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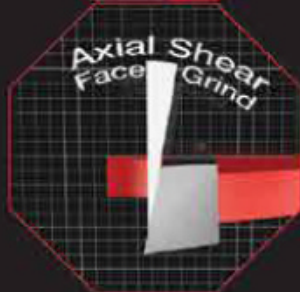
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Contributors



Derek Richmond joins the *Woodcraft Magazine* team as Associate Editor. He started woodworking in high school and has crafted everything from pens and clocks to jewelry boxes and furniture, including one perpetually unfinished electric guitar. He learned woodworking from his father and writing from his mother, and looks forward to combining those two passions on these pages. In addition to being a recovering attorney, Derek is a crew coach and volunteer firefighter. He lives in eastern Pennsylvania with his wife Michelle, son Wyatt, and a golden retriever who has never retrieved an ounce of gold.



Willie Sandry is a process guy. His designs often begin with inspiration gleaned from antique shops and old catalogs. After that comes detailed drawings and mock-ups, followed by drying his own lumber. “The more control you have over each step of the building process, the better the finished product becomes,”

he says. His detail-oriented process leads to beautiful Arts and Crafts furniture like the Limbert-style book rack he created for this issue (p. 32). Willie lives in Washington state with his wife. Together, they restore antique furniture by day and spend evenings reading antique furniture catalogs for inspiration. “If only I could get her to join me for finish sanding,” he says.



After a 15-year stint at *Fine Woodworking* magazine, **Asa Christiana** packed up and moved cross-country. Now in Portland, Oregon, he is a freelance writer and photographer. (Asa shot the photos for the Limbert-style book rack

on page 32.) He also teaches woodworking classes and maintains a blog featuring all manner of DIY projects. Asa spends his leisure time working on his fixer-upper house and biking with his wife and teenage daughter. ■

On the Web



17th Annual Turn for Troops at Woodcraft.

Woodcraft is looking to top 200,000 handcrafted pens for the troops in 2020! Volunteers are invited to Woodcraft stores across the country November 7 and 8 to turn wooden pens to be sent to military personnel. No experience is necessary, and all ages are welcome. For more info and to find a participating store near you, visit woodcraft.com/pages/turn-for-troops. At left, Allen Harp helps his

son Allen turn a pen at The Woodworkers Club/Woodcraft of Rockville, Maryland, store during the Turn for Troops National Turn-a-Thon in November 2019.

A cornucopia of free content. Where can you go to find full-size patterns for an Arts & Crafts book rack, templates or CNC plans for snack containers, article downloads for core woodworking techniques, and a salsa recipe? It's all on our website under our onlineEXTRAS page. And this horn of plenty just keeps on giving. While you're surfing the site, check out our catalog of helpful videos, or our archive of tips, techniques, and tool stories from all the way back to issue 1! ■

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Share the bounty

I've spent as much of the last several months as possible in my shop. Though I've learned a lot during my quarantine-induced shop time, I'm a bit malnourished due to social distancing. I want to share what I've learned and to learn from other makers, but it's difficult these days to work shoulder-to-shoulder in the woodworking field. Nevertheless, we have the means to virtually band together to share our common information harvest for the greater good. And by offering up our experiences and ideas, we also nourish young makers, encouraging a bountiful future for our craft.

One of my favorite facets of making *Woodcraft Magazine* is acquiring knowledge from fellow woodworkers. I've reaped an abundance of smarts from our sundry contributors over the years, including those in this issue. Plus, I'm astounded by the ingenuity of you, our readers. Your capacity for clever problem-solving is on full display in our Tips & Tricks column. And the photos we receive of your work are tributes to your creativity. Sometimes these projects were inspired by something on our pages, often incorporating variations

or improvements. But just as often they are original designs, accompanied by stories of builds that were rich with learning opportunities.

Plenty of woodworking expertise is ripe for the picking in this issue. Snack on the tasty techniques presented on p. 23 or view layout tools from a new angle (p. 27). Pages 41–45 are burning with colorful creativity to cultivate. Traditional furniture can be refreshed with innovative methods, as demonstrated on p. 32. And game-lovers will enjoy rolling the dice on a fun design (p. 46).

I invite you, dear reader, to bring something to the table. Let us know what's cooking in your shop. Submit your ideas and project photos via email, snail-mail, and social media. If you're between projects, survey your shop for jigs and ingenious ideas to add to woodworking's rich cornucopia of ideas. I hope to be tasting the fruits of your woodworking knowledge soon. ■



Share your ideas.

We love hearing from readers! And there are all kinds of reasons to get in touch with the crew at *Woodcraft Magazine*. Check out the details below.

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Have a tough woodworking question?

We'll do our best to find the expert and provide the answer. Email us at editor@woodcraftmagazine.com and put "Expert Answers" in the subject line.

News & Views:

This catch-all column is where we do our best to correct mistakes, publish feedback from readers, and share other noteworthy news items. It's easy to participate in this discussion. Just email us at editor@woodcraftmagazine.com and put "N&V" in the subject line.

Submit an article idea:

Do you have a story idea? We'd love to hear about it. To find out how to submit an article, email us at editor@woodcraftmagazine.com and put "Submission" in the subject line.

Share photos of your projects:

We'd like to see what you're building. To show off your work send your photos to editor@woodcraftmagazine.com, or find us on social media.



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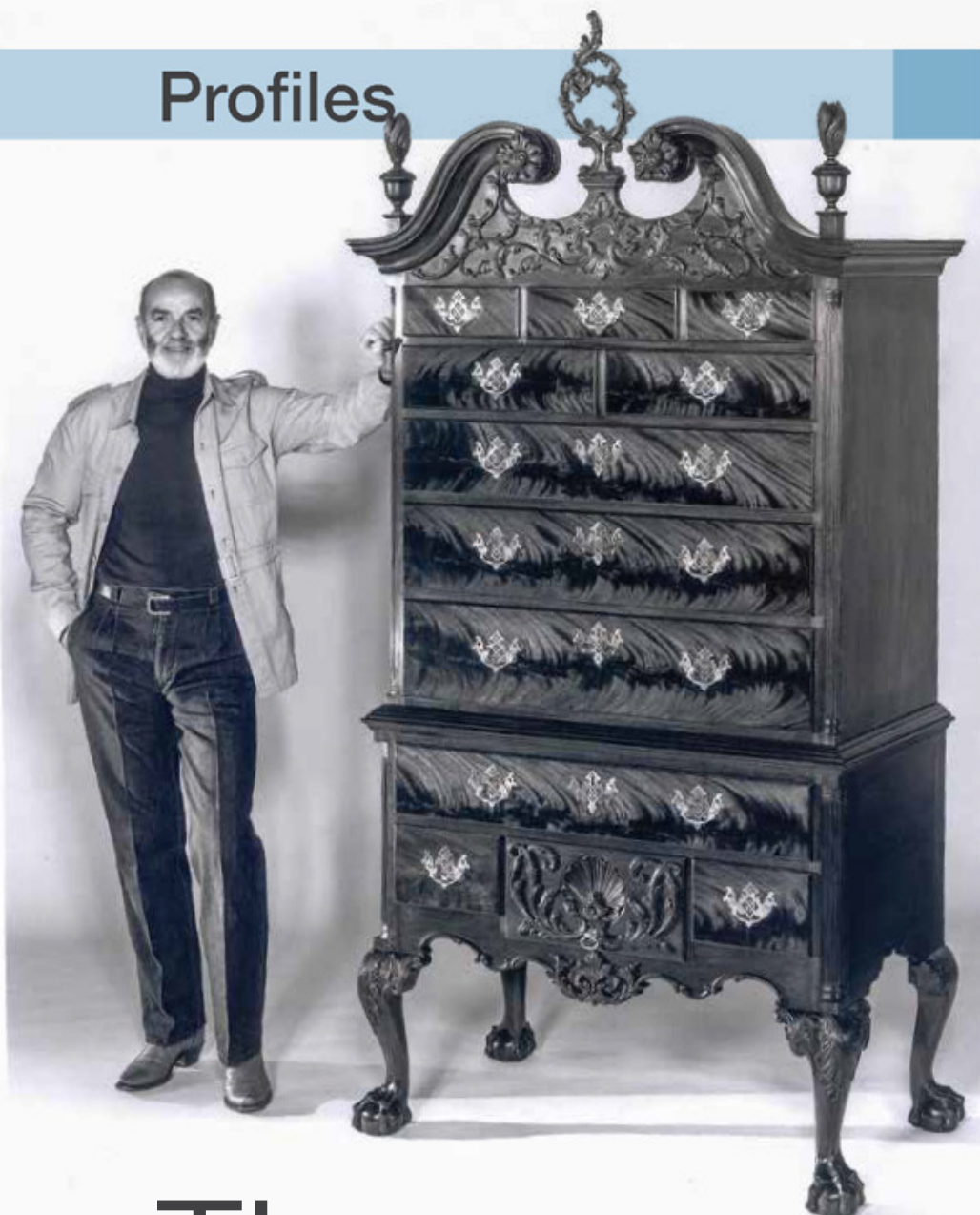


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Profiles



The Whitley Rocker. After several iterations, this became one of Bob's most commercially successful pieces. Its clean lines and flowing curves impart a timeless look that suits any setting. It is extremely comfortable and the silky smooth hand-rubbed oil finish is a pleasure to touch.

Past master. This stunning piece is a reproduction of a high chest that was originally owned by Stacy Potts (1731-1816), a Pennsylvania legislator and Trenton, NJ mayor. Whitley built it for a descendent of Mr. Potts.

The consummate RENAISSANCE MAN

A tribute to Robert C. Whitley By Craig Bentzley

On June 1, 2020, the woodworking world lost a grand master when Robert Whitley passed away. Whitley was the consummate Renaissance man, fluent in history, the arts and just about any other subject that you might engage him in if you were lucky enough to catch him relaxing. But his primary passion was woodworking, and his palette spanned centuries. Capable of crafting immaculate reproductions of classic 18th-century designs, Whitley's background in art and sculpture allowed him to easily cross the bridge

into the 20th century, producing exquisite contemporary furniture.

There isn't enough room here to list all of Whitley's major commissions and awards. He built countless museum-quality reproductions of high-end 18th and 19th century pieces. His contemporary work resides in the Renwick Gallery of the Smithsonian American Art Museum in Washington, D.C., as well as the Museum of Arts and Design in New York City. His celebrated "Throne Chair" was the 1980 winner of the

National Endowment for the Arts award. He also successfully produced and marketed a selection of his pieces, including a beautiful, comfortable rocker that he built in batches of ten. These "Whitley Rockers" occasionally turn up for sale online, and have proven to retain their value well into the 21st century.

In the workshop, Whitley was adept at just about any operation, whether rough milling, carving, joinery, or anything else. But his favorite wheelhouse was finishing. He loved coaxing out the nuances

of the grain and luring out the overall personality of the wood. He was equally comfortable with brushing shellac, spraying lacquer, or hand-rubbing an oil finish. He would often have four or five pieces in the finishing room, each with a different type of finish.

One of the projects he was most proud of was his copy of the "Resolute" desk that resides in the White House Oval Office. (See page 52). Commissioned in 1978 for permanent display in the John F. Kennedy Library and Museum in Boston, the piece took nearly a year to com-



Winning inspiration. The “Throne Chair,” which won the 1980 National Endowment for the Arts award, was inspired by a massive oak wainscot chair Whitley saw in Scotland. Although the original was more rectilinear, age had softened the hard edges and shrinkage caused the pegs to protrude from their joints, contributing to this interpretation.



A finishing virtuoso. Whitley was known for his impeccable finish work. Here he applies shellac to a high chest reproduction.

On a Personal Note

I had the great fortune not only to know Bob Whitley as a friend, but to work alongside him for a few years—a dream come true for me. As a budding woodworker in Bucks County, Pennsylvania in the 1970s I was well aware of Whitley’s reputation for unparalleled expertise in the craft, and was lucky enough to finally meet him in the early 1980s. Over time, we became close, and enjoyed many long discussions in the tranquility of his Japanese-style tea house. The topics usually focused on the appreciation of beauty in both art and nature, as well as modern society’s indifference to it.

In addition to Bob’s relentless passion for woodworking, he was also a believer in holistic living and leading a healthy lifestyle. I came to realize that he was a man of his word, which is a rare commodity in today’s world. It’s true that he didn’t suffer fools, and could be a stern taskmaster. However he was equally effusive with praise for a job well done. I’ll miss him. Rest in peace, my friend. —C.B.

plete. Whitley spent three days in the Oval Office measuring and photographing the original under tight security while then-President Jimmy Carter was on a trip to Germany. Other historical commissions—including a reproduction of Thomas Jefferson’s swivel chair—reside in Philadelphia’s Independence Hall, Carpenter’s Hall, and Franklin Court.

As to his own history, Whitley was born in 1924 in the formerly rural outskirts of Trenton, New Jersey to a school teacher mother and a father who loved antique furniture. The senior Whitley would bring young Bob to auctions to buy pieces that they would then clean and restore together.

A truly excellent design—one that is pleasing to the eye, graceful in line and serves a practical function—this will survive the trends and fads of the times and will retain its classic beauty forever.”

—Robert C. Whitley

The boy was an eager student, quickly absorbing his father’s instruction as to what makes great furniture. After attending the Trenton School of Arts, the young man took on many diverse jobs, including working as a cowboy and a welder. Then, in 1948, he started the area’s first flea market, along with a business restoring and selling furniture. A year later, a young Ervin Hart began his 60-year stint as Whitley’s trusted and devoted assistant.

As his skills and reputation grew, Whitley garnered com-

missions for reproduction work while simultaneously developing contemporary pieces of his own design. In addition to his ambitious workload, he purchased thirteen acres outside New Hope, Pennsylvania, where he built a home and workshop complex. By the mid-1970s he dominated the wood-working landscape in Bucks County Pennsylvania, along with George Nakashima, his famous woodworking contemporary. Although their styles differed, they both shared the

view that—regardless of the project—the wood should take top billing. Like Nakashima, Whitley sourced much of his wood locally, using the best stock he could find, and usually directing the sawyer as to how he wanted the wood processed.

For the rest of his life until his informal retirement in 2011, Bob Whitley did right by the craft he loved. He lived his 95 years on earth fully, and leaves behind a legacy of work that most of us can only aspire to. But we’d do well to try. ■

Tenon alternative



The article about the Counter-height Stool (Issue 95) is great. Could the chair be redesigned to use dowels to connect the joints?
—Walt , via email

Senior editor Ken Burton replies:

I've repaired too many dowel-assembled chairs to be willing to advocate this. That said,

there is one potential way that dowels might work here. A stepped dowel installed in through holes rather than blind holes provide a mechanical lock in addition to the glue's bond. The dowels and special drill bit are both available from the Miller Dowel company. I'd use the largest of their three sizes for the main joinery and the smallest for the stretchers. In the case of this chair, you'd clamp together the front and side rails and drill through the front and into the ends of the side rails. This might hold up to the rigors of being used in the chair, but I haven't tried it myself.

Making the list

Thank you for a most timely article on the counter-height stool. I plan to attempt this most interesting project. A question first: is a cutting list available?

—Michael Carter, via email

Woodcraft Magazine staff replies:

A complete cut list is now available at woodcraftmagazine.com.

The finial word

I appreciated Jeff Peters' tip for turning a live center tailstock for finials in the Aug/Sep 20 issue. I had never thought of turning my own mandrel, and I would worry it wouldn't fit snugly or squarely in the Morse taper of the tailstock spindle. Instead, I have always opted to hold a ball bearing in a drill chuck in the tailstock for turning fine finials, but not anymore with this clever trick.

—Barry Stephens, Fairfax, VA



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Happy Birthday, James

October 31 marks what would have been the 100th birthday of James Krenov. A master woodworker, author, and teacher, Krenov continues to inspire furniture makers with his regard for both material and craftsmanship. Krenov's cabinets are recognizable for their long, slender legs and hand-carved elements. His designs were often driven by the grain in a certain piece of wood, particularly those used in the legs and cabinet doors. Krenov also made his own wooden handplanes, continuing to do so by feel when his eyesight failed him. He founded the fine woodworking program at California's College of the Redwoods and authored the groundbreaking *A Cabinetmaker's Notebook*, still considered one of the premier books on the craft. Krenov passed away on September 9, 2009 at the age of 88. Learn more about Krenov, his signature style, and his lasting influence from The Krenov Foundation, www.thekrenovfoundation.org. ■

—Staff

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Reader Showcase



DOUGLAS GILLIE,

via email

Turning back time. Gillie turned the base and rings around the skeleton clock body from tiger wood, while the support column and finial are dyed maple. The accent ring is set at about eleven o'clock and secured apart from the clock housing with spacers, lending an air of lightness and whimsy to the final design.



RICHARD VANNICE, ALBANY, OR

Raise your glass. When his daughter received a salvaged piece of glass, Vannice turned it into the centerpiece of a new coffee table for her home. The table is made of monkey pod with maple accents in the legs. At age 87, Vannice says he will continue woodworking "for as long as I can stand at the tool stand and see the cutline."



JOE BURKE, NEWMARKET, NH

Have a seat. Burke built this pair of cherry chairs for his daughter from plans included in Issue 72 (Aug/Sep 2016), adding an inch and a half to the seating height. The additional height made the chairs more comfortable for dining but forced Burke to work through changing the taper of the rear leg. "I picked up some new knowledge and skills along the way," he says.



DAVE GILBERT, LAFAYETTE, GA

Rent free for wrens.

Gilbert crafted this home for the wrens that frequent his Georgia backyard.

The house is constructed of white oak on a base of walnut, and the walnut strips up top allow the roof to conform to the house's elegant curves. A small entry hole and no perch make the project the perfect home for wrens. ■

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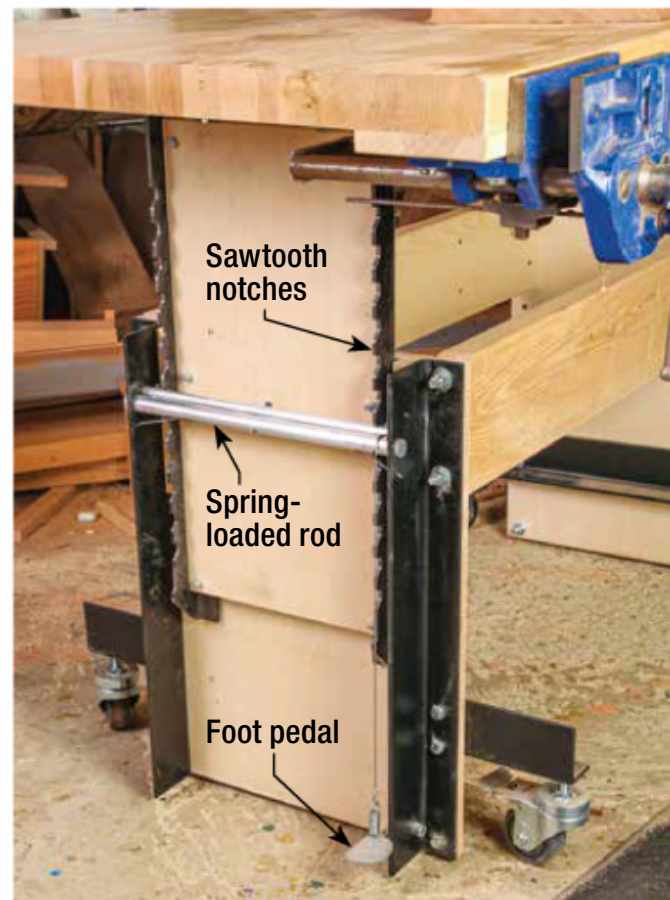


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Since using fellow editor Paul Anthony's Adjust-A-Bench some years ago, I've suffered a bit of bench envy. So I jumped at the opportunity to test Adjust-A-Bench inventor Geoff Noden's new Craftsman Hardware Package. I recently built the bench shown here just in time to make the party trays on page 23. And I'm glad I did because this workbench's core feature came in handy for the myriad layout and routing tasks required of the tray build.

Noden developed the Craftsman package to be a lower-cost alternative to the original Adjust-A-Bench. The original features steel U-channels that form the nesting legs or "trays" that allow adjustment. With this new package, you provide plywood panels and bolt them

to the supplied pieces of steel angle to form similar trays. The well-conceived package comes with all the necessary hardware for assembly.

At the heart of this hardware set are four lengths of $\frac{3}{16}$ "-thick steel angle milled with a series of saw-tooth-like notches. These, coupled with two spring-loaded steel rods, allow the bench to ratchet upward in $1\frac{1}{2}$ " increments when you lift an end. After lifting the other end to match, you're ready to work—it's that simple. Lowering the bench is just as easy. After lifting one end slightly, depress the kit's foot pedal to retract the spring-loaded rod and lower the top to the desired height, repeating at the other end. My new bench can raise from 27" up to 44" (with its $1\frac{3}{4}$ "-thick top).

With the legs completed, I bought a top, and lumber for the rails. The only trouble I had was finding 48" long lengths of threaded rod to connect the rails to the legs. But rather than ordering them and postponing the build, I improvised by using couplers to join shorter pieces of threaded rod.

I also tested Noden's Caster Package. It came with high-quality, lockable casters providing excellent mobility. The kit's wide stance adds to the bench's stability, but even with the casters locked, the bench rocked slightly. However, when I need a rock-solid bench, the casters retract with only a couple of turns of each mounting bolt, allowing the legs to sit directly on the floor.

My only complaint lies with the directions. Rather than

supplying comprehensive written instructions, Noden provides a link to online videos. While the videos are informative, I would prefer a set of written directions.

Using the bench is a joy, although the up-and-down mechanism isn't as smooth as Paul's heavier duty Adjust-A-Bench leg set. I suspect that parts of my bench are binding. I'll have to track down the culprits. That said, being able to raise the bench to a comfortable height for laying out the trays and then lowering the bench to do the routing made the job easier. If you need a new bench or even an extra one, I'd seriously consider Adjust-A-Bench. ■

—Tester, Ken Burton

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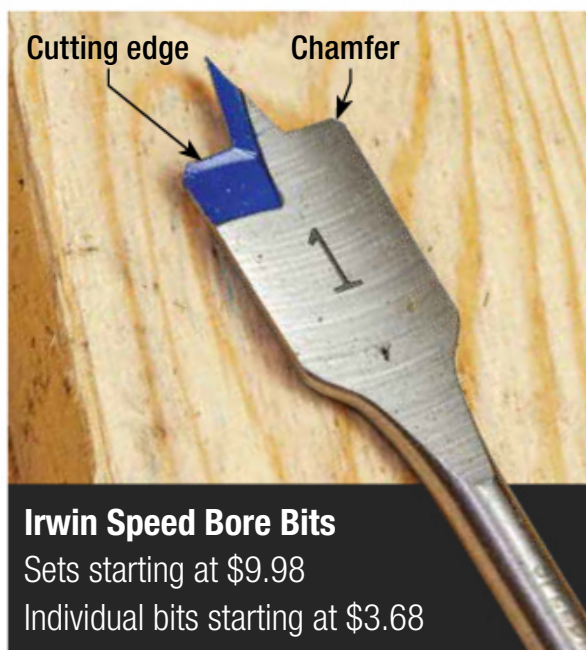
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Innovation comes to an old standby

Irwin Speedbor 8-piece Spade Bit set



While I don't typically use Speed-bore bits (also known as spade bits) as a furniture maker, I do use them frequently when I have on my

carpenter's belt. On the job site, they're my go-to bits for boring large holes such as those for recessing lags screws or drilling studs for electrical wires.

When I received this new set from Irwin, I noticed they were somewhat different from the flat, paddle-like shapes I was used to. For instance, their cutting edges are ground with a short bevel similar to the edge on a Forstner bit, an innovation implemented in 2006. (Obviously, it has been a while since I had to buy new Speed-bore bits.) This "new" grind allows the bits to cut faster than the older style. Another significant difference is that the corner spurs have been replaced with chamfers, an improvement rolled

Overview

- Available from 1/4"-1" in 1/16" increments and to 1 1/2" in 1/4" increments
- Available in sets or individually
- Faster cutting and longer lasting than the traditional design

out in April of this year. (At least I'm not 14 years behind on this upgrade.) With the old design, the spurs defined the hole's perimeter and helped provide a clean cut. But those spurs were often the first part of the bit to dull.

Irwin claims the chamfered design lasts longer without compromising cut quality. I haven't drilled enough holes to speak to the bits' longevity, but I can attest to how cleanly they cut. After several walls' worth of electric cable holes, my new 3/4" bit is still cutting cleanly on entry with minimal exit tearout. Pick up a set from the hardware store for your next home improvement project. ■

—Tester, Ken Burton

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1. What template do you make first when building the Limbert-style Book Rack?
2. True or False: You can blow soap through the end grain of white oak.
3. How many times does Ken Burton's name appear in this issue?

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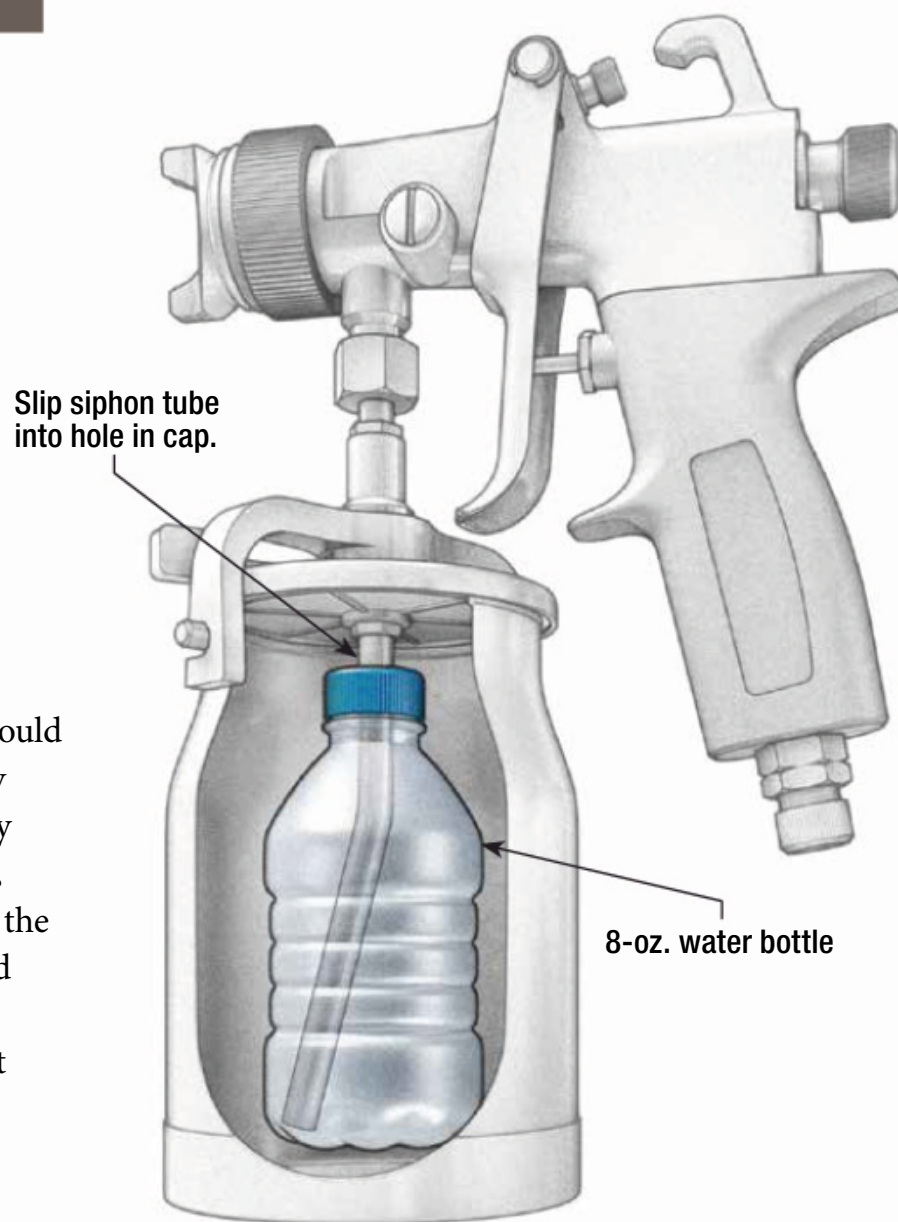
TOP TIP

A smarter way to spray small

I've always loved using my HVLP sprayer, except when finishing small projects. That's because it's inconvenient and wasteful to mix up small amounts of finish for the large can, which also doesn't work as well when it's mostly empty. I was agonizing over this when my 6-year-old granddaughter wandered into my shop sipping from a small 8-oz. water bottle, and I realized the answer was right in front of me.

I dried out the bottle and drilled a hole in the cap that would create a tight fit for my gun's siphon tube. Drilling part way through from each side with a brad-point bit created a very neat hole. I filled the bottle with finish, screwed on the top, and inserted the siphon tube. After slipping the bottle into the can and dogging down the lid, I found that the gun worked very well. Even when I tilted it sideways, the finish did not leak out. When done, I simply removed the bottle, sealed it with another cap, and set it aside to wait for the next coat. I didn't even have to clean out the can. No muss, no fuss.

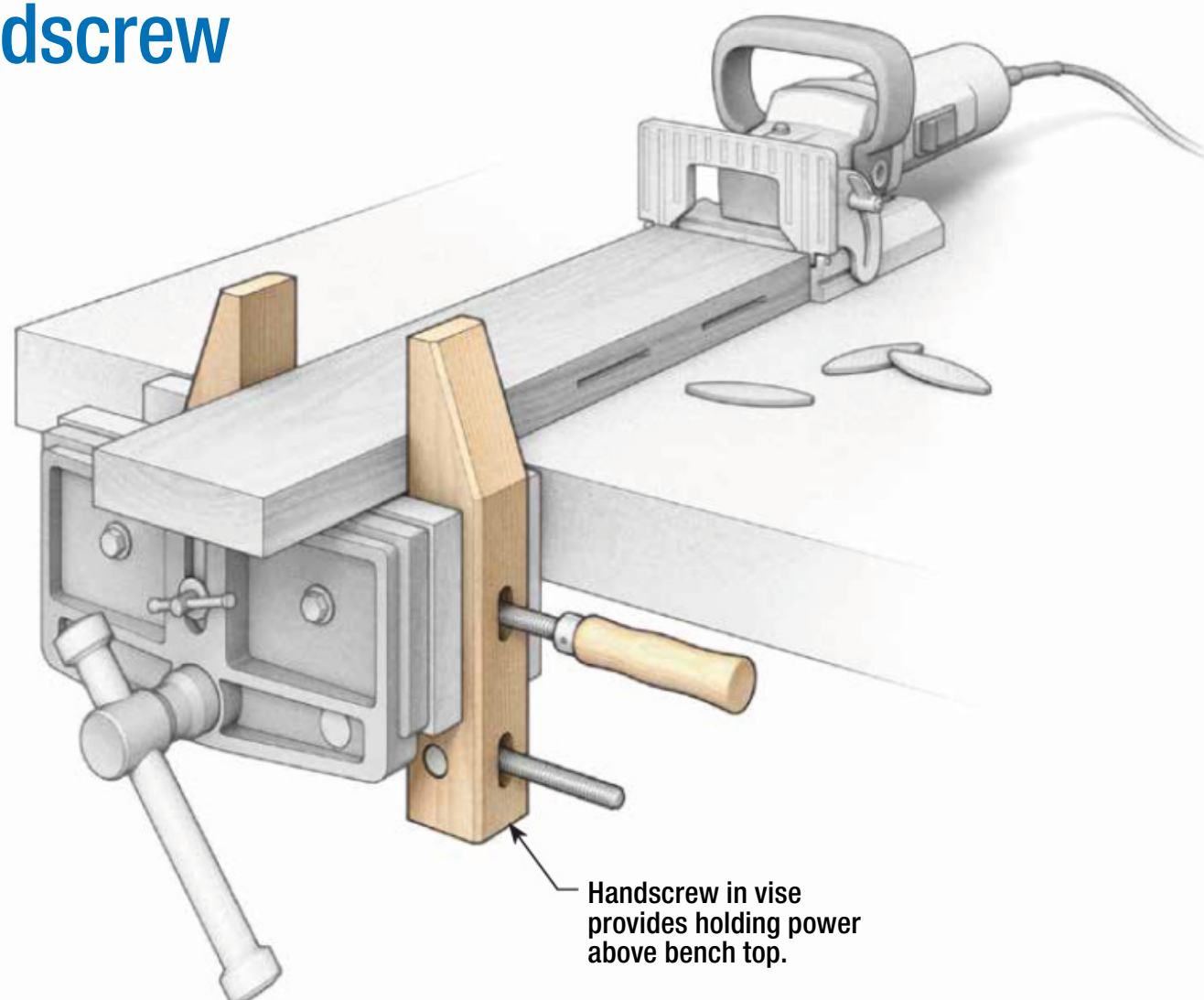
—Thomas Moss, Bradenton, Florida



A tall-vise handscrew

There were times when I used to wish my vise jaws could project above the bench top, which would be helpful when securing workpieces for biscuiting and other operations. I got my wish recently when I realized that all I have to do is clamp a large wooden handscrew into the vise as shown. It sure makes a lot of jobs quicker and easier now.

—William Purcell,
Laurinburg, North Carolina



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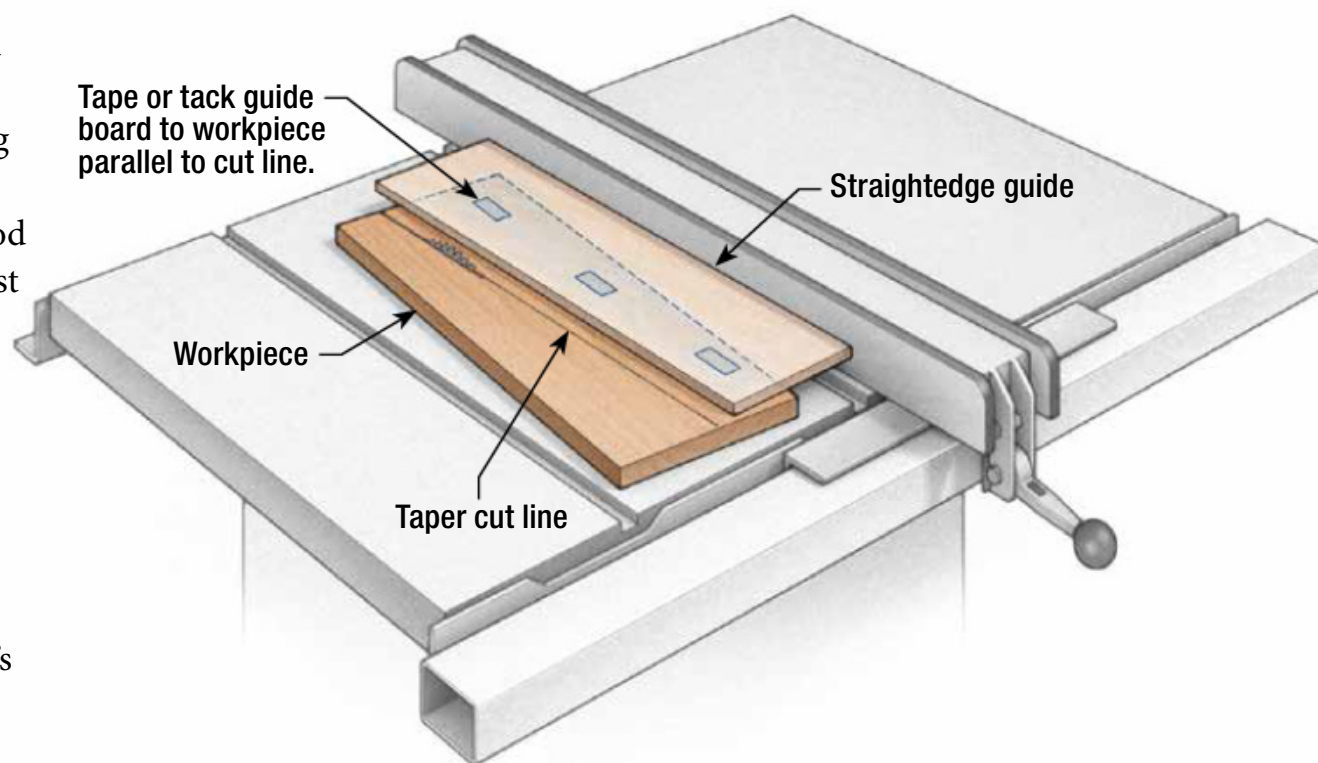
KING ARTHUR'S TOOLS

CLASSIC TIP

Tapering boards at the table saw

I was working on a project that called for tapering long, wide boards, but my commercial tapering jig wasn't big enough for the job. So to make the cuts, I used a strip of ¼"-thick plywood to serve as a straightedge guide against the rip fence. After marking out the taper on the workpiece, I tacked the plywood to it, aligning the plywood's fence-bearing edge parallel to my cutline. At that point, it was a simple matter of ripping to the cutline in the usual fashion. To prevent marring, begin with a workpiece that's oversized in length, and tack into the excess. Or use double-faced tape.

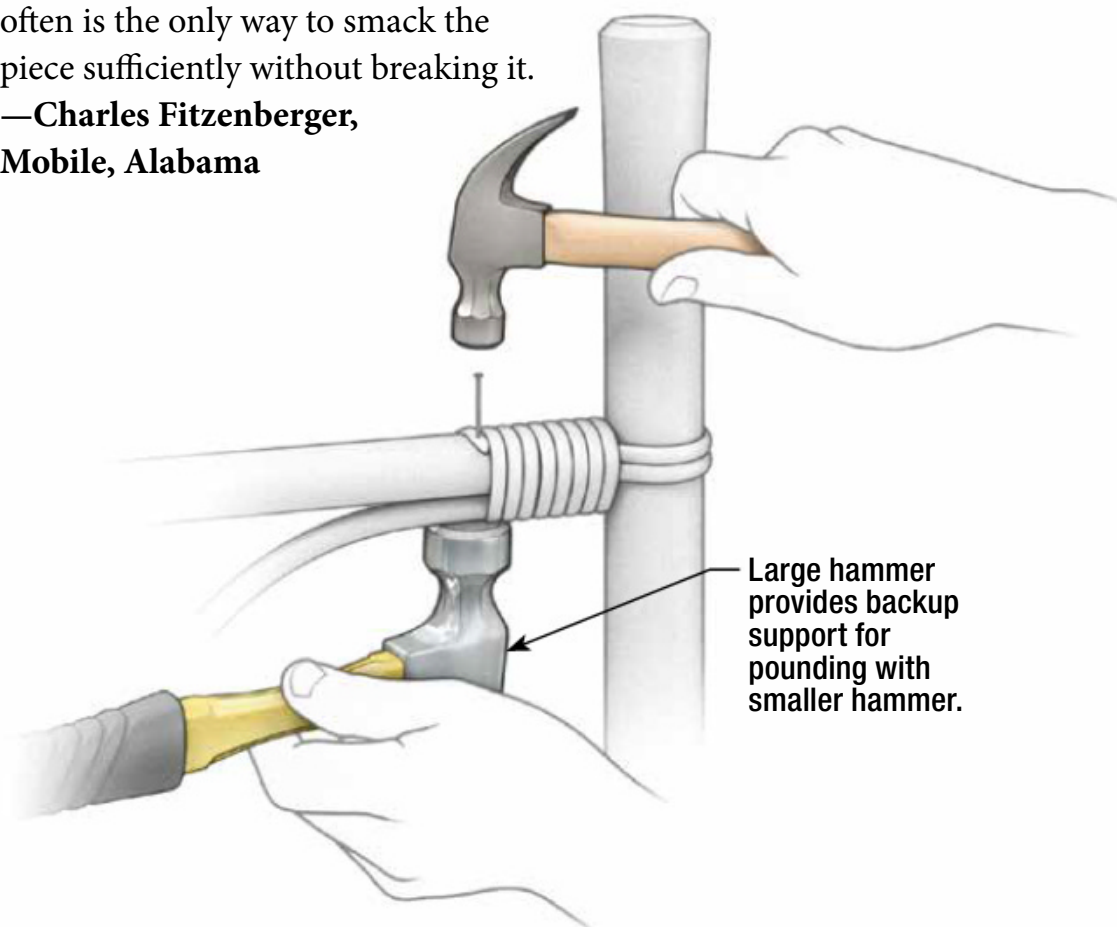
—Mark Clement, Phoenix, Arizona



Heavy metal backup

This tip came to mind the other day when I was tacking a strip of loose rattan back onto its table leg. There are times when you need to hammer against something like an upended table leg or a cantilevered chair arm that can't be laid on the bench for solid support. In those cases, you can bring backup to the piece in the form of another (preferably larger) hammer, small anvil, or any other chunk of heavy metal. It makes a world of difference, and often is the only way to smack the piece sufficiently without breaking it.

—Charles Fitzenberger,
Mobile, Alabama



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Party TRAYS

Make some chips before serving some chips

By Ken Burton



Whether you're preparing a treat for your next potluck dinner or dishing up salsa and chips to eat in front of the game, you'll find these two party trays are up to the challenge. They also make great gifts and are a good way to show off your woodworking skills. The removable dish, called a ramekin, is available at most department stores for a couple of bucks. Or splurge and find a local potter to make you a set. Either way, adding that ceramic element frees you to serve nearly any food without fear of damaging your tray.

The key to making both of these designs is to start with a template that includes inner "rings." In teaching how to make these trays, I've found most students have trouble guiding a router across a wide-open area—essentially free-handing the tool. The rings provide guidance for every cut and make the job much easier. You'll also need a plunge router and a $\frac{3}{4}$ " tray bit with a top guide bearing. You can make your tray from nearly any wood—those shown here are made of 6/4 sapele.



Order of Work

- Make the templates
- Rout the interior
- Rout the exterior
- Sand and finish



onlineEXTRA

- CNC files for template-free routing
- Full-size template layouts
- Peach-mango salsa recipe

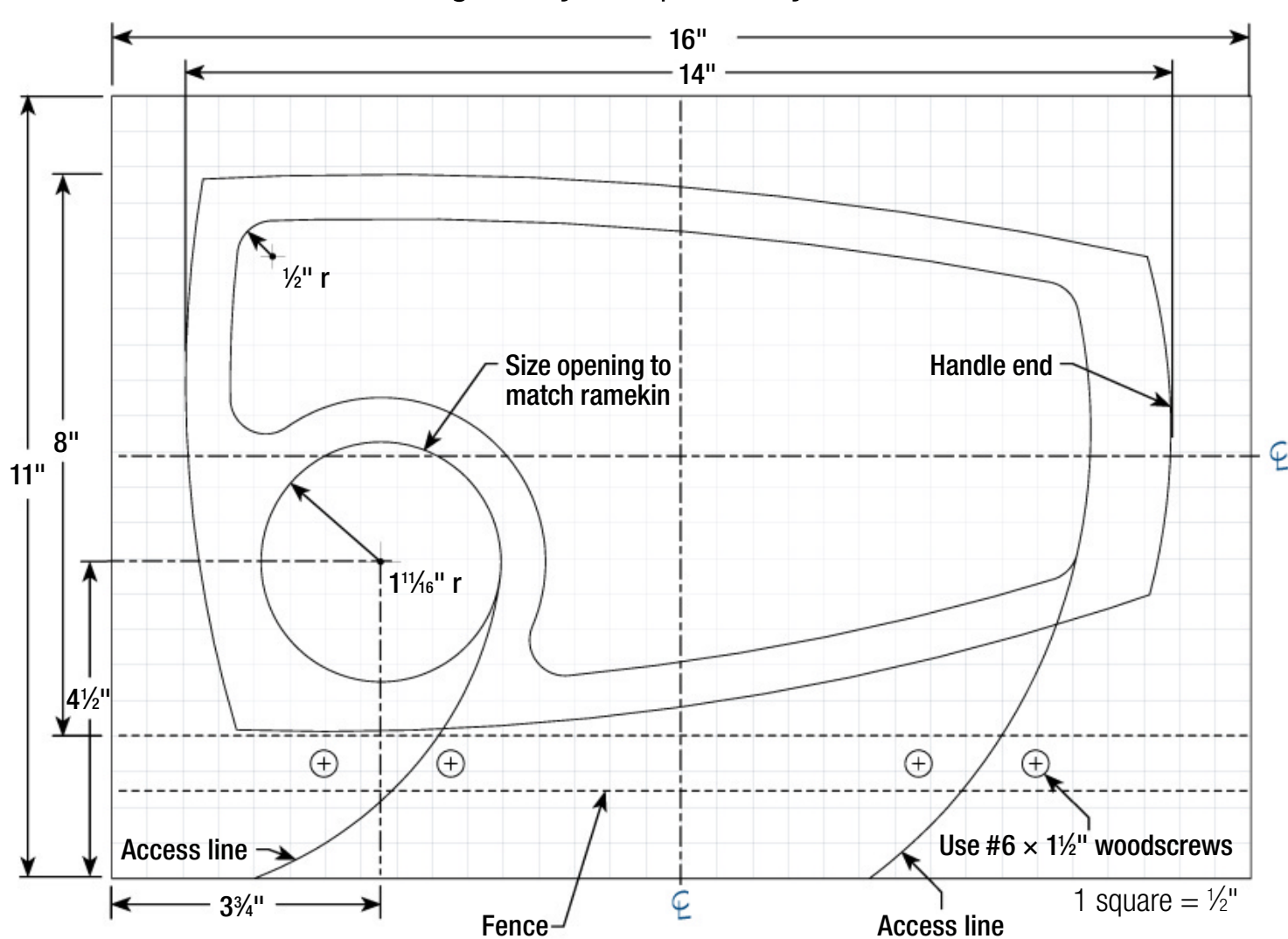
Lay out the templates

Regardless of which tray you make, the steps are the same. Make two templates for each tray from $\frac{1}{2}$ " MDF or plywood. The first or “inner” template gets the cutouts for the recesses in the tray. Keep it rectangular for maximum router support. Cut the second, or “outer” template, to match the outside shape of the tray. Draw centerlines on it to help with alignment.

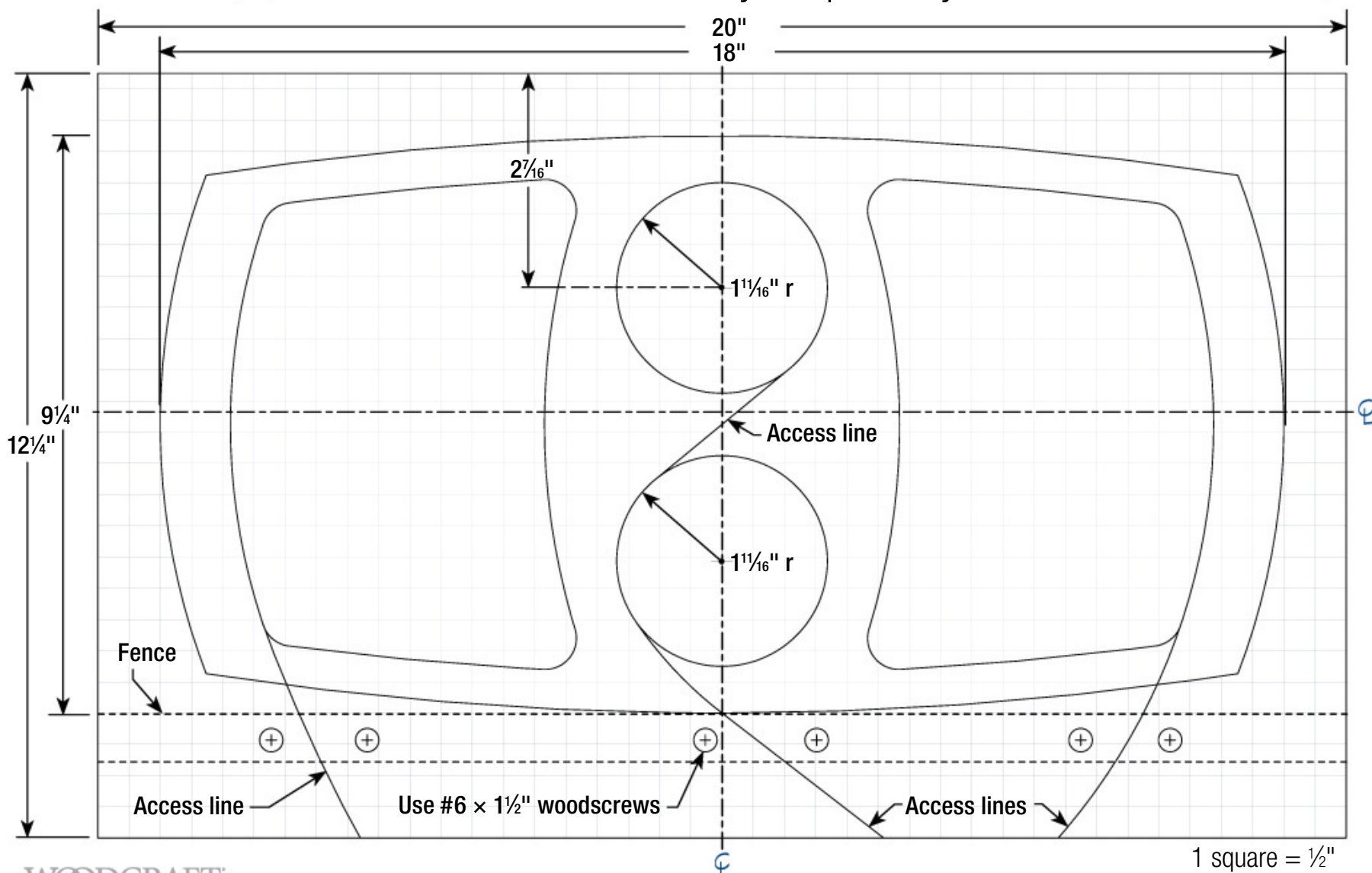
CNC router

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Single Tray Template Layout

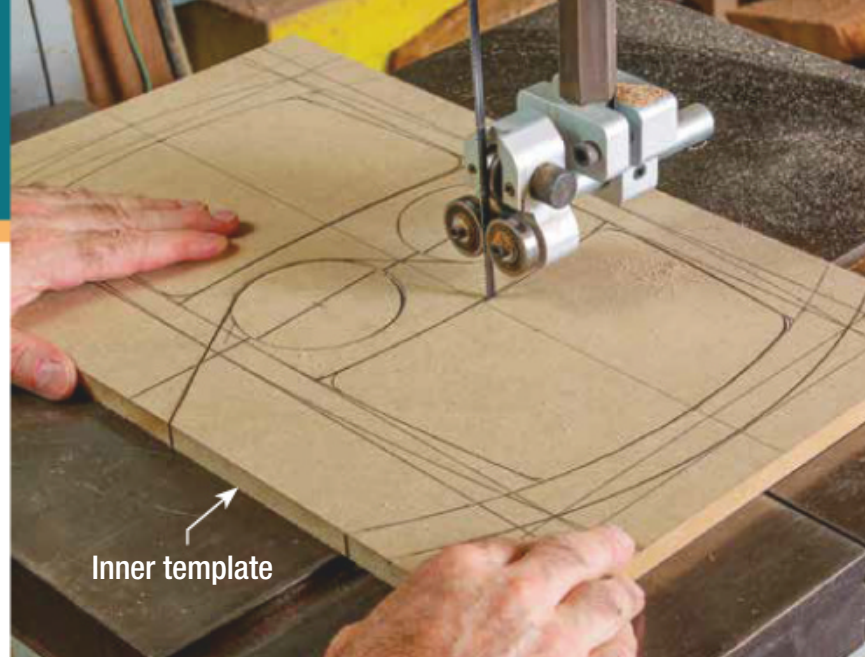


Double Tray Template Layout



Bandsaw the templates

Cut two template blanks to the size specified in the drawing on page 24. Lay out the interior cutouts on one blank, and cut out these shapes at the band saw. Follow the designated access lines through the outer portion of the interior template as shown. Clean up the saw marks at the spindle sander, then, cut the inner rings on the band saw as shown. With a little luck when making the double tray, you'll only need a single set of rings to make both end recesses and another set for the circular cutouts because the openings are identical. In the real world, it may not work out that way. If so, simply make a set of rings for each opening. Attach a fence to the template as shown. To make the outer template, draw center lines on the second blank and lay out the shape before cutting it out at the bandsaw.



Mind if I cut in? With a fresh $\frac{1}{4}$ " blade, I was able to navigate the openings in the inner template in one smooth cut, leaving the inside "scrap" to make into the inner rings. If you have trouble with the tight radii you can always trace the openings and cut replacement "scrap" pieces.



Follow the line. Lay out the first inner ring with a line sketched in about $\frac{5}{8}$ " in from the perimeter. Cut along the line to make the first ring. Then repeat, making a series of concentric rings, until you end up with a gap approximately 1" wide in the center. Don't worry if your cuts wobble—the only ones that matter are the outermost cuts that define the openings.



Add a fence. Screw a length of $\frac{3}{4}$ " $\times$ $1\frac{1}{2}$ " stock to the underside of the inner template to serve as a fence. Position the fence as indicated on the diagram on page 24. Test the rings' fit in the openings. Wrap 3-4 layers of masking tape around each to take up some of the slop from the saw kerfs.

Ring around the recesses

Cut the tray blank to size from $\frac{5}{4}$ or $\frac{6}{4}$ stock and draw two centerlines across the width and length of the top surface. Clamp the blank to the template's fence centering it end-to-end. Equip a plunge router with a $\frac{3}{4}$ "-diameter bowl bit and an auxiliary base plate wide enough to span the opening. Set maximum cutting depth to $\frac{3}{8}$ " less than the thickness of the blank. Beginning with all the rings in place, rout away the recesses starting from the inside and working your way out. This will make a lot of chips. Vacuum out the recess after each pass. Be sure to retract the bit before lifting the router to avoid damage to your template.



Inside outward. Rout the recesses from the center outward. Move the router clockwise around the opening, making each cut in several $\frac{1}{4}$ "-deep passes (often two steps on most router's depth control turret). When you reach full depth, retract the bit completely, remove the innermost ring, and repeat the process.

Shape and profile

Align the template and tray blank, and trace the outside shape as shown. Bandsaw the blank to just outside the line and sand to clean up the saw marks and fair the curves. At the router table, profile the upper outside edges as shown. Then round over the inside edges with a $\frac{1}{4}$ " bit. Along the bottom, shape the long edges (or, in the case of the single tray, all but the handle end) with a $\frac{5}{8}$ " roundover bit. Finally, rout the handles as shown.



Trace the tray shape. Align the centerlines on the outer template with the centerlines on the tray blank and trace around the template.

Start upside down. With the tray inverted, shape the outside ends with a $\frac{1}{2}$ " roundover bit, feeding the piece from right to left. Follow up along the edges.



Finish right-side-up. For the handle ends, switch to a $\frac{3}{4}$ " cove bit. Cut these large coves in several shallow passes.

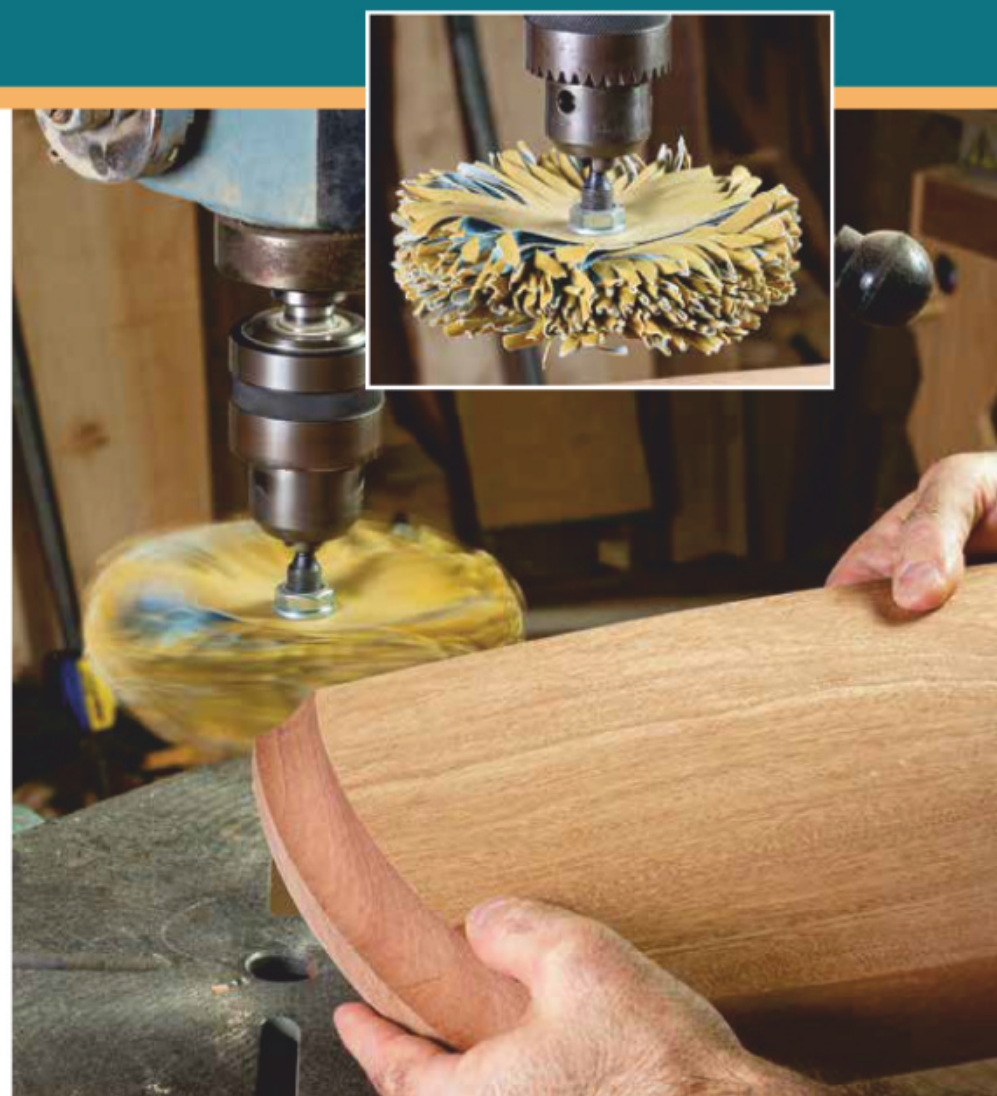


Sanding at the drill press

You can make short work of cleaning up the tray with a couple of drill press-mounted sanding accessories including a foam-backed sanding pad and a sanding mop. The pad makes use of wavy edge abrasive discs, which help keep the edges of the paper from digging in. Once you have everything sanded, apply a finish. I finished these trays with several coats of tung oil.



Time for recess. Make sure you eliminate all the router marks with coarse sandpaper before working your way through the grits. Use a light touch to avoid damaging the foam pad.



Mopping up. While you can sand the flat surfaces conventionally, a sanding mop will do a nice job on the roundovers without altering their shape. ■

Playing the ANGLES

When 90 degrees won't cut it



By Ken Burton

Most woodworking is all about cutting square. But to really up your game in the shop, you have to contend with angles. Picture frames, mitered boxes, chairs, or even something as simple as the wall shelf pictured on page 55 all involve non-90-degree cuts. But how do you determine the necessary angles? How do you lay them out? And how do you set up your machines to cut them accurately? Tools for working angles typically perform one or both of two functions: registering an angle, and identifying it. For example the time-honored T-bevel registers an angle by conforming to its shape. Then a protractor is used to identify the angle in terms of degrees.

Although those two tools used in conjunction may satisfy the majority of your angled-work needs, manufacturers offer a plethora of options. As I'll show you on these pages, some efficiently register and identify an angle in one operation. Some are better for large layouts. Some take innovative, high-tech approaches to faster, more accurate machine setups. Read on to discover the best ways to complement your particular type of work.

T-bevel and protractor, hand in hand

The T-bevel, also called a sliding T-bevel or even a bevel square, is the time-tested first choice for gauging and transferring angles. This tool consists of a thick handle that locks around a thinner blade. Available in lengths from 4" to 14", an 8" to 10" model is ideal for most furniture work. To get the most from a T-bevel, pair it with a protractor to determine an angle's measure. In practice, a protractor with a bigger scale means more accuracy and easier visibility—something to factor into your purchasing decision.

Fast Miters

To quickly set your T-bevel to 45°, register it against a precise combination square such as one made by Starrett.



Up and over. T-bevels excel at laying out dovetails. Dovetail angles are frequently expressed as a ratio such as 1:6, which means six inches *up* for every inch *over*. Here, I'm using a 9" ebony and brass-handled T-bevel from I-Gaging, featuring a knurled brass knob to lock the blade.

Down to a degree. Angles are frequently specified in degrees. If you know the degree, you can set your T-bevel using a protractor. This bevel gauge/protractor from I-Gaging (left) features angles from 0° to 50° with divisions every ¼°. The all-metal 10" Shinwa T-bevel secures the blade with a wire bale lock at the end of the handle. T-bevels with an end lock tend to hold their setting tenaciously.



Angles galore. At 0°-60°, Veritas bevel setter has a wider range than the I-Gaging model, although it's smaller and only divides each degree in half. Its reverse side is etched with some of the more commonly used woodworking angles. The vintage Stanley T-bevel locks the blade securely with a knurled knob at the end of its handle.

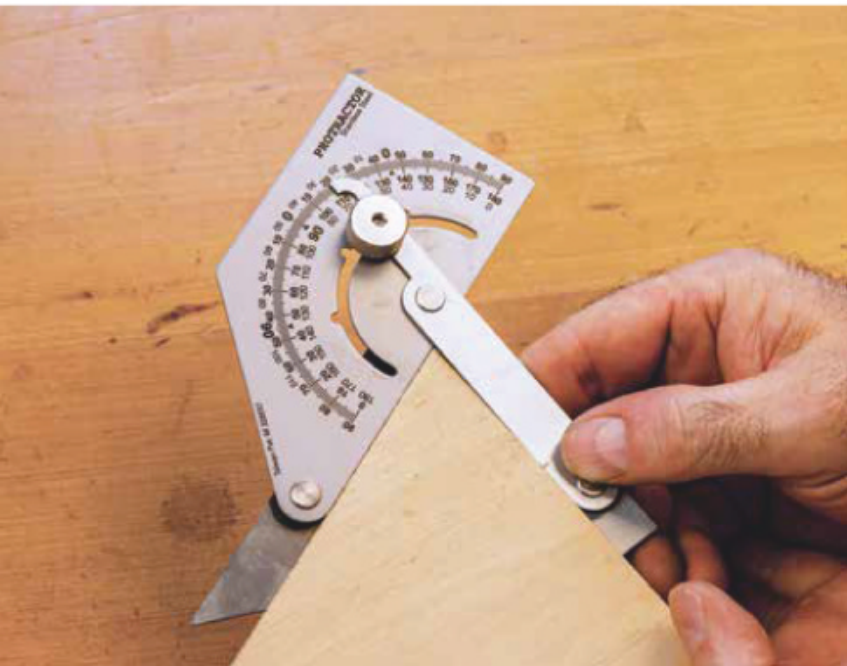


Back to math class.

The two protractors shown here might remind you of math class. The General model lying on the bench has easy-to-read markings from 0°-180°, but the small head makes precise settings tricky. The two-sided Sawset model features a cutaway section for your T-bevel. One side is calibrated for the actual angular measure while the obverse side (inset) notes the bisected angle as reference for setting your saw to cut a miter joint.

Beyond the T

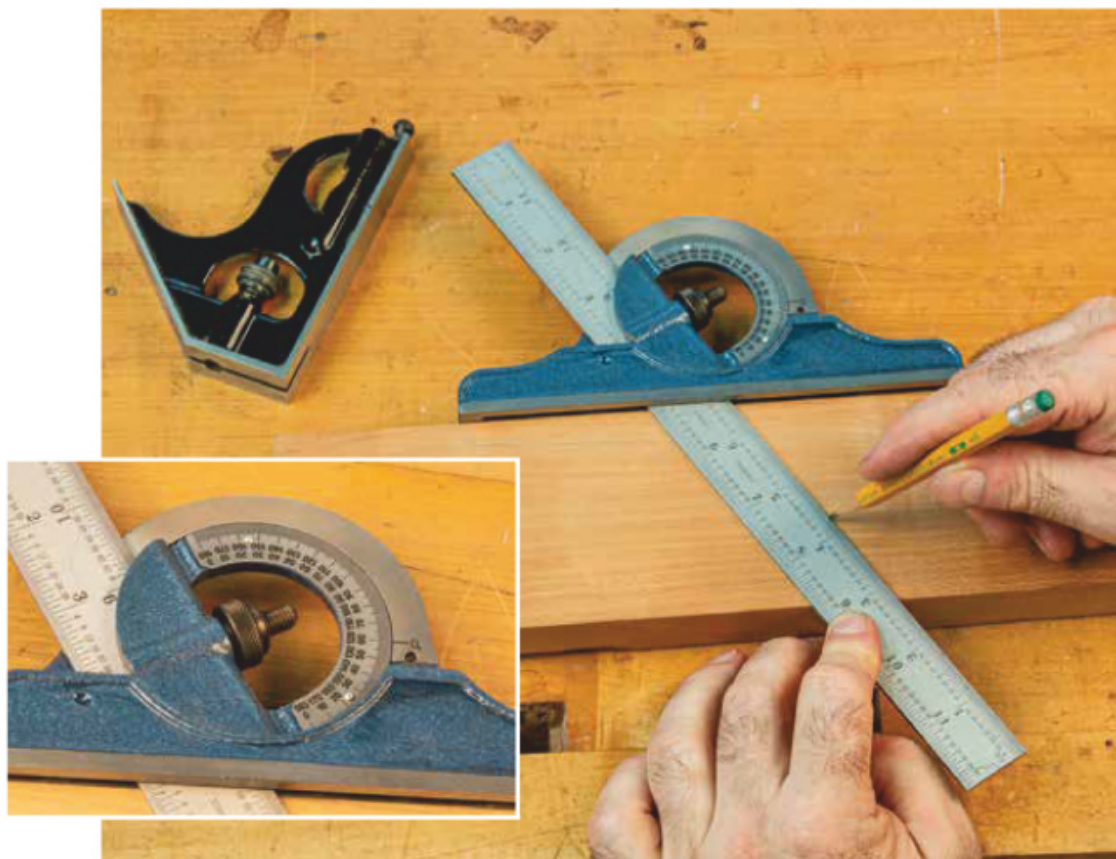
While you can't go wrong with adding a T-bevel (or two) and a protractor to your tool arsenal, alternatives abound. The tools shown here work similarly, but have their own unique features and solve some different problems.



Hybrid angle gauging. Branded as just a protractor, this angle gauge from E-Base is more like a protractor/T-bevel crossbreed. Set its two blades along the edges of the piece in question and get the analog angle in one shot.



All in one. For the minimalist woodworker, this handy multi-tool from Lee Valley might be all you need in your apron pocket. In addition to serving as an excellent T-bevel, it also functions as a square, marking gauge, depth gauge, compass, divider, and 12" rule. You'll still need a protractor for measuring and setting specific angles.



Combo square add-on. Available as part of a set, or as an added accessory, a protractor head that slides on the blade of your 12" combination square adds more functionality to that tool. This cast iron head from PEC Tools fits perfectly on a Starrett rule. The protractor is graduated from 0°-180° and from 180°-0°, though the etched numbers can be hard to read. Use as shown, or slide your T-bevel through the protractor's slot to transfer the setting.



Digital angles. This plastic/metal digital T-bevel from General features a small but readable LCD screen that indicates angles to the 20th of a degree, eliminating the need for a protractor. It is sensitive enough that setting specific angles takes a steady hand.

Bigger tools for bigger work

While an 8"-10" T-bevel will suffice for most furniture work, when it comes to laying out angles on plywood and other sheet goods, it helps to have longer tools. Some of the tools that follow are bigger cousins of those previously discussed (p. 27-29), while others are unique to the tasks involved.



Long and low-tech. This protractor from E-Base incorporates long aluminum blades that lock securely at your chosen angle. Used here in conjunction with a Starrett combo-square, it makes accurate work of laying out angles on a panel.



Carpentry crossover. Sold as a T-square for drywallers, this large, aluminum layout tool from Kapro has several key features that make it useful for plywood layout. Its sliding head has detents that lock it in place at 90°. But by loosening the knob you can readily pivot the head to any desired angle. It also has a built-in protractor with a few common angles such as 30°, 45°, and 60°. The head also folds parallel to the blade for compact storage.



Long and high-tech. The 14" long, stainless steel blades on this digital protractor from I-Gaging suit it to large-scale layouts. However, despite the nicely-machined, knurled knob, this tool doesn't lock securely. But careful use in conjunction with a long straightedge will yield accurate layout across wide sheets.

Is it 90° or is it 0°?

One confusing aspect of setting up tools for angled cuts involves the gauge on the machine itself. Most table saws and miter saws—and many miter gauges—include a scale that begins at 0°, indicating the machine is set to make a 90° (or square) cut. Then as you tilt the blade (on a table saw) or pivot it (on a miter saw) the pointer will register somewhere between 0° and 45°. The I-Gaging and Veritas protractors correspond with this system, but other protractors (and many woodworking plans) refer to a square cut as 90° rather than 0°.

To compensate for this discrepancy, recall a lesson from geometry class on complementary angles (No, you won't have to do a proof!). Complementary angles are two angles that, together, equal 90°. So if your plans call for a 70° cut, you'll use 20° on your machine's scale ($70^\circ + 20^\circ = 90^\circ$). Also, understand that the angle scale on the front of most table saws only gets you in the ballpark. For precise bevel setting, you'll need a T-bevel and protractor, a digital angle gauge, a set-up block, or even a drafting triangle.



Complementary angles. A table saw with its blade tilted to 20° will cut a 70° bevel.

Machine set-up

Knowing how to measure and lay out angles is only half the battle. You also need to transfer those angles to your machinery for accurate work. Some of the tools featured in this article excel at both layout and machine set up. But a couple of dedicated tools make set-ups quick and painless.



Raise and conquer. To tilt the blade on your table saw to a specific angle, raise the blade to its full height. Then set your T-bevel to the desired angle, and tilt the saw blade until it parallels the T-bevel blade. Be sure the tool handle is flat on the table and aligned with the saw's arbor, and that its blade extends between the saw blade's teeth. Lock the saw's tilt control, and lower the blade to a safe height for the operation.



Making miters. To adjust a miter gauge, hold the set T-bevel against the fence and pivot the fence until the bevel's blade is parallel to the saw blade. Keep the T-bevel's handle flat on the saw table and extend its blade between the saw blade's teeth. Use the same process for setting up angled cuts at the miter saw.



Magnets and technology. Possibly the fastest and easiest way to set blade tilt is with this digital angle gauge from Wixey. Simply stand the magnetic gauge flat on the saw table and press a button to zero it out. Then affix the gauge to the blade, and crank over the blade to your desired angle. Alternatively, for a 45° setting you can use a dedicated setup block (inset) or a drafting triangle.



Tilt the table. On a band saw, you can use a digital angle gauge to set the table's tilt. Square the table to the blade before zeroing the gauge on the table. Then tilt the table as desired. ■

Limbert-style BOOK RACK

A diminutive showcase for treasured volumes

By Willie Sandry

I love Arts and Crafts style furniture. I also like angles in furniture, as they often add visual appeal to a design. This book rack provided a great way to marry those two interests. The trapezoidal openings in the sides are inspired by the work of Charles P. Limbert, a renowned Arts and Crafts furniture designer working in the early 1900s. However, the overall design, with its tapered sides and angled shelves, also incorporates design elements drawn from other well-known Arts and Crafts designers such as Gustav Stickley and Elbert Hubbard.

This white oak unit incorporates mortise-and-tenon joinery throughout. The rails and angled shelves join the sides with a simple form of the joint. However, I joined the bottom to the sides with tusk tenons. This variation of through-tenon joinery incorporates wedges that insert into mortises in the projecting tenons to draw the parts together. Normally used for knock-down furniture, the tusk tenons here are strictly for style. The rails below the bottom shelf provide added support and visual weight. The two angled shelves orient book spines upward for better display in this diminutive rack.

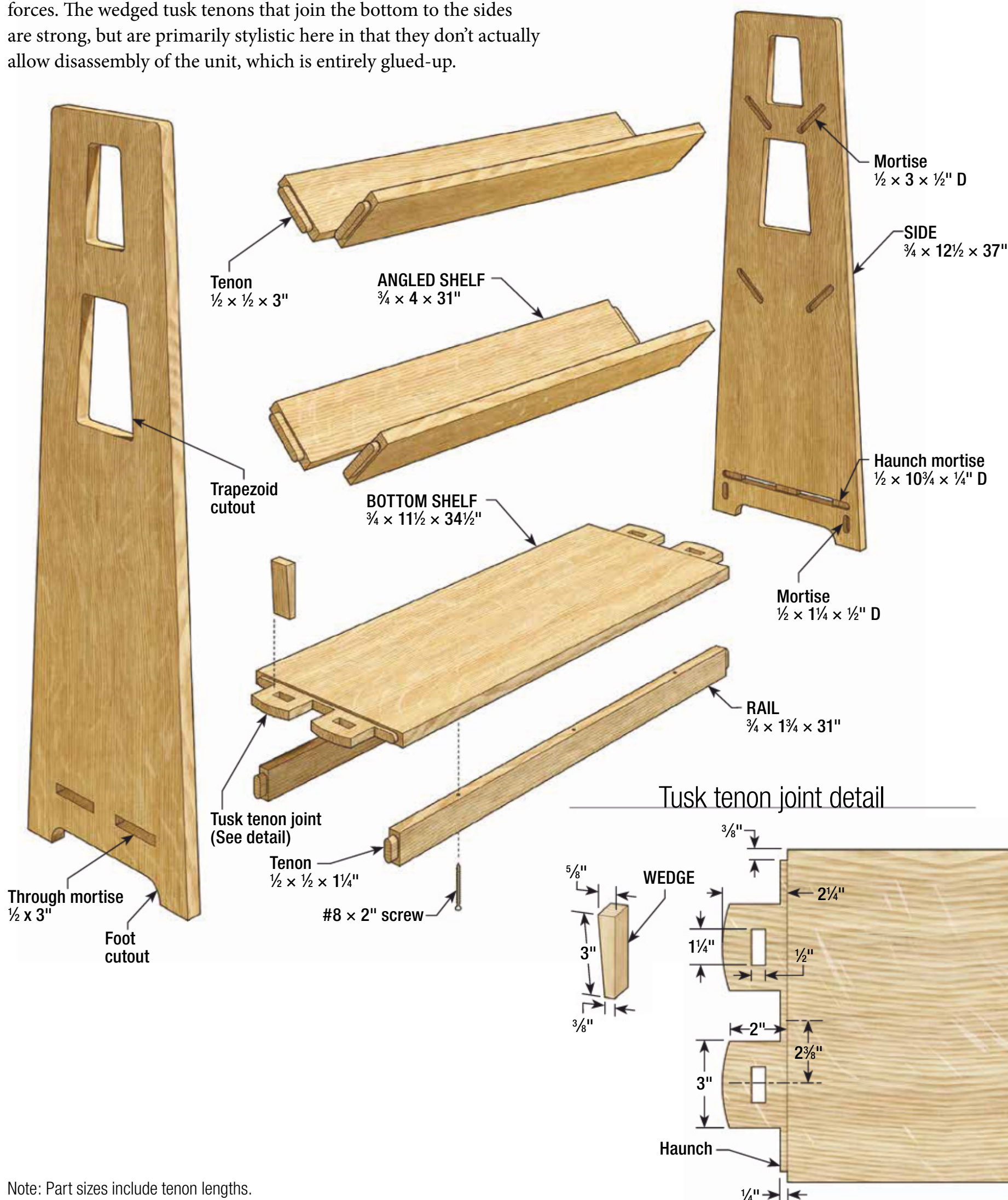
One of the keys to building this rack successfully is to template-rout (or pattern-rout) the sides. Using templates makes efficient work of both shaping the sides and routing the mortises. It also ensures perfect symmetry from side to side.

When you're done, you'll have a classic book rack just begging to display treasured volumes that invite you to pick them up for a leisurely read.



Mortise and tenon lock-down

This book case is rock-solid due to its extensive mortise-and-tenon joinery and angled shelves, which help protect against racking forces. The wedged tusk tenons that join the bottom to the sides are strong, but are primarily stylistic here in that they don't actually allow disassembly of the unit, which is entirely glued-up.



Note: Part sizes include tenon lengths.

"Parent template" gives birth to master template

Referring to the drawings, lay out the parent and master templates. I used $\frac{1}{4}$ " MDF for the parent, and $\frac{1}{2}$ " MDF for the master. Install a $\frac{3}{4}$ "-diameter straight bit in a table router and set up the router table fence and stops to rout all four slots in the parent template. Then clamp it to the bottom end of the master template and use it as a guide for routing the four bottom-most slots. Cobble together a plywood A-frame guide for routing out the trapezoid openings. For the foot cutout, simply saw and sand to your layout lines. Mark one face of the template "left" and the other "right."



Order of Work

- Make templates
- Rout mortises and cutouts
- Saw tenons
- Saw tapers and assemble
- Apply finish

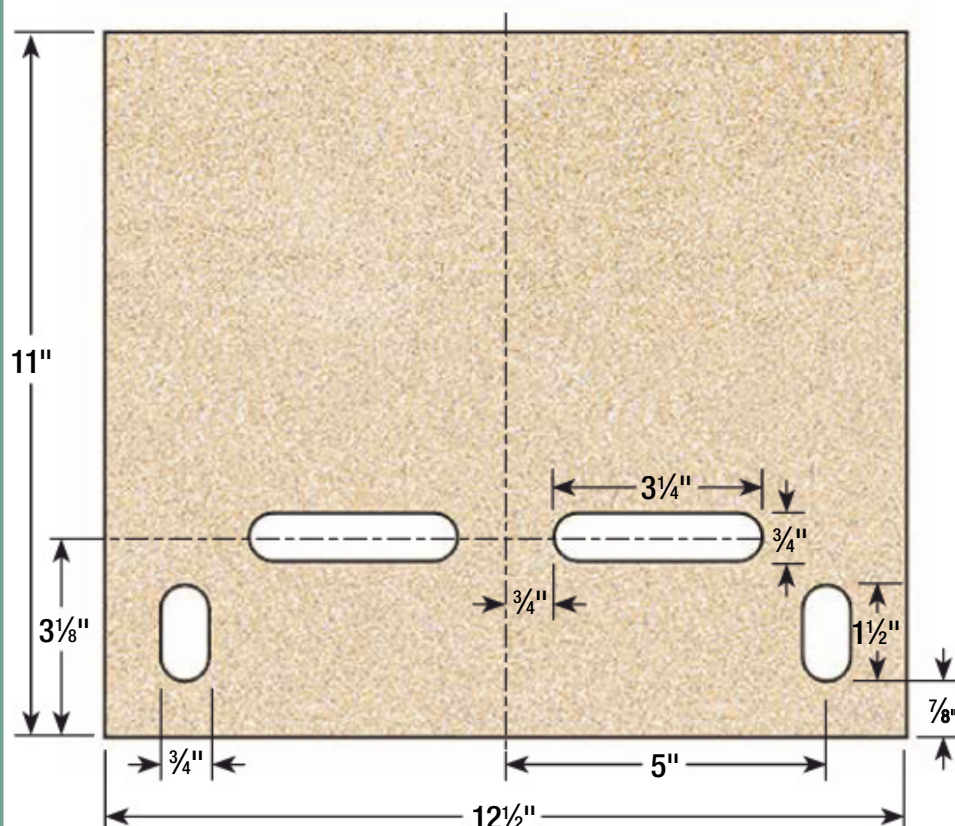


onlineEXTRA

- Full-size parent template pattern

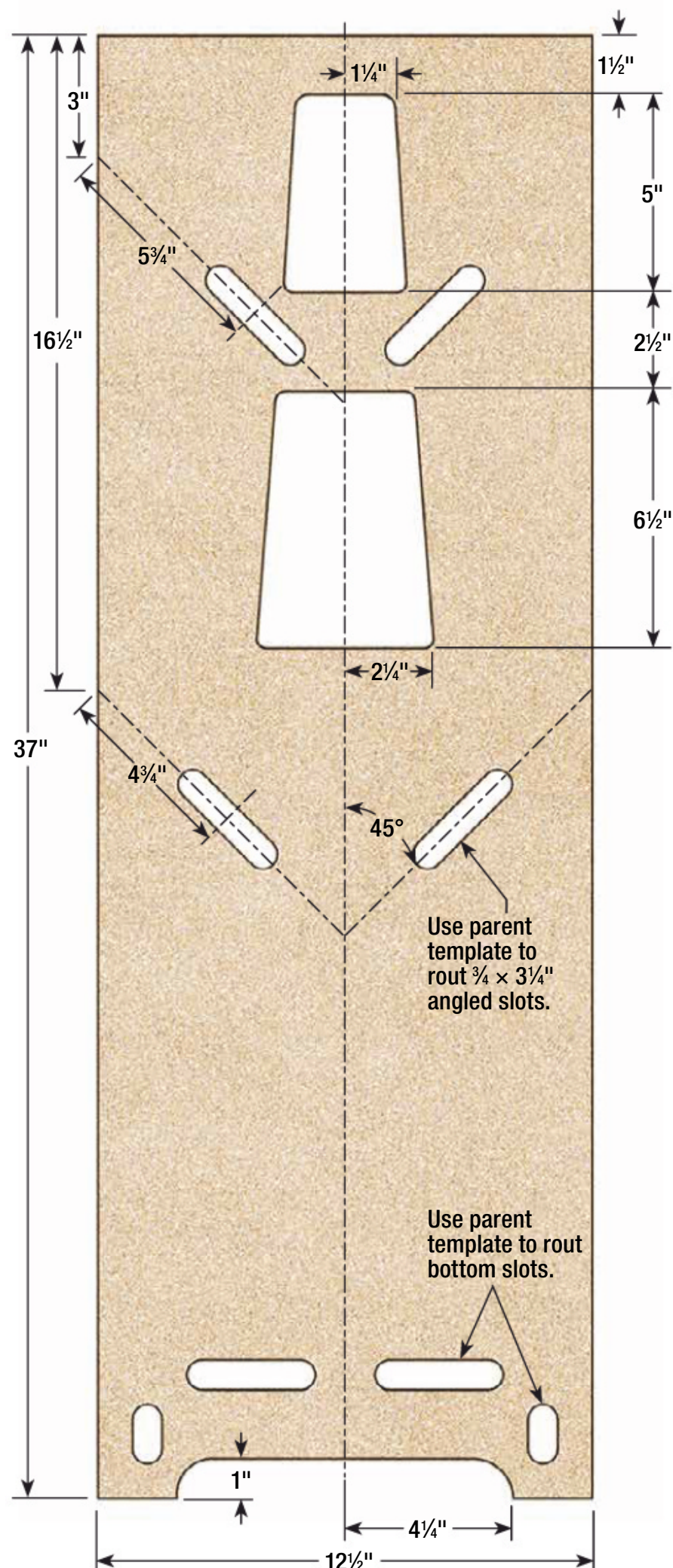
Parent template layout

Make the "parent" template on a router table. Then use this template in conjunction with a hand-held router to make the "master" template.



Master template layout

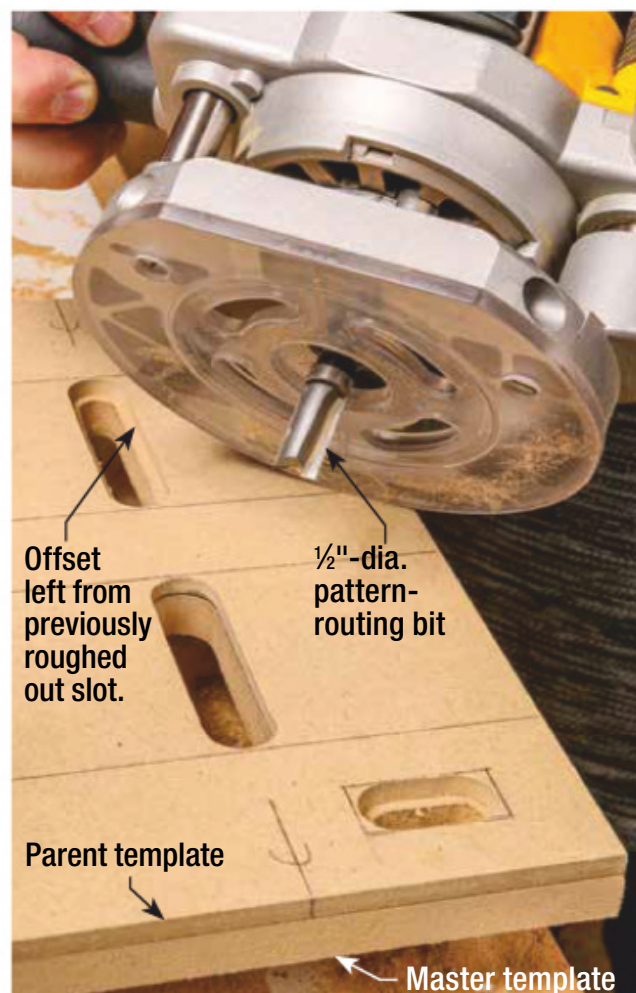
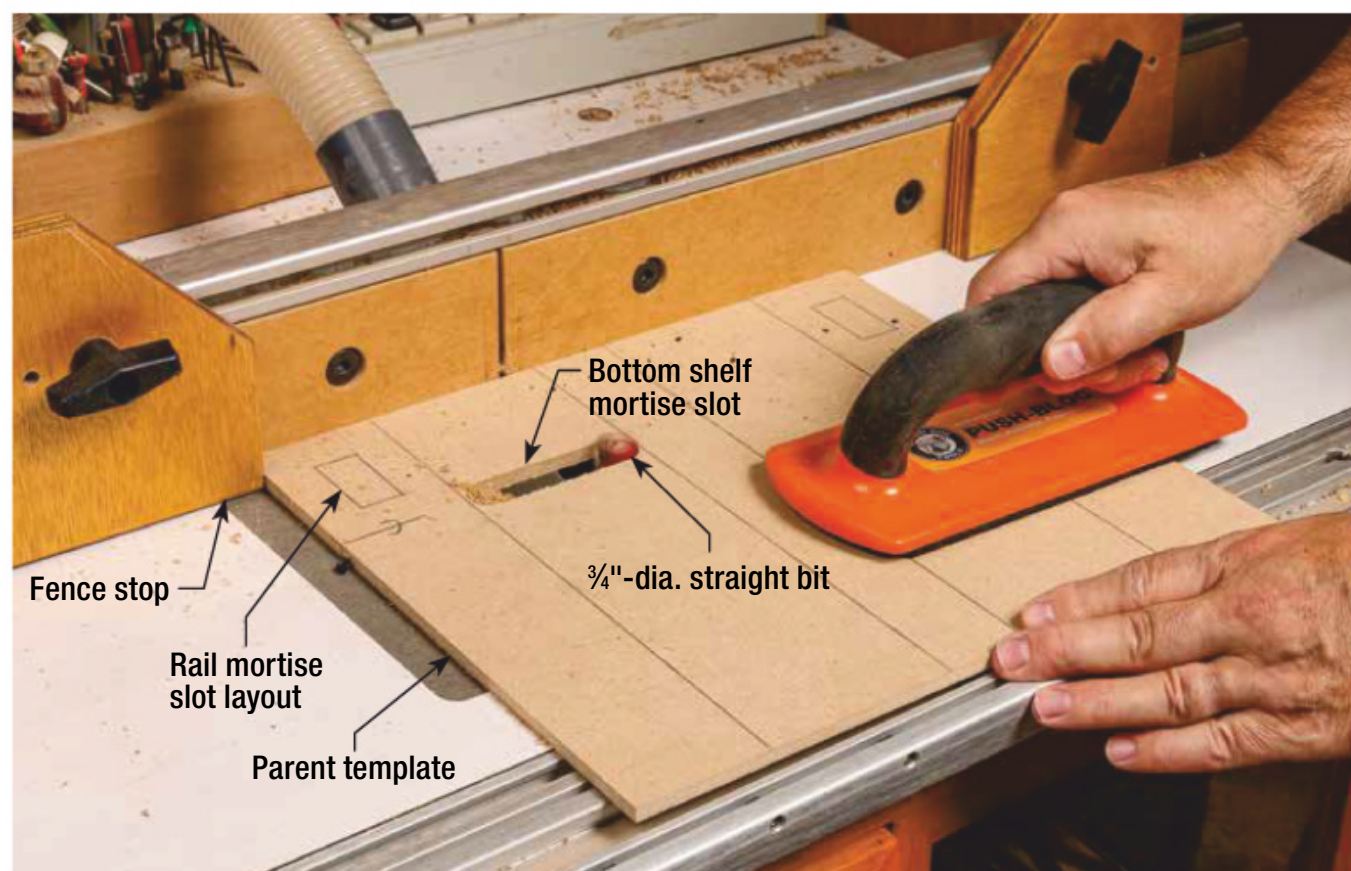
Use the master template to make the book rack sides. Lay out the angled slots and the trapezoid and foot cutouts, and then use the parent template to rout all eight slots.



Slot the parent template.

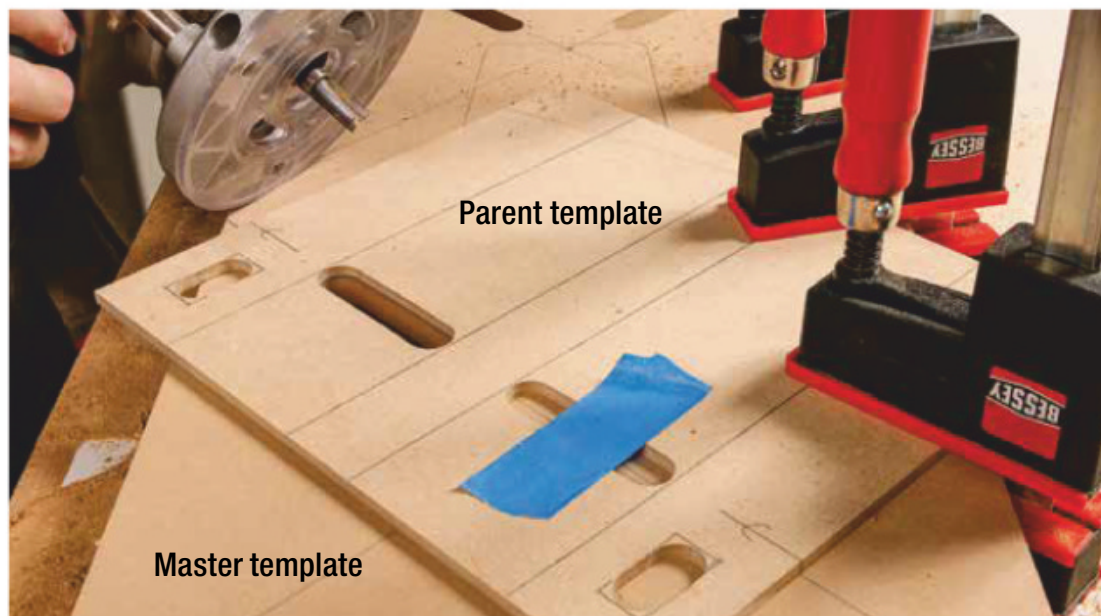
Set up your router table fence and stops to rout the first of the bottom shelf mortise slots. To make a plunge cut with a straight bit like this, carefully scrub the board side-to-side while lowering it onto the spinning bit. Next, flip the board end-over-end, and repeat to make the second shelf mortise slot.

Then reset the fence and stops, and rout the rail mortise slots in the same manner.



Start slotting the master template.

With the parent template clamped to the master template, rout all four of the slots. Outfit your router with a 1/2" O.D. bushing and a 1/4" upcut spiral bit to rough out the openings. Then follow up with a 1/2"-dia. pattern routing bit to remove the cut offset.



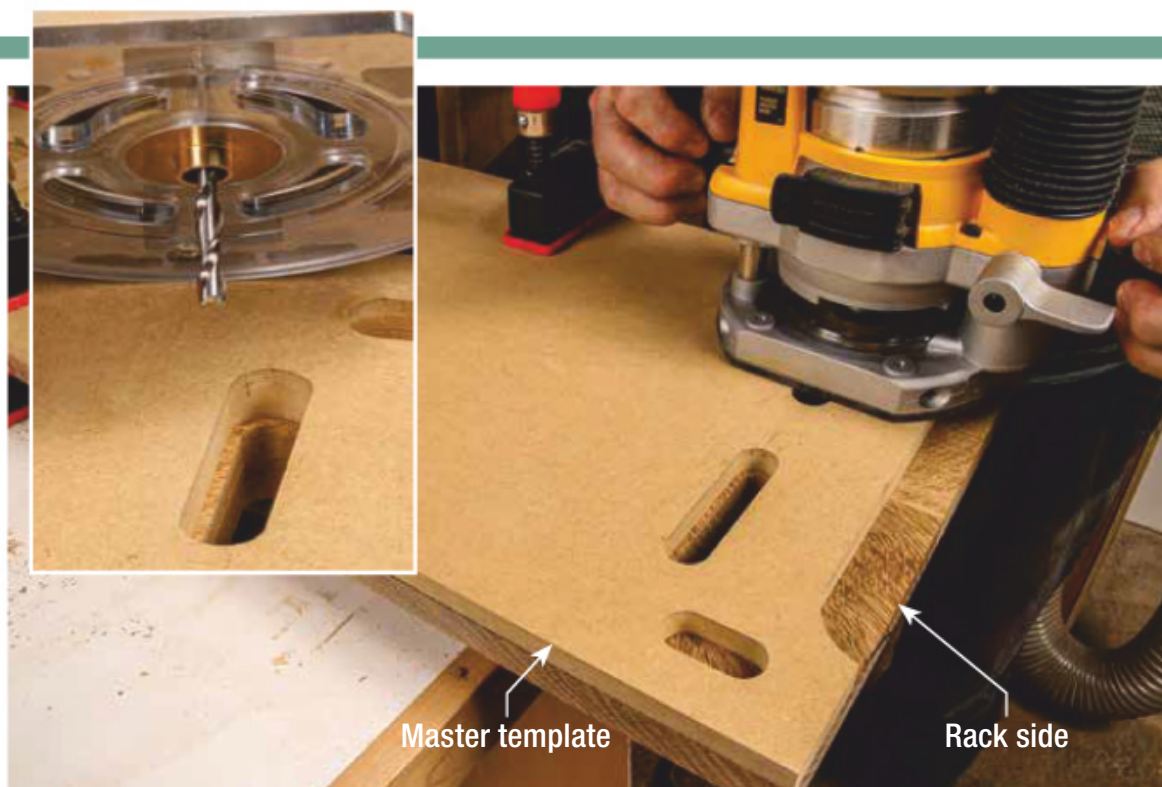
Rout the angled slots. Position the parent template for cutting each angled slot in the master template in turn. As before, rough out each slot using a bushing and spiral bit first, then trim it to final size with a pattern routing bit.



Cut the trapezoid openings. Use plywood strips and pocket screws to create a guide for cutting the trapezoid openings on the master template. Then rout them out, roughing and trimming in the same manner.

Mortise and cut out the sides

Make up finished-size panels for the two sides and the bottom shelf. Also cut the four angled shelves and two rails to their finished sizes, and mark all the parts for their final orientation in the project. Outfit your plunge router with a $\frac{1}{2}$ " O.D. bushing and $\frac{1}{4}$ "-diameter upcut spiral bit, and clamp the master template to a rack side. Rout all the mortises and cut-outs in that side. Switch to a 1"-long pattern routing bit, and trim away the offsets in the trapezoidal and foot cutouts. For perfectly mirrored sides, make sure to orient the left face of the template against the inside of the left-hand rack side. Vise-versa for the right side. Next, remove the master template, clamp a straightedge adjacent to the through mortises, mark out the ends of the haunch mortise, and rout it as shown. Finally, chisel the ends of the through mortises square.



Rout the side mortises. With the master template clamped to the rack side, rout the mortises using a guide bushing and upcut spiral bit. After cutting the through-mortises as shown here, readjust the cutting depth to rout all the $\frac{1}{2}$ "-deep mortises.



Rough-cut the cut-outs. With the router still outfitted with a spiral bit and guide bushing, rough out the trapezoid and foot cut-outs on the rack side.



Flush-cut the cut-outs. Trim away the offsets on the trapezoid and foot cut-outs using a $\frac{1}{2}$ "-diameter, 1"-long pattern routing bit.



Rout the haunch mortise. Align a straight-edged board with the through-mortise walls and use a $\frac{1}{2}$ "-diameter $\times$ $\frac{1}{2}$ "-long pattern bit to rout the haunch mortise on each rack side.

Saw the tenons

Saw the tenons on the shelves and rails using a dado head as shown. Sneak up on the thickness, testing the fit by tucking the corners of each tenon in its mortises, and finessing the thickness with a shoulder plane if necessary. Make sure that the shoulder-to-shoulder length on all the pieces matches exactly. Precisely mark out the tenon widths and the haunch, and then make the cuts as shown. Also bandsaw and sand the wedges to the dimensions shown in the drawing. Dry-assemble the rack and mark each tusk tenon where it projects from the side. Then disassemble the unit, radius the tusk tenon ends, and lay out and cut the wedge mortises.



Saw the tenons to thickness. Start cutting the tusk tenons by guiding the bottom shelf past the dado blade with the miter gauge. Make multiple passes, and use the rip fence as a stop. Note that the sacrificial fence here was used when cutting the ½"-long tenons on the rails and angled shelves.



Saw the tusk tenons to width. After laying out the four individual tusk tenons, stand the bottom shelf on end against a tall miter gauge fence. Raise your dado head to the haunch line, and then make the cuts with the workpiece clamped to the fence, realigning and reclamping as you go.



Cut the wedge mortises. Drill and chop out the wedge mortises, working from both sides to prevent exit blowout. Cut slightly beyond your innermost layout lines to allow the wedge to draw the parts together tightly. Taper the outer wall of each mortise as shown to match the angle of its wedge.

Taper and assemble

With the joinery complete, taper the sides from full width at the bottom to 8½" at the top. I did this using a table saw tapering jig, but you could use a simple guide board instead. (See page 22.) Rout a ⅛" radius on all shelf edges, the bottom of the rails, and both faces of the sides. Drill counterbored clearance holes in the rails. Smooth the parts through 220 grit, scrutinizing surfaces under raking light for any remaining dings or mill marks. Then do a final dry-clamping to ensure the joints fit well and the rails pull tight to the bottom shelf. Assemble the unit as shown, gluing all the mortise-and-tenon joints, including the tusk tenons. Lastly, install the wedges, spot-gluing them in place, and fasten the rails as shown.



Taper the sides. My sled for tapering large panels is guided by a single runner that rides in a table slot. A hold-down screwed to a block at the foot and one in a workpiece opening secures the panel to the jig.

Fit the wedges. Belt-sand each tusk tenon wedge until it slips halfway into its mortise. (A combination square serves as a good height gauge.) Don't glue the wedges yet.



First glue-up one side... With one of the rack sides lying on padded risers on the bench, apply glue to the joints and insert the shelves and rails. Cover only the innermost ¾" of the tusk tenons with glue.



...then the other. After brushing glue onto the remaining joints, carefully place the opposite side atop the assembly and tap the parts together.



Pull it all together. Clamp the sides to the shelves and rails to draw all the joints tight. Also spot-glue the tusk tenon wedges into their mortises, and pull the rails up against the bottom shelf.



Screw through the rail. After the glue dries, remove the bar clamps and lay the unit down. Drill pilot holes into the bottom shelf, and reinforce the rail/shelf connection with screws.

Finishing up

Apply your desired finish. I used Golden Brown, water-based Transtint dye, pre-raising the grain with water and scuff sanding the dried surfaces before applying the dye. I followed the dye by spraying on a coat of Zinsser Shellac Seal Coat, which I also scuff sanded when dry. Then I applied a coat of General Finishes Antique Walnut Glaze, wiping it back until I reached the desired color. Finally I sprayed the whole thing with two coats of satin sheen lacquer. This multi-layered coloring process yields a rich look that lets the golden brown dye shimmer through.



Applying the glaze. After one final inspection of the surfaces and removing any residual glue squeezeout, I apply a coat of dye, which I top with shellac, glaze (shown), and then lacquer. ■

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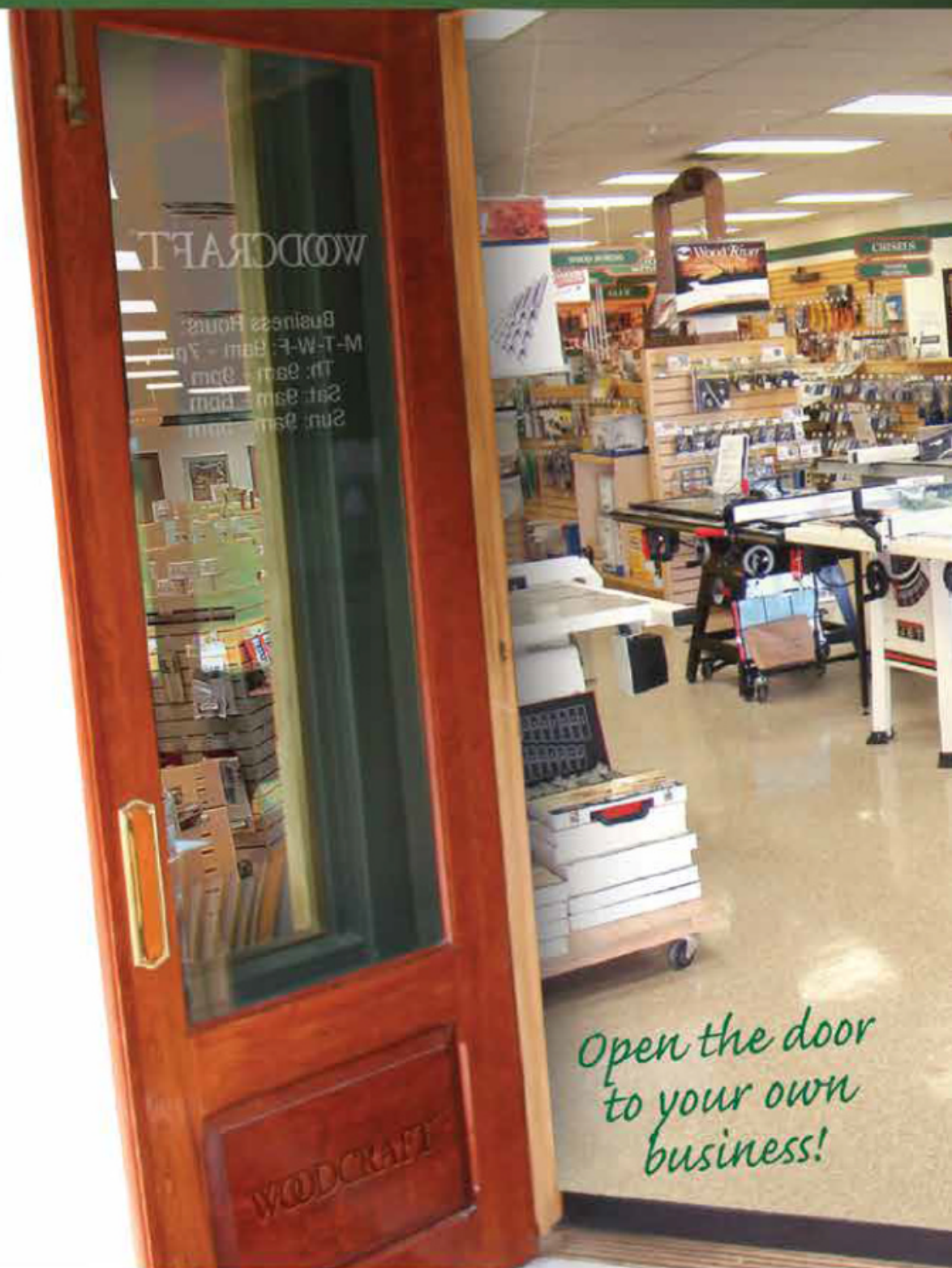
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FIRE-SANDING and *Coloring*

Try a little woodshop alchemy

By Michael Kehs

I've always had reservations about using exotic woods. While the colors and figure can be spectacular, the prices make it hard to experiment, or play. But what if I told you that you can achieve some of those amazing colors on local, more humble species such as poplar, ash, and oak to name a few? Before you accuse me of sorcery, read this story and give this technique a try. It is so easy that even the most timid beginner can produce stunning color in minutes. And what little black magic there is comes from a jar.

The secret lies in a multi-step preparation process followed by the application of a special product called Accent Paste. The prep involves sanding, burning, brushing, and sealing. The Accent Paste—available in a number of colors—is a soft, wax-based product that you apply with your finger to the prepared wood. The simple bowls I'm demonstrating on here will show you the basics, but the possibilities are endless in terms of colors, shapes, and surfaces. Experiment and be sure to let us know what you come up with.



Burn baby, burn

Turn your piece to shape, and sand it well to remove any tearout and to refine the surfaces. After carefully smoothing through 600 grit, inspect the surfaces before burning, as dings and cross-grain scratches will really stand out when you eventually apply the color. Then clean up your lathe area to prepare for using the torch. I use both a MAPP (or propane) gas torch as well as a smaller butane torch. Both are available at any hardware store or home center in the plumbing section. The idea behind charring the surface is to burn away some of the softer areas, increasing the texture. I suggest you practice first on scrap so you don't inadvertently reduce your carefully turned bowl to a cinder. Note that torching laminated pieces can compromise the glue joints, so I recommend sticking with solid stock.



Inside out. Start with the inside recess and work your way outward. Quickly “paint” the surface with the flame, trying to achieve a consistent overall scorch. Keep the torch moving and try not to let the wood actually start to flare up. Be particularly careful at the edges as they will check if they get too hot.



SAFETY ALERT



Warning, using a torch in a woodshop is dangerous. Thoroughly clean up all dust and shavings before you fire up.



More control. This smaller butane torch doesn't burn as hot as MAPP gas and the pressure is lower, so you may find it works better for smaller pieces.



Texture to the forefront. A consistently burned surface creates pronounced grain texture even in mild-grained species such as poplar (left). In a coarser-grained wood such as ash (right) the texture is even more striking. Note that both of these bowls were dead smooth before torching.

Give it the brush off

Once you achieve an even char over the surface(s) of your piece, the next step is to give it a thorough brushing to cut back on the blackening and increase the texture even further. You may need to experiment a bit to find the appropriate brush. On softer woods, I find a brush with stiff plastic bristles works well. With harder woods, a brass-bristle brush often does the trick. Be careful not to add cross-grain scratches or to mar the surface by bumping it with the brush's handle.

Go with the grain. With the piece still on the lathe, brush *with* the grain to prepare the surface for the dye. You'll notice a lot of the shiny black goes away, leaving a more matte, browner surface.



Follow the contour. Keep following the grain as you brush the inside of the bowl, this may require a kind of twisting stroke.

Good, clean fun. The brushed surfaces should have an even sheen to them. On softer woods such as bigleaf maple burl, I use the plastic brushes shown.



Polishing your act

Brushing will leave the surfaces highly textured, but also a bit rough. Now it's back to sandpaper to tame the roughness. You don't want to abrade away all the work you just did with the torch and brush, you just want to polish the high spots and ease the jagged spots. Thoroughly blow

off the dust when you're finished, and rub on a thin coat of a fast-drying finish such as Doctor's Woodshop Pens Plus, or Myland's High Build Friction Polish to seal the wood and get it ready for the color. (For product sources, see page 62.)



Polish away. With the lathe running, use 1000-grit abrasive paper to give the surface a final polish. After a few seconds, you'll start to see some highlights on the raised surfaces (right).



The blow off. After sanding, blow off the surface thoroughly to clean the dust out of the pores. You'll see the surface transform from a frosted white to a clean brown.



Seal the surface.

Dab the friction polish onto the surface with the lathe stopped (inset). Because the back of the bowl isn't necessarily ready for finish, you don't want to risk contaminating it as you might were the lathe spinning. Once the surface is coated, run the lathe to buff the finish and force it into the surface.

The glory work

After all that prep work, it is time to add the color. The accent pastes I use come in small plastic jars. When you're shopping, be sure to get *gilding* paste, rather than *patina* paste, as the latter doesn't seem to work as well. With the lathe off, use your finger to apply the

paste, vigorously rubbing it into the pores. Then turn the machine on to burnish the surface and increase contrast. Burnishing will help force the paste into the grain, while also removing it from the high spots. The resulting surface won't need a further finish.



Rub it in. I find it works best to rub in the paste with my finger. This way I can really work it well into the pores. It wipes and washes off readily afterward so I don't look like a smurf the rest of the day. Power-buff to polish and set the color.



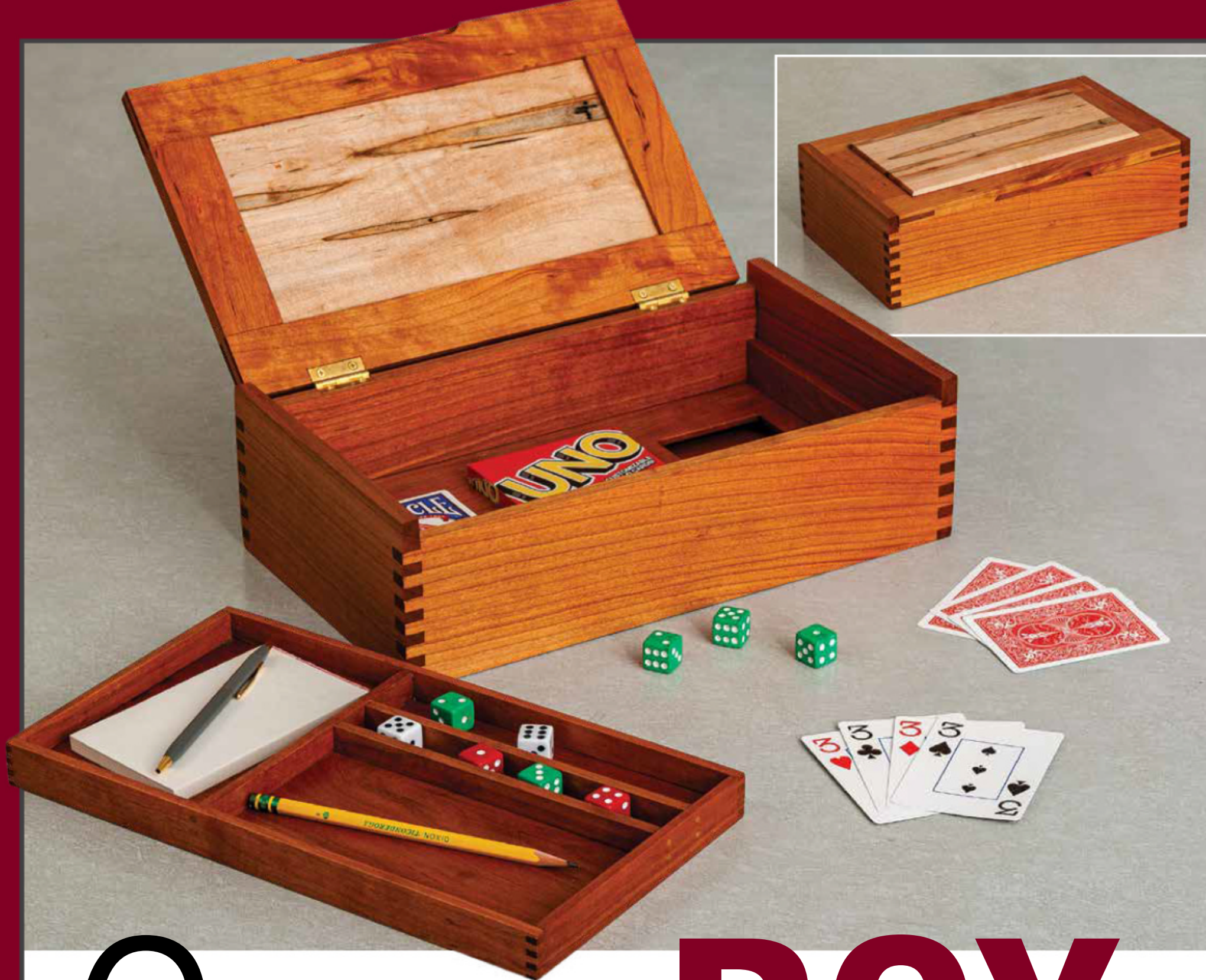
Add the second color. Rub in the next color, being careful at the edges to keep the colors separate. Fortunately, you can readily remove the paste from previously buffed areas as long as you haven't pushed it hard into the surface.



Buff, buff, buff. With the lathe spinning at about 1800 RPM, buff the surface with a rag or paper towel. This is where you'll be creating that beautiful mottled surface effect and remove any excess paste.



Endless possibilities. The results can be truly spectacular—you can transform the humblest of woods into some real jewels. ■



Game BOX

Craft a custom container for your favorite decks of cards

By Chad McClung

My family and I play a lot of games together. We enjoy all manner of board games new and old—and no shortage of card games. So I thought I'd store a few of our favorites in this fun box designed by senior editor Ken Burton. The project is a joy to make and it looks better on the shelf than messy stacks of cards. The box has two bot-

toms, the upper of which is custom-cut to hold your favorite decks. In this version, I made room for a couple of decks of regular playing cards for our War and Rummy sessions, and in the center is a cutout for family favorite, Uno. We also love Skip-bo, Phase 10, and the fast-paced Dutch Blitz. But you can customize the box to fit anything you

like. Rout slots that hold poker chips, or get creative and outfit it for a board game. For a great gift, pre-load a box for other game-lovers. This version also features a tray to hold dice and note pads as well as pens for keeping score. I chose cherry for the box, accenting it with an ambrosia maple lid panel.

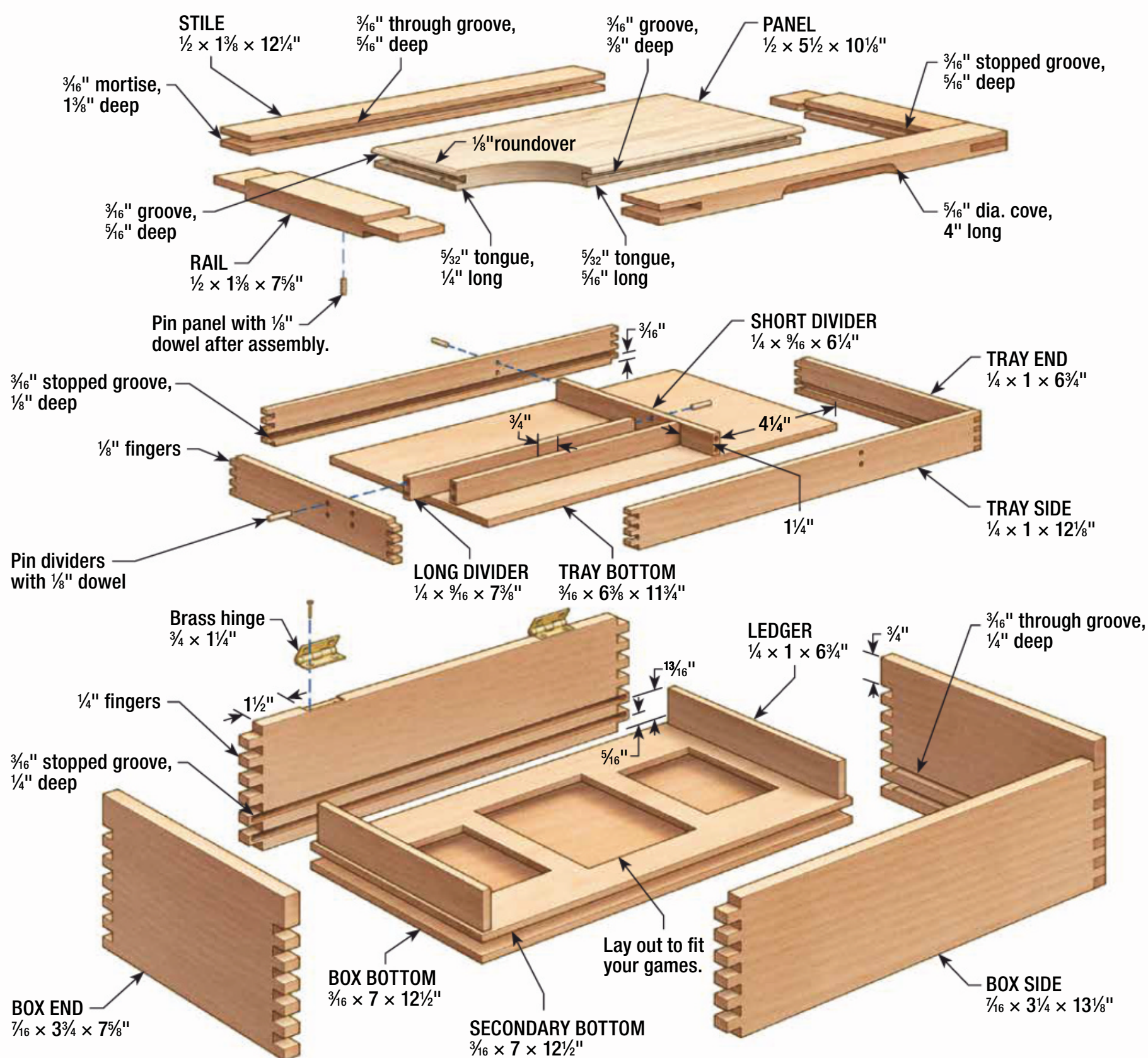
Finger joints for the box and tray, slip joints for the lid

The first thing you'll notice about this box is the unusual raised panel, which overlaps a slip-joined frame. A routed cove invites opening the finger-jointed container to reveal a removable divided tray, also held together by finger joints, that sits on ledgers to elevate it above the cards underneath. Customized cutouts in the bottom hold your games of choice. These bottoms fit into grooves routed into the inner walls of the box.



Order of Work

- Build the box
- Cut out the bottom
- Make the tray
- Make the lid
- Mortise for hinges
- Get the snacks, it's game time.



Saw the fingers, rout the grooves, and assemble

Cut the box sides and ends (plus extra for setups) to the sizes in the drawing. Set up a simple finger joint jig to cut the joinery as shown. The end pieces terminate in fingers, but the sides terminate in notches. Using a $\frac{3}{16}$ "-diameter straight bit at the router table, groove each piece to hold the two bottoms, then cut the bottoms to fit your box.

Measure and mark the cutout(s) for your cards of choice. Rout the cutouts using the same bit from routing the grooves. Dry-assemble the box, fit the ledgers, and clamp and glue them in place. Then immediately disassemble the box walls and wipe up any excess glue. Sand and pre-finish the interior, avoiding mating edges, and glue up the box as shown.

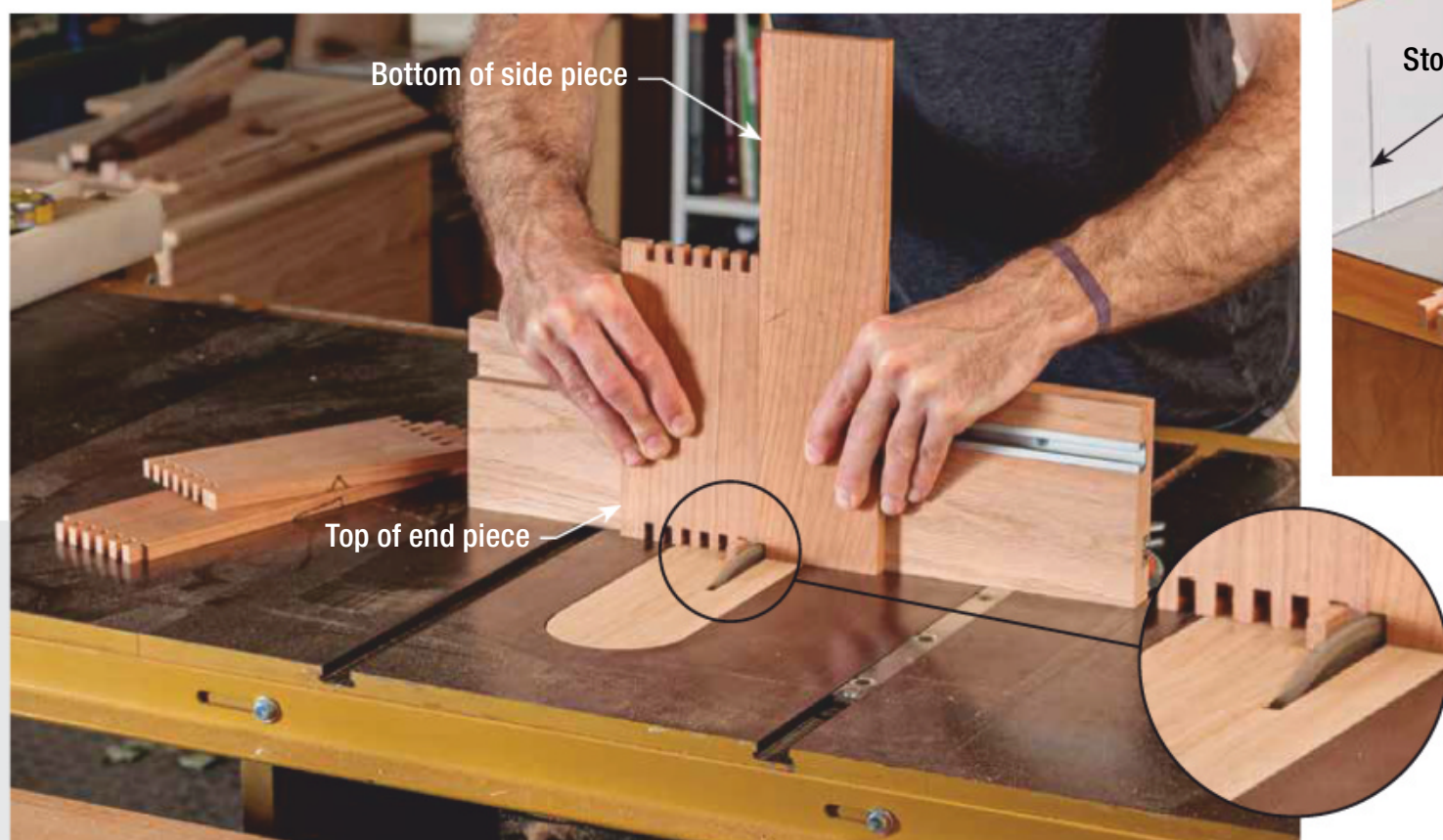
Better Box Joints

See Great Gear on page 60 for more information on dedicated box joint blades.



onlineEXTRA

Check our website for a free article on the basics of cutting finger joints.

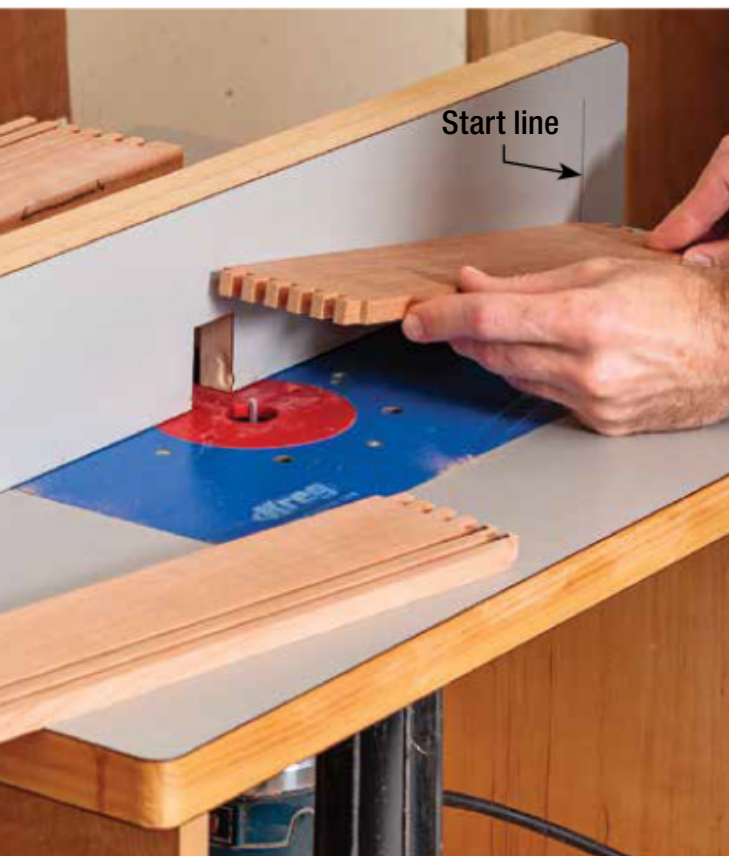


Start at the ends. Starting with the end pieces, cut the finger joints, leaving $\frac{3}{4}$ " at the top edges. Then straddle the jig's pin with the bottom-most notch of an end piece. Butt the bottom edges of a side piece and end piece against each other to begin notching the side piece, as shown.

Build and assemble the tray

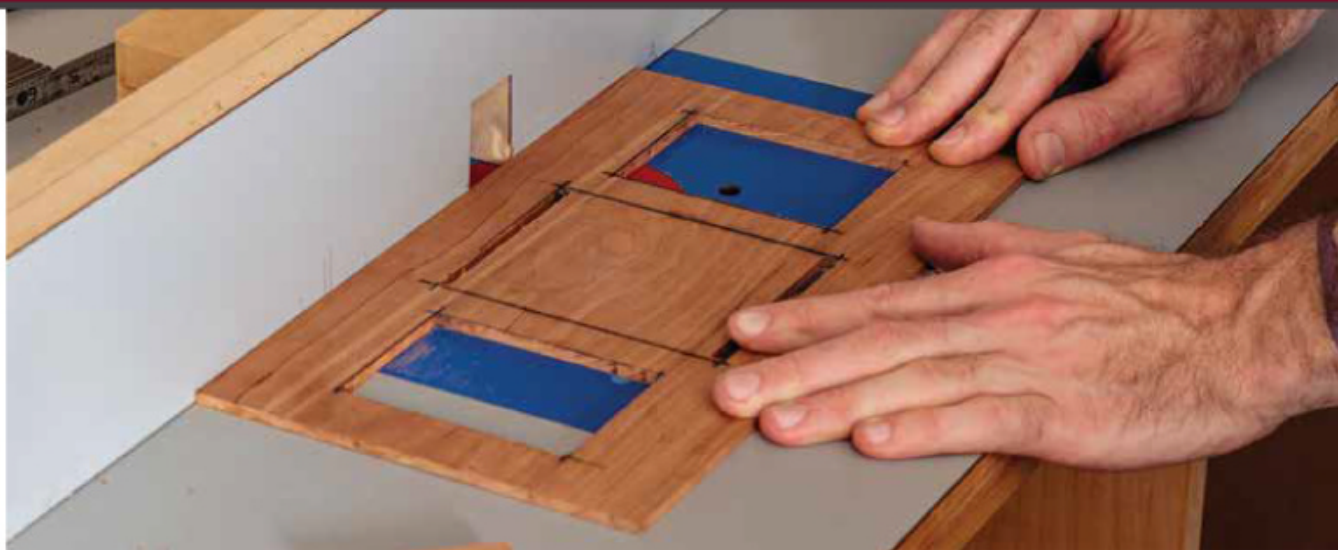
While the glue is curing, start the tray. Cut the tray sides and ends (plus extra for setups) to fit your box. Use a full-kerf ATBR blade for a smooth, flat cut, and saw the finger joints as shown. The tray parts get a single groove to hold the bottom, but this time, both the ends and the sides get stopped grooves. Take care when test-fitting and dry-assembling the tray after routing the stopped grooves. The wood remaining in the grooved fingers is very thin and can easily break if you tug too hard in the wrong direction. If you do break a finger, simply plug the void after assembly. Cut the bottom to fit and pre-finish it before assembling the tray. Cut dividers as desired, and attach as shown.





Grooves, through and stopped.

Rout the double grooves in the interior box walls. The end pieces get through grooves, and the side pieces get stopped grooves. To rout the stopped grooves, hold the piece against the fence with the trailing shoulder on the start line, and lower the piece onto the spinning bit. Push the piece right to left, stopping when the leading shoulder reaches the stop line.



Rout it out. Lower the workpiece onto the spinning bit, and rout just inside your layout line for each shape, repositioning the fence as necessary. Clean up the hole edges using a sanding block.



Clamps and cauls. Brush glue on the finger joints, then clamp up the box. Plywood cauls wrapped in packing tape evenly distribute clamping pressure without sticking to the box.



One jig, two joints. I used a dressed board and my miter gauge to make this jig, which I use to cut both finger joint sizes for this box. To allow laterally adjustable attachment to my miter gauge, I installed T-track in both faces but near opposite edges. To switch finger sizes, flip the jig edge for edge. One indexing pin will poke rearward during use, but it won't interfere with the operation.



Divide and pin. After assembling the box walls and bottom, fit your chosen dividers. To attach each one, hold it in place using spacers, and drill the $\frac{1}{8}$ "-diameter dowel holes as shown. Then glue the dowels in place.

Make the lid frame

Cut the rails and stiles (and extra for setups) slightly oversize. (You'll trim them to fit after assembly.) Then cut the slip joints, which are essentially open mortise-and-tenon joinery. I used my table saw outfitted with a box joint blade set to make a $\frac{3}{16}$ "-wide mortise, setting the blade height to match the width of the rail stock. Position your tenoning jig to center the cut across the stock thickness, and then mortise both ends of each stile, always keeping the show face outward on the jig. To cut the rail tenons, install a full-kerf ATBR blade, and set its height to match the mortise depth. Set up to cut the innermost tenon cheeks as shown, and saw all four of them. Then reset the rip fence and saw all the outermost cheeks. Making cheek cuts like this rather than flipping the stock on the jig ensures consistent tenon thickness regardless of inconsistencies in stock thickness. Finish up the tenons by sawing the shoulders, then rout through grooves in the stiles and stopped grooves in the rails as shown.



Mortise the stiles.

With the stock centered on the blade, hold the piece firmly against the jig to cut the mortise. Always orient the show face outward to maintain joint consistency.



Tenon cheek-cut setup.

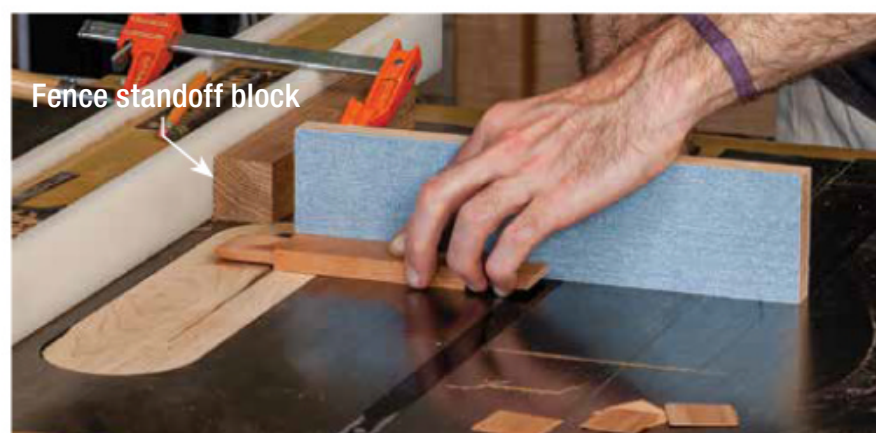
To set up to cut the innermost tenon cheeks, mount a mortised stile on your jig, and adjust your rip fence to align the innermost mortise cheek with the outermost face of the blade teeth.



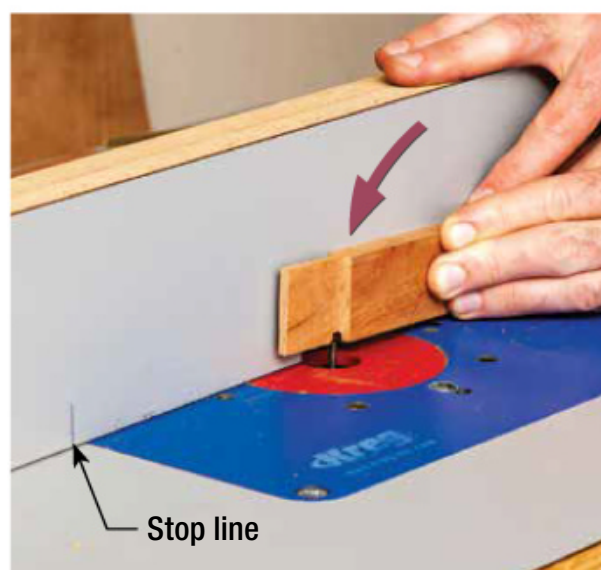
Saw the innermost cheeks. With the blade raised to match the stile width, saw both innermost cheeks on each rail. To avoid double-cutting, remove the workpiece before retracting the jig.



Saw the outermost cheeks. Again using a mortised stile as reference, reposition the rip fence to cut the opposite cheeks on the rails. Then make the cuts on all the rails.



A little off the shoulder. Register the end of the tenon against a rip fence standoff block, and cut the tenon shoulders. A miter gauge outfitted with a sandpaper-faced auxiliary fence prevents slippage.



Stopped grooves for rails.

With the trailing shoulder at your start line (obscured here), lower the rail onto the spinning bit. Move the piece right to left, stopping when the leading shoulder reaches the stop line. Rout the groove in two successively deeper passes, keeping the show face out.

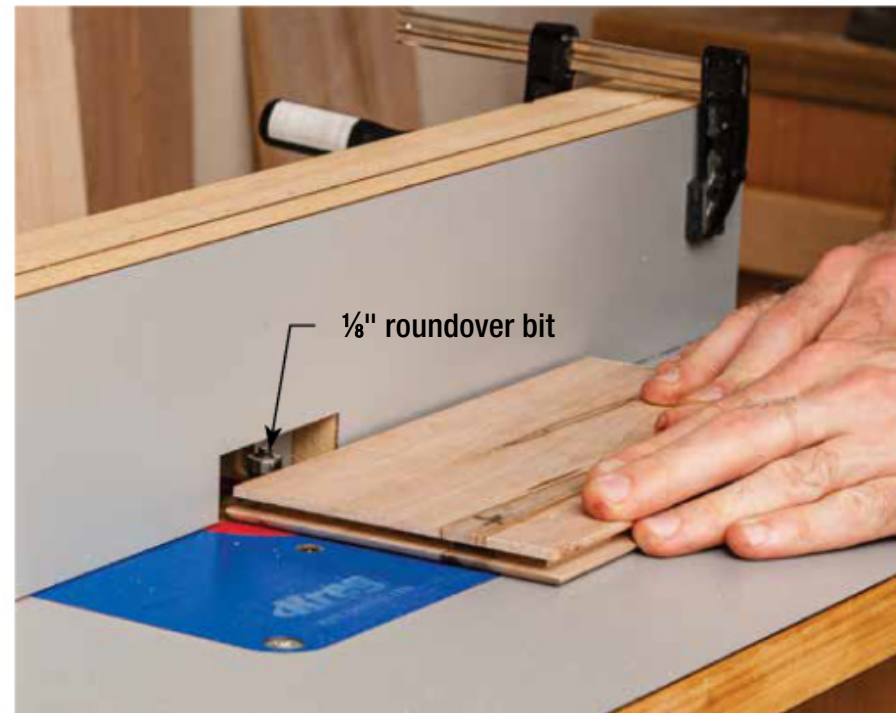
Assemble and attach the lid

Size the lid panel to fit the dry-assembled frame. At the table saw, cut $\frac{3}{16}$ "-wide grooves, $\frac{5}{16}$ " deep in the panel ends. Then raise the blade $\frac{1}{16}$ " and groove the panel edges. Now, trim the edge tongues and round over the panel top as shown. Assemble the lid, applying glue only to the frame joints, not the panel grooves. Pin the panel through the rails where noted in the drawing (p. 47). Mortise the box for the hinges as shown, and install each hinge with a single screw. Trim the lid's length as needed to fit between

the box ends and set it in place atop the hinges. To transfer the hinge locations to the top frame, press a sharp knife upward along the end of each hinge barrel and into the edge of the frame. After cutting the hinge mortises in the lid, temporarily attach it to the hinges, and mark its front edge flush to the box. Detach the lid, trim its front edge, and rout a cove to serve as a lift. Sand everything and apply your finish of choice. I used several coats of Danish oil. Reattach the lid, and load the games. You win.



Tongue-trim. After grooving the panel edges, install a standard table saw blade and reset your fence to trim the edge tongues to $\frac{1}{4}$ " to allow for seasonal movement in the frame. The end tongues can stay as-is for a tight, fully-seated fit.



Lid roundover. Chuck a $\frac{1}{8}$ " roundover bit in your table router, and rout the profile on the top of the panel. To minimize tearout, rout the ends first, following up along the edges.



Rout the hinge mortises. Make a simple jig like the one shown here to mortise the box and lid for the hinges. You'll need a platform big enough to prevent your trim router from tipping, and a clampable fence for alignment. Using a guide bushing and a $\frac{1}{4}$ " straight bit, rout the mortises. Follow up by chiseling their corners square. ■



THE RESOLUTE DESK

By David Heim

In 1845, Sir John Franklin sailed from England to the Canadian Arctic on a quest to find the Northwest Passage. His party vanished. Seven years later, Sir Edward Belcher led a five-ship expedition to find Franklin, only to have his ships repeatedly trapped in ice. He forsook four of the ice-bound ships in 1854 to return with his crew to England, where he was court-martialed, but ultimately exonerated, for abandoning seaworthy vessels.

Eventually, one of the ships—the *HMS Resolute*—drifted southward, still caught in pack ice. In 1855, an American whaling vessel encountered the ghost ship and brought it to New London, Connecticut. At the time, relations between England and the U.S. were strained and, as a goodwill gesture, Congress spent \$40,000 to have the *Resolute* refurbished and returned to England. Queen Victoria's acceptance of it in December 1856 contributed to the easing of tensions between the two countries.

When the *Resolute* was retired years later, the Queen directed that timbers from the dismantled ship be used to make several desks. One, built by master carpenter William Evenden, became a thank-you gift to the United States. In December 1880, it was presented to President Rutherford Hayes, who placed it in the president's study on the second floor of the White House residence.

In the nascent 1900's, President Theodore Roosevelt relocated the desk to

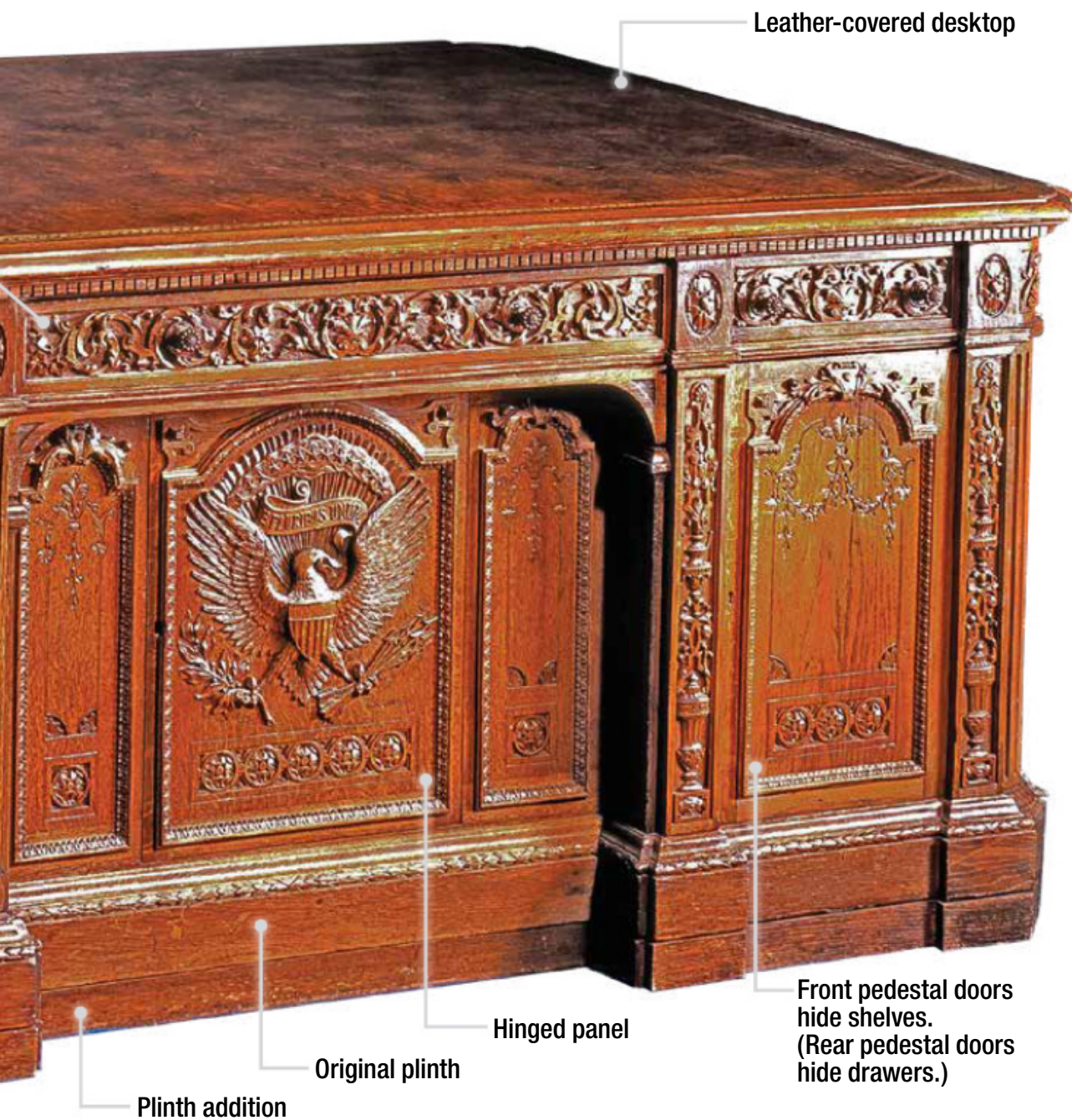
a study on the second floor of the newly constructed west wing. There it stayed until President Kennedy moved it into the Oval Office. Following his assassination, the desk traveled as part of an exhibition of artifacts from the Kennedy Presidential Library. From there, it went on display at the Smithsonian until President Carter returned it to the White House Oval Office in 1977, where it remains today.

Built primarily of English oak, the *Resolute* desk is an imposing piece. It was designed as a partner's desk, with its symmetrical construction intended to accommodate two people working face-to-face at its leather-covered top. It was built with nine drawers on each side—three in each pedestal behind a door, and three fitted into the top section that spans the pedestals. A plaque commemorating the desk's historical origins is mounted to one of the top drawers. The pedestals' panels feature raised tombstone-style moldings with shallow carving in the fields. The panels are bordered by deeply carved pilasters sitting below similarly carved drawer fronts, while fluted quarter-columns adorn the desk's corners. The wood is finished with brushed and padded shellac.



Over time, the desk has undergone several modifications. Most notable is the hinged front kneehole panel commissioned by President Franklin Delano Roosevelt to conceal his leg braces. FDR died before its completion, so his successor Harry Truman had it installed. At some point, the six frontmost pedestal drawers were replaced with shelves, and in the early 1960's, President Kennedy had a plinth added to elevate the desk. This extension of the base was made of pine for some reason, which President Reagan had replaced with a more suitable oak plinth in 1986.

As the history-saturated *Resolute* Desk retains its place of honor in the Oval Office, it is being well cared-for. It is touched up regularly, and has been completely refinished a number of times over the years. ■



Dimensions: 32" H. x 48" D. x 72" L.



fastFACTS

- In the center panel's carving of the Great Seal, the eagle faces the arrows of war. On all modern arrangements of the Seal, the eagle faces the olive branch of peace.
- The multiple desks Queen Victoria commissioned from the timbers of the *HMS Resolute* included two small writing desks made for herself.
- The remnants of John Franklin's ships were discovered in 2014. Canadian archaeologists are slowly exploring the wreckage for artifacts.
- For fascinating historical photos of the desk, including a close-up of its commemorative plaque, visit: whitehousemuseum.org/furnishings/resolute-desk.htm



JFK and son. In this celebrated 1962 photo, John F. Kennedy Jr. peeks out into history from behind the *Resolute* desk's hinged modesty panel. The desk has been used by all but three presidents since it was bequeathed to the U.S. by England in 1880.



Resolute discovery. The Arctic discovery ship *HMS Resolute* (left) as she appeared when found in the ice after drifting nearly 1200 miles.



Celebrating old ties. U.S. President Obama shows the *Resolute* desk to Britain's Prince Charles and Camilla, the Duchess of Cornwall, during a 2015 tour of the White House. Note Britain's commemorative plaque on the drawer front.



WHITE OAK

A true North American hero

By Ken Burton

Were there an all-star team of North American hardwoods, white oak (*Quercus alba*) might play quarterback. Strong, durable, attractive, abundant, easy-to-work, and moderately-priced; what more could you ask? Perhaps its only drawback is its tendency to warp, particularly when flatsawn. Of the two dozen or so oak species cut for lumber, white oak is second only to red oak in availability and use, and is one of the most sought after North American hardwoods.

Where the wood comes from

White oaks grow throughout the eastern US as far west as Texas. The trees are some of the continent's longest lived, with many individual specimens documented as 300-400 years old. At maturity they can be 4 feet or more in diameter. In the open, these stately trees spread their branches widely, while in forests, their crowns can reach to 100 feet or more. As of this writing, white oak is not cited on either the CITES list or the IUCN Red List as being endangered, and is considered in abundant supply.

History in woodworking

Where to start? Perhaps with Connecticut's "Charter Oak." Featured on the state quarter, this massive white oak dated from the 12th or 13th century, and was believed to have concealed the Connecticut State Charter of 1662 from the invading British. The venerable tree finally succumbed to a storm in 1856.

And let's remember the USS Constitution, the oldest commissioned warship still afloat. "Old Ironsides" earned her nickname in an 1812 battle with the HMS Guerriere when the British cannonballs simply bounced off her white oak-planked hull. Today, the US Navy maintains The Constitution Grove, a woodlot in Indiana where white oak trees are reserved for the ship's upkeep. Or turn to Gustav Stickley or Charles Limbert, whose white oak furniture has become synonymous with the Arts and Crafts style that's still popular today. (See page 32.) Or consider the millions of barrels used to ship goods worldwide for centuries. Nearly all of those that carried wet cargo were made from white oak because it is naturally water-tight and resistant to decay. Today, white oak barrels are still a mainstay at distilleries and wineries here and abroad.

Selecting the best stock

White oak is available in thicknesses from 4/4 to 16/4, widths from 4" to 20" or more, and lengths to 16'. You'll pay more for wider, thicker, and longer pieces, with prices starting at \$5-6 per board foot. While most stock is plainsawn, it is also commonly available quartersawn, which is much more stable. Quartersawn white



White vs red oak.

White oak (front) contains a high percentage of tyloses—microscopic structures that fill the wood's pores, making it more water-proof and a good choice for outdoor projects. Red oak (rear) has so few tyloses that you can blow in one end of a board and make soap bubble at the other—an impossibility with white oak.



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Many Patterns. Depending on the cut, white oak offers three distinct looks. Plainsawn (left) displays strong cathedral patterning. Riftsawn (center) has very linear grain, while quartersawn (right) is straight with a distinctive fleck.

oak, which exhibits a beautiful fleck pattern interlaced with straight grain, is often used in Arts and Crafts era furniture. While warp and checks may be easy to spot when sorting boards, white oak is prone to a less evident defect called *honeycombing*. Caused by improper drying, it manifests as internal checking. It's particularly difficult to detect in roughsawn boards, and may be revealed only during milling. Fortunately, most reputable dealers will exchange honeycombed boards.

Working and finishing

White oak is a well-behaved species when worked with both machine and hand tools. It glues easily, holds nails and screws tenaciously, and finishes nicely. But be aware that white oak can develop a black stain if exposed to a combination of iron and water. This happens frequently during glue ups where squeeze out creates a liquid bridge between wood and clamp. To protect against this, cover your clamps with packing tape where such contact might occur. On a personal note, working oak tends to turn my hands purple, although it eventually wears off. However, I once worked with a fellow whose skin chemistry was such that he actually left purple finger prints on oak. Eventually he was no longer assigned to build any projects with the wood.



White Oak Uses

- Furniture
- Cabinetry
- Flooring
- Barrels
- Ship building

A-Oak-Kay

White oak is no stranger to my shop, and it's always a pleasure when a project demands it. As long as my tools are sharp, I don't have to undergo any special preparations other than careful stock selection. I usually opt for using rift or quartersawn stock, as I don't particularly like plainsawn oak. I find the stark difference between its spring and summer wood makes the cathedral pattern a little too bold. I'll make the majority of a larger piece from riftsawn stock, saving the quartersawn pieces for prominent surfaces. The trick is finding riftsawn stock. Most dealers cull out quartersawn pieces as premium product, but few differentiate between riftsawn and plainsawn. I take the time to search out boards that display primarily rift grain or I'll look for wider boards that display rift grain along their edges. When building, I'll cut out the center section, using the plainsawn center offcuts in less prominent places. ■

Straight and tawny. This wall shelf is based on a candle holder my father-in-law made years ago. The straight-grain and tan coloring of the quartersawn oak play well with the alumi-lite resin I used for the dragonfly inlay. The vase was colored using the fire-sanding technique shown on page 41.





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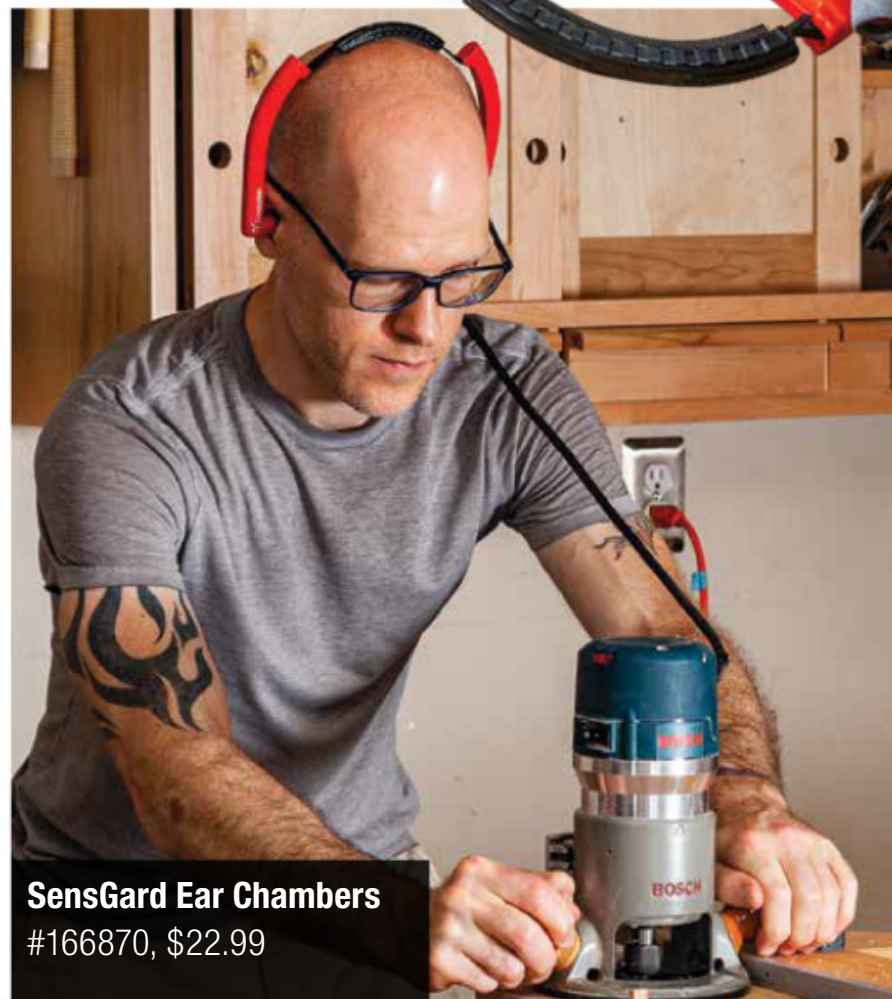
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I struggle with ear plugs. I find them uncomfortable and they inevitably pop out whether I want them to or not. Over-the-ear muffs aren't much better. Too hot in the summer in my unairconditioned shop, and bulky to boot. But I had assumed that was the price to pay to protect my hearing. Then I discovered SensGard Ear Chambers. These hollow headbands with a NRR (Noise Reduction Rating) of 26 db are lightweight, easy on-and-off, and their foam tips fit securely in my ears. When I'm not making noise, I can hang them around my neck or fold them up for stashing in my apron pocket. The SensGard's passive (no batteries!) chambers selectively dampen frequencies so that I can hear the kids playing next door, but the screaming router in my hands is just a low hum. While I may still don a pair of muffs for an extended machine session, the SensGard Ear Chambers are perfect protection for everyday shop use.

—Chad McClung



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of box joints. These blades excel at sawing precise, flat-bottom, and square rabbets and grooves too. In fact, I don't own a stack dado. I use this blade set instead. Sure, sometimes I have to bump over my saw's fence and make a couple of extra passes, but the simple, shim-free setup and dead square cuts more than make up for that. ■

—Chad McClung



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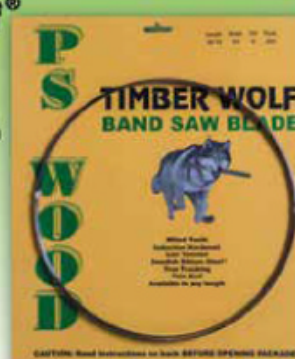
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- 1. Adjust-A-Bench Craftsman Hardware Package\$299.00
- 2. Irwin Spade bitsfrom \$3.68

Party Trays (p. 23)

- 1. Whiteside Bowl and Tray Bit with Double Bearing,
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- 2. Whiteside Roundover Bit, 3/8" R, 1 1/4" D, 5/8" CL, 1/2" SH.....#24C24, \$26.99
- 3. Whiteside Roundover Bit, 1/4" R, 1" D, 1/2" CL, 1/4" SH.....#24B94, \$23.99
- 4. Whiteside Roundover Bit, 5/8" R, 1-3/4" D, 1" CL, 1/2" SH.....#813855, \$52.11
- 5. Freud Cove Bit 5/8" R, 1 1/4" D, 3/4" CL, 1/2" SH.....#834594, \$51.47
- 6. Performance Abrasives, New Wave 2" Abranet Bowl Sanding Kit.....#164532, \$54.99
- 7. Sanding Mop (various sizes and grits)..... woodworkingshop.com, #FS36999, \$72.99

Playing the Angles (p. 27)

- 1. General Tools Square Head Protractor#85045, \$22.50
- 2. General Tools Digital Sliding T-Bevel#153776, \$49.99
- 3. Wixey Digital Angle Gauge With Level.....#154507, \$44.99
- 4. WoodRiver Triangle Set Up Block.....#171600, \$19.99

Following available from LeeValley.com

- 5. Workshop Protractor#99N0423, \$24.50
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- 7. Miter-Saw Setting Guide#88N9090, \$21.50
- 8. Veritas Bevel Setter\$37.50
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Following available from HighlandWoodworking.com

- 10. Shinwa Sliding Bevel, 10"#461202, \$26.99
- 11. Bevel Setting Gauge#169306, \$19.99

Following available from InfinityTools.com

- 12. iGaging 14" Digital Protractor & Ruler#DPT-014, \$29.90
- 13. iGaging 9" Ebony Sliding Bevel Gauge#100-111, \$29.90
- 14. PEC Protractor Head for 12" Rule (blemished)taytools.com, \$29.99
- 15. Adjustable Drywall Square #317shopkapro.com, \$30.99

Limbert Book Rack (p. 32)

- 1. Straight Router Bit 1/2" SH, 3/4"D, 1 1/4"CL.....#835497, \$23.97
- 2. Guide bushing, 1/2" OD.....#144691, \$9.50
- 3. Whiteside Solid Carbide Spiral Upcut Router Bit, 1/4" D, 1" CL, 1/4" SH#03K33, \$19.99
- 4. Whiteside Template Bit, 1/2" D, 1/2" CL, 1/4" SH.....hartvilletool.com, #R3001, \$22.55
- 5. Whiteside Bearing Template Router Bit, 1/2" D, 1" CL, 1/4" SH#24A61, \$24.99
- 6. TransTint - Dyes, Golden Brown, 2 oz#128482, \$21.99
- 7. Sealcoat Universal Sanding Sealer, qt.....#823195, \$17.99
- 8. Antique Walnut Gel Stain, qt.....#826961, \$24.99

Fire-sanding and coloring (p. 41)

- 1. Accent Paste Purple (other colors available)chroma-craft.com, #GP-21565, \$8.99
- 2. Grip 3-Piece Wire Brush Set#167199, \$4.99
- 3. Mylands High Build Friction Polish, 500 mls#813772, \$26.99
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Game Box (p. 46)

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- 2. Whiteside Straight Router Bit, 3/16" D, 1/2" CL, 1/4" SH.....#813301, \$15.44
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Great Gear (p. 58)

- 1. SensGard Ear Chambers.....#166870, \$22.99
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Woodcraft is pleased to continue partnership with Chelsea as she demonstrates her own brand of inspiration and empowerment, showing viewers how to tackle their own home repairs, improvements and upcycles. A married mother of three, Chelsea shares projects like installing butcher block countertops, building a handrail serving tray for the deck and creating a workshop on a budget.

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In Praise of Expedient FURNITURE

Building pretty well, without the pretty

By Ken Burton

Recently, my wife and I acquired a chest of drawers my father made about 60 years ago. He built it as a changing table for my unborn sister when money was tight. It served three children in that capacity before becoming my mother's sewing cabinet. After my folks downsized, my sister won it in a friendly coin toss, but recently relinquished it to me.

It's an unpretentious, painted piece made of A/D-grade fir plywood. The case is simply screwed together, the drawers just rabbeted and nailed. All the same, it is well-made, and not scrappy looking at all. The joints are tight, and glue blocks under the drawers have kept them solid over the years. Although Dad didn't bother with edge banding; he did sand edges, putty voids and plug the screw holes to ensure a nice paint job. The proportions are pleasing, and a few key details add just a touch of flair.

As I was repainting it, I got to thinking about other humble pieces built quickly to fill a specific need.

I certainly have made my share of such "expedient furniture" over the years when I had neither the time nor budget to do better. There was a splayed-leg end table I cobbled together from construction lumber and particle board left in the basement of the first house I purchased. The piece lived under a table cloth for five years until I found the time to replace it with something better. But it still lives on today in shortened form as a Christmas tree stand.

Then there was my college apartment bookcase, which was screwed together from cast-off honeycombed oak boards. Not very pretty, but solid corner braces have kept it sturdy for the past three decades. It now resides in our basement, storing homemade jams and pickles. That same apartment spawned a TV stand made from a 1x12 board quickly crosscut into lengths and joined together with battens and screws. Again,

not especially attractive, but highly functional and quite durable. It's still doing its duty, even though the VCR shelf now holds an X-Box and the original 19" set has given way to a 60" flatscreen.

While I savor the days I spend building "real" furniture, I also enjoy the challenges posed by a lack of time and budget. Here, creativity and a little knowledge of how things go together can combine to solve a problem in a matter of hours. So let's raise a glass to expedient furniture! Like many of us, it may not be much to look at, but it gets the job done. And if you build it well enough, it will far outlast a piece of

cheap, department store furniture that's not likely to survive to see a second purpose. With luck, your work will endure to see several lives. Who knows? Maybe someday your kids will be tossing a coin over it. ■





ULTIMATE *Trim Bits*



“ULTIMATE” Flush Trim/Pattern Router Bits

“ULTIMATE” Trim Bits are perfect when working with templates or when using a router to flush trim matching wood surfaces. Whiteside’s compression spiral design, along with a ball bearing guide, makes this bit easy to use in the router and produces a superior quality trimmed edge. The “ULTIMATE” Trim series brings industrial engineered bits, previously manufactured for CNC machines, right into your shop.

$\frac{7}{8}$ " Diameter x $1\frac{1}{8}$ " Cut Length x $\frac{1}{2}$ " Shank

Available at Woodcraft!
For a Free Catalog Or To Find Your Local Woodcraft Store,
Visit woodcraft.com Or Call 800-225-1153.



154275 (A) Flush Trim
154276 (B) Pattern/Plunge
154274 (C) Combination

RIKON

EXPANDING ← The → Possibilities

40"

Expandable
Sliding Bed

Up To
30" Swing

RIKON 70-3040



Expandable Bed Lathe | 40" Between Centers | Beefy | 3 HP VSR Motor



Beefy 3HP motor delivers ample power to turn large diameter projects in forward or reverse modes.



Control Box has a magnetic back so that it can be set anywhere along the lathe for quick access when turning.



1-1/4" x 8 TPI threaded spindle is supported by 4 heavy-duty bearings for precise and dependable turning.



Tailstock's quill extends out to a generous 4-3/4" RAM travel with precision Acme threading.

Call today for more information 877-884-5167
or visit www.rikontools.com for a dealer near you!