

**5** Great Gift  
**PROJECTS!**



Cutting Board Trio



Turned Christmas Trees



Scrollsawn Reindeer



Six-piece Puzzle

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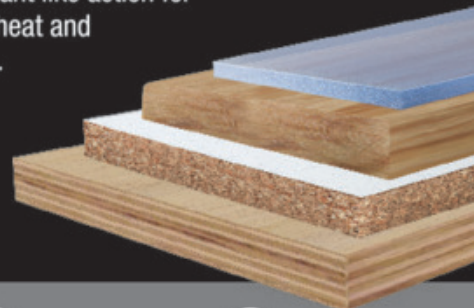


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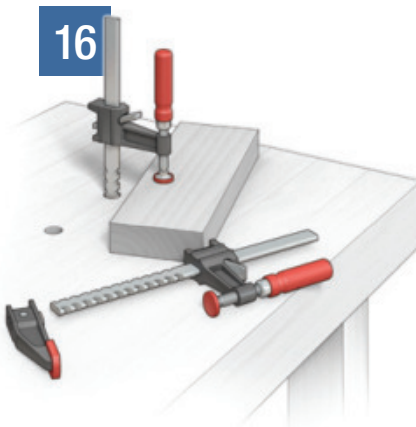
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## The value of attention

Attention may be the most valuable investment we can make in our work. We are all made better woodworkers by recognizing the reliability of a good combination square or noticing when a well-crafted chair beckons you to sit and invites your fingers to find the subtle details in its armrests. So learn to observe the heft of a bench plane, the way your hand wraps around the rosewood tote. Acknowledge its purpose, its maker. Take a breath as you step to your table saw. Give this machine the respect it deserves. Notice its accuracy, its dead-flat surface. Pause to regard the smooth surface of a freshly ripped edge with your thumb.

Being mindful during these moments brings appreciation for your tools and the craft at large. When busy in your shop making gifts this season, immerse yourself into the process. Such focus isn't always easy, with myriad distractions clamoring for your bandwidth. But that's all the more reason to be mindful. Hurried work leads to mistakes, or worse, injuries. It may not seem like it at the time, but slowing down will save you from having to redo work or pull splinters. That's not to suggest mistakes won't happen, but paying

attention will reveal the error's origin, to help you avoid it the next time.

This stopping-to-smell-the-sawdust approach works wonders outside of the shop as well. If your holiday arrangements this year include face-to-face time with loved ones, you'll do well to lavish them with attention. And if your plans include gift-making, this issue is packed with plenty of projects to pay attention to. Set the scene this season with festive scrollsawn reindeer (p. 50) or a turned Christmas tree ornament or table topper (p. 40). Then, build the Burr Puzzle (p. 47) to keep your holiday guests entertained. To help keep them fed, make the nesting cutting boards (p. 21). Drill press add-ons (p. 27) may come in handy during your Santa's helper sessions, and might even make great stocking stuffers for your woodworking pals. The shapely Keepsake Box (p. 32) would certainly make a delightful present for anyone.

Whatever you end up doing this season, give yourself the gift of refined attention. Your return on investment will be a more enjoyable life in and out of the shop. Happy holidays. ■



# WOODCRAFT<sup>®</sup>

magazine

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## 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](mailto: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](mailto:editor@woodcraftmagazine.com) and put "N&V" in the subject line.

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### 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](mailto:editor@woodcraftmagazine.com), or find us on social media.



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**Safety First!** Working wood can be dangerous. Always make shop safety your first priority by reading and following the recommendations of your machine owner's manuals, using appropriate guards and safety devices, and maintaining all your tools properly. Use adequate sight and hearing protection. Please note that for purposes of illustrative clarity, guards and other safety devices may be removed from tools shown in photographs and illustrations in this publication.



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### Time for more information



*I'm interested in building the Arts & Crafts Wall Clock (Oct/Nov, 2021) and found the mechanism listed in the Buyers Guide, but the article doesn't seem to specify the threaded post length.*

*—David Noack,  
via email*

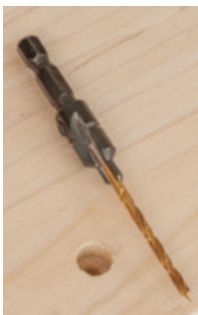
#### Associate Editor Derek Richmond replies:

Apologies for the omission. The clock uses a  $\frac{7}{16}$ " threaded post. I chose a  $2\frac{1}{2}$ "-long minute hand to match the radius of the time track on the dial. I used a  $2\frac{3}{4}$ " diameter pendulum bob, although since the movement isn't mechanical, you could use a  $2\frac{1}{8}$ " bob for a lighter look.

### Felled by DNA

Federal prosecutors in Washington used DNA from a big leaf maple tree to convict 39-year old Justin Wilke of five offenses related to an illegal logging operation. That operation also ignited a fire that burned 3,300 acres and did \$4.2 million in damage. A research geneticist with the U.S. Forest Service testified that DNA from lumber sold by Wilke to a mill matched that of poached trees nearby. According to prosecutors, it was the first use of tree DNA evidence in a federal criminal trial.

### Hole-ly erroneous



The Simple Step Stool (Oct/Nov, 2021) mentioned a drill bit that could bore the necessary holes all in one shot. The story referred readers to the Buyers Guide, where the wrong product was inadvertently listed. The correct product is the MilesCraft CounterBit Countersink Drill Bit Set, item #153553, available at [woodcraft.com](http://woodcraft.com), for \$10.99.

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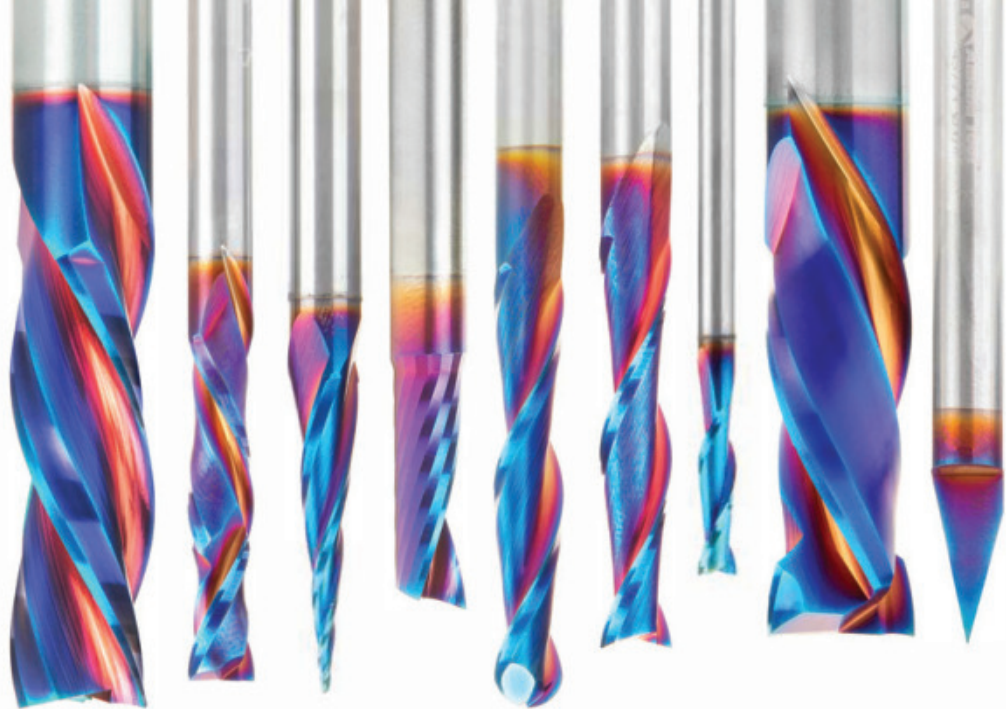


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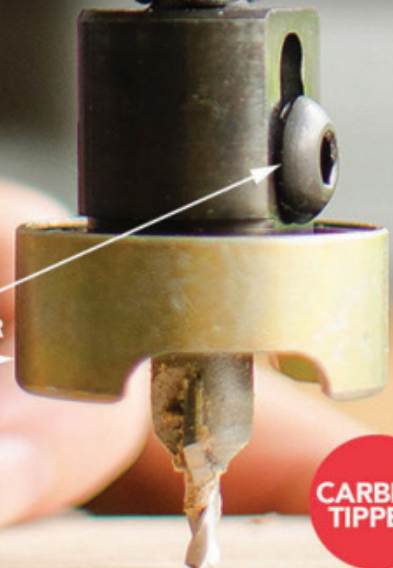
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## Re-released classic



Linden Publishing plans to release a special edition of master craftsman Toshio Odate's definitive tome on traditional Japanese hand tools. Each of 500 copies of *Japanese Woodworking Tools: Their Tradition, Spirit, and Use* will be numbered, signed by Odate, and stamped with his family crest. The special edition

includes a new preface by Odate, reflecting on his life using traditional Japanese tools and how their place in woodworking has changed since the volume was first published in 1984. The book will go on sale in early 2022.

## Eyes on the Personal DC?

*Need a dust collector, I've considered buying the Oneida Benchtop DC, especially after your review (Oct/Nov, 2021). One thing puzzles me, though. Photos I've seen online show threaded inserts atop the case near the handle. The holes look like they could be used for eyebolts to hang the unit from the ceiling. Is that their purpose?*

—George Kelliher, via email

### Editor-in-Chief Chad McClung replies:

The inserts are for hanging the unit from the ceiling with eye bolts. But Oneida recommends this only for customers working with machinery such as a full-size lathe, which may not have a suitable work surface on which to set the unit. The user could suspend the dust collector from the ceiling, hanging it behind the lathe, for example. Nevertheless, it would still need to be within 20" of the work for maximum efficiency. ■

### How to reach us

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-or-

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## Reader Showcase



**DAVE JANOS, CORVALLIS, OR**  
**Quali-tea table.** Longtime reader Dave Janos crafted this tea table for his home. The bookmatched canarywood top measures 28" x 15" and sits 22" high atop mahogany legs. The matching aprons feature inlaid rosewood and maple banding. Janos formed the curved rosewood edge molding around the tabletop by creating a segmented ring, trammel routing the profile into the top edge, then cutting it into quarters and inserting straight sections between the curves. We think it's beau-tea-ful!

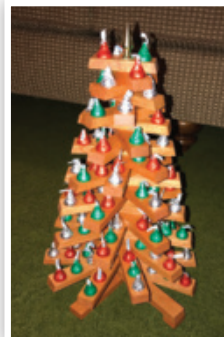


**JACK O'DONNELL, RUSHFORD, MN**  
**Rising star.** This Minnesota woodworker was one of many readers to put their own spin on the Kissmas Tree (Dec/Jan

2021). O'Donnell's version is made of walnut with a lacquer finish. He replaced the spike nut topper of the original with a T-nut fitted into a walnut star. The wood was harvested from a walnut tree felled on O'Donnell's mother's property, giving the finished piece extra-special meaning to its maker.



**DAN MARTIN, COLUMBUS, OH**  
**Case Claused.** Harkening to ghosts of Christmas past, Martin crafted this intarsia Santa featured in Issue 38 (Dec/Jan 2011). The project's palette came from natural colors in the aspen and red cedar parts. After assembling the intarsia, Martin wrapped it in a glass-fronted maple shadow box lit with integral LEDs. A drawer in the back stores the remote that controls the lighting. This was Martin's first attempt at intarsia, which makes him *elf*-taught.



**GARY ALLEN, RICHMOND, KY**  
**Forest for the trees.** Apparently attempting to keep a certain chocolate company in business, Allen made a whole forest of Kissmas Trees. This cherry version was one of a dozen treat trees he made as gifts

last Christmas. He said family members who received them absolutely loved the unique, handmade gifts.



**DAVID MARTIN, CHADDS FORD, PA**  
**Star of wonder.** Pennsylvania woodworker Martin designed and built this tree-topper from half-inch thick pieces of maple and cherry. After mitering the ends of the rays, he glued them to a piece of Baltic birch plywood and finished the assembly with tung oil. A screw eye affixed to the back allows the 12-inch star to be secured to the tree with wire or a zip tie. This tree-topper truly deserves to take a bough!



**ROBERT OWENS, ST. MARY'S CITY, MD**  
**Safe shipment.** Owens says he enjoyed building a pair of Kissmas Trees for his chocolate-loving grandchildren. But since they live far away, he had to make

sure the aromatic cedar boughs survived the long trip. Owens modified the storage box (see onlineEXTRAS for Issue 98, Dec/Jan 2021) to include a hold-down bar for securing the tree during shipping. ■

### Show off your work!



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# A dual-power jobsite-worthy miter saw

*Metabo 36V MultiVolt 10" Dual-Bevel Sliding Miter Saw*

When Hitachi introduced the first sliding compound miter saw in 1988 it was a real game-changer, offering much more crosscut capacity than regular chopsaws. After rebranding as Metabo HPT (Hitachi Power Tools) in 2018, the company brought out a new line of Multivolt cordless tools including this new iteration of its venerable slider.

The tool is sold in kits with either a MultiVolt battery (4.0 Ah at 36 volts) and charger, an AC adapter, or as a “bare tool” with neither power source, for users who already have other Metabo batteries (see the Buyers Guide, p 62). I tested the saw with both power sources. The saw’s dual power options offer great flexibility for jobsite tasks such

as installing trim or deck building. The battery charged quickly and powered several hours of consistent cutting. When crosscutting 3"-thick cherry, the battery actually provided more power than the adapter with its 20-foot cord.

I found that moderate lateral pressure on the switch handle deflected the motorhead, but only minimally affected cut accuracy. Pulling straight down and sliding straight back still resulted in straight, square cuts. Miter detents were easily located and spot-on. After mitering at all nine stops, the saw returned to zero degrees accurately.

Tilting the saw to cut bevels proved more complicated. The bevel scale pointer required minor adjustments to

make the stops accurate. And beveling requires releasing an index pin located beneath the blade with one hand and holding the switch handle to set the bevel with the other, risking engaging the saw with one arm under the blade. Be sure to detach your power source when setting up bevel cuts. The saw tilts to 48 degrees on both sides, but due to motor placement, tilting more than 41 degrees to the right requires removing the right-hand sub-fence.

The brushless motor is quiet, and with its 15 amp rating, has plenty of power. The slide mechanism protrudes 13½" behind the fence without sacrificing cut width. Spinning a 10-inch blade, the saw boasts an 11½" maximum-

## Overview

- Powered by battery or AC adapter
- 0-60° right miter, 0-55° left miter
- 48° left and right bevel
- Dust bag
- Hold-down clamp

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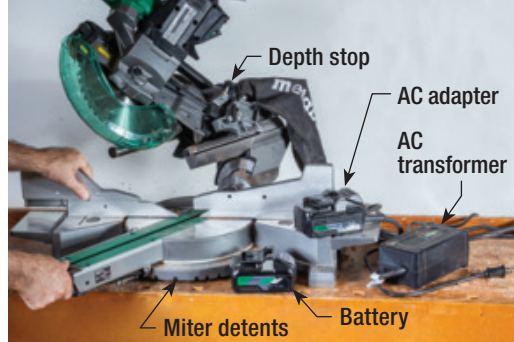
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width of cut on a 3½"-thick board or 12½ inches on pieces 2½" thick or less—comparable to other saws in its price range.

The included 40-tooth blade cuts cleanly enough, but I swapped in a 60-tooth crosscut blade for further testing, resulting in cleaner cuts. I didn't find the laser to be very helpful, but appreciated the built-in LED light, which helps with cut line visibility. The table proved flat and solid, and its long, stable extension wings provide good workpiece stability.

Ultimately, it's accurate enough for cabinetry and furniture-making, but its portability and power options make it more suited as a jobsite saw, especially if you already own other Metabo MultiVolt tools. ■

—Tester, Derek Richmond



**Metabo 36V MultiVolt 10" Dual-Bevel Sliding Miter Saw with battery/charger, \$619.00**  
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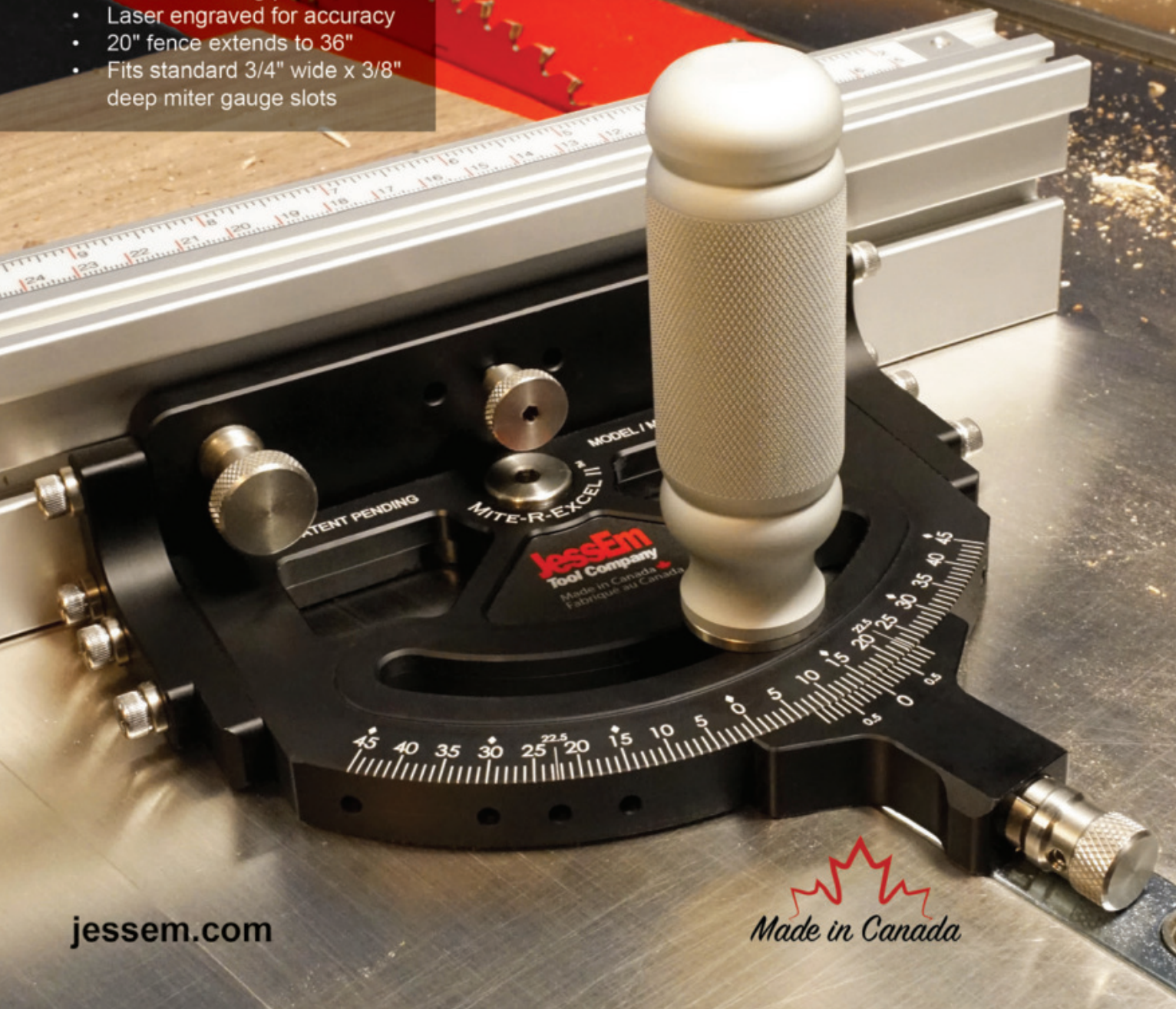


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## TOP TIP

## Bar clamp hold-down

During a recent project, I realized that I needed a bench hold-down. I've seen commercially available toggle-style hold-downs that fit in  $\frac{3}{4}$ "-diameter bench dog holes like mine but wanted the kind of extra strength that a screw clamp can apply. I couldn't find what I wanted, so I created one by modifying a clamp I already have. I began by sawing the head off of a 12"-long F-style clamp that has a  $\frac{3}{4}$ "-wide bar. Then, using an angle grinder outfitted with a  $\frac{1}{16}$ " disk, I ground a dozen or so pairs of opposing notches about  $\frac{1}{8}$ " apart at the end of the bar, angling them at about  $60^\circ$ . Finally, I filed the sharp edges of the notched section for safety and for an easier fit in my dog holes. The modified clamp works great! It's remarkable how often I find myself using it.

—Don Stump, Grand Rapids, Michigan

Ground notches create teeth that lodge in bench dog holes.

Head hacksawn from F-style clamp.

## Velcro cord management

After a couple of shoulder surgeries, I found myself with several hook-and-loop (e.g. Velcro®) straps that had been used to attach various therapeutic supports. I wanted to use them in some way, and realized that they would make great hangers for cords and other such items. All I had to do was attach a grommet to the end of a strap using a grommet installation kit, which can be had for less than \$10. A strapped cord can then be neatly carried and hung anywhere you install a screw.

—Deanna Manke, Island Lake, Illinois

Install grommet in end of hook-and-loop strap for hanging on wall.



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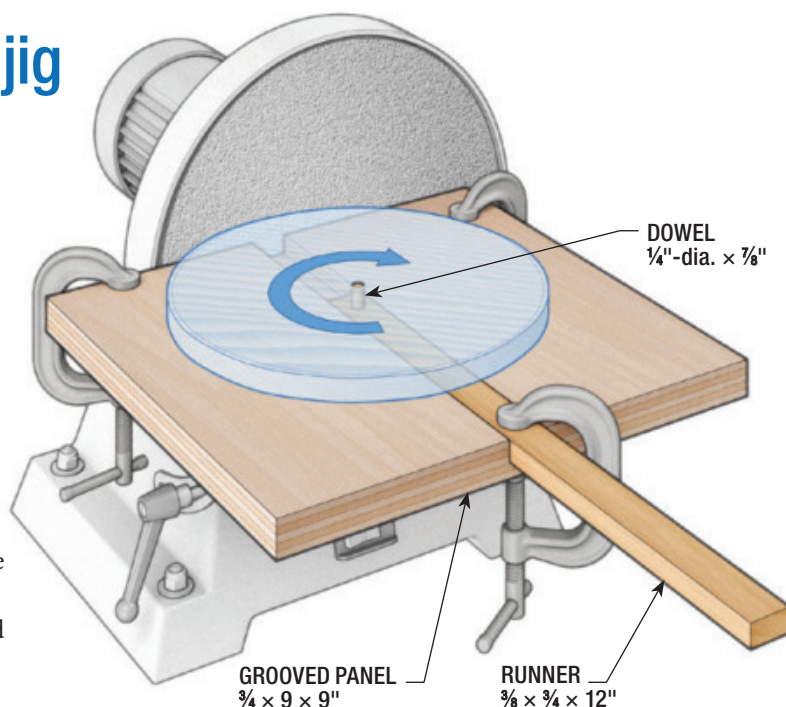




## Simple circle-sanding jig

I needed a jig to sand some small round disks to an accurate diameter after bandsawing them to rough shape. I cobbled together a quick 'n' dirty jig to do the job using my disk sander. The jig is simply a grooved panel that houses a runner with a  $\frac{1}{4}$ " dowel at one end. The dowel inserts in a hole in the workpiece to serve as a pivot point that can be set to the desired distance from the sanding disk. To use the jig, first drill a  $\frac{1}{4}$ "-diameter center hole in your workpiece. Then clamp the grooved panel to your sander table. Insert the runner in its groove, and mount the workpiece on the dowel. With the sander running, slide the runner forward until you've sanded to your layout line. Then stop the tool and clamp the runner to the panel. Restart the sander and slowly rotate the workpiece to complete the job.

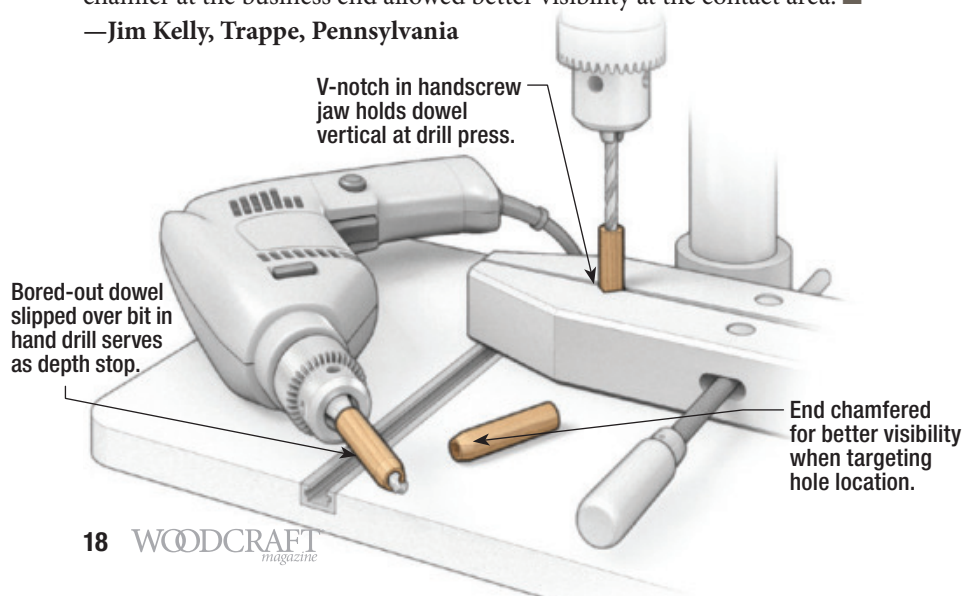
—Derek Richmond, associate editor



## Dowel depth stop

A recent project required hand-drilling a lot of  $\frac{1}{4}$ "-diameter holes exactly  $\frac{5}{16}$ " deep. After some thought, I realized that I could make an accurate depth stop from a length of dowel. First, I fully seated a  $\frac{1}{4}$ " bit in my hand drill to calculate the stop's length. I cut a  $\frac{1}{2}$ "-diameter dowel to that length and marked center on one end with an awl. I chucked the  $\frac{1}{4}$ " bit in my drill press and bored a hole through the axis of the dowel, which I held vertically in a notched handscrew. I then chucked the dowel in a  $\frac{1}{2}$ "-capacity hand drill and chamfered the end by rotating it against the spin of my disk sander. I rechunked the  $\frac{1}{4}$ " bit in my hand drill and slipped the dowel over it. The inner end of the dowel that pressed against the end of the chuck provided solid registration, while the chamfer at the business end allowed better visibility at the contact area. ■

—Jim Kelly, Trappe, Pennsylvania



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# Mini CUTTING BOARD Trio

*Nested, wall-hung  
snack-slicing boards*

By Paul Anthony



**M**y wife comes up with great project ideas. For some time, she had been suggesting I make small cutting boards, noting how convenient they would be for simply slicing up a piece of fruit or small block of cheese when snacking throughout the day. Made sense to *this* snacker, so I got to work playing with a variety of shapes that might suit both form and function. It occurred to me that hanging the boards—but not stacked—would provide easy access to them. These design parameters boiled down to the concept of nesting three differently shaped boards side by side on a wall-hung backboard. I really like the combination of a  $\frac{5}{8}$ "-thick paddle-shaped board flanked by  $\frac{1}{2}$ "-thick round- and kidney-shaped boards.

Realizing that I would likely also end up making these sets as gifts, I decided to template-rout them. Carefully made templates allow for quick production and ensure that adjacent profiles are a consistent distance from each other for aesthetics. Another advantage to template-routing is that it greatly reduces edge cleanup if you use an over-under flush trim bit, which can be adjusted to cut with the grain to minimize tearout.

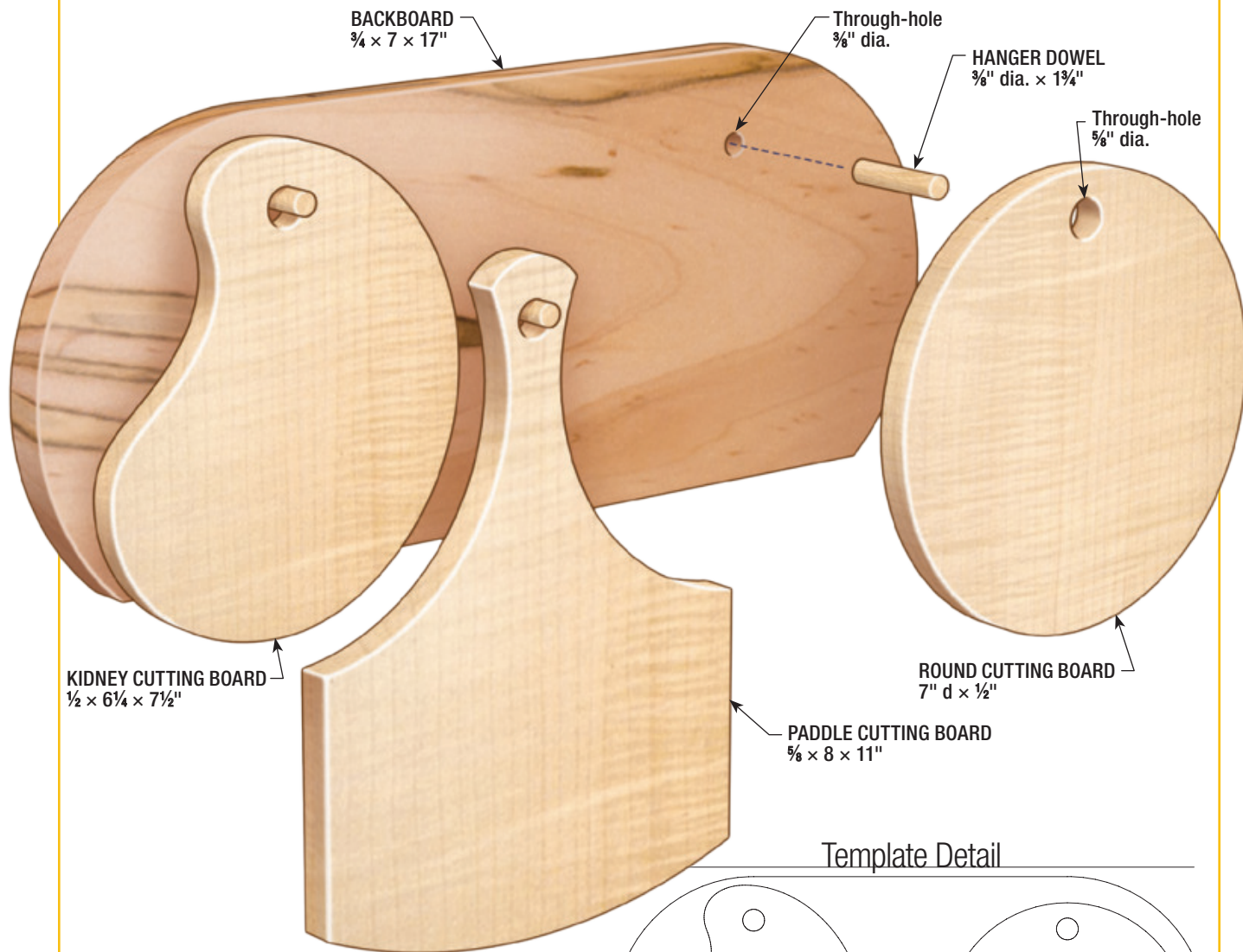
This project affords a great opportunity to use small scrap boards of precious woods. I made this set of cutting boards from curly maple, while the backboard is ambrosia maple. I have to hand it to my wife: we reach for these small boards at least as often as our full-size versions. You'll see.



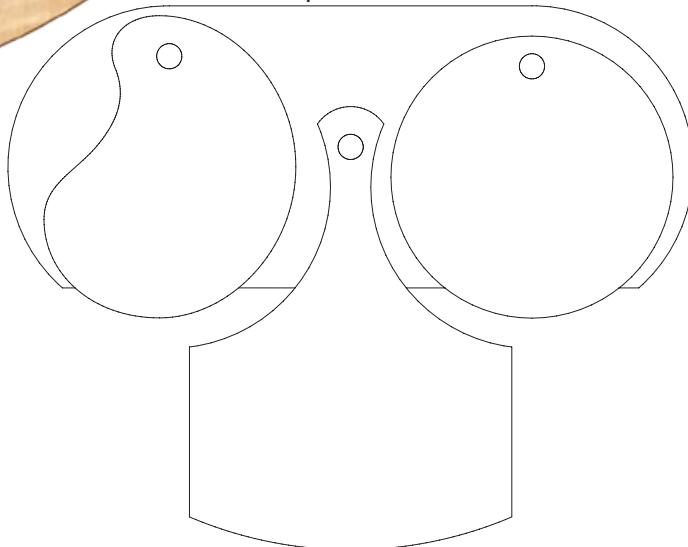
# Complementary kitchen kit

The cutting boards hang from dowels installed in a backboard that is secured to the wall using keyhole slots routed in the back (not shown here). Curves in the round and kidney-shaped boards complement those that form the handle of the paddle board, allowing the

boards to nest together when hanging. The grain in the cutting boards is oriented vertically for both strength and aesthetics. Making the paddle board  $\frac{1}{8}$ " thicker than the two flanking it adds visual dimension to the hanging set.



Template Detail



## Order of Work

- Make templates
- Pattern-route blanks to shape
- Shape backboard and hangers
- Sand and finish



# Make the templates

Print out the paddle and kidney board patterns (see OnlineEXTRAS). Using stiff-paper versions, trace the profiles onto  $\frac{1}{2}$ " plywood. Lay out the 7"-diameter round plywood template using a compass. In each case, orient the plywood's grain to match that of the finished piece to help visualize grain direction when template-routing later. Bandsaw all the templates slightly oversized before sanding them to final shape with a disc sander and a spindle sander. At each hanger hole location, drill a hole just large enough to accept the shank of an awl that you'll use later to mark the cutting board blanks.



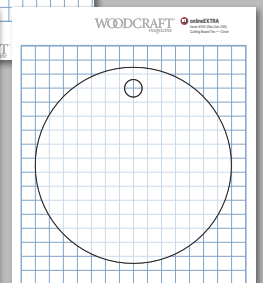
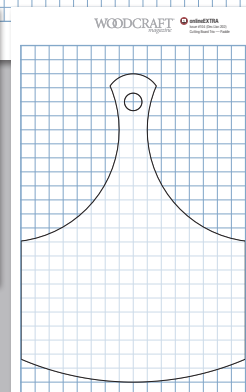
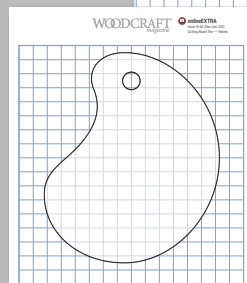
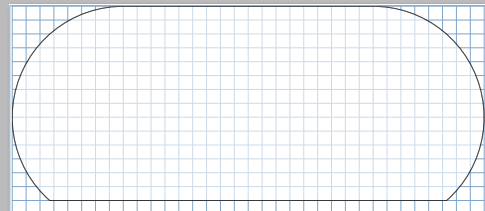
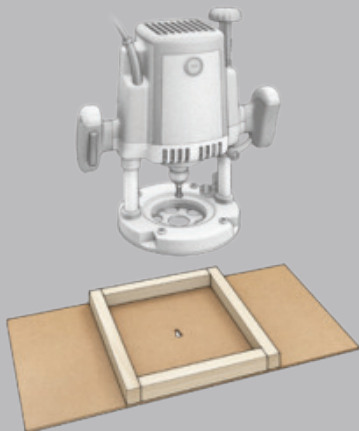
**Saw First.** Bandsaw the templates just outside the lines, using a narrow blade to easily navigate the concave curves.

**Sand Second.** Sand the round template to shape using a disc sander and jig (See Tips & Tricks, p. 18). The template rotates on a pivot pin installed in the end of a runner that's clamped to the auxiliary table at the proper distance from the sanding disc.



## onlineEXTRA

- Keyhole slot routing jig
- Full-size patterns for cutting boards and backboard





# Shape the boards

After milling stock to thickness, trace the template profiles onto the blanks, orienting the grain to run vertically when boards are hung. Then rough-saw the boards to shape. Attach the templates to the blanks with double-faced tape, and use an awl to mark the hanger hole locations. Then

template-route to the final profile as shown, using an over-under flush-trim bit. (See Buyers Guide, p. 62.) Detach the templates and drill a  $\frac{5}{8}$ "-diameter hanger hole in each board. Finally, chuck a  $\frac{1}{8}$ " roundover bit in your router table and ease the edges of all the boards, including the hanger holes.



## Flush-trim Setup



An over-under flush-trim bit allows pattern-routing with the template atop or under the blank. Mark out the direction of bit travel for cutting with the grain when the template is on top. Note that you'll be feeding the workpiece opposite the direction of bit travel.

**A little sticky.** A bit of double-faced tape goes a long way, so a few square inches will easily hold the templates to the blanks for routing. For added security, clamp the taped sections in a vise for a few seconds before routing.



**Clean over and under.** With the endmost bearing riding against the template atop the workpiece, trim along the sections you marked earlier, feeding the piece against the rotation of the bit (left). Then flip the assembly over, adjust the bit height to employ the opposite bearing, and trim the sections that remain (right).



## Finish up

Size and shape the backboard. It's worth making a router template if you plan to produce multiple cutting board sets. Drill  $\frac{3}{8}$ "-diameter holes for the hanger dowels where shown on the pattern, then plunge-route the keyhole slots in the back. Sand and finish all pieces before sizing and installing the hanger dowels. Mineral

oil—warmed in a pan to aid penetration—works well for finishing the cutting boards, while the backboard calls for something more durable such as wiping varnish. Finally, install pan-head screws in your wall for hanging your cutting board set. Then sit back and snack on some apple or cheese slices while you admire your work.



**Key to hanging.** A simple router jig (see OnlineEXTRAS) helps with cutting the keyhole slots on the back. The jig corrals and guides the router base, allowing you to plunge the keyhole bit, then accurately shift the router  $\frac{3}{8}$ " to create the slot.



**Slimming down.** If commercial dowel stock is too fat, drive it through a dowel sizing plate. You can purchase one or make your own by drilling through plate steel. This shop-made version will slim down  $\frac{1}{4}$ "-,  $\frac{5}{16}$ "-,  $\frac{3}{8}$ "-, and  $\frac{1}{2}$ "-diameter dowels.



**Nosing around.** After sizing the hanger dowels, chuck each one in a hand drill and round one end using a disc sander. Spin the drill opposite the rotation of the sanding disc. ■





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# DRILL PRESS ACCESSORIES

*Make your  
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less boring*

By Derek Richmond

There's no getting around the importance of holes in woodworking, and the drill press is the go-to machine for boring them. Properly tuned, a drill press will put holes of the right size in the right place at a right—or just about any other—angle. But if it's to deserve its place on the shop floor or bench, it must do more than just make holes. With the right accoutrements, you can turn your drill press into a multipurpose machine capable of supplementing or even supplanting a few other tools in your shop. I've put together a stable of accessories sure to take any drill press from a one-trick pony to a workshop workhorse capable of sanding, shaping, scouring, and more. And check the Buyers Guide (p. 62) for a quick list of these products, including sources, product numbers, and prices.





## Drum up support

Chucking a sanding drum in the drill press is a time-honored trick, but it's not always a good one. Drill presses aren't designed to handle lateral pressure, so side-loading risks sloping the edges of your workpiece or even damaging your machine's bearings. This clever support from Veritas acts as a live center on your drill press table, to add support and help prevent sanding drums from deflecting. While Veritas also makes shafts with a dimple in their ends to engage with the support system, I found that the support works well with a solid rubber drum by mating the point with the center of the drum bottom.

Place the support under your drum and raise the table until the support mates firmly with the drum's underside.

Keep your drill press speed at about 1700 RPM. You'll also need an auxiliary table at least  $\frac{3}{4}$ " thick to raise the workpiece above the support as shown on the left.



**Veritas Drum Sander Support System, \$19.90**  
([leevalley.com](http://leevalley.com) #68Z0220)

## Mopping up

With a sanding mop, you can easily smooth complex curves like moldings, coves, or carvings. Stack the pre-sliced sheets on either the short or the long mandrel, depending on your sanding needs, and fan them out to create a wheel. For lighter sanding, insert the included washers between every 3-5 sheets to create more "fluff" in your mop. Need to remove more material? The included nylon stabilizer discs cover all but the tips of the "flutter sheets," making the mop stiffer for more aggressive sanding or shaping.

Run your new sanding mop against some scrap wood first to break in the paper's edges and separate the sheets to avoid gouging your workpiece. The manufacturer advises that you keep your drill press speed below 2300 RPM. Starter kits including mandrels and abrasives are available in grits from 80 to 320. I

reach for the 120 grit mop most often. Replacement abrasives are also available

(see Buyers Guide, p. 62).



**Klingspor Gold Sand Mop 1" x 4" 120 Grit Flutter Sheet Starter Kit, \$44.95**  
([woodworkingshop.com](http://woodworkingshop.com) #FS32999)



## Scouring pad

The chip and ramekin wells of party trays like the one shown here are too small to smooth with a random orbit sander but too large to reasonably hand-sand. A rotary sanding pad reaches small hollows for efficient sanding, and its foam backer allows it to sand the bottom flat without gouging the sides.

Pick up precut 2"- diameter discs in grits from 60-240, or cut your own from sanding discs. The standard hook-and-loop connection makes for quick swaps, allowing you to run the gamut of grits efficiently. I found that excessive pressure might cause lower grit discs to lose their hook-and-loop grip, so use a light touch and keep the workpiece moving. Run your drill press at a max of 1750 RPM, according to the manufacturer.



**Sorby 2" Foam Sanding Disc Holder, \$24.99**  
([woodcraft.com](http://woodcraft.com) #17K70)

## Inflate-a-bulb

These inflatable sanding bulbs combine elements of sanding drums and mop sanders. Straight sides let you work flat areas as you would with a drum, while the air-filled rubber conforms to shapely profiles. The round one is ideal for concave curves such as the bowl of a spoon while the drum works well for complex curves such as those on a guitar neck—where a spindle sander may risk imparting a divot. Inject a shot of air through the valved stem with the included pump to inflate the rubber bulb and hold the sanding pad in place.

The set includes the hand pump, the inflatable dome and drums sanders, and sleeves for each sander in four grits: 60, 120, 220, and 320. For best results, don't apply unnecessary pressure to the bulb—let the sandpaper do the work. Pushing too hard against the bulb can cause the seal to break, releasing the trapped air. The manufacturer suggests 3400 RPM for optimum performance.



**King Arthur Tools Guinevere Basic Sanding Kit, \$134.99**  
([woodcraft.com](http://woodcraft.com) #147549)







**Microplane 2" Diameter Rotary Shaper,**  
\$18.99 ([woodcraft.com](http://woodcraft.com) #828821)



## Wood grater

Ideal for shaping small carvings, spoon backs, and knife handles, a rotary rasp removes large amounts of material quickly. The tooth configuration leaves a smooth surface requiring finish sanding only. And when the blades wear out, replacements are available for both the 1"- and 2"- diameter cutters. All this from a company known for their cheese graters.

Use light pressure to avoid the cutter gouging or grabbing the workpiece. I found the faster you run the spindle, the smoother the cut and more control you have over the shaping. But don't exceed 2500 RPM. Even at that speed, the tooth pattern and venting design ensure the blade stays cool. Beyond shaping wood, this rasp also easily shapes sheetrock, plastic, rubber, and other non-metals. Just be sure to keep your fingers clear.



**4" Crimp Wheel, 1/4" Shank, \$5.27**  
([homedepot.com](http://homedepot.com) #202831062)



## Brush it off

Pick up a wire brush or two to make quick work of removing rust, paint, and burrs from tools and other metal implements. They also excel at taking finish off reclaimed lumber and quickly adding a distressed look to new stock. Available at most hardware stores, you can find these brushes in a variety of diameters with bristles of steel, stainless steel, brass, and nylon. Steel bristles are the most aggressive and are good for reclaiming old tools such as the plane body shown to the left. Use stainless brushes to clean up other stainless items so as not to contaminate the surface with metal that can rust. Brass and abrasive-coated nylon brushes are a little gentler and are a better choice for removing paint from wood without gouging it severely. When shopping, be sure to pick brushes with an integral shank. Those with a hole at the center are designed for use with a bench grinder.



## It's hip to be square

There's no avoiding it: your drill press is made to make holes. That doesn't mean they must be round. A mortising attachment wraps a drill bit with a four-sided chisel, letting you drive both into your workpiece together to make a square hole. Move your workpiece down the fence and repeat to extend that hole into a mortise. The drill press version uses the same  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{1}{2}$ ", and  $\frac{5}{8}$ " hollow chisel sets common to benchtop mortisers but is less expensive and space-hogging. The model shown on the right includes a fence and three hold-downs to secure your workpiece.

Because of the length it adds to the quill, the mortiser attachment fits best on a floor-standing drill press. If your table deflects downward when driving the chisel into your work, wedge a 2x4 support leg between it and the floor for additional support. I found that speeds between 900 and 1200 RPM leave the cleanest cuts.



**Ironton Mortising Attachment, \$57.99**  
([northerntool.com](http://northerntool.com) #57860)

## Plugging along

Whether you're hiding a miscut hole or simply concealing a screw, making your own plugs is the best way to match the wood and the counterbore. These cutters create perfectly-sized and shaped plugs that you pluck from scrap work material and tap into place. Align the grain to camouflage the plug, or emphasize the holes by cutting them from a contrasting species. After gluing the plug into its hole, trim it with a flush-cut saw or chisel.

This three-piece set creates  $\frac{1}{4}$ ",  $\frac{3}{8}$ ", and  $\frac{1}{2}$ " plugs. The manufacturer suggests running your drill press at 500 RPM and driving the plug cutter into the scrap until the bit bottoms out. The cutter's shape creates a slightly tapered plug with chamfered upper corners for easy insertion. Use a small flat-head screwdriver to free them from your scrap. ■



**Snappy 3-Piece Tapered Plug Cutter Set, \$34.99** ([woodcraft.com](http://woodcraft.com) #146723)



# KEEPSAKE BOX

*A classy container with architectural profiles*

By Bill Sands



**K**eepsake boxes are enduring favorite projects for many woodworkers. Some of these handcrafted wooden repositories are practical in design; others are elaborate and aesthetically pleasing while maintaining their functionality. This container, which is perfect for anyone, falls under the latter category. Its lavish lines and fabric-covered sections enhance its elegance, while its spaciousness and divided tray increase its utility.

The ornate profiles that set off this attractive repository are achieved with

a handful of router bits that create architectural profiles you may recognize in your own home. For example, the box walls are shaped with a crown molding bit that is also used to help shape the feet here. And a table edge bit, which can also be used for staircase handrails, shapes the lid frame and its raised panel. Contrasting wood species (canary wood and leopard wood) add to the stylish design.

Miters make up most of the joinery, and the lid frame and box are reinforced with Domino tenons, though you can

use splines instead (see below). The clever construction includes unusual techniques sure to challenge your woodworking skills, and the finished box will provide a gorgeous haven for jewelry, collectibles, and other mementos.



## onlineEXTRA

- Full-size foot pattern
- Free article download: Table-sawn Splines

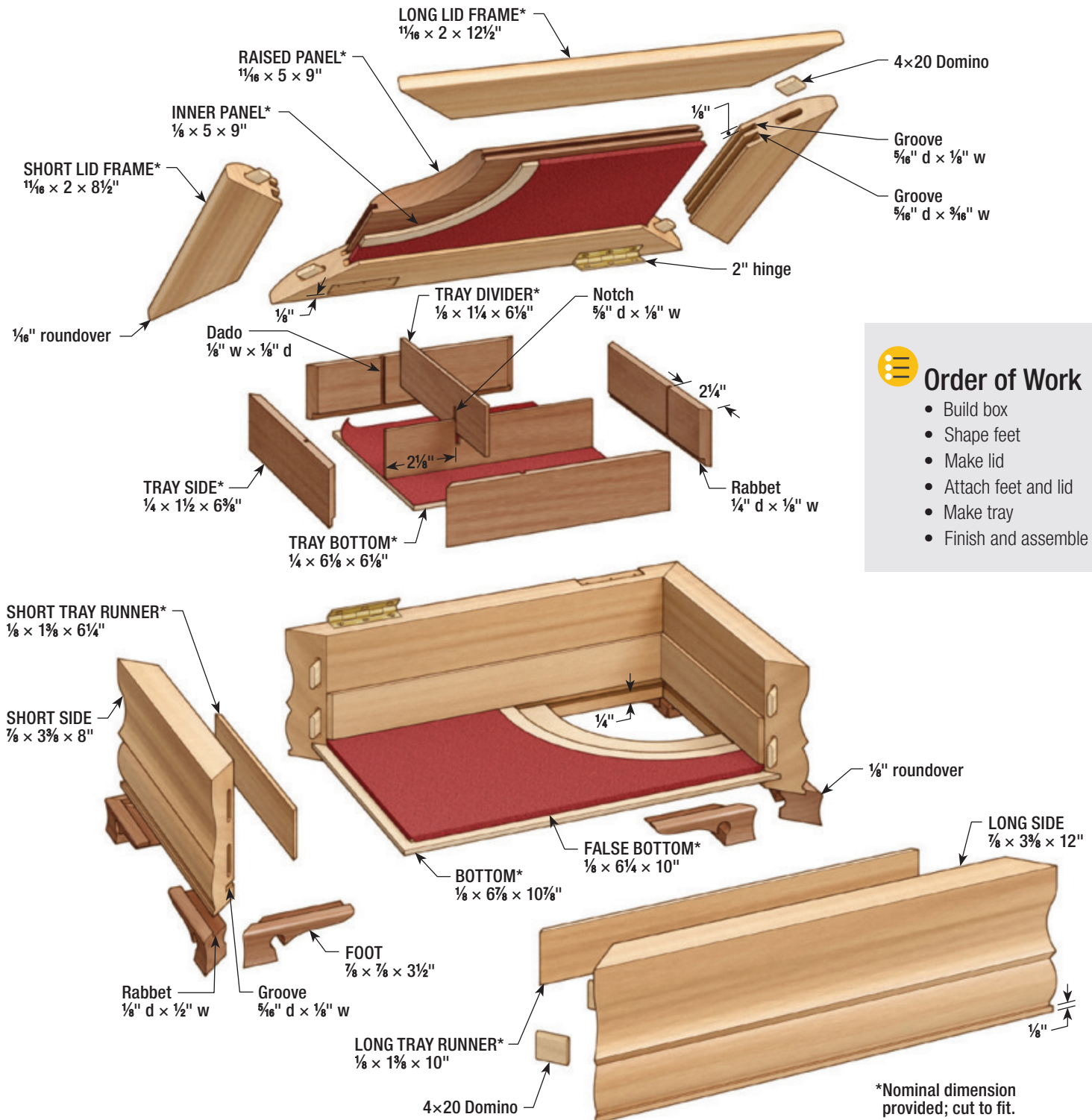


# Mitered majesty

The joinery on this regal-looking box consists largely of miters reinforced with Festool Domino tenons. The box walls, which are shaped using a crown molding bit, are grooved to accept a bottom panel. Atop that sits a fabric-

wrapped "false" bottom and runners that support a partitioned sliding tray. The lid frame is double-grooved to capture a raised panel on top and a fabric-wrapped inner panel beneath it. The hinges that attach the lid are

positioned to support it upright when open. The container sits elevated on ornate molded, sawn, and mitered feet that are glued and pinned in place.



## Order of Work

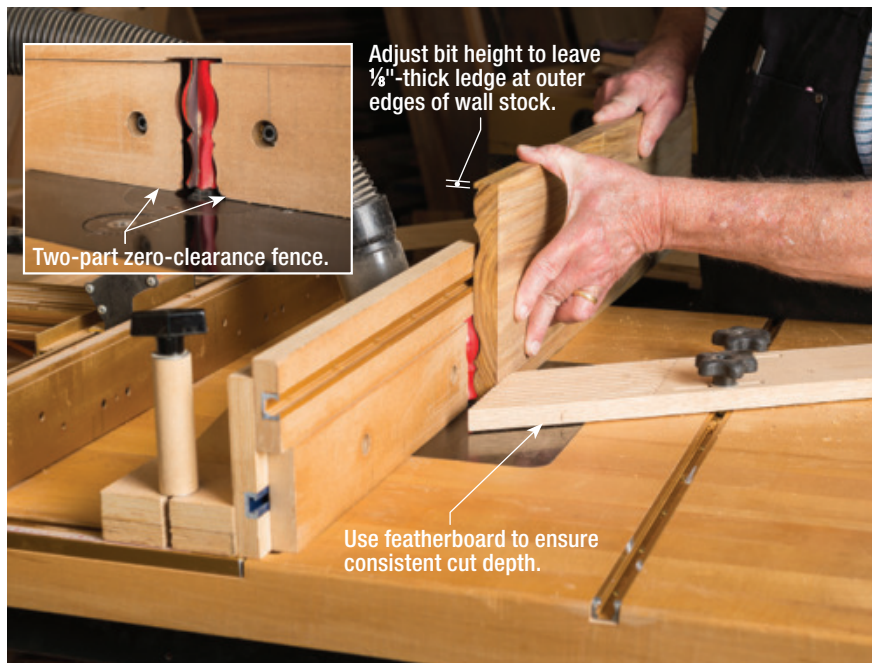
- Build box
- Shape feet
- Make lid
- Attach feet and lid
- Make tray
- Finish and assemble



# Route the profile and build the box

Saw a  $\frac{7}{8}$ "-thick board to about  $8 \times 22$ ", which will yield all four box walls. Outfit your router table with a crown molding bit (see p. 62). Adjust the bit height so that the cutting edge starts  $\frac{1}{8}$ " above the table, which will leave a  $\frac{1}{8}$ "-thick ledge at the edge of the stock. Then route the profile on each edge of one face, taking multiple shallow passes as shown. Use the same procedure on a piece of scrap that you can use to create a custom sanding pad (see sidebar below).

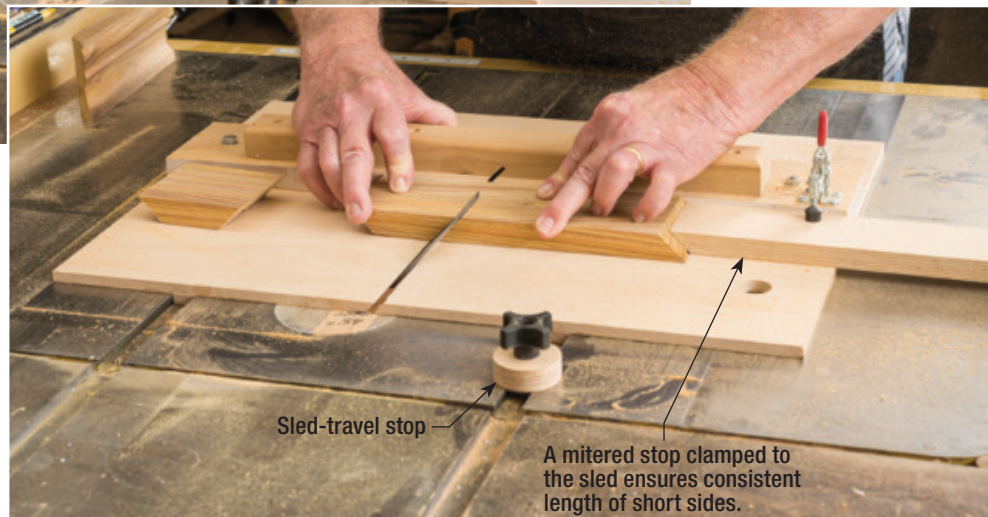
Rip a  $3\frac{3}{8}$ "-wide section from each edge of the stock. Then miter each of the two resulting sections into a short side and a long side. To ensure grain continuity around two of the box corners, cut the long and short sides from opposite ends of the sections. Saw grooves in each piece for the bottom panel, then cut the Domino mortises in the mitered ends. (See onlineEXTRAS for an alternative to Festool Domino joinery.) Dry-fit the box and measure for the bottom. Cut the bottom to size, then sand its outside face and the inside faces of the box walls before assembling.



**Route the profile.** With your router table fence set for a light cut, feed the wall blank stock past the bit. After the first pass, flip it end for end and repeat. Move the fence back for each successive pair of light passes. Repeat until the full length of the cutting flute contacts the stock, as shown here.



**Miter the box walls.** Using a sled and a standoff block along the rip fence, miter to length the long sides from each box wall blank. Then miter the short sides. A stop secured in the table slot prevents excess sled travel.





## Complementary sanding block

A complementary sanding block significantly reduces time smoothing moldings. To make one, first crosscut two 1/8"-wide kerfs a few inches apart in a scrap of your molding, then wedge a plywood "dam" in each kerf. Lay plastic wrap (as a mold resist) over the assembly, and press a thick layer of auto body filler into the dammed area. Cut a 3/4"-thick backer to size, and press it onto the filler. After an hour, pull your sanding block free, attach sandpaper using spray adhesive, and fasten on a handle. I typically make two sanding blocks for a particular molding profile, facing one with 150-grit paper, and one with 220 grit.



**Cut the Domino mortises.** After sawing the grooves for the bottom, set the Domino's fence to 45°, and secure the parts before making the two mortises into the face of each miter.

**Pull it together.** Quick-grip clamps are more effective than band clamps on heavily profiled box walls like this. Position them for force in each direction to bring the joints together. Then ensure the box is square under clamp pressure.





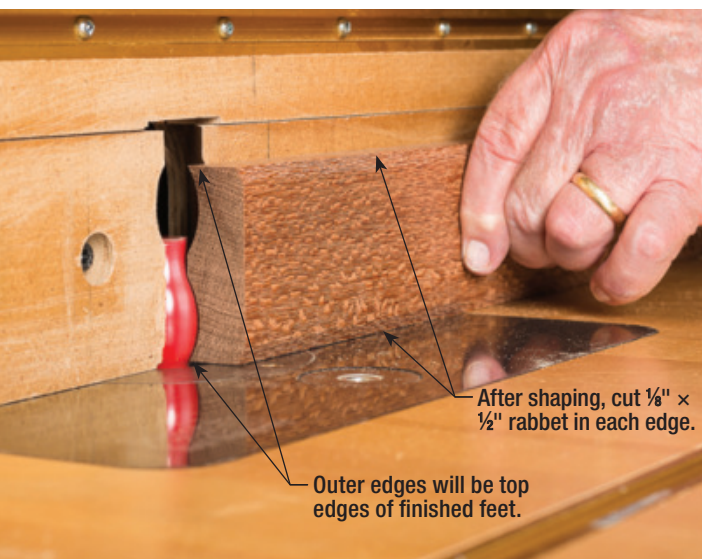
# Make and shape the feet

Spray-adhere a printed foot profile pattern to  $\frac{1}{8}$ "-thick plywood, then drill and scrollsaw the shape to create a plywood pattern. Mill stock  $\frac{7}{8}$ " thick, at least 2" wide, and 24" long, enough to yield 12 parts—eight for the box and four for set-ups. Rout the coves as shown, then rout

a  $\frac{1}{8}$ "-radius roundover on both edges of the coved face. Next, rabbet the edges of the opposite face to create the recess for the box.

Rip a  $\frac{7}{8}$ " strip from each edge of your coved blank and then miter and crosscut your 12 parts to length, making six right-hand and six left-

hand miters. Drill the holes in the feet and trace the profile as shown. Scrollsaw each foot to shape, and sand its edges. Glue up each pair of feet, being careful to align the top edges. The bottoms of the feet will be sanded flush after attachment to the box.



**Rout the cove.** Position the height of the crown molding bit to use only the cove portion, and then set the fence to make a  $\frac{1}{4}$ "-deep cut. Use the same light-pass flip-and-repeat procedure used to make the box walls to rout the cove in the feet stock.



**Drill the feet.** Use the foot template and a mitered stop to position a foot blank with its top edge against the drill press fence. Then bore the  $\frac{3}{8}$ "-diameter hole into the coved face.

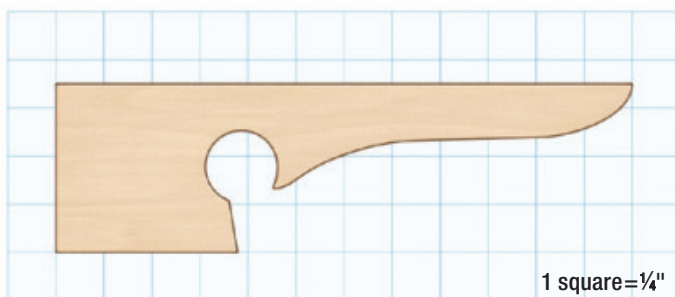


**Trace the profile.** Use a dowel inserted in the foot blank's hole as registration for the template. Then trace its profile onto the blank. A white colored pencil improves visibility when scrollsawing on dark wood.



**Wrap it up.** After brushing glue onto the miters of mating feet parts, rub them together to tack up the glue. Then wrap a rubber band around the pair and press their top edges against a flat surface to make sure they align.

Foot Pattern





# Make the lid frame and panel

Cut two pieces of your lid frame stock to about 3 × 24" long, which will yield the frame pieces and some extra for kerfs and test cuts. Shape the profile on the router table using a table edge router bit (see p. 62). Adjust the bit height and fence to bring the full curved portion of the cutting flute

into play. Rip the pieces to width, and then use a sled as shown to saw the miters accurately and consistently. Dry-fit the frame and measure for the two lid panels. Saw the raised panel to size, groove its edges, and then rout the profile using the same bit as for the frame. Saw the inner

panel to size, and wrap it with fabric cut 1" oversize at each edge. Groove each frame piece to accept the panels, and rout a 1/8" radius on its outside bottom edge. Then cut the Domino mortises where shown in the drawing, and assemble the lid as shown.



**Miter the lid frame.** To ensure perfect 90° miters, use a miter sled, cutting one end of each frame piece on the left side of the jig and the opposite end on the right side.



**Fabric-wrap.** Spray adhesive on one side of the inner panel and press it into the fabric. Use a wheel cutter to miter the fabric corners to wrap around the panel. Double-face tape affixes the flaps to the inside face.



**Double grooves.** After sawing the grooves in the lid frame parts for the raised panel, saw the grooves for the inner panel. Use the fabric-wrapped inner panel itself to test the groove width, adjusting it as needed by relocating the fence.



**Lid assembly.** Apply glue to the miters and Domino tenons. Then, with both panels fit into their grooves, clamp the lid frame together. Inspecting both faces, adjust the clamps to align the frame's corners with those of the raised panel.

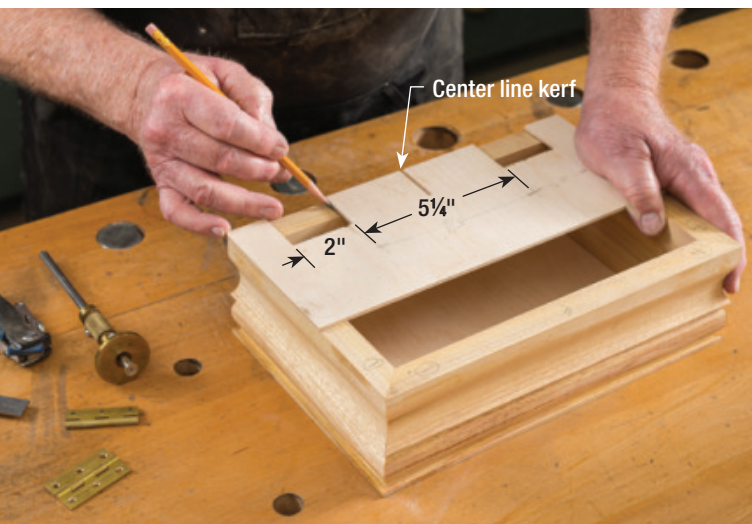


# Mortise for hinges and attach the feet

When laying out the hinge mortises, I use a template made from  $\frac{1}{8}$ " plywood to make a template to ensure perfectly matched spacing between the box and lid hinges. Lay out the box mortises first. Chuck an upcut spiral bit in a palm router, and set the bit depth to the thickness of your hinge leaf. Rout close to your layout lines, then chisel out the remaining waste. Lay out and cut the

hinge mortises in the lid in the same manner, but locate them about  $\frac{1}{4}$ " from the lid's rear edge. This positions the lid to stay upright when fully opened. With your table saw blade projecting just over  $\frac{1}{8}$ ", trim a consistent amount from the projecting ledge at the bottom of each box wall to make the box bottom perimeter  $8\frac{1}{2} \times 12\frac{1}{2}$ ". Then attach the feet as shown. After the glue dries, level

the standing assembly by scrubbing it on sandpaper affixed to a flat surface. Snugly fit thin scrap plywood over the interior lid panel to protect the fabric while sanding and finishing. Also, mask off the tray runner glue-contact areas on the interior box walls. Then finish the box and lid as desired. I applied several coats of Watco spray lacquer.



**Wall mortise layout.** After notching your hinge mortise layout template on the table saw, align its center kerf with a center mark on the rear box wall, and pencil the hinge locations. Knife the pencil marks before routing the mortises.



**Lid mortise layout.** Also use the template to lay out the lid mortises. However, use a marking gauge to mark the rear edge of the mortise and a knife to mark the ends. For stability, work atop a scrap riser panel covered with a protective cloth.



**Chisel clean-up.** After freehand-routing the majority of the mortise waste close to the layout lines, chop and pare away the remaining waste, working to the knifed mortise ends.



**Glue on the feet.** Brush glue on the rabbets of the feet and use spring clamps to pull them up against the outer box wall. Then clamp or pin-nail them to the bottom edges of the walls.



# Insert the false bottom and make the tray

Fit the interior with a fabric-covered false bottom similar to the interior lid panel. Looping masking tape under it for retrieval allows testing the fit. Make the square tray as shown in the drawing, sizing it to fit your box's interior front-to-back dimensions. Rabbet the bottom edges of the  $\frac{1}{4}$ "-thick tray walls to accept the bottom panel. Use a  $\frac{1}{8}$ " flat-kerf

table saw blade to cut a dado in each side where shown in the drawing to house  $\frac{1}{8}$ "-thick dividers. Then glue the sides together. To mark out the half-lap notches, first invert the assembled tray, and insert one divider. Then tuck the second divider into its dados, resting it on the first, and mark their intersection. Saw the joint as shown and glue the dividers

to the tray. Apply finish to the side-and-divider assembly, avoiding the bottom rabbet. Cut a tray bottom to fit, and glue fabric to its inside face. Use glue and  $\frac{1}{2}$ " pins to attach the bottom to the tray. Rip the runners to position the tray just below the top of the box walls. Miter the runners to fit, and then glue them in place. Finally, attach the lid by installing the hinges.



**Fit the dividers.** It's better here to mark-to-fit rather than relying on measurements. Tuck one end of an oversized divider in a side dado, and mark it to length at the opposite dado.



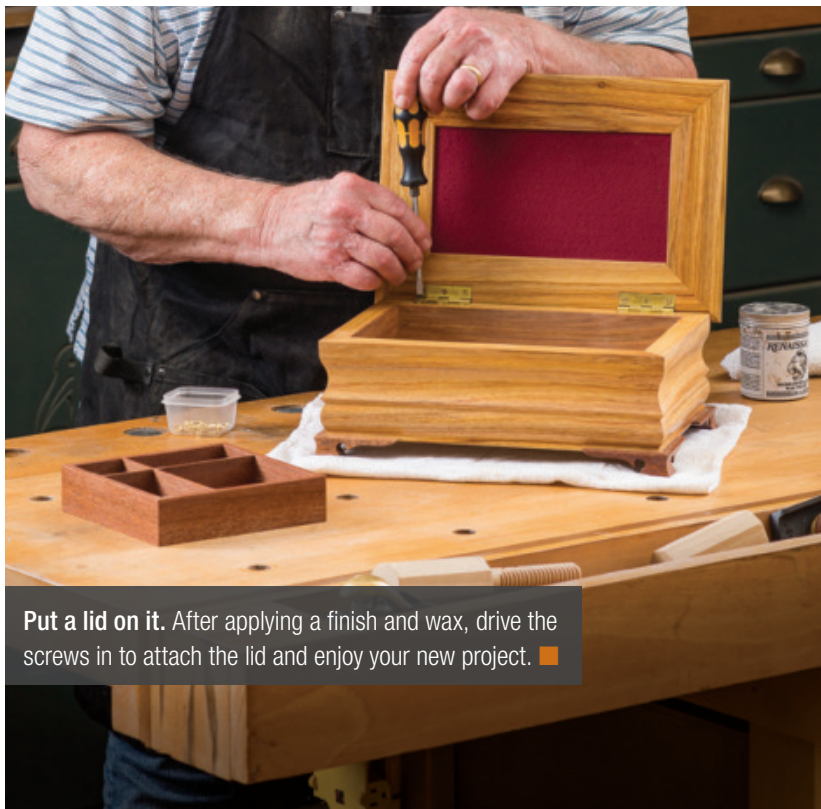
**Saw the half-lap joint.** When sawing the notches for the half-lap joint, stack-cut the two dividers using a table saw crosscut sled.

## About the Author



West Virginia woodworker **Bill Sands** retired from GE Research & Development in 1998 and expanded a latent interest in woodworking. He is a regular contributor to

Woodcraft Magazine, having built several projects for us over the years. When not in the shop, Bill enjoys photographing his outdoor adventures, all facets of BBQ cooking, and sharing good ale with friends.



**Put a lid on it.** After applying a finish and wax, drive the screws in to attach the lid and enjoy your new project. ■





# Turned CHRISTMAS TREE

*Cut your own tree for the holidays*

By Jim Kelly

**F**or most woodturners, making Christmas ornaments is second nature. They're fun and easy to turn from tasty wooden shop leftovers. They make great gifts, and don't usually require special equipment. Such is the case with these Christmas tree ornaments, which can decorate a table or a Christmas tree itself. What's special about them is that they're decorated with ornaments themselves in the form of inlaid slices of colored pencils. The best part of giving away these little turnings

is seeing people's reactions when asked if they can guess what the little ornament balls are made from. It usually takes a minute, but when they realize they're looking at the ends of colored pencils, a smile spreads across their face, and they want to know how I did it.

I make these trees in a variety of sizes. Small versions up to about 3" tall can be hung on a real Christmas tree. In that case, I just turn a tree body with an integral trunk, and install a shop-made wire hangar in the top. Table-standing

models can range up to 12" or so, and include a base that attaches to the tree body with a dowel "trunk."

Here, I'll take you through the steps of making a particular table ornament and hanging ornament. The overall dimensions given are not critical, and serve only to take you easily through my processes. Once you get the gist, you're on your way making your own forest of ornaments. Have fun, and Merry Christmas!





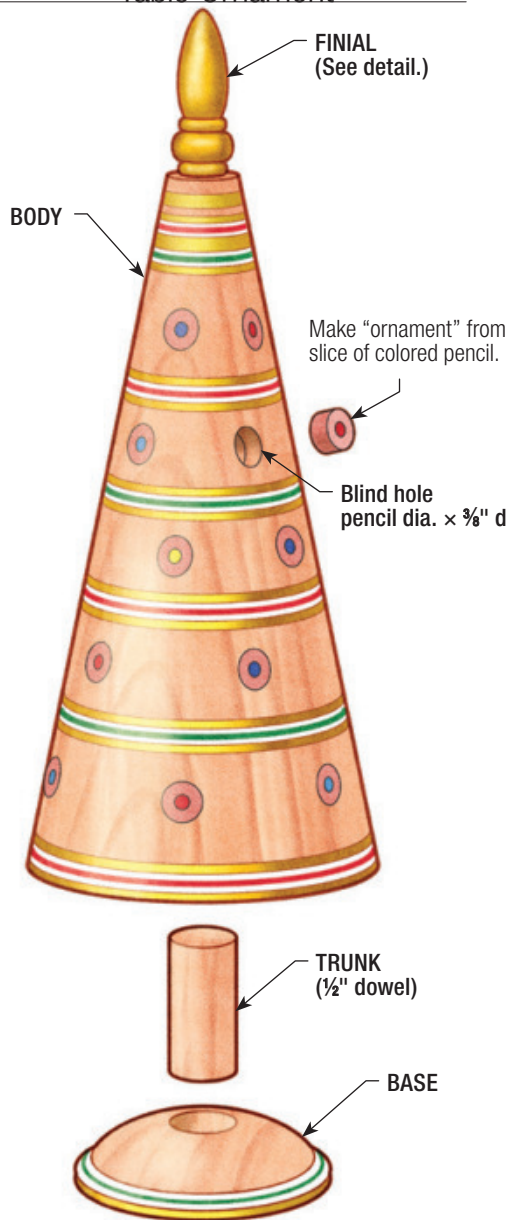
## About the Author



**Jim Kelly** has been a woodturner for 20 years, and resides in southeast Pennsylvania, where the hardwood is so plentiful it grows on trees. He is a board member of Keystone Woodturners, a chapter of the American Association of Woodturners based in Chester County, Pennsylvania. In addition to woodturning and woodworking, Jim enjoys historical restoration carpentry, is a board member of Historic Trappe, a local historical society, and is a beekeeper.



## Table Ornament

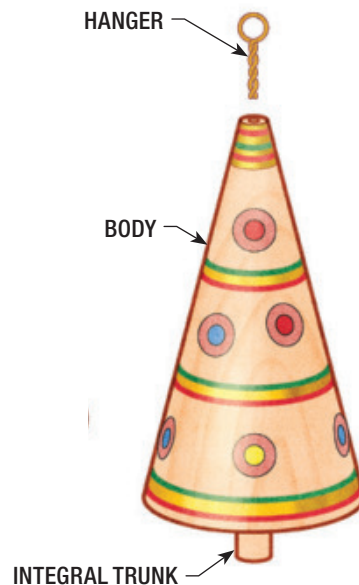


## Two tree types

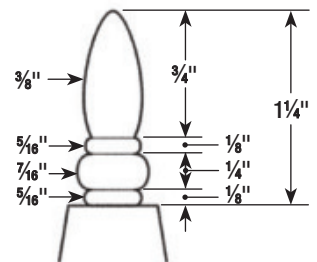
A table ornament consists of a base and a body joined by a dowel "trunk," while a smaller hanging ornament is simply turned from one piece that is drilled at the top to accept a

shop-made eye hanger. On both types, inlaid slices of colored pencils serve as "ornaments," and paint markers are used to apply rings of "garland" decoration.

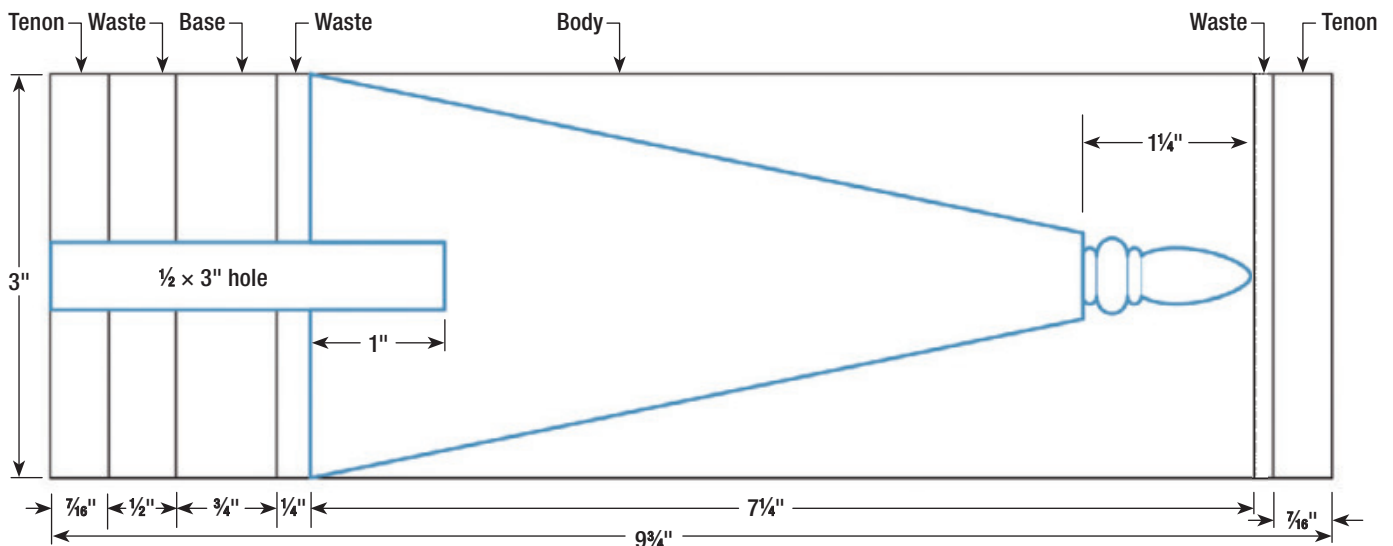
## Hanging Ornament



## Finial Detail



## Table Ornament Cylinder Layout

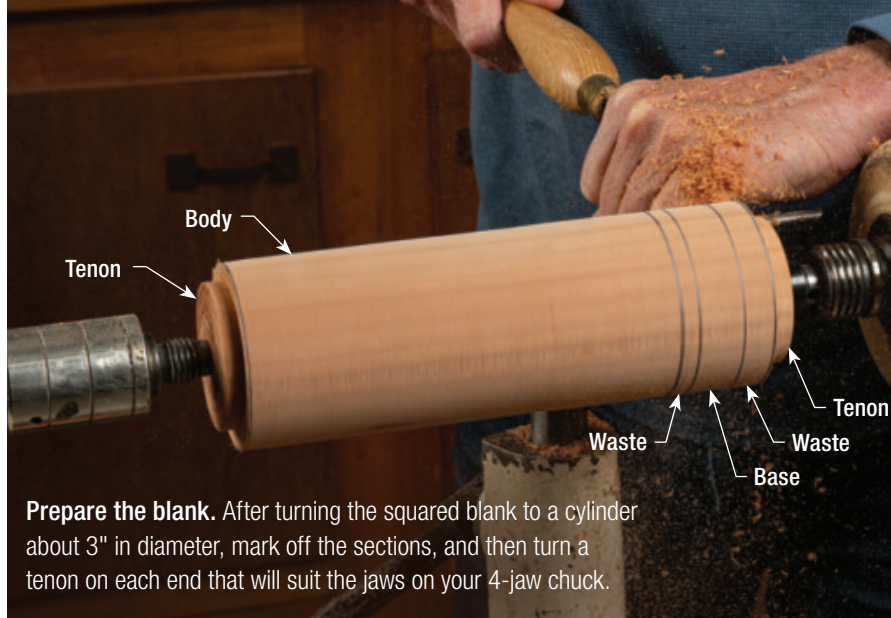




# Cultivate the tree

Turn a  $3\frac{1}{2}$ "-square  $\times$   $9\frac{1}{2}$ "-long blank to a cylinder between centers. Then mark off the sections shown in the drawing to the lower left, and turn a  $1\frac{3}{4}$ "-diameter by  $\frac{7}{16}$ "-long tenon at each end. (These tenons suit the #2 jaws on my Oneway chuck; size them to suit your chuck if necessary.) Drill a hole for the trunk as shown, then reverse the blank in the chuck. Make a parting cut to define the bottom of the tree body, rough out the conical tree shape, and turn the finial to  $\frac{1}{2}$ " diameter.

**Drill for the trunk.** Mount what will be the top end of the tree in a 4-jaw chuck, and use a  $\frac{1}{2}$ " bit in a lathe-mounted drill chuck to bore a  $2\frac{3}{4}$ "-deep hole into the opposite end. You'll be drilling through waste and the base section into the tree body.



**Prepare the blank.** After turning the squared blank to a cylinder about 3" in diameter, mark off the sections, and then turn a tenon on each end that will suit the jaws on your 4-jaw chuck.



**Reverse and rough out.** Invert the blank and bring a live tailstock center into play for support. Then turn the finial section to a  $\frac{1}{2}$ "-diameter cylinder, and rough out the conical tree body, leaving it about  $\frac{1}{8}$ " oversized in diameter for now.



**Finalize the finial.** Back the tailstock center off and turn the finial to its final shape, still leaving the tree body slightly oversized in diameter.



## Trim the tree

With the blank still mounted on the lathe, mark out the ornament grid on the body using the tool rest to guide a pencil for making the axial lines. Use a seamstress cloth tape measure to evenly step off their spacing. To prevent tearout, don't crowd the hole locations. Then poke starter holes with an awl. Referring to the tip on page 18, create a depth stop using a bit that matches the diameter of the pencils. Then drill the ornament holes as shown. Slice up some colored pencils and glue them into the holes, making sure to spread out the various colors. Finesse the body of the tree to its final diameter, flushing the pencil sections to the surface in the process. I use a 1/2" superflute gouge with a fingernail grind for this. Sand the surface, spray it with a coat or two of aerosol lacquer, then use ink markers to apply the "garland." Finally, part the body free of the waste. I place a box full of shavings on the lathe ways to safely catch the falling piece.



**Drill the ornament holes.** Using the grid as a guide, drill 3/8"-deep holes for the ornaments with a brad-point drill. Some rows of holes will fall on the axial lines, while others will fall in between. Orient the bit perpendicular to the cone's surface, not its axis.



**Pencil plugs.** Bandsaw 3/8"-long sections from a taped bundle of colored pencils, and glue them into the holes. A Q-tip makes a good applicator. Be sure to distribute the colors, and lightly tap each piece to fully seat it.



**Draw the garland.** After turning the "decorated" tree to its final diameter, sand it

and spray it with lacquer. Then apply "garland" using your choice of paint markers while steadying your hand on the tool rest.





## Make the base and trunk

After parting off the tree, the excess that remains in the chuck is the blank for your tree base. Begin by cleaning up the end, and then parting in a deep groove to establish the bottom of the base. Then turn the base section to a 2"-diameter cylinder and shape it as shown or as desired. Sand and paint the shaped base, then part it off, slightly angling your parting tool to create a shallow concavity in the bottom of the base. Finally, join the base to the body by gluing a ½"-diameter dowel "trunk" to both parts.



**Shape the profile.** Make a parting cut to establish the height of the base, and then shape it to your desired profile, which can be as simple as the domed surface shown here.

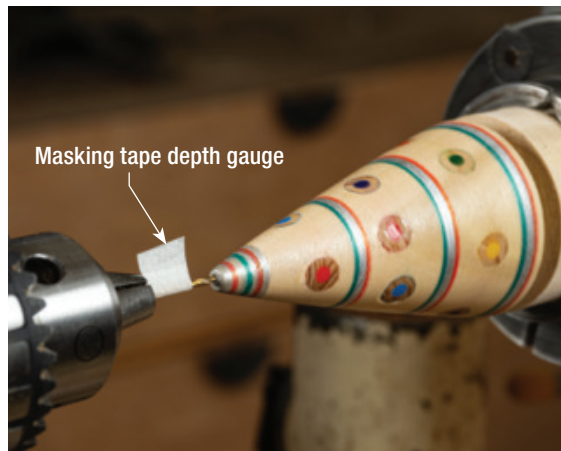
**Part off the base.** After shaping, sanding, and painting the base, part it free from the waste. Angle your parting tool to create a slight concavity in the bottom for better stability.



## Hanging ornament

Turn a 2"-square × 4"-long blank between centers to a cylinder with a 1¾"-diameter by 7/16"-long tenon at one end. Remount the blank, securing the tenon in your 4-jaw chuck. Mark a line 3" from the opposite end to locate the tree bottom, and use a parting tool to cut a ½"-deep groove there. Rough-turn the blank to a cone shape that begins at the groove. Lay out and install colored pencil "ornaments" in the same manner

as with the table ornament. Turn them flush to the surface, create a 3/16"-diameter flat at the tip of the cone, and sand and finish the surface. Then bore a ¾"-deep hole into the top end. Make the wire hanger as shown and screw it into the hole. Return to the groove you cut earlier and use a parting tool to deepen and lengthen it to create a ¼"-diameter × 3/8"-long "trunk," and then saw the finished tree free of the waste.



**Drill for the hanger.** Use a 1/16" bit in a lathe-mounted drill chuck to bore a ¾"-deep hole into the top of the shaped and painted tree to accept a hanger wire.



**Hanger twist.** To make the hanger, loop a length of 18-gauge wire around a nail and then twist the legs together and snip them to ¾" long to create a shank that will thread into the hanger hole.



**Turn the trunk.** Use a ¼" parting tool to create an integral tree trunk. Afterward, saw it free at its base. ■



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# Six-Piece BURR PUZZLE

*Careful cutting yields a clever conundrum*

By Ken Burton



**B**urr puzzles consist of a number of notched pieces that crisscross and interlock to form a three-dimensional, geometric solid. While the origin of the name isn't clear, the thought is that the puzzles were named after seed pods that they may resemble. They are both fun and challenging to solve, plus when well sanded and finished, they look intriguing when sitting assembled on a shelf or table. This particular design

is made from six pieces of wood, five of which have vee-shaped notches cut across them. Cutting the notches is a straightforward table saw operation, but it needs to be done precisely so the pieces fit together well. To aid with this, make a simple cradle to help hold the pieces as you cut them. For best results, make the pieces from a dense hardwood. The puzzle pieces in the photos are made from sapele.

## Order of Work

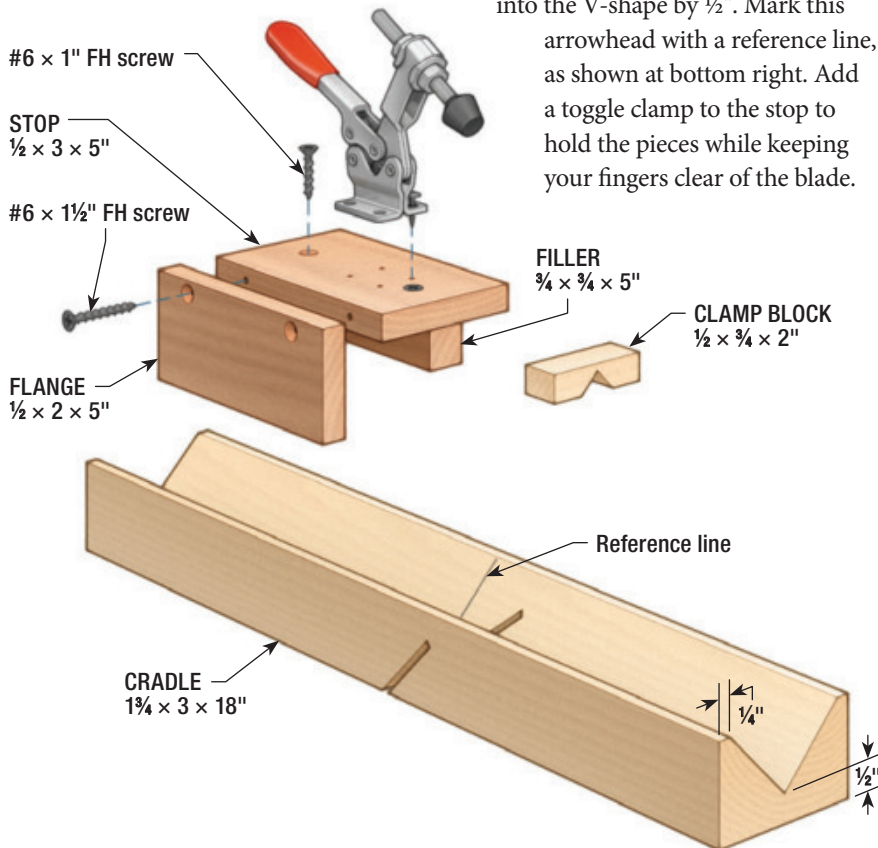
- Make cradle
- Mill pieces to thickness and width
- Crosscut notches
- Bevel to final length
- Sand, and finish
- Attempt to assemble without peeking



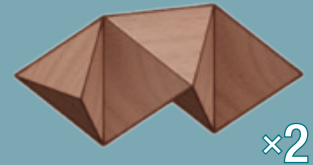
# The cradle is key

This project requires a lot of angled crosscutting. To make sawing the necessary notches and bevels safer and more precise, build a V-shaped cradle with an adjustable stop block. Dress a length of 8/4 stock, and then rip a V-groove down its center. Screw the flange and filler to the stop, as seen in the drawing below. Attach the cradle to your miter gauge. Tilt your table saw blade to 45° and crosscut

an angled kerf in the cradle that projects into the V-shape by 1/2". Mark this arrowhead with a reference line, as shown at bottom right. Add a toggle clamp to the stop to hold the pieces while keeping your fingers clear of the blade.



## Six pieces, three shapes, one solution



The puzzle is made from six equal lengths of squared stock. Three of the six pieces have two notches cut in them. Two of the pieces have three notches. One has none. After cutting the notches, the ends of all six pieces are beveled twice to cut them to final length. If you need a little help solving this brainteaser, flip to page 60 for the solution, or see onlineEXTRAS at [woodcraftmagazine.com](http://woodcraftmagazine.com).



**Tilt and rip.** With your table saw blade tilted to 45°, cut the V-groove in the blank in two passes, leaving the blank 1/2" thick at the V's tip.

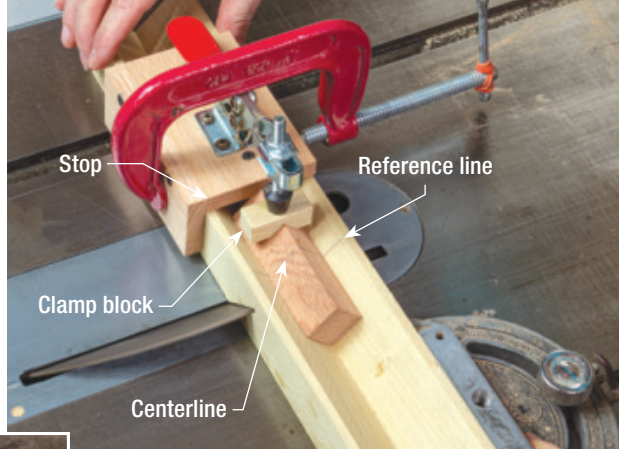


**Add a reference line.** After crosscutting a kerf through the V-groove, mark both slopes with reference lines that align with the tip of the arrowhead-shaped kerf.

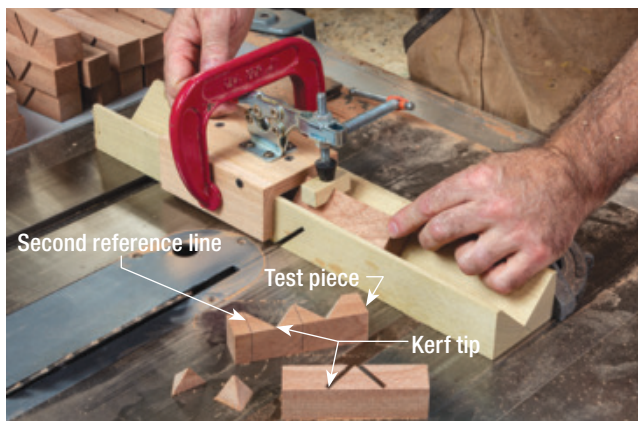


# Notch, bevel, and finish

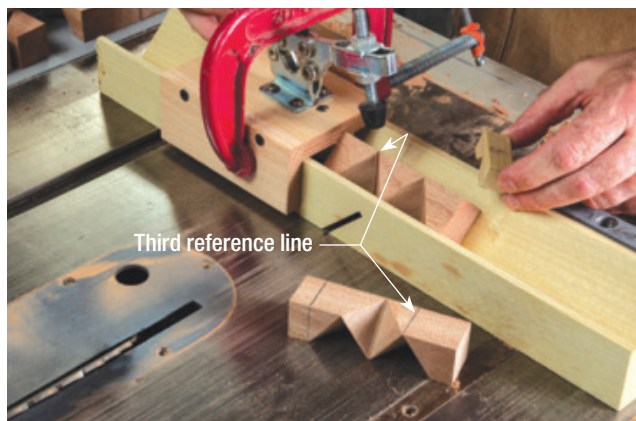
Mill two 18"-long pieces to 1½" square, and then cut them into four 4"-long segments, which will yield eight pieces—six for the puzzle and two for test cuts. Wrap a center line around a test piece, and align it with the reference mark on the cradle. Secure the piece with a clamp block and toggle clamp. Make test cuts, adjusting the stop as needed until the two cuts meet at the centerline. After making these two cuts on all but one piece, reset the stop block and make the second sets of cuts to complete these first notches. Next, on two of the pieces, repeat the basic process to cut a center notch in an adjacent corner. A sharp, high-quality combination or crosscut blade will yield notches that need little sanding and make for a better fitting puzzle. To finish the puzzle pieces, bevel their ends to cut them to their final length. Sand all surfaces and apply a clear finish.



**Centerline meet-up.** Adjust the stop to align the test piece centerline with the cradle's reference line, and adjust the blade height to kiss the horizontal corners. Saw, reverse the piece, and repeat. The two cuts should meet at the centerline as shown at left.



**Complete the first notches.** Measure from the centerline to the tip of a kerf on your test piece. Lay out the second reference line twice that distance from the centerline. Use this line to set the stop for making the intersecting notch cuts.



**Cut the center notch.** Wrap the third reference line around the block from the tip of one notch. Align this line with your cradle line to cut a center notch in two of the pieces. Orient the existing notches as shown, and then rotate the piece to complete the notch.



**Bevel to length.** Make two opposing bevel cuts on both ends of all the puzzle pieces. Use your third reference line on a test piece to set up the stop for these cuts.



**Remove saw marks.** To smooth the inside faces of the notches, adhere sandpaper to the face of a flat scrap with double-faced tape. ■



# Rudolph and Olive (the other Reindeer)

*Notched scrollsawn pieces  
connect for holiday cheer*

By Ken Burton



**T**was the week before Christmas, and down in the shop, I had been sanding without any stop. When from upstairs came a cry of dismay: When will you ever complete the display? Away to the scrollsaw I flew like a flash, and cranked out some reindeer

for not too much cash. A few bits of plywood, some patterns and such, sawn with precision, I came through in the clutch. Notched at the joints and finished with care, I soon had a herd to cease the despair. My critters were ready to frolic and so, were given a home amidst mistletoe.

Made with birch plywood, from Russia in fact, chosen to keep the pieces intact. Finished with spray paint augmented with glitter certain to keep young eyes all atwitter. And now I beseech you to saw out some deer to bring to your family holiday cheer.

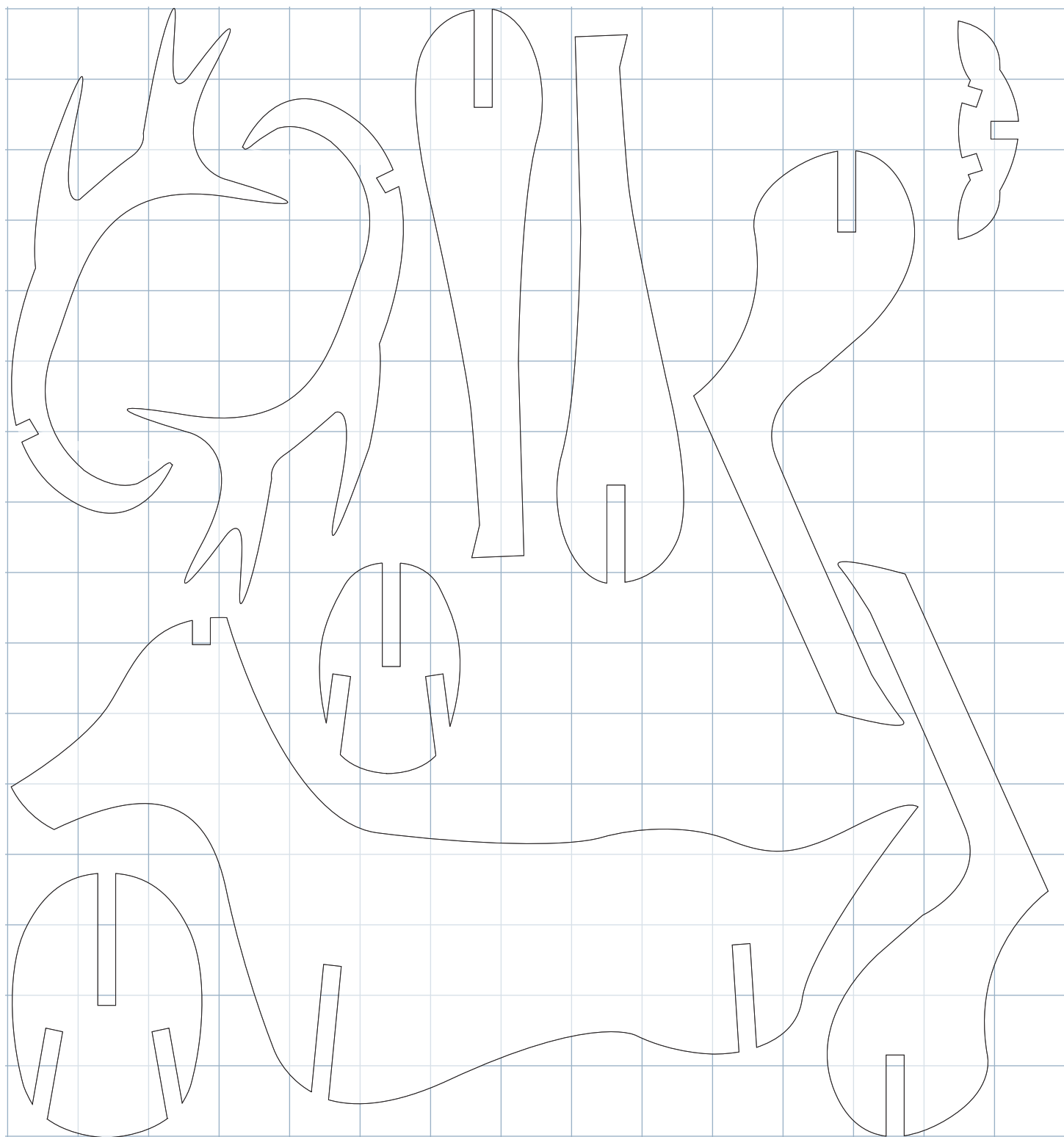


**Leave a handle.** Make all the pieces from  $\frac{1}{8}$ " plywood. When cutting small parts such as the ears, leave them attached to a longer handle to keep your fingers safe.



**Finesse the fit.** If your pieces are hard to slide together, adhere sandpaper to a thin stick with double-faced tape and sand the insides of the notches to widen them. ■





1 square=1/2"



## Order of Work

- Adhere patterns to plywood
- Cut to shape
- Sand and finish
- Assemble and go down in history



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# SECONDARY WOODS

*Quiet woods that get the job done*

By Ken Burton

Since the earliest days of furniture-making, woodworkers have saved their premium stock for where it counts—drawer fronts, face frames, tabletops—relegating less expensive material to the hidden parts of their work—drawer sides, case backs, and web frame members, for example. This lesser but no less crucial

material has become known as “secondary” wood. Depending on your locale, nearly any type of wood might be considered secondary, provided it is plentiful enough and relatively inexpensive. But across the country, three species usually are tapped for these purposes: pine, poplar, and soft maple.

## Where the wood comes from

Of the nearly thirty species of *Pinus* spp. harvested throughout the United States, three are sold generically as “pine,” including eastern white pine, western white pine, and sugar pine.

The first is available nationwide, while

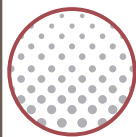
the other two are more common on the west coast. Eastern white pine grows throughout the northeastern U.S. and eastern Canada, down the Appalachian Mountains, and as far west as Michigan. Western white pine and sugar pine are found along the western slopes of the west coast mountains and into British Columbia.

What we woodworkers call “poplar” is wood from the tulip poplar tree (*Liriodendron tulipifera*), a common, rapid-growing denizen of the eastern U.S. You’ll also find the wood referred to as yellow poplar, tulip poplar, or tulipwood. From a botanical standpoint, the tree isn’t a poplar (*Populus* spp.) at all, but more closely related to the magnolia family.

Lumber sold as soft maple comes from many maple species (*Acer* spp.) that grow across the U.S. This includes red maple, silver maple, bigleaf maple, striped maple, and box elder—essentially any maple that isn’t sugar maple, which yields hard maple lumber. All of these trees are considered abundant and are species of least concern on the CITES and IUCN Red Lists.

**A whiter shade of pale.** All three of these common secondary woods are on the blonde side. Pine (top) runs to a honey yellow hue, poplar (middle) skews greenish, while soft maple (bottom) is more of a creamy white.

## Secondary Woods Quick Take



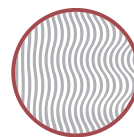
### DENSITY

|            |                       |
|------------|-----------------------|
| Pine       | 25 lbs./cu. ft.       |
| Poplar     | 29 lbs./cu ft.        |
| Soft Maple | 35 lbs./cu ft. (avg.) |



### STABILITY

|            |            |
|------------|------------|
| Pine       | Low-Medium |
| Poplar     | Low-Medium |
| Soft Maple | Low-Medium |



### TEXTURE

|            |        |
|------------|--------|
| Pine       | Medium |
| Poplar     | Medium |
| Soft Maple | Fine   |



### HARDNESS

|            |             |
|------------|-------------|
| Pine       | Soft        |
| Poplar     | Soft-Medium |
| Soft Maple | Medium-Hard |



### ROT/INSECT RESISTANCE

|            |     |
|------------|-----|
| Pine       | Low |
| Poplar     | Low |
| Soft Maple | Low |



### TOXICITY

|            |     |
|------------|-----|
| Pine       | Low |
| Poplar     | Low |
| Soft Maple | Low |



### Back-up for a pretty

**front.** With some designs, the front board of the web frames that support a piece's drawers will be exposed. Make that from your primary wood, then save money by making the rest of the frame from a secondary wood.



## History in woodworking

Of these three secondary woods, eastern white pine has the most noteworthy history. As European immigrants started colonizing what became known as New England, the British monarch laid claim to the best white pines throughout the area. The towering white pines in those virgin forests provided superior lumber for the masts and spars needed by the royal navy to maintain their dominance at sea. Certain colonists objected to these claims leading to the Pine Tree Riot of 1772, one of the events that precipitated the American Revolution. Marking the event, the first flag flown by the colonists against the British featured a pine tree in its upper corner. Beyond the politics, countless modest, early American homes were furnished with pieces nailed together from these three humble woods.

## Working and finishing

These three woods see frequent use because they are easy to work and are relatively inexpensive. They machine well, cut readily with hand tools, accept glue and finishes willingly, and hold fasteners tightly. Of the three, pine is the softest and least durable. It's also the most widely available and cheapest (\$1 to \$2 per board foot). Under a clear finish it is a honey tan color that darkens with time. It stains



well and is often one of the sample species finish manufacturers use to show off their products.

For only a little more money (\$2 to \$3 per board foot) poplar is often a better choice. It is somewhat harder and longer wearing than pine. And it is available as wide, clear boards—pine frequently contains knots every foot or so unless you pay a premium for clear stock. When freshly cut, poplar is a pale tan with a greenish cast, though some boards can be markedly green and even feature colors from purple to nearly black. Sadly, these vivid colors tend to fade to brown with time. Poplar can be stained almost any color, though

**Drawer sides, backs, and fronts?** In addition to being used where they aren't normally visible, employing secondary woods for an entire piece makes good sense when the piece is to be painted. When making drawers, be sure to match the hardness of the sides to that of the supporting web frame to prevent uneven wear.

achieving a rich red hue can be tricky due to the its greenish base coloring.

With soft maple, don't be fooled by the word "soft." This is the toughest of the three woods discussed here—and the priciest at about \$4 per board foot. While soft maple is only about half as hard as its cousin hard maple, it's approximately on par with black walnut or cherry. When I have the budget, it is my choice for drawers and web frames. Under a clear finish, maple's creamy white yellows with age. It, too, can be stained, though achieving dark colors can be difficult because its density affects stain absorption, especially with pigment stains. Best to use dyes. ■

**Shiplap instead of plywood.** Although plywood panels are usually the go-to choice for case backs these days, using ship-lapped secondary wood boards can add panache that plywood can't match.



## Secondary Wood Uses

- Drawer sides
- Paint-grade cabinetry
- Case backs
- Web frames
- Trim
- Utility shelving





## Tough towels for the shop

I first noticed these heavy-duty blue paper towels years ago in my dad's garage. He'd use them to wipe up grease and grime after working on his Harley. These days, I make sure to have a roll in my woodshop for use as general shop rags. I use them to clean up squeezeout and to wipe down projects after sanding. These tough towels work even when wet and are great for applying finish. They're lint-free and durable enough to apply smooth, consistent coats. I especially enjoy using them to apply finish to turned projects spinning on the lathe. They stand up to the friction and rip free should one catch, rather than twist up as an old t-shirt might. The rolls fit standard paper towel dispensers, and the perforated sheets are the perfect size for most tasks. You can find them as single rolls or multi-packs for a few bucks at the home center.

—Chad McClung



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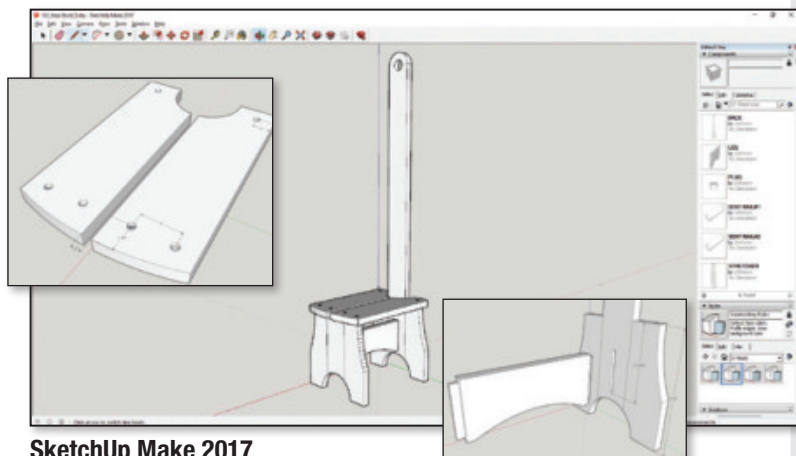
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## Step up to SketchUp

By now, most woodworkers have at least heard of SketchUp, even if they haven't tried navigating its learning curve. But the value of this 3-D modeling software is hard to overstate. I use it for almost every project, printing a SketchUp drawing to have on hand for making a cut list, jotting down planning notes, and for reference throughout a build.

I could get away with using the program only to design the basic form of a piece—nailing down balance and proportion—but why stop there? By drawing the joinery, I'm virtually building it before setting foot in the shop. Then, once I do turn on the table saw, my cuts seem familiar. Plus, labeling and dimensioning parts make me that much more intimate with the project. This upfront practice saves time and lumber and can expose potential problems before it's too late.



**SketchUp Make 2017**

<https://help.sketchup.com/en/downloading-older-versions>

SketchUp Pro is a costly \$700, so I recommend trying the free and full-featured (although no longer update-supported) SketchUp Make 2017. It can be downloaded from the link above. ■

—Chad McClung



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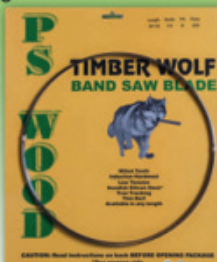
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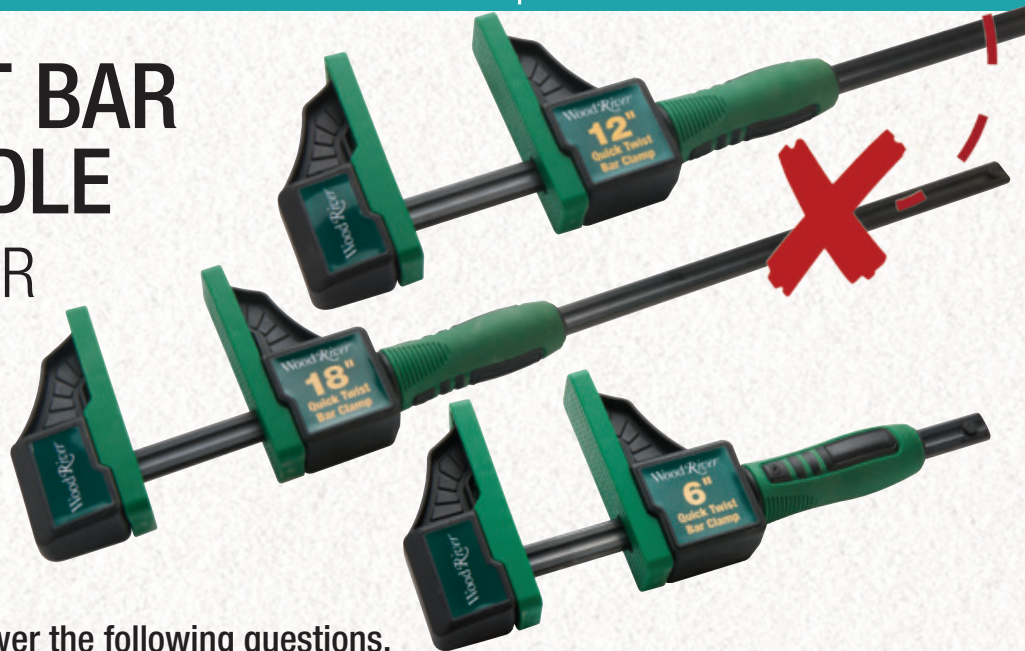
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Read this issue closely to answer the following questions.

1. What is unique about the router bit Paul Anthony recommends using to template rout the Mini Cutting Board Trio?
2. What names did Ken Burton give to his pair of scrollsawn reindeer?
3. What three species of wood are typically used as secondary wood in furniture?

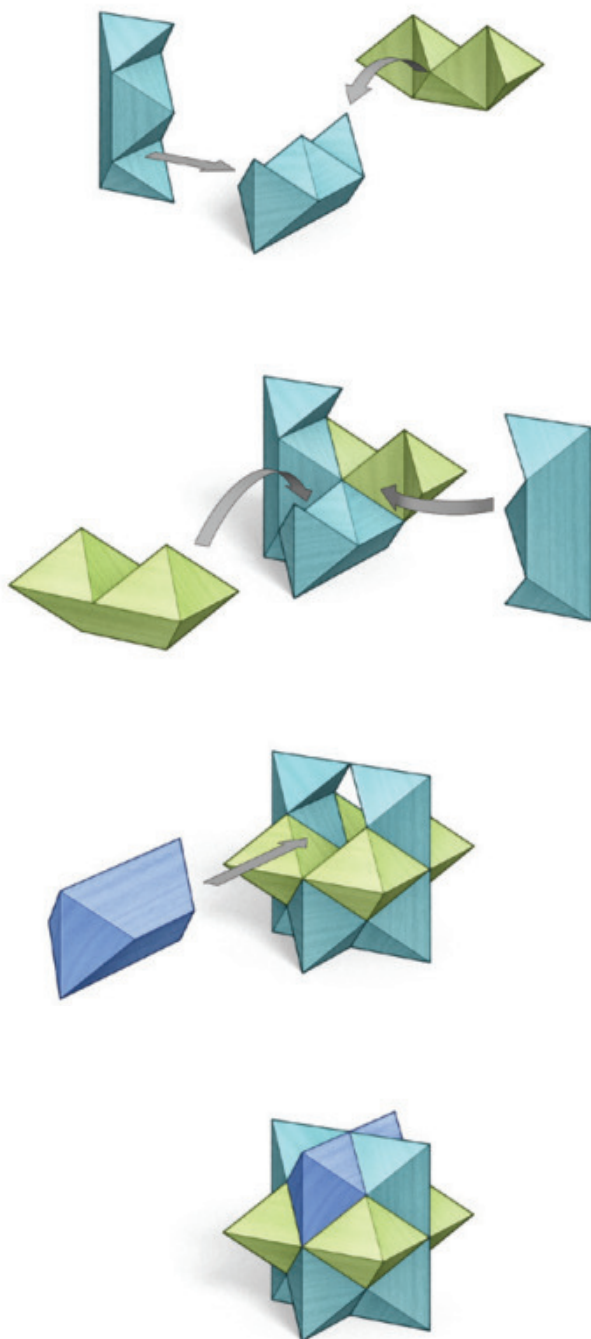
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# Six-Piece BURR PUZZLE Solution

See the project on page 47.



**onlineEXTRA**

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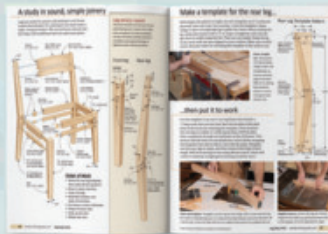
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2. Metabo 36V MultiVolt 10" Dual Bevel Sliding Miter Saw w/AC adapter ..... **\$599.00**
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4. Metabo 18V/36V MultiVolt Batter with Rapid Charger ..... **\$199.00**
5. Metabo 36V AC Adapter ..... **\$119.00**

## Mini Cutting Board Trio (p. 21)

1. Whiteside Over-Under Flush Trim Router Bit, ½" D, 1" CL, ¼" SH ..... #147970, **\$26.99**

## Drill Press Accessories (p. 27)

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## Keepsake Box (p. 32)

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2. Freud Quadra-Cut Table Edge Router Bit, ½" SH ..... #828787, **\$105.97**
3. Whiteside Carbide Spiral Upcut Bit, ¼" D, 1" CL, ¼" SH ..... #03K33, **\$20.99**
4. Fabric is available at craft supply stores for a few bucks per square yard.
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7. Watco Satin Lacquer Solvent Based Aerosol, 13 oz ..... #146950, **\$10.99**

## Turned Christmas Tree (p. 40)

1. Colored pencils, paint markers, and 18-gauge wire are all available at *michaels.com*.

## Six-piece Burr Puzzle (p. 46)

1. Wood River Low-Silhouette Toggle Clamp ..... #143938, **\$16.99**

## Great Gear (p. 56)

1. Scott Shop Towels, 3 pk. .... *homedepot.com*, **\$5.97**
2. SketchUp 2017 ..... <https://help.sketchup.com/en/downloading-older-versions>, **Free**

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### Panel construction: Rings up or rings down?

**Q:** *I've seen conflicting advice regarding how to orient the annular rings on boards when edge-gluing them to make up wide panels. Should I alternate the direction of the rings or keep them all oriented the same way?*

**Kirby Hastings**  
Kansas City, MO

A panel with all annular rings oriented the same way will tend to cup in a single curve.

A panel with the annular rings alternated will tend to be wavy.



**A:** This debate goes back to the days when woodworkers had wider, but inconsistently dried stock to work with. Flat-sawn boards tend to cup opposite the orientation of their annular growth rings. So if all the rings of the boards that make up a panel are oriented in the same direction, the panel will tend to curl like a potato chip as it adjusts to its environment. This tendency can be overcome by fastening the panel to an apron, adding breadboard ends, or trapping it within a frame.

If the rings in the boards are alternated, the panel will tend to develop waves, or ripples across its surface. But overall, the panel will remain flatter. I take this approach when making unsupported panels such as table leaves, using riftsawn or quartersawn stock if possible for best stability.

For panels that will be supported in some manner, I simply arrange the boards for the best face grain match, and ignore the annular ring orientation. ■



**Ken Burton**  
Senior Editor,  
Woodcraft Magazine

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