chisel-like cutter in a sliding fixture came to be, the hand plane was born and its long history began. Initially, plane bodies were made of wood and their irons, or blades, were metal. As both woodworking and metalworking became more sophisticated, hand plane styles and purposes evolved, too. Irons for moldings and other tasks broadened the concept beyond its basic beginnings into a tool that not only shaped beautiful objects but also our very concept of woodworking.

For a tool that essentially began as a wood smoother, the variety of hand planes that now abound is frankly extraordinary. A chisel-like blade, held securely at an angle that allows it to cut the fibers of wood effectively, does not sound like a big deal. But as expert woodworker Ian Kirby has told me: "If the hand plane was invented this year, they would call it the woodworking wonder tool." That would not be hyperbole.

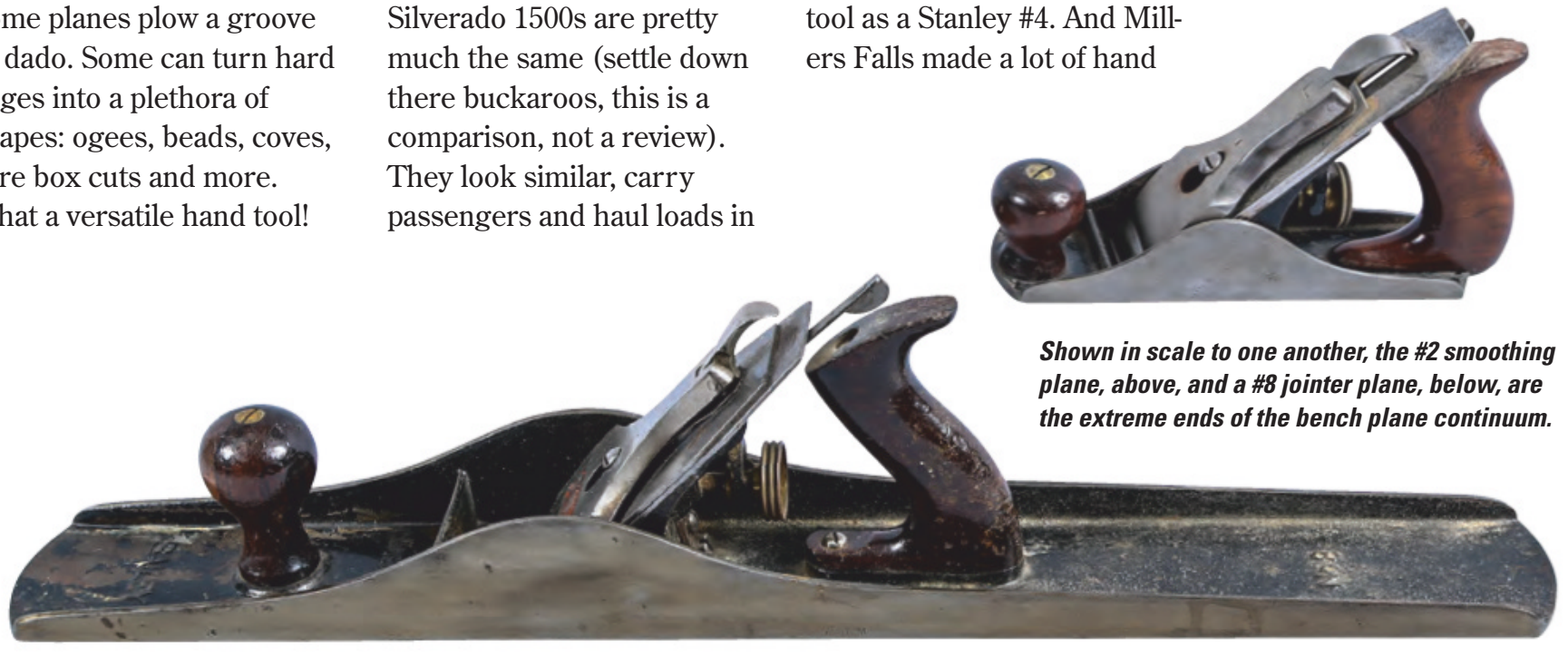
From humble beginnings, hand planes were developed to accomplish a multitude of tasks beyond smoothing. Some planes plow a groove or dado. Some can turn hard edges into a plethora of shapes: ogees, beads, coves, core box cuts and more. What a versatile hand tool!

Names and Numbers

I confess that all the names and numbers that folks use to describe planes can be confusing to me. Perhaps they are to you, too. Some are common sense: "smoothing" plane, for example. But then what is a bench plane ... does it smooth things? What about a jack plane? Who was Jack and why did they name a plane after him? Do I need an infill, scrub or fore plane? And what about those numbers ... Is it a #4 or #04? Are they the same plane or not?

The names and numbers are a bit like pickup truck styles. Ford F150s and Chevy Silverado 1500s are pretty much the same (settle down there buckaroos, this is a comparison, not a review). They look similar, carry passengers and haul loads in the back. Hand planes have similarities, too. Leonard Bailey, after which the Stanley Bailey-style plane was named, apparently created the numbering system at Stanley when he invented the groundbreaking Bailey plane. The Bailey plane was so successful that other manufacturers copied it, and the Bailey numbering system became ubiquitous ... but not universal.

While planes from other companies mimicked the Bailey style, not all shared the numbering system. So a Millers Falls Bailey-type #9 plane is basically the same tool as a Stanley #4. And Millers Falls made a lot of hand



Shown in scale to one another, the #2 smoothing plane, above, and a #8 jointer plane, below, are the extreme ends of the bench plane continuum.

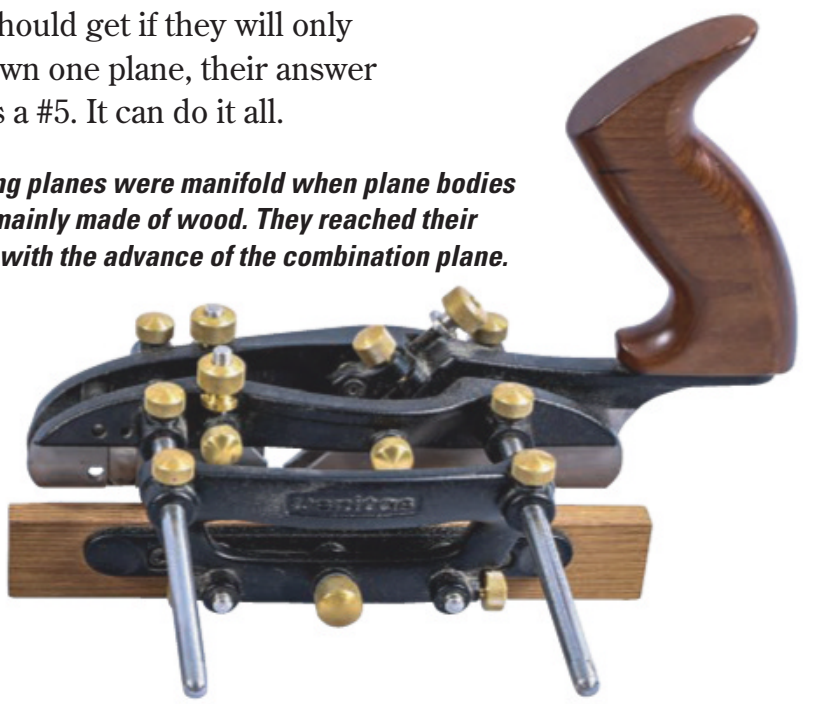
Lever caps are an integral component of both the Bailey and Bedrock plane configuration.

planes. But in general, the Stanley numbering system is used by most plane makers — Record, Clifton and Bench Dog. See the chart on the next page to get a feel for what the numbers mean.

Okay, we've talked about the numbers, but what about the names? Here is a good way to come at it. **Bench planes** are, under the Stanley numbering system, numbers #1 through #8. There was a time in our craft when the workbench was the center of nearly every bit of working with wood. Working "at the bench" meant the same thing as our broad term "woodworking" today. For that reason, the main woodworking planes were called bench planes, because that is where you used them. And use is a major factor in how plane names developed. In that vein, **smoothing planes** are bench planes used primarily for smoothing a piece of wood. So generally, #1 though #4½ are smoothing planes, even though #1 and #2 planes are too small to be useful for smoothing anything larger than a hockey puck. Planes #5, #5¼, #5½ and #6 are **jack planes**, so called because they are "jacks of all trades," in that they can in some ways do it all for both smoothing and jointing tasks. I tried to find documentation for the "jack" terminology, but could not, but the versatile nature of jack planes is well documented. Often when an expert is asked which plane a person should get if they will only own one plane, their answer is a #5. It can do it all.

Within the jack plane group there are a couple of anomalies. For example, when a plane has a fractional number, say #4½, it would seem that the plane should be a little bigger and wider than the #4. This is true for the #5½ when compared to the #5. But the #5¼ is actually narrower and shorter than the #5. It was made for school kids, and why it was not called the #4¾ or "school kid plane" is anyone's guess.

You will also see #6 planes sometimes called **fore planes**. This is a term brought over from Britain. Fore implies that it is used *before* you use a smoothing plane. Plane expert Ernie



Molding planes were manifold when plane bodies were mainly made of wood. They reached their zenith with the advance of the combination plane.

Bench Plane Analysis:

Model #	Sole Length	Iron Width	Comments
#1	5½"	1¼"	Too small to be very useful, very collectible
#2	7"	1⅝"	Too small but said to be less collectible
#3	8"	1¾"	Too small, but some like it for planing edges
#4	9"	2"	Very popular as a smoothing plane
#4-1/2	10"	2⅜"	Popular, essentially very similar to the #4
#5	14"	2"	Jack plane – versatile "jack of all trades"
#5-1/4	11½"	1¾"	Jack plane supposedly used in education classes
#5-1/2	15"	2¼" or 3/8"	Jack plane – versatile "jack of all trades"
#6	18"	2⅜"	Jack plane or fore plane: used before other planes
#7	22"	2⅜"	Jointer plane — making edge joints
#8	24"	2⅝"	Jointer plane — making edge joints
#40	9½"	1¼"	Scrub plane or roughing plane
#62-1/2	14"	2"	Low-angle block plane

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MORE ON THE WEB

VIDEO For videos demonstrating how to use a hand plane and links to websites dedicated to the history of these interesting tools, please visit woodworkoersjournal.com and click on "More on the Web" under the Magazine tab.

Conover describes the #6 as neither fish nor fowl, fitting no task particularly well.

There are some (mostly) British-made planes called fore planes that also have solid wood filling up the front of the metal body. These are called **infill planes**, due to their being filled in with wood. There are infill planes of many sizes and styles in part, because companies like Norris and Sons in Britain made a wide range of planes with infilled bodies to work as smoothing planes, jack planes and fore planes. Two points of note: Norris has a completely different numbering system, and they also came up with a unique blade adjuster (more on adjustment systems shortly).

Jointer planes are also bench planes but are generally not thought of as smoothing planes. (But I do use my #7 to smooth wide and long slab lumber ... it's my addition to plane usage confusion.) Once again, the name describes the function. The #7 and #8 planes are used to create straight, smooth edges required for perfect edge joints. Why are they so long (22" and 24", respectively)? Well, to create those long, perfectly straight edges. A plane can straighten an edge roughly up to three times its length. So a #8 can prepare an edge about 6' long. That constraint is why you can use a #4 to make butt joints on smaller panels, say up to 18" or 20". Jack planes are a bit longer still.

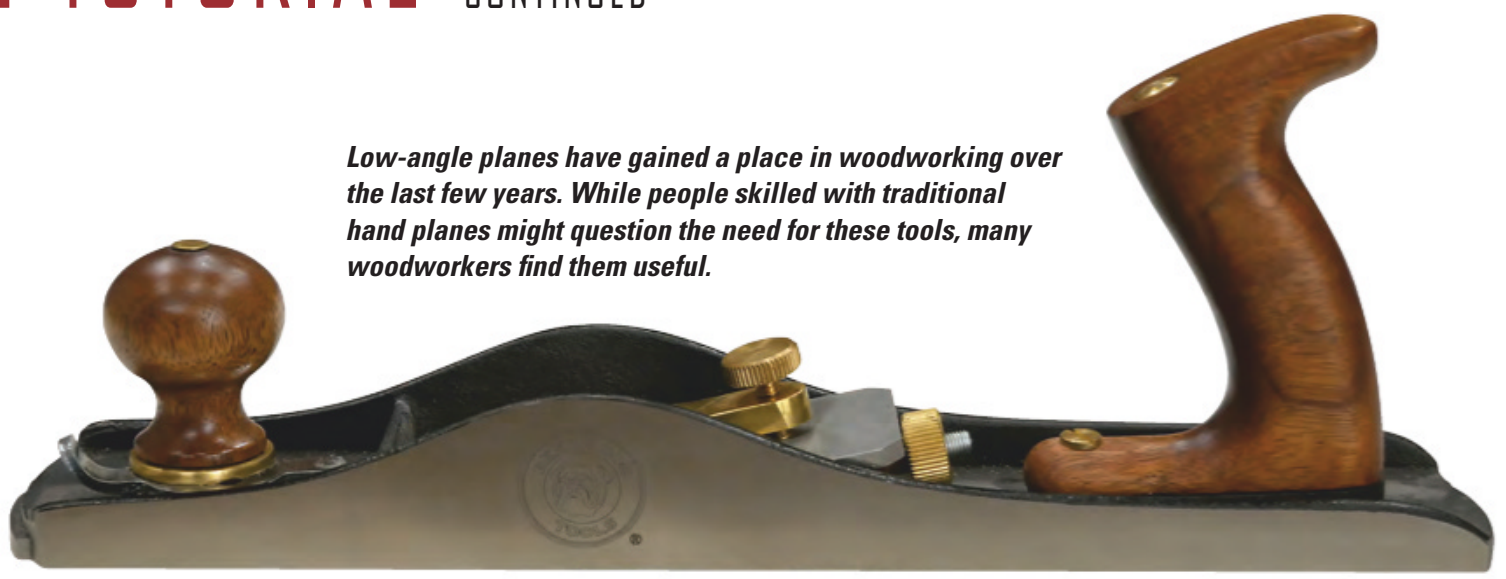
The last member of the traditional bench plane group is the **scrub** or **roughing** plane. These planes neither wash nor roughen stock as their names seem to imply. Instead, they are used to surface roughsawn lumber quickly but not super smooth. They knock off the rough stuff fast, using a wider mouth or throat opening. One method of work I've seen recommended is to use a scrub plane first, fore plane next and then an appropriate smoothing plane. However, if your lumber is already pretty smooth, say from a band saw mill, do you need a roughing plane? That is where experience and personal preference will be your guide.

Blade Adjustments

That runs out the string of the traditional bench plane panoply. Within that group, two main categories refer to how the plane irons

Block Planes

Are block planes "real" planes? Of course they are. In their early wooden iterations, they were larger than the ever-present metal block plane found in nearly every woodworking shop in North America. There is controversy about their original use and where the name came from. Some say it's from being used to surface the end grain of butcher blocks. Others say they lack the required heft to shear end grain, so the name came from their blocky shape. But with their low-angled bevel up configuration, these little one handed wonders have been found useful for myriad tasks. Whether chamfering edges or removing just a bit of material when fitting pieces together, woodworkers have embraced the block plane when many reject other hand planes. Its size and versatility seem to have been the keys to its widespread acceptance.



Low-angle planes have gained a place in woodworking over the last few years. While people skilled with traditional hand planes might question the need for these tools, many woodworkers find them useful.

(or blades) are secured and adjusted: **Bailey** and **Bedrock**. As mentioned earlier, Leonard Bailey really upgraded metal hand plane manufacture with his design. And for years, those designs were copied. Of course, others like Norris and Sons were constantly working to improve their adjustment system — and my assumption is that they were not alone. The next game-changer improvement came with the Stanley Bedrock design, which featured a more robust frog configuration and what Stanley marketed as an easier adjustment system. Bedrock became the dominant system from there forward.

Blade or Iron Angles

Change is the only constant, and that is true with hand planes in spades. From wooden hand planes to metal bodies filled with wood to the Bailey and Bedrock advances, the basic idea of using a cutting edge to smooth wood has never stopped evolving. In the not-too-distant past, large-bodied, low-angle planes have participated in that process and have basically made a hash out of the system I have just been describing. Low-angle smoothing planes, some with the bevels on their irons facing up and some with them facing down, have been introduced with haters and hopefuls fully engaged. Hopefuls were thinking, "Finally a hand plane that I don't really need to practice with to get good!" Haters were like, "We don't need any stinkin' new designs ... the current styles were clearly revealed from heaven, and these new ones

Fettling a Plane

All planes, but especially old ones, need to be tuned up or "fettled." Here is a quick step-by-step.

Clean up: disassemble, wash, remove rust and then file away nicks and sharp corners. The edges of the sole must be smooth.

Blade Controls: Manipulate the blade controls. If they don't work, find what is bent, missing or clogged and put it right.

Frog and Mouth Adjustments: The frog is the metal component that supports the blade assembly. The mouth is the opening in the sole. Secure the frog so there is about a 1/32" mouth opening.

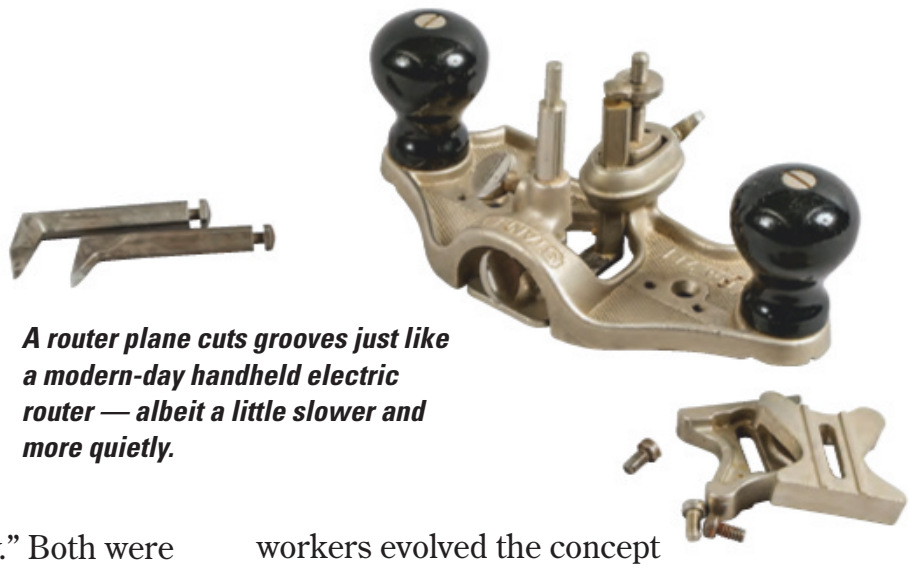
Flattening the Sole: The sole of a plane needs to be reasonably flat, but flattening the sole is a lot of work. Once you've cleaned it up, sharpened the blade and adjusted the plane, if it works well, leave the sole alone. If not, use a sheet of 220-grit wet/dry paper on a 1/4"-thick piece of plate glass. With the blade retracted, use a circular motion and plenty of water to flatten it. Once you have contact at mouth, sole and heal, you're done. Perfect flatness is unnecessary.

To make your plane less likely to mar the wood's surface, file a substantial chamfer on the toe and heal of the plane's sole.

A Bedrock frog (above) ingeniously connects the blade assembly firmly to the body. A Bailey frog is not as robust.

The old-style blade controls are more strongly made than the stamped metal version today.

Adjust the frog to support the blade securely. The mouth opening should be set at 1/32".



A router plane cuts grooves just like a modern-day handheld electric router — albeit a little slower and more quietly.

An infill plane, like the example above, has a metal body filled with wood. Manufacturers such as Spiers and Norris produced planes of exceptional quality and beauty.

are blasphemy." Both were wrong. While the desire for a "new and improved" plane design might have been spurred less from need and more from greed, low-angle planes are useful and practical tools — smoothing unruly grain being the prime selling point. And most of the major plane makers have quality models to choose from. In fact, a well-known hand tool colleague of mine from a "popular" magazine has gone on record saying that if a person was to own just one plane, one of these new tools would be his choice. With that said, old-school plane users point out that the "low angle" of the cutter meeting the wood can be achieved by custom sharpening the existing system instead.

So Many Planes to Learn

I mentioned earlier that the concept of hand planes branched off into more tasks than simply smoothing surfaces. The ingenuity of woodworkers evolved the concept into shaping moldings (with irons ground into various shapes), plowing dadoes and grooves, smoothing radii and more. I won't go into that universe in any significant ways here. But check out our "More on the Web" tab on our website where I will list and link several of the websites I researched so you can explore the topic more.

The Plane Truth

I will confess that even though I have been professionally involved with woodworking for over 40 years, I learned a great deal while preparing for this article. I was "raised" in a production woodworking shop, and power tools were how I learned to get the job done. So my methods of work were based on power tools. I have only discovered the benefits of hand tools late in my career. The ability to be active in my workshop while listening to the ball game finally won me over to "cutting some cords."

Many woodworkers have never really embraced hand tools like planes. And if you are happy with that, good for you. But if you are interested in hand planes and have simply been put off by the terminology and the obscure "lore" that surrounds the topic, perhaps this article will help you to cross the Rubicon that the ancient Roman woodworker did back in 79 A.D.

If you were hoping for detailed information about using a hand plane, take heart! We have an entire video series by Ernie Conover at *woodworkersjournal.com* that demonstrates the process more effectively than a magazine article can. Many other hand tool articles are also available on our website.

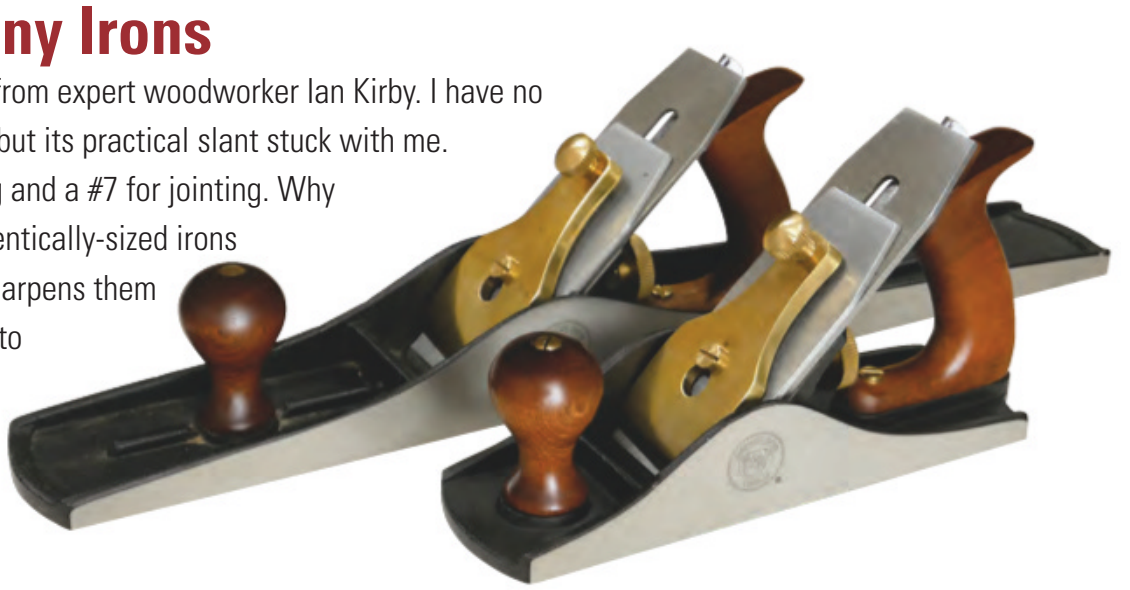
Rob Johnstone is Publisher of Woodworker's Journal.

Expert Tip: Two Planes, Many Irons

One of the best pieces of plane advice I was given came from expert woodworker Ian Kirby. I have no idea whether this was his idea or is more widely spread, but its practical slant stuck with me.

Ian mainly uses two bench planes: a #4½ for smoothing and a #7 for jointing. Why those two? The answer is the irons. Both planes share identically-sized irons (blades). So Ian has six or eight that fit both planes. He sharpens them all at once and swaps out blades quickly when they start to get dull. This allows for extended time at the bench between sharpenings, no matter which plane is being used.

Ian told me to give his system a try, and I have been using it ever since.



Rockler Portable Drill Guide and Self-Centering Drill Vise

By Dan Cary

No drill press? No problem! This pairing raises drill guides to the next level.

The Guide's overmolded handle and knob are comfortable to grip. They adjust the drilling angle from 0 to 60 degrees. White markings make the protractor scale easier to read.

Two new accessories from Rockler can add portable precision to your drilling operations.

The first words that came to mind when I got my hands on the new Portable Drill Guide (item 52885; $149.99) were "substantial" and "smooth." From the center bearings that spin the chuck shaft to the depth adjustment rails to the angle adjustment scale, everything on this Guide is beefed up and operates smoothly.

Portable drill guides essentially turn a handheld drill/driver into a small drill press. The drill attaches to a shaft that is connected to a chuck, which is guided in a straight line on two rails. The angle of the guide can be changed in relation to the workpiece, and most also feature a depth stop. It's a great tool to have if you don't have space for a full-size drill press or if you need to drill angled or repetitive holes when your drill press is either inaccessible or won't work for the applica-

An integral depth stop with knurled brass knob (left) sets the drilling depth for repeatable drilling. The Guide offers 9 5/16" of capacity from the end of the chuck to the bottom of the base (right).

V-notches in the base can hold round workpieces, such as dowels, for drilling centered holes.

tion. The problem with most drill guides, however, is they tend to be a little flimsy and not very precise.

Rockler's Portable Drill Guide has all of the features of other options, with the added advantage that it's also built like a tank. A large 1/2"-capacity Jacobs chuck glides on smooth ball bearings. Twirling it with your fingers feels like you're playing with a fidget spinner. Its drilling angle adjusts easily from 0 to 60 degrees, which is more than the typical range of 0 to 45 degrees. The Guide's anodized aluminum and steel construction ensures durability. Large handle and adjustment knobs have soft overmolds that are comfortable to grip.

Mounting holes in the base can be used to attach other shop-made jigs. Or install a set of pins that come standard so you can straddle the Portable Drill Guide over the edge of a workpiece to drill centered holes and mortises.

All of this adds up to a cool, precise drilling accessory that I think a lot of woodworkers will want in their shop, whether they already own a drill press or not.

A set of steel pins that store in the top of the Guide (left) install under its base to straddle and center the bit over the edge of a workpiece (right).

Self-centering Drill Vise

You can take the Portable Drill Guide to the next level by pairing it with the new Rockler Self-Centering Drill Vise (item 50916; $99.99). Its 3" x 3" capacity is ideal for small tasks, such as drilling mandrel holes in pen blanks, but the Vise is big enough to secure larger pieces, too. A rubber knob on the end opens and closes the aluminum jaws simultaneously.

Use the Vise independently, or install it on the Portable Drill Guide with pre-drilled holes to create a souped-up drilling station. I think these two tools are impressive on their own but work even better as a team.

Rockler's Self-centering Drill Vise can be used independently or mounted in the Drilling Guide's base to create an integrated precision drilling system. Purchase both as a set (item 63057) for $219.99.

WHAT'S IN STORE

Thick Epoxy Option, Faster-setting Titebond

Contact Information

Bosch
877-267-2499

Festool
888-337-8600

MAS Epoxies
800-755-8568

Rockler
800-279-4441

Titebond
800-877-4583

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MORE ON THE WEB

VIDEO For videos demonstrating featured tools, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Rockler's *Dust Right® Flexiport Dust Canister* provides a passive form of dust collection for hand-held sanders and other small power tools. Four flexible couplers with inside diameters of 3/4", 1", 1¼" and 1½" connect the canister to a variety of power tool port sizes and conform to oddly shaped port openings, too. An easy-to-clean pleated paper filter is mounted inside and captures particles down to 10 microns. The canister's translucent polymer housing enables you to see when it needs to be emptied. To do that, simply twist off the filter end cap. The canister also can be twisted and removed from each of the Flexiport couplers, so you could use the same canister with multiple coupler-equipped power tools. The Dust Right Flexiport Dust Canister (item 50319) sells for $19.99.

Dust Right Flexiport Dust Canister

Bosch GAL18V-160C HELL-ION Battery Charger

With the new "HELL-ION" 16-amp charger ($103.99) from **Bosch**, you can charge your CORE18V lithium-ion batteries to 50 percent capacity in 15 minutes or 80 percent in 26 minutes, thanks to a "Power Boost Mode" built into the unit's circuitry. Bosch reports that the *GAL18V-160C* charger "delivers eight times the charging current of its standard counterparts." The HELL-ION is also the first of its kind to offer battery diagnostics by way of connectivity: Bluetooth can pair a charging battery to a smart device when a connectivity module (GCY42; sold separately) is installed on the charger.

Connectivity provides the user more control over battery charging preferences and a way to monitor charging levels and status.

MAS *Deep Pour Epoxy* is designed for encapsulating and creating deep pour castings such as pressure pot turning blanks and live edge river tables. The two-component system is composed of 100 percent solids with a 3:1 by volume mix ratio. It cures slowly in pours of up to 1" thick to a clear, glass-like finish that resists yellowing. Thicker castings can be achieved with multiple pours. Its extended gel time minimizes heat buildup and improves air release for the clearest possible results. The cured epoxy can be machined after 24 to 48 hours. Rockler sells Deep Pour in 1.3-quart (item 65640; $39.99), 1.3-gallon (item 61453; $169.99) and 4-gallon (item 67112; $499.99) kits of resin and hardener.

MAS Deep Pour Epoxy

Titebond *Speed Set Wood Glue* is a high-solids PVA wood adhesive with an extremely fast set time. It requires just 15 minutes of clamping yet still offers excellent strength and durability. Intended for interior use, it resists heat and solvents, cleans up with water and sands easily. It's also visible under black light for pre-finishing inspection. Gallon jugs of Speed Set Wood Glue (item 64166) cost $29.99.

Titebond Speed Set Wood Glue

This summer, **Festool** is launching a comprehensive lineup of premium cordless tools that are powered by the company's new Li-HighPower 4.0 HPC-ASI 18-volt battery pack. It offers a compact and light design that delivers the power and performance users demand from Festool. Headlining this new cordless tool family are the *TID 18 Impact Driver* and *T18 Easy Drill Driver*. The TID 18 (starting at $199) features a standard quick-release 1/4" chuck and T-Mode control that differentiates wood from metal-fastening applications to prevent overtightening. The tool's brushless motor develops 1,593 in.-lbs. of torque and has three speed settings. Also starting at $199, the T18 Easy Drill Driver has a 1/2"-capacity keyless chuck and brushless motor. Its two-speed gearbox and stepless speed control ensure powerful, smooth drilling performance.

The drill has an LED light to brighten the work area, and both tools come with magnetic bit storage and removable belt clips.

Festool TID 18 Impact Driver, T18 Easy Drill Driver

Easy-to-Grip 5-star Fence Knobs from **Rockler** have an overall height of 4 7/16" to rise above most router table fences. That enables you to more easily loosen or tighten fence settings without bruising your knuckles, and the soft overmolded knobs are comfortable to grasp. Sold in pairs for $9.99, the knobs are available with three sizes of insert threading: 1/4" (item 58063), 5/16" (item 50035) and 3/8" (item 55561).

Easy-to-Grip 5-star Fence Knobs

SIX SIMPLE FINISHES #4

Natural (Clear) Finish on Softwoods

By WJ Staff

Softwoods are very tricky to stain, but luckily, they look lovely with a clear finish.

www.woodworkersjournal.com
MORE ON THE WEB

VIDEO For a video demonstrating the technique of finishing softwoods, please go to rockler.com/finishing.

Softwoods are often overlooked in the world of furniture makers. And that is a bit of a shame when you consider the range of softwoods and how beautiful they are. Clear pine and Douglas fir are lovely to work with and are durable when used properly. Southern heart pine — especially longleaf pine — is gorgeous and has the specific gravity of many hardwoods. All of these species can be found in salvaged as well as recently harvested lumber.

But what to do when it comes to finishing? Softwood in general does not take a stain well — the early- and latewood accept pigment in the stain completely differently, often looking reminiscent of an X-ray exposure.

If you must add color to your softwood creations, it is best to suspend it in the finish coat. However, that can obscure the wood grain and lead to uneven color if done poorly. The good news is that a clear finish on softwood looks great. This is especially true if the finish adds an amber hue to the wood. So shellacs and oil-based polyurethanes are perfect for this job. Finishing oils such as boiled linseed oil or a Watco-like product will look fine, but they don't protect the less-dense fibers of softwood the way that shellac and poly do as thicker surface films.

You can apply either option using any number of methods, but the easiest is to wipe on both the shellac primer coat and then the polyurethane coats. Zinsser SealCoat is a great sealer, especially for pine. Flood it on using a synthetic pad or soft cloth. Wipe the excess shellac off and let it dry, which it does very quickly. Look for glue spots, nail holes or cracks and deal with them at this time. Then move onto a wipe-on polyurethane. Two coats of the poly are the minimum, and three or four are even better. Allow the finish to cure between coats, and remove any dust nibs that appear with either very fine sandpaper or using an ultra-fine synthetic pad.

While not necessary, once the film coat has cured (perhaps a week's time), a layer of paste wax rubbed on and polished off is a wonderful way to take a finish from good to great. The look and feel of a waxed finish really does make a difference!

Natural Finish on Softwoods

Step-by-step instructions:

1. Sand the project up through 220-grit. Don't skip grits. It is a good idea to sand pieces that will be hard to reach before assembly.
2. Wipe the project with mineral spirits to check for glue splotches that may appear on the dampened wood. Sand them away as needed.
3. Apply a sealer coat (Zinsser SealCoat) of a shellac-based finish by wiping. Flood it on, let it absorb briefly and wipe off the excess.
4. Fill nail holes with wood putty that matches the wood's finished color. Sand it smooth.
5. Apply at least two coats of wipe-on polyurethane. If dust nibs appear between coats, lightly sand them off.
6. Optional: After 7 days, apply paste wax. Let it dry to a haze, and buff the surfaces smooth.

Woodworking Tools & Supplies Index



August 2020

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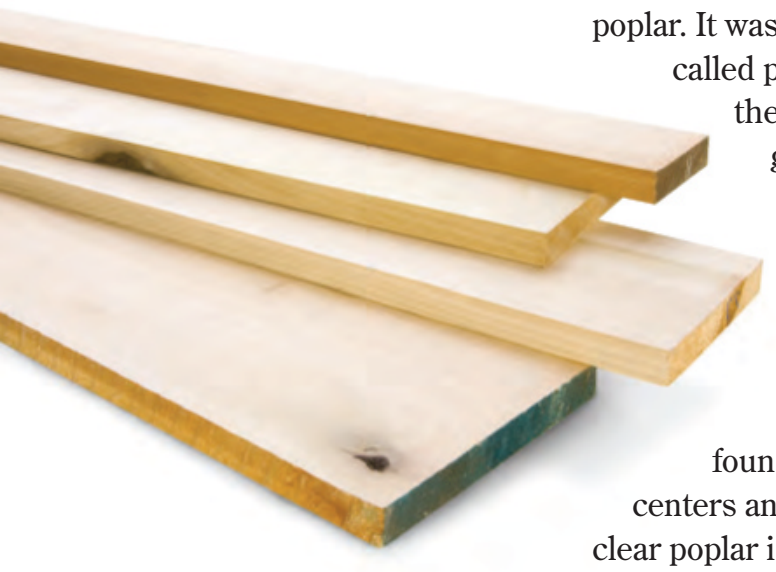
HARDWORKING WOODS

Yellow Poplar: *Liriodendron tulipifera*

By Rob Johnstone

While it won't win any hardwood beauty contests, yellow poplar is durable, reasonably priced and easy to use.



Yellow poplar, also called tuliptree and tulip poplar due to its tulip-like bloom, is a member of the magnolia family but is in a different genus than the common magnolias. Curiously, it is not a true poplar. The poplars include the cottonwood species, balsam poplar and aspen, but not yellow poplar. It was commonly called poplar because the leaves are dark green on top and silvery green on the bottom, much like the true poplars.

Commonly found at both home centers and lumberyards, clear poplar is available in wide widths and substantial lengths. It is modestly priced, compared with most other hardwoods. The wood has an indistinct, close grain pattern. It cuts, routs and fastens easily and sands quickly to a smooth, even surface.

Green, gray, blue and purple hues are not uncommon on patches of yellow poplar, along with creamy white areas and even black streaks. While wide color variation makes poplar lumber visually unique, it isn't a prime choice for grain pattern or figure. But yellow poplar may be the most popular hardwood never seen. Used in untold numbers of upholstered furniture pieces and as the carcass components of cabinets, its strength and easy-to-work nature make it a practical favorite.

I've talked to many woodworkers who have stained yellow poplar and applied a topcoat, and to their eyes it "looks exactly like walnut or cherry." Now, far be it from me to second-guess what another woodworker has accomplished, but statements like that do make me wonder whether these folks have actually seen what a nicely finished piece of cherry or walnut actually look like. Personally, I would never select yellow poplar for a project I planned to stain and apply a clear finish to. But when my goal is to paint or cover a piece of furniture with fabric or veneer, then poplar is the perfect choice.

The versatility of yellow poplar doesn't stop at cabinetry, components or paint-grade millwork, either. During the 1960s and '70s, it often was substituted for framing lumber during a softwood lumber shortage. Native Americans often used it for dugout canoes too, although popular is not as durable an outdoor lumber as cedar, redwood or white oak.

Shop Score Card

Uses: Carcass and frame construction, paint-grade millwork and furniture, plywood core veneer

Hardness: Medium density, similar to alder, aspen or soft maple

Area of Origin: Eastern and central North America

Workability: Dense, indiscriminate grain machines easily with hand and power tools. Dimensionally stable. Sands quickly to a smooth surface.

Finishing: Readily accepts stains, dye and topcoats. Can be finished to mimic other hardwoods.

Cost: Low to moderate, when compared to other furniture-grade hardwoods such as red oak, cherry or walnut.

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